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SEALBHÚ NA GAEILGE AG NAÍONÁIN: EARLY LANGUAGE ACQUISTION OF IRISH

By

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BSc. (Hons) Clinical Speech and Language Studies
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A dissertation submitted to the College of Medicine and Health in partial fulfilment of the requirements for the degree of Degree of Doctor of Philosophy in Speech and Hearing Sciences

National University of Ireland, Cork

To

Prof Fiona Gibbon
(Head of Department, Department of Speech and Hearing Sciences)

&
Prof Paul J Fletcher
(Doctoral supervisor, Department of Speech and Hearing Sciences)

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- The Irish language officers of the Health Service Executive who provided me with a grant to help with the completion of the study
- To all my family and friends for supporting me throughout this process

DECLARATION

I hereby certify that the thesis I am presenting for examination for the degree
Doctor of Philosophy in Speech and Hearing Sciences
In
The Department of Speech and Hearing Sciences,
College of Medicine and Health,
National University of Ireland, Cork
is solely my own work,
other than where I have clearly indicated that it is the work of others
I consider the work to be a complete thesis fit for examination

Signed_____ Date_____

ABSTRACT

Speech and language therapy (SLT) services are coming under increased pressure to provide people living in linguistic minority communities with assessment and intervention in the language of the community in which the client lives. In Ireland, Irish, although a minority language, enjoys a positive attitude and a high status as the first official language of Ireland. However, there is little known about Irish language acquisition in typically developing children, let alone assessment or developmental pathways for speech and language therapists to work with. Furthermore, the study of Irish can make a valuable contribution to cross-linguistic research as it has structures which are very different to English such as a VSO word order, and complex morphophonological inflections in its initial mutations.

This study adapted a well-known research tool, the MacArthur-Bates Communicative Development Inventories, to Irish in order to measure vocabulary and grammatical development longitudinally for twenty-one children aged between 16 and 40 months. Results from the parent-checklists were validated against spontaneous language samples and elicitation tasks, and compared to crosslinguistic studies of early language development. The analysis explored theoretical questions such as whether there is a 'noun advantage' in Irish, how grammar is acquired, and the nature of the relationship between the lexicon and grammar. In addition, other theoretical aspects such as the effect of gender, birth order and maternal education on early language milestones were investigated. The findings indicate that Irish-speaking children develop vocabulary at a relatively similar rate to other children but the content of their vocabulary is somewhat different, with a relative advantage in grammatical words once they have 400 words in their vocabulary. On the other hand, many inflectional morphemes are acquired relatively late, and this is largely due to their relative complexity. The outcomes of this study not only give SLTs a descriptive framework of the development of vocabulary and grammar in Irish but also contribute to the body of cross linguistic research.

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1 INTRODUCTION

1.1 Background to the current study

Acquiring language is one of the primary tasks of toddlerhood, making this period the optimum time for studying language development. At about 12 months children conceptualise abstract relations between symbols and their real-world referents as is evidenced by their first expressive words, and from this point language rapidly emerges as the significant mode of communication (Bornstein & Haynes, 1998). Some of the key features of language development over this period that have been studied to date include the considerable variability in the age at which language milestones are reached; the nature of the relationship between language subsystems; gender, birth order and socioeconomic influences on language acquisition, as well as the variation across language types and cultures (Fenson et al., 1994). Observing how language develops across different languages remains one of the key methods of investigating theories of linguistic evolution and acquisition and psycholinguistic theories of the balance of competencies that relate to human languages (Slobin, 2002). Furthermore, Dale and Goodman (2005) highlight that information about the nature, time course and stability of the acquisition of different languages is essential, not only for examining crosslinguistic differences and theories on language acquisition, but also for the identification and remediation of language disorders.

In recent years crosslinguistic studies have used similar methodologies in order to compare and contrast aspects of language acquisition which can be considered 'universal' and those that are language-specific. Regardless of the language under study, broad similarities in language milestones have been noted. These include the observation that children start with babbling from about 6 months; demonstrate comprehension around nine-months and move to 'first words' (especially for people and objects) around 12-months. This is followed by a slow accumulation of words and then a sharp acceleration in lexical acquisition around 16-18 months. Between 18 and 20 months children move to a period of two word combinations, albeit with limited morphosyntactic marking, and by

three years most children have mastered the basic morphological and syntactic structures of the input language (Fenson et al., 1994). Those that argue that language acquisition is universal hold that it is aided by a presumably innate set of constraints or commands to direct the child to attend to certain aspects of the input such as 'the ends of words' or to 'avoid discontinuous element' (Slobin, 2002). However, in as much as these universals have been found, there have also been reports of large variations and individual differences in the rate of language development both across and within different languages. Dale and Goodman (2005) hold that this enormous variability is itself a universal feature of language acquisition within a language. In addition, international research has taught us that the onset and growth of inflectional morphology can vary markedly from one language to another, starting as early as the one-word stage in some richly inflected languages (Slobin, 1985). Furthermore, the appearance of complex syntactic structures has been found to be related to the frequency of the adult-input language. Thus passives appear as early as two-years in Sesotho, a language rich in passives whereas the frequency of relative clauses in the Italian language is reflected in the speech of Italian children at three years (Caselli et al, 1995).

One method of observing early language development across languages which enables the collection of rich data from large population studies is through parent report measures. One of the most widely used assessments is the MacArthur-Bates CDI (MCDI; (Fenson et al., 1993; Fenson et al., 2007) and numerous studies have shown it to be an effective and efficient tool for assessing early language development, providing a rapid overall evaluation that can serve both screening and research purposes. Moreover, as the MCDI has now been adapted to over 40 languages (Bleses et al., 2008) comparative crosslinguistic research is now possible. Adapting the instrument to a lesser-known, minority language which has unique and interesting linguistic features makes for fascinating comparisons. This study describes the adaptation of the MCDI to Irish, a minority language of Ireland, and how it was validated longitudinally on a sample of children between the ages of 16 and 40 months. This chapter describes the current status of the Irish language in Ireland, the linguistic structure of Irish and the motivation for developing an assessment tool for the language. The following chapters outline the adaptation of the MCDI to Irish, pilot testing of the tool and validity and reliability

measures, before describing the main features of vocabulary and grammatical development and their relationship, as captured by the instrument. All of the above aspects are explored in relation to the current crosslinguistic literature and wider theoretical issues on language acquisition.

1.2 The Status of Irish and the Irish speaking community

1.2.1 Historical Background

Irish belongs to the Celtic branch of the Indo-European languages and is thought to have been introduced by the invading Gaels in about 300 BC (Ó' Siadhail, 1989). Subsequently this 'Gaelic' language extended to Scotland and the Isle of Man and now the term 'Gaelic' may be used to encompass all three languages. Up until the 16th century, Irish was the most common language in Ireland (with a population of approximately 8 million speakers at the time), however following the suppression of the Irish aristocracy and the social and literacy influences of the English colonists in the 17th century, English began to dominate (Ó' Siadhail, 1989).The decline of Irish was further increased by The Great Famine (1846-48) which lead to death and subsequent emigration of the poorer rural classes, particularly from regions officially recognised for having Irish as the majority language, known as the 'Gaeltacht'. With the increase in prestige gained by English due to its association with prosperity, employment and progress and the perceived association between the Irish language and poverty and economic deprivation, the growth of the English language after 1800 was rapid (Ureland, 1988). This was amplified by the establishment of English-based primary schools in 1831, where Irish was excluded from the curriculum, even banned as a means of instruction for children who had no English. Therefore by 1900, 90% of the population spoke only English, and the remaining 10% were bilingual.

Following this extensive period of Irish-language decline came the revival of nationalism and with that, the Irish language. The Gaelic League, an organisation formed in 1893 by Douglas Hyde (an Irish scholar who later went on to become the president of Ireland) began defending the language and aimed to promote the language and culture of

Ireland, particularly for those for bilingual speakers of the Gaeltacht. Through political lobbying the League was responsible for the introduction of Irish into the primary school system, with five to six hours or Irish instruction per week. The establishment of the Irish Free State in 1922 saw Irish being recognised as the first official language of the state, and all aspects of administration were handled bilingually (Purdon, 1990). Subsequently, the government of the time set up the Gaeltacht Commission of Irish (1926), which assessed the attitudes of people in Gaeltacht regions towards the language and defined the boundaries and economic capabilities of these Irish-speaking districts (Ó' Laoire, 2004). The definition of these regions at the time was that Irish was the language of the community and spoken by more than 25% of the population. Figure 1.1 below contains a current map of these regions (highlighted in green).

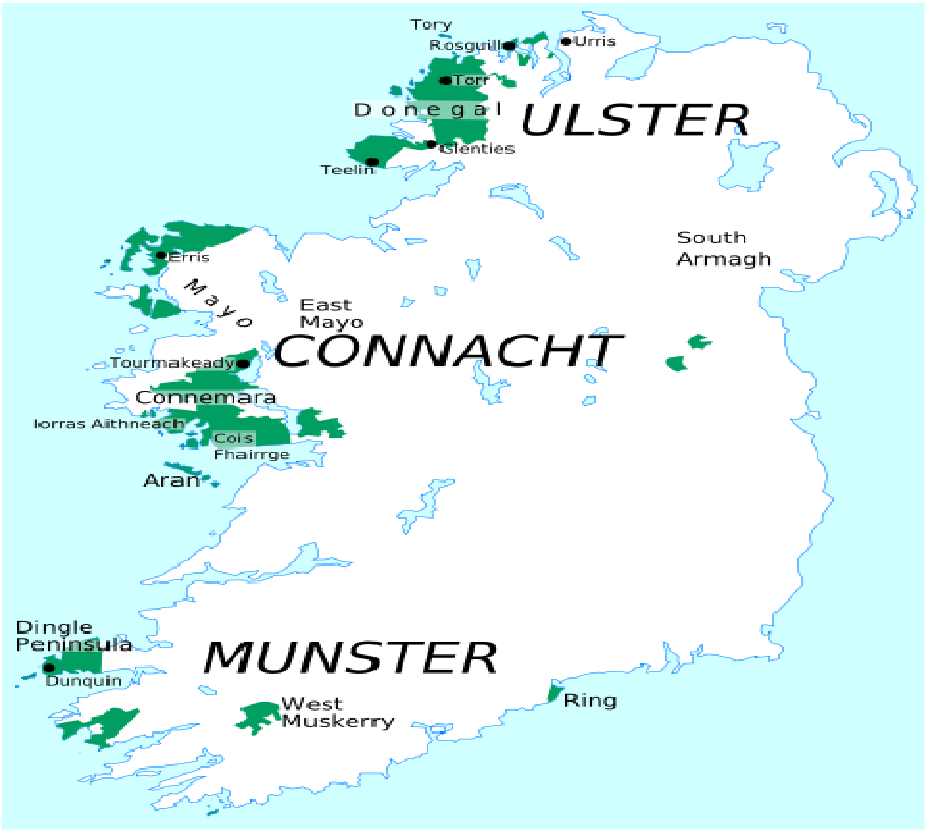


Figure 1.1 Gaeltacht Regions of Ireland

Source: Údarás na Gaeltachta (www.udaras.ie)

As part of the language- revival, Irish was gradually introduced as part of the curriculum in primary and secondary schools, Irish-immersion schools were established

and Irish was the medium of instruction in schools within the Gaeltacht regions. In 1928 Irish was introduced as a compulsory subject of the Intermediate Certificate and the Leaving Certificate in 1934 (remaining so until 1973). Teachers were provided with Irish language skills and standards of competencies in Irish were set for entry into the civil service (Ó' Riagáin, 1997). Despite this attempt at revival, the number of native speakers continued to decline and fell from 200,000 to 100,000 between 1922 and 1939. The peak in Irish-medium education of the 1930s also started to fall rapidly during the 1960s, with a decrease from 420 primary schools in 1961, to just 160 in 1979 (Titley, 2004). This was largely linked to a report which found that pupils educated through the medium of a 2nd language were 'backward' in basic skills (Owens, 1992). Although this was later refuted, the decline of Irish once again became associated with economic deprivation and resulted in extensive emigration among the largely farming industry-based Gaeltacht areas at this time. This led to the establishment of state agencies in the 1980s and 90s in order to preserve the language by focusing on industrial development and increasing non-agricultural employment in Gaeltacht regions.

1.2.2 Government Bodies

The Department of Community, Rural & Gaeltacht Affairs, under the leadership of a cabinet minister, is responsible for the Irish government policy with respect to the Gaeltacht. In 1980 the department set up the local authority 'Údarás na Gaeltachta' to promote business, industry and community development through the language of Irish. 'Bord na Gaeilge', *The Irish Language Board*, was also founded in the 1970s as the state body responsible for coordinating the work of all Irish-language agencies and for the promotion of Irish as an everyday community language. Following the Good Friday agreement of 1999, this agency became the all-island body 'Foras na Gaeilge' which now also presides over 'An Gúm', a government-supported Irish-language publisher, and 'An Coiste Téarmaíochta', *The Terminology Committee* which is responsible for updating the language with new terminology (Ní Chartúir, 2002). Foras na Gaeilge also supports 'Gaelscoileanna' an organisation which supports schools where instruction is through the medium of Irish. The Irish government also provides supports to Irish-language radio stations (Raidió na Gaeltachta & Raidió na Life) and an increasingly popular and

contemporary television station (TG4) which broadcasts through the medium of Irish. In addition, there are daily ('Lá') and weekly ('Foinse') Irish language newspapers with circulation figures of 5,000 and 7,000 respectively (Foras na Gaeilge, nd), an on-line Irish language newspaper 'Beo!' and English- language newspapers such as *The Irish Times* are also publishing material in Irish. All of these aspects have helped promote Irish as a living, modern language.

Perhaps the most significant development in the promotion of the language however has been the legislation that provides a statutory framework for the provision of public services through Irish. This has been achieved through the European Charter for Regional or Minority Languages (1992) in Northern Ireland and the Official Languages Act (2003) in the south of Ireland (Foras na Gaeilge, nd). These pieces of legislation make the provision for correspondence to be replied to in the language in which it was written, for information to be provided to the public in the Irish language or bilingually, for key documents to be published bilingually and ensures the use of Irish in the courts (Department of Community Rural and Gaeltacht Affairs, 2003). Within the Official Language Act was also the establishment of an ombudsman to supervise and monitor the act, know as the 'Coimisinéir Teanga', *Language Commissioner*. The Coimisinéir has the power to investigate complaints and take legal action against public bodies that are not cooperating with the Act. Moreover, the decline in the status of the Irish language in the 1960's and 1970's meant that when Ireland joined the European Economic Community in 1973, Irish was not requested to be made on official language (Titley, 2004). However, following recent negotiations with the European Union, Irish was made an official language of the European Union (EU) in January 2007.

1.2.3 Contemporary Irish speakers and the Gaeltacht

Brennan (2004) holds that although there are few negative associations with Irish, in practice it is dying as a living community language, nowadays only spoken in rural Gaeltacht areas. As outlined in Figure 1.1, the current Gaeltacht areas are mostly in the western counties of Kerry, Clare, Galway, Mayo and Donegal. They also include parts of Cork, Waterford and Meath. Stenson, (1993) reported that virtually everyone in the

Gaeltacht is bilingual to some degree, and many actively use English on a regular basis in their work and social interactions, even where Irish remains the preferred language among family and friends. Furthermore, a recent survey on the use of Irish in the Gaeltacht indicated that young people in this area had a strong attachment to the language, although their use of Irish with peers was low (Department of Community Rural and Gaeltacht Affairs, 2007). The most recent census of 2006 revealed that about 2% of the population or 89,260 people aged over 3 years live in the officially-defined Gaeltacht areas, with 71.4% claiming to be Irish-speaking. However closer inspection of the figures indicates that many children speak Irish only within education. For example of the 1,213 Irish speakers aged 3-4 years in the Gaeltacht, only 178 of these also speak Irish outside of education. One measure that is often used as a yardstick as to the current status of Irish in Gaeltacht regions is 'Scéim Labhairt na Gaeilge' *The Spoken Irish Language Scheme*, (Department of Community Rural and Gaeltacht Affairs, nd). Under this Scheme, the government pays a grant of €260 per year to households in the Gaeltacht with school-aged children (aged 5 years and over), who demonstrate that Irish is their normal spoken language. Taking into consideration that not all households want to take part in the scheme and that some may receive the grant even though they don't speak Irish at home, the most recent figures available (from 2006/7) revealed that more than a fifth of households in the official Gaeltacht regions are not receiving the full grant. These are areas where 21% of the school-going children of the Gaeltacht live and therefore may be at risk from losing their status as official Gaeltacht areas. According to these statistics, 'Ceantar na nOileán' in east Connemara is the strongest Gaeltacht in the country and some of the most historical Gaeltacht areas including the Aran Islands, Gweedore in Donegal and Kerry have a decline in the amount of households receiving the grant. On the other hand, some areas which had been in decline over the last 10 years, were found to have an increase in the amount of households speaking Irish, and include Ring in Co. Waterford, where figures rose from 24 households in 2006 to 38 in 2007 (Gaelport, November, 2007).

Interest in the Irish language outside of the Gaeltacht is growing and figures indicate that about 2% of this population are speaking Irish at home as their everyday language (Ó' Dochartaigh, 2006). Combined with the figures from the Gaeltacht, this

indicates that almost 4% of the population is acquiring Irish as their first language or at least bilingually. Much like the situation in Wales (Rees & Munro, 2005), issues such as language mixing and attitudinal dimensions are also pertinent to Irish. However, the situation in Ireland is different as although a minority language, the attitudes to Irish are largely positive attitude and it has high status the first official language in Ireland (Kallen & Smith, 1992). Moreover, because of the growth in immersion education (Irish-medium schools 'Gaelscoileanna'), and new 'urban-Gaeltacht' areas of Belfast, Derry and Dublin (Foras na Gaeilge, nd) children can receive their education and engage in extra-curricular activities through Irish. In 1975 there were 14 Irish-medium schools, however by September 2007, there were 166 gaelscoileanna at primary level and 42 at post-primary level throughout the 32 counties, with approximately 35,000 pupils attending these schools, (Gaelport, November, 2007). This upsurge was thought to be due to dissatisfaction with the level of competency in Irish achieved in ordinary schools, a drive to hold on to national culture, and as an alternative to church-controlled schools (Owens, 1992). There has also been considerable growth in Irish-medium preschools ('naíonraí') around the country and at the other end, students can study in Irish for courses at University level, including law and engineering. The 2006 census confirmed the increase in Irish speakers when it reported that 1.66 million people, (almost 41% of adults) throughout Ireland claimed to be able to speak Irish, although less than one-quarter of these would do so at least once a day (Central Statistics Office, 2007). In addition, about 11% of the population of Northern Ireland also claims to have knowledge of the language. Finally, recent increases in immigration have introduced the concept of a multilingual society, while also exposing new people to the culture, language and traditions of Ireland. A group of immigrants have set up an organization called 'iMEASC' *integrate,* aiming to encourage other immigrants to learn the language and embrace Irish culture (Foras na Gaeilge, ND).

It is within the current climate of change in the legal status of Irish and the rights of the remaining population who continue to speak the language, that the importance of investigating the acquisition of the language is considered.

1.3 Introduction to Modern Irish

Developing a tool to examine the acquisition of the major features of the Irish language first requires a review of the major linguistic features. These will now be outlined in so far as is relevant to the age group in the study (16-40 months). In orthography it should be mentioned that simple spelling rules exist whereby slender consonants (also known as palatalised consonants as outlined below) always have the vowels e and i next to them, and likewise broad or labio-velarised consonants always have the vowels a, o and u on either side of them. This is captured in the rule 'caol le caol, leathan le leathan' lit: *slender with slender, broad with broad.* Other orthographic rules which give an indication of the phonetic form of the lexical item include the addition of a 'h' following the initial phoneme to indicate lenition, or addition of a consonant (generally, b, d, g, m, n and 'bh') before the initial phoneme/grapheme of a word to indicate eclipses. These orthographic rules may help with understanding the morphological rules below, although phonetic transcription is also provided to highlight certain features where relevant. During the 1950s and 1960s a standardised form of Irish, known as the 'An Caighdeán Oifigiúil' *The Official Standard* was developed. It combines elements from the three major dialects and is the form of the language taught in most schools. Although the general grammatical rules and vocabulary are broadly similar across dialects, differences may occur in the way they are employed, particularly among native speakers. Ó' Siadhail (1989) provides a comprehensive summary of the major features of modern Irish from the three main dialects of Donegal, Connacht and Munster. For the purposes of this study, the Munster dialect will be focused on, although the general features of Irish will also be taken into account.

Irish has a basic word order of Verb-Subject-Object (VSO), followed by an extension (generally adverbial). Irish is a VSO language 'par excellence' as all (apart from one) of Greenberg's universals concerning VSO language are supported (McCloskey, 2008). These include that the genitive almost always follows the governing noun, that interrogatives are always found in sentence-initial position, that an inflected auxiliary always precedes the main verb, prepositions mark case relations and that all noun modifiers (adjectives, demonstratives and relative clauses) come after the head

noun. However, unlike the other universals for VSO languages, there is no alternative basic SVO order in Irish. Although exceptions occur, (e.g. subjects precede the verb in clefted sentences and negatives or question markers precede main verbs) these could not be considered alternative word orders, (Hickey, 1990a). Thus the main word order occurs in the following sequence (Mac Murchaidh, 2004).

1. preverbal particle
2. verb
3. subject
4. direct object or predicate
5. adjective
6. indirect object
7. location descriptor
8. manner descriptor
9. time descriptor

Only the verb and subject are obligatory in sentences, except in synthetic verb forms, where the subject is marked by a person suffix on the verb, making even single-word sentences possible– 'tuigim', *I understand*. This is known as synthetic verb + person marking and is widespread in the Munster dialect (Ó' Sé, 1991).

1.3.1 Morphology and Major Lexical Categories

Ó' Siadhail (1989) describes how the phonology and morphology of modern Irish are intrinsically connected and inflection occurs on nouns, adjectives, verbs, pronouns and prepositions. The main feature of the phonological system is that all consonants come in broad/palatalised and slender/labio-velarised versions. This means that although the phonemes have the same lip position (e.g. bilabial) the labio-velarised versions are where the tongue base is in the pharynx during articulation, and the palatalised consonants are where the tongue base is more anterior, towards the palate. This contrast also occurs in some vowels.

Labio-velarised ('broad')	*Palatalised ('slender')*
bó /boː/ (cow)	beó /bʲoː/ (alive)
cairt /kaɹt/ (cart)	ceart /kʲaɹt/ (right)
at /ɑt̪/ (swelling)	ait /ɑtʲ/ (strange)
uan /uən/ (lamb)	uain /uənʲ/ (lambs)

There are certain morphological rules which apply equally to verbs, nouns, adjectives and prepositional pronouns which have final consonants. These are that either the quality of that consonant is changed (replaced by slender ('palatalised') or broad ('velarised') counterpart; e.g. 'buail' /buəlʲ/ *hit*; 'ag bualadh' /əʔ buələ/ *hitting*); or an extra vowel is added ('cóta' /koːt̪ə/ *coat*; cótaí /koːt̪i/ *coats*), thereby increasing the number of syllables. However, Ó' Siadhail (1989) holds that overall, the verb is far more predictable in terms of its phonetic shape and grammatical function. In some respects, the morphological rules are governed by the phonology and not directly connected with the syntactic structure, although grammatical and lexical considerations do come into play. Many new suffixes have developed in the spoken language, which are not reflected in previous dictionaries and more than likely are due to the close contact of Irish with English (Doyle, 1996). Before outlining these aspects and the major lexical categories of Irish, the morphophonolgical system of initial mutations will be discussed, as it features in many of the morphological rules described hereafter.

1.3.2 Initial Mutations

One of the distinctive features of Irish (and all Celtic languages) is its initial mutations which cause the initial consonant of a word to undergo phonological change under specific morphological and syntactic conditions. The mutations of Irish involve replacing consonants with their fricative counterparts (lenition), or their nasalized/voiced counterparts (eclipsis). There are also initial mutations that prefix 'h'or 't' to vowel or 't' to words beginning in 's' when preceded by the definite article 'an' *the* as outlined below.

Mutation	Radical	Mutated
Lenition	bó /boː/ (*cow*)	an bhó /ən voː/ (*the cow*)
Eclipsis	bosca /bʌskə/ (*box*)	I mbosca /ɪ mʌskə/ (*in (a) box*)
Eclipsis	áit /ɔɪtʲ/ (*place*)	I n-áit /ɪ nɔɪtʲ/ (*in (a) place*)
Initial h-	athair /ahɪɻ̊/ (*father*)	a hathair /a hahɪɻ̊/ (*her father*)
Initial t-to vowel	úll /uːlʲ/ (*apple*)	an t-úll /ən tuːlʲ/ (*the apple*)
Initial t- to s-	súil /suːlʲ/ (*eye*)	an t-súil /ən tuːlʲ/ (*the eye*)

Lenition:

Ó' Siadhail (1989) describes how the phonetic mutation of lenition ('séimhiú') involves a loss of tension which changes stops into fricatives and is shown in orthography by adding a 'h'. The phonetic effect of lenition includes the following:

1. A stop becomes a fricative (voicing and place of articulation retained, apart from dentals, which become velar fricatives or palatal glides).

   /p/ → /f/ /k/ → /x/ /g/→ /ɣ/

   /t/ → /h/ /d/ → /ɣ/ or /j/ /b/ → /v/

2. /m/ becomes /w/ or /v/ (depending on dialect and secondary articulation)
3. /s/ becomes /h/; but /s/ + plosive and /sm/ do not mutate
4. /f/ is deleted

Although it is beyond the scope of this summary to give a list of all the circumstances where lenition and its exceptions occur, it is possible to give a general overview. Ó' Siadhail (1989) divides them into proclitics (which lenite a following verbal noun or adjective); compounds and attributive combinations. Proclitics cause lenition in the following environments:

- *After the definite article 'an'* - usually on feminine nouns; e.g. 'bean' /ban/ *woman*; 'an bhean' /ən van/
- *After the vocative particle 'a';* e.g. 'Máire' /məɪi̯ə/ 'a Mháire!' /a vɔi̯ə/ *Máire!*
- *After possessive pronouns* 'mo', *my*; 'do', *your*; 'a', *his*; e.g. 'teach' /tʲɑx/ *house*; 'do theach' /dʌ hɑx/ *your house*
- *After most simple prepositions*-; e.g. 'duine', /d̪ɪnə/ *person*; 'mar dhuine' /mɑɹ ɣɪnə/ *as a person*
- *A verb in the past tense, imperfect or conditional*: e.g. 'bris' /bɾɪʃ/ *break*; 'bhris mé' /vɾɪʃ meː/ *I broke*)
- *After the past/conditional of the copula*- 'deas' /das/ *nice*, 'ba dheas uait é' /bə jas uɪt ɛː/, *that was nice of you*
- *After negatives, question particles and complementizers in the past tense*- 'sagart' /sɑgəɹt̪/ *priest*; 'ar shagart é?' /əɹ hɑgəɹt̪ ɛː/ *was he a priest?*

- *After certain preverbal particles*- ‘tuigim’ /t̪ɪgəm/ I understand; ‘ní thuigim’ /ni hɪgəm/ *I don’t understand*)

Compounds cause lenition in the following environments:

- *After adjective + noun compounds*- ‘sean’ /ʃan/ *old* + ‘bean’ /ban/ *woman* = ‘seanbhean’ /ʃanvan/ *old woman*
- *After prefixes* ‘an’ *very*, ‘ró’ *too*, ‘mí’, *dis*- and ‘idir’ *inter*- e.g. ‘sásta’ /sɔsṯə/ *happy*; ‘míshásta’ /mihɔsṯə/ *unhappy*
- *On the second noun of a compound noun construction*- ‘ainm’, /anəm/ *name* + ‘focal’, /fʌkəl/ *word* = ainmfhocal /anɪmʌkəl/ *noun* (f-deletion)

Attributive combinations cause lenition in the following environments:

- *Numbers* 1-6- ‘bó’ /boː/ *cow*; ‘aon bhó amháin’ /ɛn voː awɔnʲ/ *one cow*
- *Genitive nouns in certain circumstances*- ‘báistí’ /bɔɪʃti/ *rainy* following feminine singular noun ‘aimsir’ *weather,* becomes ‘aimsir bháistí’ /ɑimʃəɹ ṿɔɪʃti/ *rainy weather)*
- *Postponed adjective in certain circumstances*- usually feminine e.g. ‘maith’ /mɑ/ *good*, ‘bean mhaith’, /ban vɑ/ *a good woman*)

Eclipsis

Eclipsis, (urú) causes the voicing of voiceless stops and the nasalisation of voiced stops and is symbolised in orthography by placing the letter of the new sound in front of certain consonants. Examples include:

Base	*Eclipsed*	*Gloss*
peann /pʲaun/	bpeann /bʲaun/	pen
teanga /tʲaŋə/	dteanga /dʲaŋə/	tongue
ceann /kʲaun/	gceann /gʲaun/	head
bean /baṇ/	mbean /maṇ/	woman
droim /dɾɪm/	ndroim /nɾɪm/	back

Base	*Eclipsed*	*Gloss*
glúin /gluːən/	nglúin /ŋluːən/	knee
freagra /fɾagɾə/	bhfreagra /vɾagɾə/	answer
éan /eːn/	n-éan /nʲeːn/	bird
oíche /iːhə/	n-oíche /nʲiːhə/	night

Ó' Siadhail (1989) states that eclipsis has more limited and specialised grammatical functions than lenition and it is always triggered by either proclitics or numerals. Eclipsis occurs in the following environments:

1. *After plural possessive pronouns:* 'ár', *our;* 'bhur', *your* and 'a', *their*; e.g. 'cairde' /kɑɪɹdə/ *friend*; 'ár gcairde' /ɑɹʲ gɑɪɹdə/ *our friends*
2. *After numbers 7-10* - 'asal' /ɑsəl/ *donkey*; 'seacht n-asal' /ʃaxt nɑsəl/ *seven donkeys*
3. *After the preposition* 'i', *in*- 'teach' /tɑx/, *house* becomes 'i dteach' /ɪ dɑx/ *in (a) house*
4. *Following phrases involving the definite article + prepositions* (e.g. 'fear' /fœ̯ɹ/ *man*; 'ag an bhfear' /əg ə vœ̯ɹ/ *by the man*)
5. *After certain preverbal particles* (e.g. relative particle 'go' *that*; 'dá' *if* and *yes/no* question particle 'an'). For example, 'beadh' /bʲʌx/ *would be*; 'dá mbeadh' /dɔ mʲʌx/ *If (it) would be.*

Some of the major lexical categories of Irish will now be outlined.

1.3.3 The Article

The singular definite article in the nominative case is 'an', *the* and there is no indefinite article, rather this is indicated by the absence of 'an'. When a noun is preceded by the definite article, its phonological shape changes according to its gender and phonological make up (discussed under 'lenition' above). 'Na' is the plural form of 'an' in all cases (although is also used for the genitive singular case) and requires the placement of a 'h' /h/ before nouns beginning with a vowel; for example, 'eitleán' *plane*,

'na heitleáin', *the planes*. It is only after the plural definite article that noun plurals are used, while the singular form is generally used following numerals.

1.3.4 Preverbal Particles

Irish uses a number of preverbal negative and interrogative particles. For example, negation is expressed as a clause-initial particle attached to the main verb (Acquaviva, 1996). Negative particles (roughly meaning *not*) include negative forms of the copula, 'ní' (+lenition) which is used for present and future tenses and the conditional mood (and before irregular verbs in the past tense), 'níor' for (regular) simple past, and 'ná' *don't* for the negative imperative. The negative particle also combines with the substantive verbs 'tá' (*to-be*, present) and 'bhí' (*to-be*, past) to produce 'níl' and 'ní raibh' respectively (Owens, 1992). Interrogative particles are also placed before the verb in a positive declarative statement to form yes/no questions. In the present and future tense 'an?' *is?* is placed before the verb and 'ar?' *did?* in the past tense. Irish also has negative interrogative particles such as 'nach?' *didn't*? in the present, future and conditional, and 'nár' ('ná' in Munster) in the past. It should be noted that Irish does not have the equivalent of English 'yes' and 'no' as answers to questions. Instead in responses to questions, the verb of the question is either repeated or negated. However there is an increase among bilingual speakers in the use of the loan words *yea* and 'neó' *no*. Finally, 'Wh' interrogative particles (referred to as 'C'- questions in Irish) include 'cá?' *where?* 'cad/céard?' *what*? 'cathain?' *when*?; 'cé?' *who*? and 'conas?' *how*?

1.3.5 Nouns

All nouns in Irish are either masculine or feminine, may be singular or plural and may assume different cases (nominative/accusative, genitive, dative & vocative) as outlined below. There is generally a close correspondence between word endings and the gender of the noun- that is words ending in broad consonants are masculine and those ending in slender consonants are feminine, although exceptions to both exist (Ó' Siadhail, 1989). Noun inflection for plural and verbal noun (progressive) marking are complex and

largely irregular, although there are certain patterns of predictability, as will be outlined below.

Noun case

Irish has four cases: nominative, (for the subject of a sentence: 'tá an cat ag ól'- *the cat is drinking*); vocative (used when addressing someone -'Mairéad' /mɔɾeɪd̪/ becomes 'A Mhairéad!' /ə vɔɹeɪd̪/); genitive (the subject of possession: 'bean' *woman* - 'teach na mná' *the woman's house*) and dative. The dative doesn't actually have a distinctive form from the nominative (unless eclipsis applies) and is used as the object of most simple prepositions: e.g. 'teach' /tɑx/ *house* 'as an teach'/əs ə dɑx/- *out of the house*, which although does not result in eclipsis in the orthography, does in the Munster dialectal pronunciation (Mac Murchaidh, 2004).

Declensions

For descriptive purposes, nouns and adjectives are usually divided into declensions which describe the rules and exceptions associated with particular groups. There are five recognised noun declensions in Irish (the first four are also similar to the adjectival declensions). Words are divided into declensions in a relatively complex fashion, depending on the gender of the noun, the formation of the genitive and the relation between the genitive and the plural nominative. There are exceptions to every declension but in general, they are outlined in Table 1.1 below:

Table 1:1: Noun Declensions in Irish

	Nominative singular ends with:	**Genitive singular ends with:**	**Gender**
First declension	Broad consonant	Slender consonant	Masculine
Second declension	Broad or slender consonant	-e/- í	Feminine
Third declension	Broad or slender consonant	-a	Masculine or Feminine
Fourth declension	Vowel or –ín	(no change)	Masculine or Feminine
Fifth declension	Vowel or slender consonant	Broad consonant	Mostly feminine

(Ní Chartúir, 2002)

Noun plurals

The formation of noun plurals in Irish is described by Wigger (1988) as one of the more complicated, dynamic and variable areas in the morphology of spoken Irish. Carnie (2008) describes how there is no one-to-one mapping between the declension class and the way the noun forms the plural in Irish, rather, the formation of the plural depends largely on the phonological shape of the nominative singular (Hickey, 1985). Ó' Siadhail (1989, 1995) divides the morphological endings into three broad categories: slendering, vowel addition, and consonantal extension plus vowel addition, which will now be outlined.

a. *Final consonant made slender (palatalised)*

- This is used for a large group of masculine nouns who have similar genitive singular forms and end in the 'dentals' r, n, l, s. Examples include 'bád' /bɔːd̪/ *boat*; báid /bɔːdʲ/ *boats* and 'páipéar'/pɔpɛɻ/, *paper* 'páipéir' /pɔpɛɻʲ/ *papers*
- This rule is also used for two-syllable surnames, and a few two-syllable nouns ending in '–(e)ach' e.g. *rat* 'francach'/fɾaunkəx/; *rats* 'francaigh' /fɾaunkɪxʲ/

b. *Vowel addition*:

There are two main types of vowel addition:

1. The first is the addition of a neutral schwa vowel /ə/ to a small group of nouns produced with one syllable (if there are two syllables, the middle one is dropped in the plural). These nouns are mostly masculine and end in l, n, s. (e.g. *pig* 'muc' /mʌx/; pigs 'muca' /mʌxə/)
    i. Variations of the /ə/ vowel addition occur when it is combined with palatalisation of the final consonant in most two-syllable masculine nouns: *light* 'solas'/sʌləs/; *lights* 'soilse' /silʃə/ or *door* 'doras' /dʌɹəs/; *doors* 'doirse' /dʌɹʃə/
    ii. Other variations occur when the schwa vowel is combined with consonant addition such as inserting a 'th' before the vowel addition (e.g. *sky*, 'spéir' /spɛɻ/ becomes 'spéartha' /spɛɻhə/); or 't' before the vowel ending (*story*,

‘scéal’ /ʃkel/ becomes ‘scéalta’ /ʃkeltə/) and finally adding a ‘t’ and dropping the vowel (*line* ‘líne’ /linə/ becomes ‘línte’ /lintə/)

2. The next form of vowel addition occurs with the addition of final –(a)í. There are some cases where it seems that – (a)í is the only possible ending
   - Words ending in –a, e.g. ‘cóta’ *coat*, plural ‘cótaí’
   - Words ending in –ín, e.g. ‘caipín’ *cap*, plural ‘caipíní’
   - Words ending in –(e)acht or –(e)acht, e.g. ‘Gaeltacht’ plural ‘Gaeltachtaí’
   - Words ending in –óir, e.g. ‘bádóir’ *boatman*, plural ‘bádóirí’
   - Words ending in –éir e.g. *butcher*, ‘búistéir’, plural ‘búistéirí’

c. *Consonant extension and vowel addition combined:*

The final main category of plural marking involves the addition of a consonant and vowel thus either –(e)anna /ənə/ (added to monosyllables) or –(e)acha /əxə/ to polysyllables. These are frequently added to recent loan words (*balls*- bál*anna*; or *packages*- peaicits*eacha*), although as before, variations occur:

a.–(e)anna

i. In a few words connected with time, a ‘t’ is added before the final a – e.g. *hour*, ‘uair’/uəɻ/; ‘uaireanta’ /uɹənt̪ə/

b.–(e)eacha

i. Final consonant made slender before ending, thus *egg* ‘ubh’ /ʊv/ becomes *eggs* ‘uibheacha’ /ɪvəxə/ (although the genitive form of, ‘uíbh’ /i/ is frequently used for the plural of ‘ubh’ in the Munster dialect)

ii. In some one-syllable nouns ending in ‘n’ and ‘r’, the final consonant is broadened (un-palatalized) before ending (e.g. *train* ‘traein’ /tɹɛnʲ/; *trains* ‘traenacha’ /tɹɛnəxə/)

iii. In a few one-syllable nouns ending in ‘m’, an ‘n’ is inserted before the ending (e.g. *name* ‘ainm’ /anm̩/; *names* ‘ainmneacha’ /anm̩nəxə/)

Finally there are other minor plural endings such as the addition of –n e.g. *duck* ‘lacha’ /laxə/ ; *ducks* ‘lachain’ /lɑxɪn/. Although this account could be argued to highlight that the entire plural system of Irish is irregular, there are some noun plurals

that are held by others to be truly 'irregular'. For example, the plural of 'bean' /ban/, *woman* is 'mná /mn̪ɔ/; 'leaba' /labə/ *bed*, is 'leapacha' /ləpɑxə/ *beds*; 'teach' /tɑx/ *house*, is 'tithe' /tɪhə/ *houses* and 'lá' /lɔ/ *day*, is 'laethanta' /lehətə/ *days*. There are also dialectal differences in plural formation. For example, where Munster plurals have the vowel addition –a, (e.g. fuinneog *window;* fuinneog**a**', *windows*), the Connacht dialect uses vowel ending of –aí- (i.e. 'fuinneog**aí**') (Doyle, 1996). In addition, Ó' Siadhail (1989) states that there has been an increase of the 'long' plural endings, particularly '-acha' and '-anna', which in some dialects replace the vowel-slendering plurals. For example, the standard plural of 'bád' *boat* - báid /bɔːdʲ/ has become 'bádeachaí' /bɔŒxiː/ in Connacht from the addition of the 'long' consonant plus vowel –acha(í) ending, whereas in Donegal dialects it has become 'bádaí' /bɔdiː/ from the addition of the –aí endings. In child language acquisition, Hickey (1990b) noted that vowel addition (-(a)í) and consonant extension plus vowel addition (-anna) were the earliest plurals used by children.

The increase of long plural endings and dialectal differences often leads to nouns having two or more optional plural forms. This complexity is increased by the previously mentioned fact that in general the singular form of the noun is retained following numerals, although initial mutations do feature. For example the plural of *horse* 'capall' /kɑpəl/ is 'capaill' /kɑpəlʲ/, although after the numerals, the singular noun base is maintained (e.g. 'trí chapall' /tri xɑpal/ *three horses*, 'ocht gcapall' /ʌxt gɑpəl/ eight horses etc.)

1.3.6 Adjectives

The adjective assumes the gender, case and number of the associated noun or pronoun and generally follows the noun. Feminine nouns lenite the following adjective, and so the adjectives 'maith'/mɑh/, *good* and 'mór' /muɹ/, *big* are realised as:

	leabhar(m) maith /lʲɑuwəɹ mɑh/	srón(f) mhór /ʃɹoːn vuˌɹ/
Lit:	book good	nose big
Gloss:	*good book*	*big nose*

Exceptions in word order occur when the adjective is moved to a word-initial position when combined with the noun to form a compound; thus ‘aimsir’, *weather*, ‘drochaimsir’ *bad weather*.

Adjectives following plural nouns

When modifying plural nouns, adjectives must also be in the plural. Although as described above, feminine nouns lenite the following adjective, whereas masculine nouns do not, the opposite pattern can be seen when (some) plural nouns are involved (again adding to the relative complexity of the initial mutation system). Thus ‘oíche fhada’ /ihə ɑd̪ə/ (*a) long night* becomes ‘oícheanta fada’ /ihənt̪ə fɑd̪ə/ *long nights*. However masculine nouns ending in a slender consonant in the plural do lenite the following adjectives, for example ‘amhrán fada’ /ɑurɔn fɑd̪ə/ *a long song*; ‘amhráin fhada’ /aurɑɪnʲ ɑd̪ə/, *long songs*, (Mac Murchaidh, 2004). Adjectives can also be inflected as verbs when combined with an auxiliary to indicate aspect (usually past progressive) as will be outlined in the description of verbal adjectives below.

Comparatives and Superlatives

The phonological form of comparative and superlative adjectives are the same, the difference being signalled by the fact that the comparative adjective is preceded by the adverbial prefix ‘níos’ (lit, *more*), and the superlative by prefix ‘is’. They inflect according to their endings in the nominative singular, although those which could be considered frequent in child language such as ‘mór’, *big*, ‘te’, *hot’*, ‘maith’ *good* and ‘beag’ *small* all inflect irregularly. Thus ‘maith’ *good* become ‘níos fearr’, *better* in the comparative and ‘is fearr’ *best* in the superlative.

1.3.7 Verbal Nouns & Adjectives

Before discussing the main features of the verbal system, an important feature of Irish is the use of verbal nouns (Vn) and verbal adjectives (VAdj), which are halfway between being nominal forms and belonging to the inflectional system of the verb (Ó’ Siadhail, 1989). In many ways their function and formation are similar to ordinary nouns and adjectives, although as almost every verb has an associated verbal noun and

adjective, they are generally considered to be part of the verbal system. Verbal nouns and adjectives play important roles in the aspectual features of Irish, although they do not carry tense, aspect or mood themselves (Hickey, 1990b). They therefore must combine with the auxiliary verb 'bí' *to be* which is fully inflectable for tense and aspect.

Verbal Nouns

The progressive aspect is formed by connecting the verbal noun (Vn) to the auxiliary verb 'tá' *to be* and the progressive particle 'ag' (meaning literally *at,* but is also a preposition meaning *beside, near or to*) and denotes continuing or concomitant action in the word order VSVnX (MacCana & Ó'Baoill, 1996). Verbal nouns are also used in prepositional phrases in a complicated system of aspectual constructions, for instance:

	Tá mé ag	ithe	mo dhinnéir
Lit:	be I at	eat(Vn)	my dinner
Gloss:	*I am eating my dinner*		

When the nominal object is a direct object of the verbal noun phrase, the genitive is used (e.g. 'arán' /ɑɾɔːn/ *bread* becomes 'aráin' /ɑɾɔːnʲ/) as outlined below:

	Tá sé ag ithe aráin
Lit:	is he at eat(Vn) bread
Gloss:	*he is eating bread*

If a non-finite clause forms the complement of the verb, the verbal noun stands alone (without the 'ag' particle):

	d'éirigh	liom	breith	ar an liathróid
Lit:	rose	with me	catch(Vn)	on the ball
Gloss:	*I succeeded at catching the ball*			

As there is no infinitive in Irish, the verbal noun is used to fulfil this function. There is some degree of regularity in the derivation of the verbal noun from the root (e.g. the suffix –(e)adh is very common with verbs in the first conjugation), and in theory almost any English verb can be borrowed into Irish and used in the progressive sense by adding the suffix – áil such as 'parcáil' *parking* and 'bácáil', *baking* (Mac Cana & Ó'

Baoill, 1996). However for a large number of verbs, the formation of the verbal noun is complex and must be lexically determined (Doyle, 2001). Ó' Siadhail (1989) outlines three basic rules for verbal noun formation:

1. No ending added to verbs ending in -áil, and a group of one-syllable verbs (e.g. 'ól', *drink*, 'ag ól' *drinking*; péinteáil, *paint*, 'ag péinteáil', *painting*)
2. –t added to the root of all verbs ending in slender l, n, r which generally have two-syllables or following a nasal in monosyllables (e.g. 'bain' *take*, ag bain**t**, *taking*; 'oscail' *open*, ag oscail**t**' *opening*; 'imir' *play*, 'ag imir**t**', *playing*)
3. –dh/–(e)adh /əɣ/ is the most frequent suffix. Examples include 'glan' *clean*, 'ag glan**adh**', *cleaning*. Sometimes the final consonant is made broad in verbs which have a root which ends in a slender consonant thus buail' /bʊəlʲ/ *hit*; 'ag bualadh' /əʔ bʊələ/ *hitting*

More marginal endings include adding the suffixes -mh (e.g. 'seas' *stand*, 'ag seas**amh**' *standing*; 'caith' *throw*, 'ag caith**eamh**' *throwing*); –m ('tit' *fall*, ag titi**m**', *falling*) to the verb base, or deleting the –igh suffix for certain verbs ('suigh'/sɪg/ *sit*, 'ag suí' /əg siː/ *sitting*; 'nigh' /nɪg/ , *wash*, 'ag ní' /əg niː/ *washing*).

Verbal adjectives

The verbal adjective is the equivalent to the English past participle and indicates the perfective aspect by combining with the auxiliary verb 'bí'. The intransitive perfect is formed using the past participle with 'tá' *to be*: 'tá sé imithe' *it/he is gone'* and the transitive perfect combines the participle with the prepositional pronoun 'agam' lit: *at-me* in 'tá sé déanta agam' *It was done by me* (Ó' Sé, 1992). The intransitive perfect is most common in Munster and not often used in Ulster. The word order for the past participle (verbal adjective) is generally VSVAdjX. For example:

	'Tá mo dinnéar	ite	agam'
Lit:	be my dinner	eat(VAdj)	at-me
Gloss:	*I have eaten my dinner*		

Another way to form the perfective in Irish is by joining the auxiliary 'bí', *to be* with the preposition 'tar éis' *after* and the verbal noun in more active constructions (Wigger, 1972).

	'Tá an bord briste'	'Tá mé tar éis an bord a bhriseadh'
Lit*:*	is the table broken(VAdj)	is me after the table to break(Vn)
Gloss:	*The table is broken* (passive)	*I am after breaking the table* (active)

Generally speaking, the verbal adjective is formed by the addition of the suffix -ta, -te, /tʲə/ or -tha /hə/ to the root of the verb, depending on its shape. Two rules apply to the formation of the verbal adjective in Munster (Ó' Siadhail, 1989):

1. -tha /hə/ is added to final –r /ɹ/ or -mh or bh /v/ or -(a)igh /əj/ (e.g. 'scríobh' *write,* 'scríobhtha' (now scríofa) *written* and 'imigh' *go*; 'imithe' *gone*)
2. -te /tʲə/ is added where the preceding rules have not been applied (e.g. 'ith' *eat*; 'ite')

1.3.8 Verbs

Ó' Siadhail (1989) states that it is best to think of Irish as having two marked tenses: the future and the past, and each have their own grammatical morphemes. Other tenses are the present tense (including habitual and indicative), habitual past, and conditional. Verbs also inflect for person (first, second and third), number (singular and plural) and mood (indicative, subjunctive and imperative). Ó' Siadhail (1989) describes how the inflection of the verb is affected by the use of various morphological and syntactic devices, some of which have been previously outlined and include:

a) broadening of a final consonant root, e.g. 'buail', *hit* ; '(ag) bualadh', *hitting*
b) addition of endings to signify person (i.e. synthetic verb+ person marking), number etc. 'cuir', *put*; 'cuir**im**', *I put (present tense)*; 'cuir**imid**', *we-put*
c) placing an element that carries grammatical information such as past tense (do + lenition) before the verb e.g. 'do chuir' *put* (past)
d) use of idiomatic phrases where a verbal noun or verbal adjective is attached to an auxiliary verb to express aspect and passivity. e.g. 'tá sé ag bualadh', *he is hitting*

Regular Verbs

The majority of verbs in Irish are regular and are divided into two conjugations: the first where verbs have single syllable roots (e.g. 'bog' /bʌg/ *move*) and the second where verbs have a root of more than one syllable (e.g. 'bailigh' /bɑlɪg/ *collect*). The imperative mood is often considered to be the base or root form of all verbs and it has no subject marking, apart from 2nd person plural which can be added ('bail**ígí**'- *you(pl.) collect*); (Ní Chartúir, 2002). The present tense is formed by adding the suffixes '–ann' or '–eann' to the imperative singular form of the verbs in the first conjugation ('bog**ann**', *move*). In the second conjugation, '-íonn' replaces the '–igh' endings for imperative verbs in the second conjugation (e.g. bail**íonn**, *collects*). The formation of the future tense depends both on the person involved and on the phonetic shape of the verb. In the impersonal form, the future is marked by the suffixes '-f(a)idh' ('bogfaidh' *will move*) and -óidh/eoidh ('baileoidh' *will collect*) , and are the most common endings for verbs in the first and second conjugations respectively.

The past tense is marked by the use of the proclitic morpheme 'do' which causes lenition; although in most dialects the actual proclitic is removed, apart from words beginning with a vowel (e.g. 'ól' *drink*, **d'**ól *drank*) or with 'f' which also become lenited (e.g. 'féach' *look,* **d'f**h**é**ach *looked*). The same rules apply to verbs in the first and second conjugations, (McGonagle, 1991). The passive mood in Irish is usually indicated by the impersonal form of the verb which is not actually passive, but allows a translation in the passive sense 'buaileadh an madra', *the dog was hit*, where in English this form would be done with the impersonal pronoun *one* (Ó' Siadhail, 1989). Other ways of indicating the passive include using the verbal adjective as previously described.

Irregular Verbs

There are 11 irregular verbs in Irish, which include the substantive 'bí', *to be*; 'abair', *to say*; 'beir', *to carry*; 'clois', *to hear*; 'dean' *to make/do*; 'faigh', *to receive/find*; 'feic', *to see*; 'ith', *to eat*; 'tabhair', *to give/bring*; 'tar', *to come* and 'téigh' *to go*. An additional feature of some irregular verbs is that two forms may be employed in the same tense or mood- the 'independent form' for statements and the dependent form which is used when verbs are preceded by a conjunct particle (e.g. negative or question particles

and complementisers). For example the independent form of *was* is 'bhí', but 'ní raibh' *was not* in the dependent, (Ó' Siadhail, 1989).

The verb 'bí' (to be)

There are two verbs to express *to be* in Irish- the copula 'is' and what is referred to traditionally as the substantive verb 'tá'. There are parallels with the Spanish verbs 'ser' and 'estar' although there are also differences (Hickey, 1992). The copula 'is' generally indicates inherent qualities between a subject and noun or pronoun complement, such as identification or classification e.g.:

'Is múinteoir í Áine'
Lit: COP (a)teacher she Áine
Gloss: *Áine is a teacher*

Owens (1992) also describes how the copula is used in idiomatic phrases combined with prepositional pronouns (outlined below) to express ownership ('is le Seán an tigh' *Seán owns the house*); like/dislike ('is maith liom' *I like*); possibility/ impossibility ('is féidir liom' *I can*); attitude (is fearr liom', *I prefer*); surprise ('is ionadh liom' *I'm surprised*) and memory ('is cuimhin liom' *I remember*).

The substantive verb 'bí' on the other hand predicates temporal qualities such as location or transient states (Hickey, 1992) as in:

'Tá an lá fliuch'
Lit: be the day wet
Gloss: *The day is wet*

These verbs will be further explored below.

The substantive

Another unique feature of Irish is that the substantive *to be* has two distinct forms in the present tense, the present indicative 'tá' *is*, and the present habitual 'bíonn' *is wont to be* (Stenson, 1993). The present indicative is used to express position, time, condition, location and to predicate most adjectives. When accompanied by the adverb 'ann' *there* it

means *exists* or *there is/are*, as in 'Tá Dia ann', *God exists*; or 'Tá Seán ann, *Seán is there.* A noun phrase alone cannot form the predicate of the existential verb, instead, the noun complement is preceded by a form meaning '*in my, in your, in his*' as in the phrase:

	'Tá	Seán	ina dhochtúir'
Lit:	be(PRES)	Seán	in-his doctor
Gloss:	*'Seán is a doctor*'		

Negative forms of the substantive include 'níl' *is not* (present) and 'ní raibh' *was not* (for past tense).

The copula 'is'

Copular sentences focus and segregate new information from old and show their relationship. The copula is used to describe 'who' or 'who someone is', as opposed to 'how' and 'where'. It is not really a verb, thus has no forms for person or number. It has only two forms of its own, an unmarked form (present/future tense) which is usually demonstrative, 'is', *is*- 'is fear é', *he is a man*; and a form 'ba' *was/would be* marked for past or conditional tense. Syntactic functions of the copula are outlined by (Ó' Siadhail, 1983; , 1989), as the following:

a) linking of nouns and pronouns, for classifying (where the subject pronoun is at the end of the sentence and so results in a VOS structure): 'is scoláire mé' *I am a scholar*; or identifying 'is mé an múinteoir' *I am the teacher*
b) linking of nouns/pronouns and adjectives in exclamatory use: 'is maith é!' *it's good!* or equational/comparative use: 'is mar a chéile iad' *they are the same*
c) use in prepositional phrases such as

	'is maith liom		é'
Lit:	cop good	with-me	it
Gloss:	*'I like it'*		

d) fronting sentences: for example in cleft sentences- the subject, object, prepositional phrase/adverbial phrase can be fronted by the copula, which is then followed by a relative clause. For example:

‘is é an fear a bhí ag péinteáil an doras inné’

Lit: COP he the man relative particle was at paint(Vn) the door yesterday

Gloss: ‘*he is the man who was painting the door yesterday’*

e) the copula also becomes evident in the demonstrative pronouns such as ‘seo’ (‘is eo’), *this*; ‘sin’ (‘is in’), *that*; ‘siúd’ (‘is iúd’), *those* if traditional spelling is disregarded (Ó’ Siadhail, 1983). Thus the copula is evident in the sentences: ‘seo lampa’, *this (is) a lamp*; ‘sin geata’, *this(is) a gate*. In Munster, é, í, iad insertion rule operates

‘seo é an lampa’

Lit: this (is) masculine pronoun the lamp

Gloss ‘*This is the lamp’*

Ó’ Siadhail, (1989) holds that all the domains of the copula show some signs of giving way to the substantive verb, more so in Kerry than other areas of Munster and is most likely due to both an inherent quality of the language and to the constant exposure of Irish to English which has only one verb ‘to be’. Therefore, traditionally where inherent states were expressed by the copula (e.g. *I am afraid* ‘is eagail liom’; *COP fear with-me*) they are now more often used with the substantive verb (e.g. ‘tá eagla orm’; *bePRES fear on-me*). In all dialects, the copula ‘is’ may be omitted at the beginning of an utterance if the predicate is a noun (although not if marked for mood, tense, negation, interrogation or when embedded in a sentence). For example, the sentence meaning ‘*I don’t care’* can have omission of the initial copula, as in: (is) ‘cuma liom’ lit: *(be) the same with-me*. This deletion is connected with the phonological rule which allows the optional omission of a neutral vowel in the beginning of an utterance and it is partly for this reason that the question particle ‘an’ /ə/ is also sometimes deleted – (an) bhfuil sé sásta? (Ó’ Siadhail, 1989). This is an important aspect when considering adult language input to the children and any errors made by children, as will subsequently be analysed.

Verb Phrases

Verb-phrase idioms are fairly common in contemporary Irish, many of them clearly borrowed from English such as ‘oibrigh amach’, *to work out*, (Stenson, 1997). However, many native forms exist, most often combined with prepositions and

prepositional pronouns (Doyle, 2000), which will be important in later analysis of child lexical categories. For example, common childhood phrases are idiomatic and include:

	is maith liom	cur ort	bain díot
Lit:	*COP good with-me*	put on-you	take from-you
Gloss	*'I like'*	*'put on'*	'*take off*'

Modals & Auxiliaries

Modal verbs in Irish are expressed through verbs, verb phrases and idiomatic expressions containing the substantive verb 'bí' or copula 'is'. Ó' Siadhail, (1989) divides them into four types:

1- theoretically fully inflectable verbs ('caithfidh mé' *I must*; 'féadfaidh mé' *I can*)
2- theoretically fully inflectable verbs + prepositional phrase ('thig liom'; lit- *can/may with-me, 'I can/may')*
3- verb phrases: copula + adjective/noun ('is féidir liom' lit- *is can with me*, '*I can*')
4- verb phrases: substantive verb + adverbial/adjective/prepositional phrase ('tá mé in ann'/'tá mé ábalta' lit: *be me able; 'I am able (to)'*)

There is no auxiliary verb *have* in Irish, instead possession is expressed either by the verb 'bí' and the preposition 'ag' *at* inflected for person or by the copula 'is' and the preposition 'le' *with*, also inflected for person. For example:

	'Tá	cat	agam'	'is	liomsa	é!'
Lit.	*bePRES*	*(a) cat*	*at me*	*COP*	*with-me(emphatic)*	*it*
Gloss	*'I have a cat'*			*it's mine!*		

Ó' Siadhail (1989) classifies the verb 'déan' *to do/act/make* (dein in the Munster dialect) as an auxiliary for the following reasons:

a) it can be used as a substitute for any verb (except substantive)
   'tá mé ag péinteáil doras'- 'séard atá mé á dhéanamh, ná an doras a phéinteáil'
   I am painting a door- *what I am doing is painting a door*
b) it can echo a previous verb in responses (particularly widespread in Munster). 'Ar ólais an tae?' *Did you drink the tea?*; 'Dheineas', *I did*
c) it can supplement verbal nouns that do not inflect:

	rinne	sé	báisteach
Lit:	did	it	rain
Gloss:	*'it rained'*		

d) it can be used in an object verbal noun complement- 'dheineamar rudaí a cheannach' (lit- *did-we things to buy*) *we bought things*- or in unadapted loan-words e.g. déanfad telephoning ort (lit- *do-I(future) telephoning on-you*) '*I will telephone you*'

However as these features are not considered applicable to child-language use of 'déan', it was classified as a main verb for the purposes of this study.

1.3.9 Pronouns

Personal Pronouns

There are three different sets of personal pronouns in Irish:

a) *Conjunctive forms*- the form of the subject pronoun directly following a verb
b) *Emphatic forms*- marked morphologically by means of emphatic clitics which vary according to the person and number of the pronominal (Doyle, 2002)
c) *Disjunctive forms*- used for object pronouns or if a subject pronoun does not follow the verb (mé, thú, é, í, sinn, sibh, iad), which also have emphatic equivalents. For example:

	Conjunctive	*Emphatic*	*Disjunctive (& emphatic)*
I, me	mé	mise	mé
You	tú	tusa	thú
He	sé	seisean	é (eisean)
She	sí	sise	í (ise)
We/us	muid	muidne	sinn
You	sibh	sibhse	sibh
They	siad	siadsan	iad (iadsan)

Possessive Pronouns

'Mo', *my*; 'do' *your*; 'a' *his*/*her* are the singular possessive pronouns which (apart from *her*) lenite the following noun. The plural possessive pronouns, 'ár', *our*; 'bhur' *your-pl* and 'a' *their* eclipse the following noun. The forms 'a' *his/her/their* and 'ár' *our* can also blend with certain prepositions so that 'de/do', *from* becomes 'dá', *from his/her*; 'i' *in* becomes 'ina' *in her*, e.g. 'ina feirm', *in her farm* and 'le' *with* becomes 'lena' *with their*- e.g. 'lena n-athair' *with their father*, (Mac Murchaidh, 2004).

Prepositional pronouns

As the object of a preposition, a pronoun is fused with the preposition to form a conjugated system of prepositional pronouns marked for person, gender and number. Doyle (2002) holds that prepositional pronouns are a defining feature of the language, and are almost as central as the role of the verb. Thus when the complement of the preposition 'do', *to,* is a pronoun, one of the following forms will be chosen: dom, duit, dó, di, dúinn, daoibh, dóibh (*to me, to you, to him* etc.). The prepositions which fuse with pronouns include 'ag', *at*; 'ar', *on*; 'as', *from*; 'chuig', *to*; 'do', *to/for*; 'le', *with*; 'ó', *from/since*; 'de' *from/off*; 'faoi', *under/about*; 'i', *in*; 'idir', *between*; 'roimh', *before*/*in front of*; 'thar', *beyond/over*; 'trí', *through* and 'um', *around*. The more frequent forms of 'do', 'ag', 'ar' 'le', 'de; and 'ó' were chosen for the child-language targets in the current study.

1.3.10 Prepositions

There are two groups of prepositions in Irish, simple prepositions ('ag', *at;* 'as', *from;* 'chuig', *to* etc.) and compound prepositions ('ar feadh', *during*; 'ar son', *on behalf;* 'os comhair' *in front* etc.). Some prepositions change form when they are joined to the plural definite article, usually for pronunciation reasons (Ní Chartúir, 2002). Examples include 'i', *in*; + 'na', *pl. definite article* = 'sna' *in the(pl)*; and 'le', *with* + 'na' = 'leis na', *with the(pl)*. The prepositional system of Irish distinguishes between prepositions of location which have position ('istigh' *inside*, 'amuigh' *outside*) and those of motion ('isteach' *going-in*, 'amach' *going-out*) (Stenson, 2008). In addition, prepositions in Irish are specified from the perspective and starting point of the speaker, whereas English only

signals an absolute direction from the mover's point of view. This results in three items corresponding to the English word 'up' including 'suas' which is used in the sense of *going up*, 'thuas' in the sense of *being up* and 'aníos' when coming *up from down below*. Similarly, the words for *down* include 'síos' (going down) 'thíos' (being down) and 'anuas' (coming-down-from-above). Stenson (2008) identifies this system of directional adverbs, whereby those beginning with a 'th' usually indicate position without movement, those beginning with an 's' indicate movement away from the speakers and those beginning with an 'an' signal motion towards the speaker. These aspects were important in the adaptation of the MCDI as will be outlined in the next chapter. Finally, prepositions also cause morphophonemic changes on following nominal objects as part of the initial mutation system previously discussed.

1.3.11 Quantifiers and articles- Prefixes: an and ró

The prefix 'an' /ɑnə/ *very* - lenites the following noun beginning in a consonant (except 'dentals' d, l, n, t, s, and h &and r). Examples include 'maith' /mɑh/ *good* ; 'an mhaith'/ɑnə vɑ/, *very good*; but 'deas' /das/ *nice;* 'an-deas'/ɑnə das/, *very nice*. The prefix 'ró', *too* also lenites the following nouns beginning in a consonant (except those beginning in h, l, n, r, sc-, sl-, sm-, sp-, st-) thus 'te' /tɛ/ *hot* becomes 'ró-the'/roː hɛ/, *too hot* but néata, *neat* remains ró-néata /roː nʲeɪtə/, *too neat* (Stenson, 2008).

1.3.12 Diminutive suffixes

The basic meaning of diminutives is 'a small (noun)' but it also expresses an emotional attitude (e.g. 'caitín', *small cat* can also mean '*dear/ nice cat*') and so is likely to be frequent in child-directed speech. Diminutives are usually only attached to nouns but can be added to conjunctions ('agus' *and* – 'aguisín', *a small addition*). There are three diminutive suffixes in Irish –ín; –án and –óg, although -án and –óg are no longer productive and have been replaced by –ín in most cases (Ní Chartúir, 2002). Nowadays '-ín' is often used as a suffix in the borrowing of lexical items from English without meaning 'small' (e.g. 'muifín', *muffin*).

1.3.13 Syntax

As before, the major syntactic and syntagmatic features of Irish will be outlined in relation to the important aspects relevant to child language acquisition for the target age-group of this study. The interesting features of this stage of language acquisition include the development of word-order and expansion in declarative and interrogative sentences and the acquisition of post-modifying complements. These aspects have been described in previous studies of early language acquisition of Irish (Hickey, 1992; McKenna & Wall, 1986; Ó' Donnchadha, 1992). Children acquiring Irish need to work out the basic Verb + Subject + X word order; and understand that question and negative particles occur in sentence initial position, that inflected auxiliaries precede the main verb and the adjective almost always occurs after the noun (Hickey, 1990b). Increasing the length of simple sentences occurs in a VSOX order (where X includes adverbials and prepositional phrases) and through the expansion of embedded clauses. In addition, conjunctions 'agus' *and*, 'mar' *because*, and 'ach' *but* can be used to join simple sentences.

Negatives and questions are formed in a relatively regular way in Irish, where the complementisers 'a' or 'go' are placed before the verb in simple declarative sentences and the basic word order retained (the dependent form is used for irregular verbs). Some questions involve a direct relative particle 'a' (+lenition on following verb) where the subject or object is represented by a noun phrase such as 'cé' *who/whom*; 'céard/ cad' *what*, cé acu/ciacu, *which*, 'cathain' *when* and 'conas' *how* (Goodluck, Guilfoyle, & Harrington, 2001). Examples include:

	Cathain a	bhfuil	tú ag teacht?
Lit	When rel. particle	be-dependent	you at come?
Gloss	*'When are you coming?'*		

In the Munster dialect, questions involving prepositions and indicating *why, how, where* and *what time*? are followed by an indirect relative particle (complementiser) 'go' + eclipses (in other dialects the relative particle 'a' + eclipsis on the following verb is used instead of 'go') e.g.:

	Cén fáth	go	bhfuil	tú	ag gol
Lit	What reason	rel. particle	be(dependent)	you	at cry?
Gloss	*'Why are you crying?'*				

Irish also has a system of negative questions using the negative interrogative verbal particle 'nach' e.g. 'nach bhfaca tú?' *didn't you see?*

The same relative particles are used in relative clauses of decarative sentences. Goodluck et al. (2001) provide a summary of this system in modern Irish, referring to the complementiser that introduces a simple relative clause as aL (lenition) on the following verb, and the indirect relative (a resumptive pronoun occupies the relativisation site) as aN (nasalization on following verb). They describe how the syntactic conditions of these different types are complex and subject to substantial dialectal and even individual variation. In the Munster dialect, the relative clause occurs at the boundary of the main clause rather than as an embedded clause. Examples of these include:

	An buachaill	a itheann	úll
Lit:	The boy	aL eat-PRES	apple
Gloss:	*'The boy that eats the apple'*		

	is maith leis	go	bhfuil	mé ann'
Lit:	is good with-him	comp.	be-dependent	me there'
Gloss:	*'he is happy (that)I am there'*			

Subordinate clauses on the other hand are formed using a verbal noun (non-finite verb) in an adverbial complement phrase (Ó' Siadhail, 1989) as in:

	'ba mhaith	liom	imeacht'
Lit	would good	with-me	go(Vn)
	'I would like to go off'		

Subordinate clauses or non-finite clauses using verbal noun complements pose a common source of difficulty for learners of Irish (Owens, 1992). This is because when transitive verbs have direct objects, the direct object has to precede the governing verb in

verbal noun complements, resulting in a seemingly incorrect SVO word order. In the complement clause, the verbal noun is used without the particle 'ag' and if the verb is transitive, the preceding direct object is separated from the verbal noun in relative clauses by the particle 'a' + lenition:

	Ba	mhaith liom	obair	a	dhéanamh
Lit	Be(conditional)	good with-me	work	aL	do(Vn)
Gloss	*'I would like to work'*				

When the verb is intransitive however, there is no such change to the word order:

	Ba	mhaith liom	dul	ag siopadóireacht
Lit	be(conditional)	good with-me	go	at shop(Vn)
Gloss	*'I would like to go shopping'*			

Finally, object complements in Irish are formed in idiomatic phrases using verb + preposition. Therefore if the complement phrase is a simple noun phrase, it is linked with a preposition as in:

	ba mhaith	liom	imirt-	leis an liathróid'
Lit:	would good	with-me	play(Vn)-	with the ball
Gloss	*'I would like to play with the ball'*			

Other aspects of the syntactic system of Irish will be explored in the next chapter when outlining the target sentences in the adaptation of the MCDI. One final aspect that must be considered in any introduction to Irish is the change that has and continues to occur in the language as the social network in the remaining Irish-speaking areas grows more complex and its contact with English continues (Ó' Baoill, 1987).

1.4 Language Change

Many languages have influenced the lexicon of Irish throughout history, including Latin and Welsh from the 5th century onwards, Old Norse from the 9th century, Norman French from the 12th and English from the 14th century to the present day (Ó' Baoill, 1987). Irish is an evolving language, with features such as literary pronunciations,

neologisms, dialect mixing and use of English vocabulary, syntax and morphology, particularly among younger speakers of the language. Unsurprisingly, nouns are borrowed more frequently than words belonging to any other morphosyntactic classes (Wigger, 1998), although not all lexical material could be considered to be 'borrowed' as it may involve codeswitching due to the bilingual nature of environment and the overwhelming influence of English (O'Malley-Madec, 2001).

Doyle (1996) outlines the two factors seen in the processes by which English words were borrowed into Irish- one being phonological where Irish assigned a regular phonological shape to borrowed words, by having them end in a vowel to set them apart from the native lexicon (e.g. 'falla', *wall*; 'cupa', *cup*; 'gúna', *dress* (*from gown*); 'hata', *hat* etc.). The tendency to add a vowel has decreased with more recent loanwords (e.g. 'bál' *ball*; 'bus'; 'frog'; 'jab', *job*; 'téip', *tape* etc). The other factor was largely semantic where native derivational affixes were substituted for foreign ones, as long as they performed the same function (Doyle, 1996). This led to the introduction of the 'foreign' suffixes into Irish such as -éir (e.g. 'búistéir', *butcher*) and -áiste /ɑːʃtʲe/ (e.g. 'bagáiste' *baggage*; 'cabáiste', *cabbage* etc.). Stenson (1993) observes that this form is the result of the metathesis of /dʒ/ and /tʃ/ of English to /ʃt/ in Irish. Other foreign suffixes include -ún of 'bagún' *bacon* and 'garsún' (from garsoun- *boy*); -éar in 'dainséar', *danger* and 'dinnéar', *dinner* and finally -éal in 'buidéal, *bottle* and 'leibhéal' *level*. Because these loanwords have been in the lexicon since the earliest Anglo-Norman contact (Stenson, 1988) and have undergone phonological adaptation, they now are considered native words by speakers of the language. The issue of loanwords versus code-switching is complex and will be further explored throughout this study.

To summarise the linguistics of contemporary Irish in terms of a conceptual 'standard' a quote from James McCloskey (2001) (cited in (Nic Eoin, 2001, p. 135); captures the main issues:

> *When you think about it, the concept of Irish is a bizarre and complex construct. It includes the vernaculars of the three main Irish-speaking areas, in all the intricacy of their variation from place to place and from generation to generation; it includes the written standard in all its flexibility, with its neologisms and carefully constructed compromises among the vernaculars; it includes the rich and complex mixes of Irish and English that people in all the Gaeltacht areas experiment and play with; it includes the new urban varieties of Belfast and Dublin, created by something like the pidginization process and probably self-sustaining; it includes the even stranger mixes that are now being created by children in the Irish-speaking schools -gaelscoileanna- by the process of creolization.*

All these factors were taken into consideration in the adaptation of a parent report form on early language acquisition to Irish which is described in the next chapter.

1.5 Aims of the current research

Having provided an overview of the history of the Irish language and the linguistic structure of Irish, the motivation behind the current study will now be outlined.

1.5.1 Profiling and measuring early language acquisition in Irish

Irish is still a 'living language', yet increasingly fewer children are exposed to it as their first language, making it very important to collect acquisition data while still possible. There is very little research on early monolingual Irish-speaking children, particularly in those who are under two-years old where the foundation for later linguistic abilities is formed and stabilised (Jackson-Maldonado, Thal, Marchman, Bates, & Gutierrez-Clellen, 1993). The most research on the language has been directed towards

later phases of language acquisition, particularly second language acquisition of Irish or has looked at bilingualism and immersion education (Hickey, 2007). Of the early language acquisition studies that do exist, there has been an emphasis on the acquisition of the phonology of the language (Brennan, 2004; Ó' Baoill, 1992); or the functional bases of language usage (Cameron-Faulkner & Hickey, 2008) while others that have addressed wider language acquisition have used a very limited number of subjects and sample sizes (Hickey, 1992). For example McKenna and Wall, (1986) based their entire account of the acquisition of Irish on one sample of 128 utterances taken from a single child over three sessions, and just one language sample from one other child. Given the knowledge of large individual variation among children at early stages of language acquisition (Fenson et al., 2000) larger samples sizes and participants are required before a comprehensive outline of the acquisition process can be described.

Within the wider context, the necessity of studying Irish language acquisition is being driven by national and European language policies such as the European Charter for Regional or Minority Languages (1992) and the Official Languages Act of Ireland (2003). As previously discussed, the Official Languages Act (2003) in Ireland ensured statutory language rights for all government and public services to be provided in the customer's language of choice (i.e. Irish and/or English). This means that speech and language therapy services are coming under increased pressure to make services available through the medium of Irish and the area of speech and language therapy through Irish is considered one of the more serious and urgent areas of need as dictated by the Act (Reid, 2005). One outcome of the Official Languages Act has been that the Irish government has sanctioned three posts for speech and language therapists to treat clients through the medium of Irish and for the people of the Gaeltacht, in particular (Health Service Executive, January, 2005). This initiative represents significant progress towards providing an equitable service to the Irish-speaking population, yet services will be ineffective unless we can provide assessment of developmental pathways and norms for speech and language therapists to work with.

The guidelines for best practice in speech and language therapy state that assessment of communication skills should take place in all the languages to which that

person is exposed, particularly to rule out communication difficulties as a consequence of having English as a second language (Royal College of Speech and Language Therapists, 2006). Furthermore, the efficacy of providing assessment and intervention for language impairment in the mother tongue when it is the child's preferred or dominant language has been demonstrated (Gutierrez-Clellen, 1999; Holm & Dodd, 2001; Holm, Dodd, Stow, & Pert, 1999). Without appropriate assessment, Irish speaking and/or bilingual Irish-English speaking children with language delay, are at risk of under-identification and may not be accessing services. It has also been found that if a child demonstrates any language or learning difficulties, parents are often being misinformed by being advised to abandon the use of the minority language (in this case Irish) with the view to facilitating the development of skills in English, a language which may be considered more useful (RCSLT, 2006). As is stated in the RCSLT guidelines:

> *With regard to assessment and differential diagnosis, bilingual individuals are vulnerable to misdiagnosis if linguistically and/or culturally inappropriate assessment tools are used to reach a diagnosis. An incomplete picture of their skills will emerge if only one language is assessed. There is also risk if normative data that has been developed with monolingual populations is applied to bilingual individuals. SLTs should strive to assess an individual in all the languages to which they are exposed (RCSLT, 2006: 270-271.*

Considering the dearth of research on the development of Irish as a first language and the poor awareness of the nature, timing and rate of vocabulary and grammatical development in particular, there is much scope for research and development. There may never be large enough numbers of children speaking Irish as their first language available to provide the psychometric qualities necessary to provide true 'norms', and the wide variability across the three main dialects as well as the bilingual status of all Irish speakers provide further complications. Nonetheless, a descriptive framework for the typical developmental profile would be valuable to qualitatively evaluate and compare the language skills of a child suspected of having difficulties, (Brennan, 2004) and would also help inform approaches to second language teaching (McKenna & Wall, 1986).

Dale (1991) discusses the urgent need for valid, cost-effective language assessment at an early age because of the knowledge of the long-term implications of delayed language, with many so-called 'late talkers' not catching up, resulting in academic and social consequences. A recent randomized control trial of screening methods in the Netherlands revealed that screening toddlers who present with language delay during the preschool check up 'can reduce the percentage of children who attend special school at 8 years by 30%' (van Agt, van der Stege, de Ridder-Sluiter, Verhoeven, & de Koning, 2007). A further relevant aspect for the Irish-speaking bilingual children is that they have language skills distributed across two languages (De Houwer, 1995), and so assessments developed for monolingual children are not appropriate (Gutierrez-Clellen, 1996). In the past, SLTs have translated tests that have been found to be valid in English, but this is problematic, not least as the population on which the test was originally standardized will be different from the target populations, and more seriously, the differences between the languages mean that the level of linguistic difficulty and order of acquisition will not be the same (Pert & Letts, 2001). Developing a cost-effective assessment tool that is tailored to the modern Irish language is therefore a crucial step in identifying and preventing language impairment.

To summarise, Irish-speaking children have the right to appropriate services and for these not to conform to the types provided by monolinguals in the dominant language in the country. Ó' Murchú (2001) highlights that professionals have a role to play in maintaining the cultural integrity of the client/patient. Therefore studies of acquisition of Irish are critical. Such studies should provide information about the acquisition in the early years, as well as information relevant to the development of instruments that may be used as language screening and/or assessment tools.

1.5.2 Irish in the context of crosslinguistic language acquisition studies

Aside from the clinical motivation for developing an assessment tool for Irish, there are also wider theoretical motivations as the Irish language is one that can make a valuable contribution to crosslinguistic research. Irish has structures which are very different to English, upon which a large amount of the knowledge of child-language acquisition is based, and has features considered in the minority among world languages.

A number of these features could be argued to highlight verbs in the input language. For example, the aforementioned Verb-Subject-Object (VSO) word order in sentences could be argued to place verbs in a more perceptually salient sentence-initial position. VSO languages are relatively rare across languages of the world and are only found in other Celtic languages such as Welsh and Scots Gaelic; Semitic languages such as Classic Arabic and Polynesian languages including Hawaiian and Tongan (Purdon, 1990). Moreover, as there is no yes/no equivalent in Irish, but an 'echo' system, whereby the response to a question is either to repeat or negate the verb of the question and morphological complexity on verbs is argued to be relatively more straightforward than that on nouns (Ó' Siadhail, 1989). Although Irish is not a pro-drop language like Spanish, Chinese or Italian, the Munster dialect in the current study commonly attaches person-suffixes to the main verb in a synthetic fashion, making single-word sentences made up predominantly of the verb (verb + person suffix) possible. One final motivation for choosing to study Irish was because there is less of a dual category issue for nouns and verbs in Irish than English. In Irish, verbs are denominlaised less frequently than in English (Ó' Baoill & Ó' Tuathail, 1992) and when this does occur, morphological marking on the verbs/noun help the child to distinguish this, much like Italian (Caselli et al., 1995).

Because these verb-highlighting aspects of Irish could be argued to increase the saliency of verbs, studies of early language acquisition of Irish can contribute to the understanding of the arguably 'universal' observation in language acquisition studies, whereby children are thought to acquire nouns before verbs (Bates, Dale, & Thal, 1995; Gentner, 1982). This finding has largely emerged from studies of SVO languages such as English where nouns are in more salient positions, and from studies of languages with less-restricted word order, including Italian (Caselli, Casadio, & Bates, 2001) and Hebrew (Maital, Dromi, Sagi, & Bornstein, 2000), strengthening the claims that it is a 'universal bias'. However recent studies of children acquiring languages where verbs are in more salient positions have challenged these claims, and in fact argue that verbs emerge just as early or even earlier than nouns. These include Korean which has an SOV (Subject-Object-Verb) sentence structure (Gopnik & Choi, 1990) and frequently omits subjects and objects, meaning that verbs are often the only content word in sentences

spoken to young children (Kim, McGregor, & Thompson, 2000). In addition, Mandarin and Cantonese, although having an SVO word order, also allow frequent omission of the subject or object in appropriate discourse contexts (Fletcher et al., 2004; Tardif, 2006) and have no grammatical inflections that might be used by children to distinguish between nouns and verbs. In addition, profiling grammatical acquisition of this language can help to address the claim that SVO languages are more easily and earlier acquired, which according to Bruner (1975) (cited in (Hickey, 1990a) is because they adhere to the ordering of agent-action-object-recipient which helps the child to grasp the meaning of appropriately ordered sentences.

Another relatively unique characteristic of the Irish language is its complex morphosyntactic features, some of which are unique to Celtic languages. These include initial mutations described above and its complex system of plural formation (Hickey, 1992; O' Baoill, 1992). Studying a language with relatively more complex morphosyntax than English can address other theoretical aspects of early language acquisition such as what makes morphemes relatively easy or hard to acquire, and how this influences the relationship between grammar and the lexicon. Some hold that grammatical and lexical skills develop from separate, innate processes whereas others argue that they emerge from a common underlying capacity for language abstraction which is facilitated by the language input in the environment (Marchman, 1997). This study will attempt to add to this debate, using data from a lesser-known language. Finally, other aspects of language acquisition that will be explored using the findings from the current study include gender and environmental influences on vocabulary acquisition. In addition, this study was carried out longitudinally, which made it possible to profile vocabulary acquisition over time, and investigate variables that might be linked to differences in growth profiles.

1.5.3 Challenges of Minority-Language Research

Although this project aimed to specifically profile the Irish language development of children with Irish as a majority or first language, the reality of this language-learning situation is that all children are inevitably exposed to the dominant English language. Previous researchers in the area of bilingual language acquisition have noted some of the

challenges of conducting research in this area. For example previous researchers have noted that despite efforts to gather accurate measurements as to the amount of exposure to each language via interviews and questionnaires, these can be biased by the language choice of the interview (Edwards, 2004). In other words, if parents are interviewed in Irish about their use of Irish and asked to complete a self-rated questionnaire written in Irish on the amount of Irish used, this may bias them towards reporting a higher use of the language. Moreover, Grosjean (2004) also outlines a number of methodological issues which influence the findings of research in bilinguals, starting from the selection of participants who will all vary in their history and relationship with the languages (when, where and how and why they were acquired); their language proficiency, current stability of use as well which context they use the language in. Furthermore, Genesse (2006) notes that it is risky to identify normative patterns that apply to all bilingual first language learners as they are a heterogeneous group who vary considerably in the amount and consistency of exposure to the languages. Although every effort was made to consider these aspects in the current study, they should be considered when reviewing the outcomes of the study.

The next chapter will focus on how the assessment was adapted to Irish, taking into account many of the features discussed in this chapter. This adaptation was then used to gather information on early language acquisition of Irish, as will be outlined in the following chapters.

2 Adaptation of the MacArthur-Bates Communicative Development Inventory to Irish

This chapter explores previous language acquisition studies that have been carried out on Irish to date and the findings from the same. The MCDI assessment tool that was chosen for the current study will then be outlined, as well as the motivation for choosing this assessment and how it has been adapted to many other languages around the world. The adaptation of the tool to Irish will then be discussed, with reference to the original MCDI and other language adaptations of the assessment. Furthermore, the previous studies of Irish language acquisition, although limited, were also taken into account to assist in selecting vocabulary and grammatical targets in the adaptation and will be outlined below.

2.1 Previous Studies on the Acquisition of Irish

Studying the acquisition of Irish as a first language is problematic as it occurs in a language environment in which contact with a different socially dominant language is inevitable, making the observation of 'pure' monolingual language acquisition impossible (Kallen, 2001). This also makes it difficult to decipher developmental errors from interferences with the dominant language or even from errors in the input itself, as parents are also bilingual and many will speak Irish only as a second language with varying degrees of proficiency. Despite these challenges, there have been a limited number of descriptive studies carried out on the acquisition of Irish as a first language. The earliest of these (MacMathúna, 1979; Nic Fhionnlaoich, 1984) provided descriptive accounts of Irish language acquisition, although as previously mentioned, involving a very limited number of children and sample sizes. More recent studies include those by Hickey (1990a, 1990b, 1992, 1993) who developed a linguistic framework for the description of Irish language acquisition with children aged 16 to 46 months; Ó' Baoill (1992) who studied the acquisition of the initial mutation system and Brennan (2004), who focused on the phonological development of typically developing children aged 1-3 years. All of these studies relied on the labour-intensive method of spontaneous language

sampling due to the lack of formal assessments available in Irish. The few diary or parental observations studies that are available have mostly focused on the second-language acquisition of Irish (Owens, 1992), or on older bilingual children (Ó' Donnchadha, 1992).

Unsurprisingly, these studies found many similarities in the sequence and timing of language development in Irish and that observed in other languages. For example, Hickey (1990b) profiled the grammatical development of preschool children and used this to produce the Irish version of the Language Assessment, Remediation and Screening Procedure (called ILARSP). She then compared their language development to that found in English-speaking children on the original English LARSP (Crystal, Fletcher, & Garman, 1989) and noted that the Irish-speaking children also produce their first words typically about 12 months before moving to two-word combinations and multi-word utterances. At the single word level, children mainly used unmarked singular nouns (except those commonly used in plural such as 'bróga', *shoes*) or onomatopoeic forms (e.g. baa). Children began to combine words by adding grammatical elements such as articles, possessives and prepositions. Early word combinations were also marked for tense and aspect using the relatively early-acquired verbal noun and verbal adjectives. Some distinctive features of Irish language acquisition included a strong preference for the VSO word order which is characteristic of the language. Hickey (1990a) argued that this finding refuted the 'naturalness argument' which holds that children start out with a strong SVO strategy for sentence structure. According to Bruner (1975) this strategy is linked to sensorimotor cognition whereby a speaker experiences his or her intention to act before carrying out the action, and so utters the subject before the verb. Hickey (1990a) noted that any deviations from the VSO word order, including SVO, were related to 'tá' (*to-be present*) omissions when children began using verbal nouns and verbal adjectives. For example, instead of the obligatory substantive verb 'tá' in the progressive sentence:

	Tá	mé ag snámh
Lit:	be (pres)	me at swim(Vn)
Gloss:	*'I am swimming'*	

Children dropped the initial ‘tá’ resulting in a seemingly subject-initial sentence ‘mé (ag) snámh’, *me swimming*. This omission was also linked to the tendency to omit redundant elements (such as auxiliaries) in early child language and was noted to be a feature of the adult input, although not to the degree that the children were found to be deleting it (Hickey, 1990a; McKenna & Wall, 1986).

Other key features of Irish language development observed at this age were the frequent use of ‘formulas’, or non-productive phrases of the language (Hickey, 1993; McKenna & Wall, 1986) whereby children used unanalyzed ‘chunks’ or set phrases that were beyond their level of language proficiency. Some of these included ‘cá bhfuil?’ *where is?* as a question form for all types of questions and ‘n’fheadar’, (negative + V + synthetic first-person marker) *(I) don’t know* as a negative response to all negative question forms. This demonstrated that, as has been reported for other languages, children don’t necessarily start out with a single word, analytical strategy (Bates et al., 1995) but can acquire language in alternative manner. These children have been labelled ‘holistic’ or ‘rote’ learners who show a formulaic, pronominal style in first word combinations followed by a pattern of grammatical learning characterised by under-generalisation and inconsistent application of rules (Bates et al., 1995). These factors will be later explored using data from the current study.

It was also reported that because of the complexity of morphological changes at the word level in Irish, many forms must be learned lexically. As noted in the introduction, there is no inflection almost uniformly generalisable across members of a lexical category in Irish and so Hickey (1992) noted this in aspects such as noun plurals, with their complex formation (Ó Siadhail, 1989) emerging relatively late. Moreover, a significant part of the morphological system of Irish involves the acquisition of the initial mutational system. Studies have found that similar to morphological development in other languages, Irish-speaking children initially go through periods of non-usage of the mutations, before progressing to item-learning, followed by a period of experimentation, reorganization and some overgeneralizations to eventual rule-learning (Hickey, 1990b; Ó’ Baoill, 1992). The earliest appearance of lenition was noted from about 21-24 months (Ó’ Baoill, 1992), but for some children did not emerge until as late as 30 months

(Brennan, 2004). Finally, another key finding from previous acquisition studies of Irish includes the observation that children indicate similar relations in their early two-word combinations as noted in other languages, such as possessor/possessed ('cóta Eibhlís', *Eibhlís's coat*), (McKenna & Wall, 1986). However unique to Irish was the use of a high number of 'C' (Wh)- type interrogatives, a low number of negative constructions (apart from the use of the English *no*) and there was no evidence of recurrence of the *more/another* type sentences typical of children acquiring English. The findings from theses studies were taken into account in the adaptation of the MCDI, including the nature of early vocabulary and grammatical targets from typically-developing preschool children. This adaptation will now be outlined, expanding on the previous acquisition study data where relevant.

2.2 The MacArthur Bates Communicative Development Inventory (MCDI)

2.2.1 Motivation for the selection of the MCDI

Young children are notoriously difficult to assess. Some of the key methods used to date include parental diary reports, direct assessments and spontaneous language sampling. However these have been found to be very time consuming, restrictive in terms of the linguistic structures observed and have performance and situational limitations for children under 3 years (Bornstein & Haynes, 1998). Moreover, the performance and attentional demands of standardised language tests make it difficult to determine whether the result is a true reflection of the child's abilities, or can be linked to these demands. Finally the artificial situation of a laboratory or clinic, where the child is expected to interact with a stranger, also questions the outcome of direct standardised testing. For these reasons, parental report is slowly coming to the fore in the assessment of early preschool children. One parental-report assessment that has been well researched and described in the literature is the Language Development Survey (LDS; Rescorla, 1989). This has a vocabulary checklist of 300 words for parents and a section for noting words not included in the list. It also asks parents if the child is combining words and to list examples. It has been found to have high concurrent validity and temporal reliability in the 18-33 months age range (Klee et al., 1998)). However, this is considered to be more

of a screening tool, and is does not assess vocabulary in a largely comprehensive way, making no assessment of morphosyntax. Moreover, for these reasons it is not considered suitable when attempting to describe a language such as Irish, about which relatively little is known in terms of language acquisition (Dale & Goodman, 2005).

Another parental-report assessment is the MCDI, which is one of the most widely-researched parental-report assessment tools in the world (Fenson et al., 1994). These instruments were designed to provide valid, reliable and cost-effective instruments for assessing a range of communicative skills in infants and toddlers. They are suitable from the early stages of prelinguistic communication up to the middle of the 3rd year, a crucial period for identifying any language related delays/disorders. They are held to provide a practical alternative to formal testing and spontaneous language sampling by relying on parental report of their child's language development. Bates et al. (1995) describe how many studies have demonstrated the reliability and validity of the MCDIs, which were based on a norming study involving more than 1800 children in the US. The vocabulary checklists correlate significantly and positively with laboratory measures of free-speech, and non-word repetition (Stokes & Klee, 2008) while grammatical measures correlate with measures of Mean Length of Utterance (MLU). The creators of the assessment argue that parental report is more representative of a child's language ability as parents have observed the child's behaviour and consequently the child's language in a wider range of situations than researchers or clinicians could ever hope to. In addition, when compared to direct assessment, parental report has been noted to provide earlier indicators of vocabulary development (Jahn-Samilo et al., 2000) and to measure overall vocabulary size in a comprehensive and cost-effective way as they are not biased towards nouns or high-frequency words (Dale & Goodman, 2005; Robinson & Mervis, 1999).

The MCDI has enabled large-scale studies of language development across a range of languages and captures the full range of typical variation in children's vocabulary and grammatical development in early childhood (Bauer, Goldfield, & Reznick 2002). However there are limitations with parental measures of language development including the ability to distinguish between imitated and spontaneous speech, formulaic from productive use of language targets or in assessing phonological

development. Bornstein and Haynes (1998) caution that parents are not trained linguists, and so their assessment of language targets, particularly productive syntax, is problematic. For these reasons, parent report should only assess current functioning or that from the very recent past only as retrospective reports are less reliable (Dale , Bates , Reznick , & Morrisset, 1989). In addition, it should focus on new/emerging behaviours that occur with enough frequency to be noticed; a recognition format should be used rather than recall memory as it places fewer demands on memory; investigators should probe for examples about how particular words are used and finally, developers should be aware of the trade off between efficiency and validity as concurrent and predictive validity decrease when shorter forms are used.

Despite these limitations, Bates et al. (1995) hold that parental report can provide a clear view of developmental changes in very early language development and have used the instruments to observe individual and stylistic variations in language acquisition, the developmental relationship between various components of the language system as well as language development in atypical populations. The instruments have also been used to address important theoretical issues, such as estimating the relative contributions of genetic verses environmental factors to the rate of language development (Dionne, Dale, Boivin, & Plomin, 2003; Price et al., 2000), evaluating the link between early speech perception and later language development (Tsao, Liu, & Kuhl, 2004) and determining the prevalence and predictors of language delay (Horwitz et al., 2003). MCDI-based studies have also been used to investigate the development in slow and fast talkers, early bilingualism, relations between early gestures, word comprehension and word production and early syntax, gender differences and language development in children with developmental disorders (Eriksson, 2001). Parent report has been used in other areas of preschool assessment, including the assessment of early cognitive development such as the *Denver Developmental Screening Test*; (Frankenberg et al., 1990), and is held to be more reliable in this age range where behaviours are new, infrequent and unpredictable (Bornstein & Haynes, 1998). Studies have found that parents are able to assess nonverbal abilities, and distinguish them from language domains (Johnson, Wolke, & Marlow, 2008; Saudino et al., 1998) .

As well as the development of short forms of the original MCDIs, there has also been an extension of the assessment up to children aged 37 months (the CDI-III) which addresses productive vocabulary, syntactic maturity and language use (Fenson et al 2007). The inventories are now widely used throughout the world and have been adapted to over forty languages and cultures in addition to the original American version, including Spanish (Thal, Jackson-Maldonado, & Acosta, 2000); Italian (Caselli, Casadio, & Bates, 1999; Caselli et al., 1995); Hebrew (Maital et al., 2000); Chinese (Tardif, Fletcher, Liang, & Kaciroti, in press); Icelandic (Thordardottir & Ellis Weismer, 1996); American Sign Language (Reilly, 1992); Dutch (Zink & Lejaegere, 2005); French (Kern, 2007); German (Szagun, Steinbrink, Franik, & Stumper, 2006); Korean (Au, Dapretto, & Song, 1994); Swedish (Eriksson, Westerlund, & Berglund, 2002); Finnish (Lyytinen & Lyytinen, in press) and a British-English version (Hamilton, Plunkett, & Schafer, 2000; Klee & Harrison, 2001). Therefore, it was felt that studying language acquisition in Irish using the same descriptive format would allow for the identification of developmental features unique to Irish, and permit cross-inguistic comparison.

Clinically, the value of a systematic inventory of children's developing linguistic competence in a particular language is that it can be used as a screening procedure for children referred for speech and language therapy services, thus helping a therapist to form a hypothesis on the nature of the child's difficulty and design appropriate supplementary testing procedures. This is particularly important for the situation in Ireland, as even if a speech and language therapist is bilingual in Irish, the pragmatics of the assessment situation dictate that the bilingual individuals choose to speak languages according to the situation, and can tell when faced with a non-native speaker (Pert & Letts, 2001). Having the parents take part in the assessment removes this variable. In addition, parental report can also be used to monitor progress in therapy over time (Dale, 1991). A final goal of the development of the Irish version of the MCDI was that once a valid and reliable form was developed, it would serve as the basis for a standardised assessment of Irish acquisition in this age range. Given further adaptation for those speaking different dialects the inventory could then, as with the original MCDI, be distributed to a wider variety of parents to collect data from a broad range of children. This would then provide a cost effective and far-wider sample of the Irish speaking

population than interviewing could ever achieve and increase the validity and reliability of the form.

2.2.2 Description of the MCDI

The two most widely used versions of the MCDIs include 1) 'Words and Gestures' and 2) 'Words and Sentences'. 'Words and Gestures' is suitable for children aged 8-16 months and designed to measure single word comprehension and production and the emergence of pre-linguistic gestures associated with language development. The second instrument, 'Words and Sentences' is designed for 16-30 month olds to measure vocabulary production and a number of aspects of grammatical development (Fenson et al., 1993). This version was chosen for the adaptation to Irish as comprehension can be harder to judge by an untrained assessor (Dale et al., 1989) and it is subject to influence by Socio-Economic Status (SES), (Feldman et al., 2000; Fenson et al., 1993; Reznick, 1990) as contextual factors that may influence language performance are likely to require more structured assessment. There are two parts to the 'Words and Sentences' scale. The first is known as 'Words Children Use' and contains a checklist of 680 words organised into 22 semantic categories. This is followed by five questions about the frequency of the child's references to past, future and absent object or people and events which are viewed as an important index of the child's emerging capacity to represent the world (Fenson et al. 1993). The second part, called 'Sentences and Grammar', measures morphological and syntactic development over five different areas (Sections A-E). The first three assess the production of selected regular and irregular bound morphemes including:

A) The child's use of the regular plurals, possessives, progressive, and past tense morphemes
B) The child's use of five common irregular plural nouns and 20 irregular past tense verbs
C) The child's use of 14 common overregularised plural nouns (teethes, blockes etc.) and 31 overregularised past tense verb forms (blowed etc.)

Section D asks the parents to write the three longest utterances that they have heard from the child recently in order to calculate the Mean Length of Utterance (MLU) of three

longest utterances (known as M3L). Finally, section E is a forced-choice recognition format that asks parents to choose which member of 37 sentence pairs best reflects the child's development in terms of the production of bound morphemes, functor words and early emerging complex sentence forms. The original MCDI is reproduced in Appendix 1 and further examples from the same will be provided when discussing the adaptation to Irish below.

2.3 The Adaptation of the MCDI to Irish

Although the MCDIs have now been adapted into over 40 languages, this does not involve direct translation of the original tests. This is because direct translation is an exercise fraught with difficulties given the lack of correspondence in the extension of words. For example in Irish, the typical word for *green* is 'glas' but the same term can also mean *grey*, *blue* depending on the context and dialect, and Irish has a term 'uain' which is used when *green* is used to describe living things. It is essential that the salient grammatical features of a target language must be reflected in any adaptation to capture the universal and unique aspects of the morphosyntax of a particular language. Thus each adaptation of the MCDI must *adapt* rather than *translate* each section of the MCDI and take into account the cultural and linguistic differences of the population in terms of content, form and use of diverse languages of (Dale, Fenson, & Thal, 1993). They also recommend taking previous language acquisition studies into account, which for the original MCDIs came from over 20 years of research and evaluation of vocabulary and grammatical development in children acquiring English. However a comparable body of research was not available for Irish and so studies previously mentioned by Tina Hickey, Brennan and Ó' Baoill among others were relied on in the drafting of the checklists.

In order to choose vocabulary targets, some studies that were particularly useful included one by O' Donnchadha (1992), which listed the 1000 most frequent vocabulary items used by an Irish-speaking child, albeit a bilingual Irish-English child who was older (aged 6 years) than those targeted in the current study. Another word-frequency list was produced by 'Institiúid Teangeolaíochta Éirinn' *Irish Institute of Linguistics* (1999) in their project on the national corpus of Irish. This listed the 300 most frequently used

words from a large corpus of data on written and spoken dialogue. Other sources for culturally and language-appropriate vocabulary targets included Irish children's books such as the First 100 Words (Amery, Cartwright, & Uí Chearbhaill, 2003) and Buntús Foclóra (Amery, Cartwright, & Uí Chearbhaill, 2004). In addition, an online database of language samples from a variety of languages, the Child Language Data Exchange System (CHILDES; (MacWhinney, 2000)), was also consulted as it contains five transcripts of Irish-speaking children providing samples of spontaneous speech from children aged between 19 and 35 months (Guilfoyle, 1992). Because of the limited research on child language acquisition of Hiberno-English, studies on early vocabulary development of British-English (including the British-CDI) were also consulted as this was felt to have closer cultural and linguistic links to Hiberno-English which in turn influences and is influenced by Irish. Finally, the Down syndrome Educational Trust- a UK-based organisation has published a booklet where they list up to 340 common early vocabulary items of British English, and this was also consulted (Down Syndrome Educational Trust, 2000). These sources formed the basis of some of the vocabulary targets as well as developmental milestones in morphology and grammar, and typical errors noted.

As previously mentioned, this study focused only on the Munster dialect of Irish, partly because the primary researcher spoke this dialect as a second language. As the dialects are disparate in terms of their vocabulary and syntactic structure (Ó´ Siadhail, 1989), the intention was that once a valid and reliable form was established in one dialect, then the possibility of adapting it and validating the form to other dialects could be explored. The translations and adaptation were made initially by the lead researcher and then for content validity, consultations were made with four native Irish speakers. Two of these were parents of young children as well as primary-school teachers in an Irish-immersion school, and used Irish as their main means of communication. The third expert was a linguist with many publications on the content and structure of Irish and the fourth a specialist on Irish language acquisition. Finally, adaptations were discussed with an expert on general child-language acquisition, who has been involved in adapting the MCDI to a language other than English. The adaptation of each section of the CDI will now be discussed in turn.

2.3.1 Adaptation of Part 1: Words Children Use

a) Vocabulary Checklist

The principles for the adaptation of the vocabulary checklist were similar to other language adaptations, which initially included general translation and organisation of the words into obvious categories, 23 in total, (one additional to the original MCDI as will be outlined below). In their adaptation of the MCDI to Italian, Caselli et al. (1995) acknowledged that the division of child-vocabulary into adult parts-of-speech is arbitrary, given that children do not always use words in early language as adults do in terms of 'nouns', 'verbs' or 'adjectives'. Therefore the categories are used as a description of the child's linguistic input, and cross-linguistic differences in the composition of vocabulary are taken as an indication of the child's sensitivity to that language input. Nonetheless, the authors acknowledge that adult classifications can be subjective especially for words comprising very early vocabulary of children such as sound effects and games and routines (Fenson et al. 1994). Inevitably this results in lexical items being classified under different categories in the various translations of the MCDI including the Irish CDI (ICDI), as will be outlined.

Following a pilot adaptation and translation, culturally and language specific terms were considered, including those from the previously mentioned studies and words that were considered to be frequent in child-directed speech in Irish. Where there was more than one name for an item, or synonyms involved, the phonologically simpler version, or word containing phonemes known to emerge early in Irish phonology was chosen. For example, *shower* can be known as 'cith'/kɪ/, 'cithfholcadh' /kɪʔʌlkaː/ or 'fras' /fras/. 'Cith', produced with an open syllable is not only phonologically simpler than the multi-syllabic 'cithfholcadh', but in addition, as velar plosives have been found to emerge relatively early in Irish phonology (Brennan 2004) 'cith' is more likely to emerge before the fricative + glide cluster of 'fras'. Other choices were influenced by child-directed speech. For example, although the word for *puppy* in Irish is 'coileán', parents often add the diminutive suffix '-ín' to words making 'maidrín' (lit- *small dog*) another likely option. Similarly, the Irish words for *shampoo* are 'foltfholcadh'

/fʌltʔʌlkaː/ and ‘seampú’ /ʃampuː/. In this case the latter was chosen because of its phonological simplicity and its similarity to English making it more likely in contemporary child-directed speech. Dialectal differences also strongly influenced vocabulary targets. For example in West Kerry, the word for *car* (‘gluaisteán’ or ‘carr’) is slowly being replaced by ‘mótar’, most likely a loanword from the English *motor*. However as the dialect of the parent could not be predicted, the three possibilities were listed alongside each other and the parent was asked to indicate which item would be more likely. This was similar to other adaptations where certain synonyms were listed as pairs including the British and Hebrew adaptations. Moreover, it is more important to ‘over sample’ in the initial stages of an adaptation as the length of a word list significantly affects a parent’s assessment of the size of their child’s expressive vocabulary- the more words the parent is reminded of, the more words he or she remembers (Klee, Robertson, Howard, & Gavin, 2000).

As the ICDI is not a direct translation MCDI, a single ‘concept’ may be represented by more than one item on the MCDI but by only one item on the ICDI. For example, the verbs *build* and *take* have only a single lexical equivalent ‘tóg’ in Irish. In other cases a concept is represented in only one of the languages, but not the other. This applied to the entire category of prepositional pronouns as described in the previous chapter which are unique to Irish, but do not exist in English. Finally, other language adaptations, including the Mexican Spanish version (Marchman & Martínez-Sussmann, 2002) noted that a single concept may be matched to more than one item on each form. As will be outlined below, this was particularly evident in adapting the section on ‘prepositions and locations’ whereby up to six lexical items could be translated for the English preposition ‘at’. Consequently, although the American CDI contained 680 vocabulary items, the initial pilot version of the Irish Communicative Development Inventories (ICDI) contained 826 items which would be used to provide information about word frequency and inevitably lead to elimination of certain items. As the inventory was to be carried out in an interview-style, it was envisaged that parents would also include additional or alternative words in the pilot stage (also recommended by Dale et al, 1993). After this it is not recommended to allow parents to add words, as the inventory is not intended to be an exhaustive atlas of a child’s vocabulary and too much

reliance on parental recall introduces too much variation in reporting style (Fenson et al., 2004). Moreover, as the number of words in a child's vocabulary that are not represented on the inventory increases with the child's MCDI score, the proportion of unrepresented words remains relatively low for children with MCDI scores below about 300-400 words. For those scoring beyond 400 the checklists are still sufficiently broad to permit effective appraisal of relative vocabulary size within and across semantic categories for individual children and to furnish a good overall representation of the words that they produce.

Another consideration for the Irish adaptation was the fact that Irish does not exist in a purely monolingual environment, and so the influence of English on vocabulary items had to be accounted for. Although there is a debate as to whether a lexical item can be considered to be a 'borrow' or a 'code-switch' (Deuchar, 2008), for the purposes of the current study, a 'loanword' was considered to be one which has been naturalised into the phonology, morphophonology and syntax of Irish and used in the everyday conversations of the Gaeltacht community. For example, some of the non-native words have been adapted to suit Irish phonological patterns, including *giraffe*, 'sioráf' /ʃəɾɔːf/; *jacket*, 'seaicéid' /ʃakeɪd/ and *no* 'neó' /nʲoː/ (containing the palatalised /nʲ/ of Irish phonology). However, although Irish had the capacity to deal with English loanwords in the past, by accommodating them into the Irish phonological system, with increasing bilingualism many non-native sounds are used in everyday speech including /dʒ/ in 'jab' /dʒɑb/; *job*; /j/ in 'yó-yó' /joː joː/, *yo-yo* and /z/ in 'zú' /zuː/, *zoo* (Ó' Baoill, 1987).

Sjoestedt-Jonval (1928) (as cited in (Stenson, 1993)) noted the acceptance of the English phonemes in Irish loanwords from the beginning of the 20th century and with modern culture this is happening at an increasing rate. The earliest lexical loans mostly related to aspects of urban and town life imported to the rural Gaeltacht setting (including modern household items, food and cookery, clothing and toiletries, urban trades, money and measurement), with the vocabulary pertaining to traditional rural life remained unaffected in this period (nature, daily life, emotional life etc.). However Stenson (1998) noted that the contemporary Irish language has borrowings from a wider range of semantic categories, and that borrowing is particularly prevalent in the heart of the

Gaeltacht areas (O'Malley-Madec, 2007). This also became apparent in the current adaptation, where loan words infiltrated include the categories of nature/rural life (under 'outside things'), routines, sports, colours as well categories where loans would be expected, such as 'food and drink'. Extensive borrowing has also led to well established loanwords with phonological assimilation to Irish sound patterns ('coláiste', *college*; pláta, *plate*; seirbhís, *service*) coexisting with English words borrowed without phonological similarity. The latter were therefore considered code-switches rather than a lexical borrowing. To allow for the language contact situation in the current study, parents were asked to indicate whether their child was using the Irish, English or bilingual terms for lexical items by placing a tick mark in either or both columns (see Appendix 2). This would also help determine to what degree the current generation are using the English items or Irish-adapted loan forms. It should be noted that some items were listed in English (e.g. JCB) as this has no Irish equivalent, although parents were free to determine if the child was using these words in the 'Irish' (i.e. loanword) or 'English' (i.e. code-switch) sense. In addition, more recent Irish words appear very similar to their English equivalents and include 'pram/bugaí' (*buggy*); 'pasta'; 'píotsa' (*pizza*); 'spaigití' (*spaghetti*); 'crèche' and 'moncaí', *monkey.* Because these were taken from recognised dictionaries as translations of their English counterparts (Ó' Donall, 2005), parents were encouraged to mark these under the 'Irish' columns unless they felt that the child was using the English equivalent as more of a code-switch.

For descriptive purposes and later analysis, the vocabulary items were divided into nominals (generally nouns), predicates (verbs and adjectives) and closed class (words with grammatical functions) which will now be outlined. As the original checklist, parents were encouraged to select an item as being in their child's vocabulary if their child was attempting to say the word, regardless of whether they could pronounce it accurately. The full form and instructions are included in Appendix 2 (although this is the version devised after pilot testing).

Nominals

The nominal categories made up the majority of the vocabulary items containing nouns 'broadly defined' (Bates et al., 1994). These were largely similar to the original MCDI with the categories 'sound effects and animal sounds', 'animals', 'vehicles', 'toys', 'food and drink', 'clothing', 'body parts', 'small household items', 'furniture and rooms', outside things', 'places to go' and 'people'. The category 'games and routines' was changed to 'games, routines and phrases' because in Irish (as was noted in the Hebrew adaptation) many semantic ideas are expressed in idiomatic phrases and often learned as a 'formula' (Hickey, 1993) rather than as a single item. O' Siadhail (1989) describes these as 'verbal idioms' which are a feature of most languages, whereby a verb and preposition are connected in set phrases. For example *like* is expressed in the phrase '(is) maith liom' (lit- (COP) *good with-me*) or 'taithíonn liom' (lit- '*please with-me'*), but if listed as a single item the word 'maith' means *good* and 'taitin' *please*, making 'phrases' a necessary addition to this category. As the original MCDI, nouns that are usually acquired in plural form were listed in their base form (e.g. 'bróga' *shoes*).

Beginning with the category 'sound effects and animals', all of the original MCDI items were retained, although to facilitate parent-recognition the term 'woof woof' was listed alongside *bow wow* and 'ddddooor' was listed together with *vroom* as these were noted to be synonymous in previous studies of Irish acquisition (Guilfoyle, 1992). Only one item was added, 'ah ah' which is often used in parental input to indicate 'no' or 'stop'. In the next category 'animals', the items *alligator, ant* and *moose* were removed and items such as *bug* were changed to 'spider' for translation. Cultural-specific items were then added, based on feedback from experts as to common animals in Irish children's stories and songs and findings from previous studies. In addition, as most of the children who speak Irish as a first language live in rural, coastal villages and farms of Ireland, this affected the vocabulary targets. Additional items included 'bóín dé' *ladybird*; 'broc' *badger;* 'colúr' *pigeon*; 'cruimh cabáiste' *caterpillar*; 'cuileog' *fly*; 'deilf' *dolphin*; 'eala' *swan*; 'foiche' *wasp*; 'faoileán' *seagull*; 'gabhar' *goat*; 'gráinneog' *hedgehog*; 'lao' *calf*; 'madra rua' *fox*; 'meaig' *magpie*; 'nathair' *snake*; 'préachán' *crow*; 'searrach' *foal*; 'seilide/slimide' *snail*; 'siorc' *shark*; 'smólach' *thrush* and 'spideog' *robin* bringing the total number of animal items to 61 (as opposed to 47 in the MCDI).

In the 'vehicles' section, the word *sled* was removed as it is not culturally appropriate and the words *stroller*, and *fire truck* were first adapted to their Hiberno-English counterparts *pram* and *fire engine* for translation. As previously mentioned, *JCB* was added as a loanword and the words 'leoraí' *lorry*, 'bainteoir' *digger*, 'otharcharr' *ambulance* and 'veain' *van* were also added. In the 'toys' category, *bat* was changed to the more culturally appropriate 'camán' *hurley*, and 'cúl/báire' *goal* , 'druma' *drum*, 'físteip' *videotape*, 'gunna' *gun*, 'míreanna mearaí' *jigsaws* and 'sliotar' (ball used in hurling) were added. The 'food and drink' section, as expected, had many changes to reflect the linguistic and cultural differences from American-English. This involved removing *applesauce, pretzel, pumpkin, pickle, tuna* and *vanilla*, and adapting the terms *candy (sweets), cookie (biscuit), french-fries (chips), jello (jelly), popsicle (ice-pop)* and *potato-chip (crisps/Taytos)* to Hiberno-English before translating to Irish. *Cheerios* was changed to 'calóga arbhar' *cornflakes* and *noodles* to 'pasta' as they were considered more culturally appropriate. *Corn* and *cereal* both translate to 'arbhar' in Irish thus were listed as a single item (although *cereal* is a more common food then *corn* in general). Finally items which are common in Irish diets including 'bagún' *bacon*; 'cabáiste' *cabbage*; 'cúcamar' *cucumber*; 'ispíní' *sausages*; 'leite/praiseach' *porridge*; 'liamhás' *ham*; 'méaróg éisc' *fish fingers*; 'mil' *honey*; 'piorra' *pear*; 'slisíní' *rashers*; 'sú chraobh' *raspberry*; 'tae' *tea;* 'tornapa' *turnip* and 'tráta' *tomato* were added.

The next category of nominals was 'clothing' and extra items added to the Irish adaptation included 'caipín' *cap*, 'cairdeagan' *cardigan*, 'culaith snámha' *swimming togs*, 'éadaí' *clothes*, 'fáinne' *ring*, 'sciorta' *skirt*, 't-léine' *t-shirt* and 'veist/foléine' *vest*. The word 'spéaclaí' *glasses* was moved from its original category under 'small household items' in the MCDI to the clothing category in the ICDI as it was felt to match the items in this section. *Sweater* and *sneakers* were changed to Hiberno-English versions *jumper* and *runners* for translation and the terms *beads* was adapted to 'muince' *necklace* and *gloves* and *mittens* were translated to a single term for both 'lámhainní'. In the section for 'body parts', it was decided to remove the items *vagina* and *penis* for cultural reasons (bodily functions regarding sexuality were also removed from the Italian CDI for cultural reasons). However further discussions revealed that the word 'pilibín' a word for *penis* (literally meaning 'tiny thing') is often used in child-directed speech and so was included.

In addition, the words for *leg* and *foot* both translate to 'cos' in Irish. Although there are dictionary terms 'troigh' and 'cos-slua' for *foot*, these were not considered frequent in young children's vocabulary, and so *leg* and *foot* were listed as the single item 'cos'. Similarly, a single item 'lámh' was listed for the translation of *hand* and *arm* , even though the dictionary contains words for *arm* such as 'géag' (lit- *limb*) and for *hand* 'crobh', these were also not considered frequent in child language. Additional items in the Irish CDI include 'cliabh' *chest*, 'droim' *back*, 'leiceann' *cheek*, 'lúidín' *small finger*, 'mala' *eyebrows*, 'ordóg' *thumb*, 'scornach' *throat*, and 'uillinn' *elbow*.

Changes and addition to the category 'small household items' included translation of *trash* and *purse* to Hiberno-English *rubbish* and *bag/handbag* before adapting to Irish. The item *tray* was removed as its translation 'tráidire' was not considered common by native speakers, and extra items in the pilot included 'bia stáin' *tinned food*; 'bosca bruscair' *dustbin*; 'fístaifeadán' *video-recorder*; 'fón-phóca' *mobile phone*; 'gobán súraic' *soother*; 'muga' *mug*; 'sáspan' *saucepan*; 'scáthán' *mirror;* 'sconna' *tap*; 'seampú' *shampoo*; 'citeal' *kettle*; 'crúiscín' *jug*; 'éadach soithigh' *tea towel*; 'pota' *pot*; 'taephota' *teapot* and 'taos fiacla' *toothpaste*. As previously mentioned *glasses* was moved to 'clothing' and the items *broom* and *brush* were translated to the single Irish word 'scuab', and *dish* and *bowl* had a single entry under 'babhla/mias'. The items under 'furniture and rooms' also had minor adaptations. For example, the word *rocking chair* was removed, and 'seomra suí' *sitting-room*, 'seomra súgartha' *play-room* and 'tine' *fire* were added. Translations of the American-English words *closet* and *stove* to Hiberno-English (*wardrobe* and *cooker*) were made before adapting to Irish.

Suggestions from Irish language experts were taken into account for the adaptation of the section 'outside things' to reflect the rural culture of the Gaeltacht. Irish is classified as a pre-political language, as it displays an abundance of vocabulary for topographical features, mountains, rivers, forests, rocks, and does not have a verb for expressing possession as will be outlined below (Mac Cóil, 2003). This resulted in a number of extra items being added to reflect nature and the weather, a frequent topic of conversation even among young children due to the related industry and employment of the locality in fishing, farming and tourism (Brennan, 2004). These included 'báisteach'

rain; 'ceo' *fog*; 'fraoch' *heather*; 'móin' *turf*; 'sceach' *bush*; 'bothán' *shed*; 'buicéad' *bucket* and 'gaineamh' *sand*. Other additions included 'crandaí bogadaí' *see saw*, 'falla' *wall*, and 'simléar' *chimney*. *Sidewalk* was translated to *footpath* for adaptation to Irish, and the word for *spade* 'laí/rámhainn' was listed alongside 'sluasaid' *shovel*. Under the next category 'places to go' the Irish adaptation contained the words 'Aifreann' *mass*; 'ospidéal' *hospital* and 'naíonra/crèche' for *preschool*. The word 'baile' in Irish means both *home* and *town*; therefore 'cathair/baile mór' *city/town* was also listed to determine whether this would be used in child language. In the MCDI, *outside* was listed under 'places to go', but *inside* under 'prepositions and locations'. As mentioned in the introduction, the Irish adverbial and prepositional system is much more elaborate than English and literal directional adverbs in all have locative counterparts (Stenson, 1997). Therefore 'istigh' meaning *inside* and 'amuigh' *outside* were listed under 'places to go', whereas 'isteach' *inward* and 'amach' *outward* were included in 'prepositions and locations', as described under 'closed class' items below. In words for 'people', 'col ceathrar' *cousin,* 'fiaclóir' *dentist* and 'gruagaire' *hairdresser* were added to the form and *cowboy* was removed. Obvious cultural differences were the use of the word 'garda' for *police* and the word 'bean' *woman* was used to indicate *lady* rather than the direct translation of 'bean uasal'.

As outlined above, the category 'games and routines' was changed to 'games, routines and phrases' in the Irish version. The phrases that were added include 'bail ó Dhia ort!' *God bless you*, '(is) maith/taitníonn liom' for *I like* (Lit *(COP) like with-me)* and '(is) breá liom' for *I love* (the verb 'gráigh' meaning *love*, was listed under 'action words' below). Other phrases included '(is) liomsa é!' (*lit- COP with-me(emphatic) it*), for *mine!*; 'tabhair dom' *gimme* (reported as a frequent formula in Irish by Hickey, 1993); mar dhea! (lit *as if!)*, a word often used when joking somebody; 'ní maith' *don't like* and 'n'fheadar/níl fhios agam' *(I) dunno*. The copula 'is' was listed in parentheses in these phrases as it is often omitted in the spoken language, particularly by children (Hickey, 1992). The phrase 'Dia dhuit' (lit- *God with you*) was included to indicate *hello* and the word 'barróg' *hug*, was moved to this category from its place in 'action words' in the MCDI as it functions only as a noun in Irish and cannot be inflected. Other additions included 'gráín' *cuddle* and 'póigín' *small kiss* (Irish words of affection); 'amhrán' *song*

and the word ‘seachain!’ which is often used as a warning as in *watch out!*. The rhyme *patty cake* was omitted and instead ‘an muicín seo’ *this little piggy* was given as an example of a rhyme, although parents were instructed to select this item if the child was using the name of any rhyme. Finally the closest translation of *peekaboo* in Irish is ‘chím thú!’ (lit. *I see you!*). As Irish has no words for ‘yes’ and ‘no’ these items were removed. However, there are many reports of children using *no* as the first example of a negative (Hickey, 1992; Mac Mathúna, 1979; McKenna & Wall, 1986; Nic Fhionnlaíoch 1984) and so this was included (with spelling adaptation for the Irish production ‘neó’). In addition, Irish-speaking children often use the generic form ‘sea’ as an affirmative response which is the copula ‘is’ plus pronoun ‘ea’ (neutral pronoun only used with the copula and corresponding to *it*) and although phonologically similar to *yea*, it was retained in the modal and auxiliary section ‘helping verbs’.

Predicates

The next category of words in the original MCDI was made up of lexical verbs ‘action words’ and adjectives ‘descriptive words’. Other versions of the MCDI including the English and Hebrew versions, listed the lexical verbs in their infinitive forms. However as Irish has no infinitive (its function taken by the verbal noun; Doyle 2001), instead the 2nd person singular form of the imperative was listed as it is the closest to the ‘root’ of a verb . Although Ó’ Sé (1991) points out that this only works for verbs in the first conjugation, as in other highly inflected languages such as Hebrew, parents were instructed to mark a word as occurring in the child’s vocabulary whether it occurs in identical or in an inflected form. Furthermore, as previously discussed, many semantic notions expressed in a single word in English (e.g. sleep, live) are expressed in phrases or verbal idioms in Irish (Ó’ Siadhail, 1989). For example, phrases describing the state or condition of a person involve the existential verb ‘bí’ *to be*, the preposition ‘i’ *in*, possessive pronoun and verbal noun, as in the phrases:

	tá	mé i mo chodladh	tá	mé i mo chónaí	sa Daingean
Lit:	*be-pres I in my sleep*		*be-pres I in my dwelling*		*in Dingle*
Gloss:	*'I am asleep'*		*I live in Dingle*'.		

However many of these verb phrases have corresponding imperative forms and so for simplicity and where the overall semantic concept could be retained, the imperative was listed (i.e. the examples above were listed as 'codail' *sleep* and 'cónaigh' *live*). Moreover, as the focus of this section was on lexical verbs as opposed to the grammatical form of the verb, parents were instructed to consider whether their child was using any form of the corresponding imperative. The adaptation did however involve removing items from the 'action words' category to reflect the language-specific use of the word. As already outlined*, hug,* 'barróg'; *like* '(is) maith/taithíonn le' and *love* 'breá le' were moved to the category 'games, routines and phrases' (although the verb *love* 'gráigh' was included in 'action words' for comparative purposes). Furthermore, the verb *have* is expressed through the prepositional 'ag' *at,* which is inflected for person in prepositional-pronouns and used in phrases such as 'tá (carr) agam' (lit. *is car at me "I have a car*). Therefore in the Irish adaptation, the semantic equivalent to the English verb *have* was listed under 'prepositional pronouns'. Other changes included the addition of 'déan' the verb *to do/make* in Irish in the action word category as opposed to the 'helping verb' (auxiliary) section because as described in the introduction, it was not felt to function as an auxiliary in child language. The word *dump* 'dumpáil' was removed as it was not considered frequent in Irish child-language, and *bite* 'greim' was also removed as it functions as a noun in Irish which cannot be inflected. The lexical verb *pretend* in Irish is indicated with the idiom 'lig ort' (lit- *let on-you; "let on"*) but is often expressed with the verbal noun 'ag magadh' *joking* and so the latter was included in this section as it was considered more likely to early emerge in child language than the verb + prepositional pronoun structure of 'lig ort'.

The adaptation of the action words section in particular highlighted that many lexical items which express two meanings in English, are expressed by a single item in Irish and the meaning is generally inferred from the context. Examples included 'ith' which usually means *eat* but also can be used for *feed*; 'buail' which can mean *hit* or

bump; 'tóg' (lit- *take/left up*) which can mean *take* or *build*; 'tit' meaning *drop* or *fall*; 'srac' meaning both *rip* and *tear* and 'tarraing' which can mean *pull* or *draw* (and led to the addition of the word 'dathaigh' *to colour* as a close semantic relation to *draw*). This resulted in a reduction in the overall number of action words and so extra verbs were added including those from the British adaptation of the MCDI such as 'bolaigh' *smell*, 'scríob' *scratch*, 'inis' *tell* and 'fiach' *chase/hunt*. In addition, there were two words listed for the English verb '*to know* and included 'aithin', which is used for knowing people and 'fiosaigh' for knowing information, although the latter is generally expressed in the idiomatic phrase 'tá a fhois ag' (lit- *be knowledge at; 'know'*) which is now considered to be an intransitive verb in the language (Doyle, personal communication). Other additions included 'ardaigh' *lift*; 'buaigh' *win*; 'cas/iompaigh' *turn*; 'cíor' *comb*; 'cniotáil' *knit*; 'conaigh' *live* 'croith' *hang*; 'cuimil' *rub*; 'fág' *leave*; 'fuaigh' *sew*; 'luigh síos' *lie down*; 'rómhair' *dig*; 'scipeáil' *skip*; 'tar' *come*; 'sáigh' *start*; 'troid' *fight* and 'tuig' *understand*. Finally the literal translation of *smile* is 'miongháire' but was listed alongside 'gáir' *laugh* as this was considered to be more frequent.

Turning to adjectives or 'descriptive words', additions to the Irish adaptation included terms for describing the weather such as 'báistí' *rainy* and 'ceomhar' *foggy* as well as 'cineálta' *kind*; 'dúnta' *closed*; 'éadrom' *light;* 'éasca/simplí' *easy*; 'gearr' *short;* 'glic' *smart*; 'ramhar' *fat*; 'tanaí' *thin* and the colour 'corcra' *purple*. The translation of *naughty* was 'dána' meaning *bold* (a Hiberno-English term), *mad* was translated to 'feargach/crosta' meaning *angry* or *cross* and 'uafásach' *horrible* was listed alongside *yucky*. The terms for *hungry* and *thirsty* were literally translated to 'ocrach' and 'tartmhar' although like other verbs and adjectives which describe the state of a person, are more often used as nouns in the phrase 'tá ocras/tart orm' (lit- *be(present) hunger/thirst on-me; I'm hungry*). Moreover, the terms *asleep* and *awake* which are also generally acquired in phrasal structures and employ a possessive adjective before the verbal noun referring to the subject such as 'i m'chodladh' (lit- *in my sleep*) 'I mo dhúiseacht' (lit- *in my awake*). Again they were listed as a single item with the prepositional phrase being optional (i.e. as '(ina) chodladh/dúiseacht'). As in the original MCDI, in addition to '(ina) codladh' *asleep* the term for *sleepy* 'codlatach' was also included. Ó' Corráin (2001) describes how this feature of Irish, whereby the subject is the

experiencer of the process rather than being the agent of an action being described, is partly caused by the highly distinctive Irish system of prepositional pronouns, which as will be outlined below, are common in the expression of states (he has, he fears, he hates he is sorry etc). However, as for other items parents were instructed to select the terms if the child used them in the phrases or other inflected forms. Finally the term *hard* in Hiberno-English can be taken to mean something which is physically hard or *difficult* and therefore both meanings 'crua' and 'deacair' were listed in the Irish adaptation.

Closed Class

Closed class lexical items were the third major category of vocabulary targets and included pronouns, question words, prepositions, quantifiers and articles, auxiliary and modal verbs (called 'helping verbs') and connecting words. 'Words about time' are also included in this section, although will not be calculated under 'closed class' items in the later analysis as many items are ambiguous as regards the nominal/grammatical distinction (Caselli et al., 1995). Beginning with the category 'words about time', the adaptation was straightforward from the original MCDI with two additions, 'arís' *again*, and 'tráthnóna' *afternoon* included based on spontaneous language samples (Guilfoyle, 1992).

Significant adaptations had to be made for the category pronouns as the pronoun system of Irish is richer than English and depends on the context or direction of the pronoun reference. As previously outlined in the introduction, as well as the base form of all pronouns, there are also synthetic and emphatic suffixes which can be added to most pronominal forms. Synthetic verb+ person forms are common in the Munster dialect of this study and they can also inflect for tense (present, past, future, passive etc.) whereas emphatic pronouns are used for stress (e.g. the pronoun 'mé' *me* has an emphatic alternative 'mise' *me-emphatic*). However, the synthetic forms were not listed in this section, instead parents were asked to indicate if children could use inflected pronouns in synthetic forms with the verb under 'regular morphemes' in the grammar section outlined below. Two emphatic pronouns 'mise' and 'tusa' *you-emphatic* were included, but for other pronouns (e.g. 'í/ise' *she/she-emphatic*) were only listed alongside the base pronouns as a possible alternative. Other adaptations to this section included moving the 3rd person singular neutral pronoun 'ea' *it* to the section on 'helping verbs' (auxiliaries) as

it is only used in conjunction with the copula 'is' *is*, ('is ea' usually reduced to ''sea'). Instead the pronoun 'ceann' meaning *one*, which is often used to express inanimate objects was included. Other pronouns included were the demonstrative pronouns *this, that* and *those* ('seo', 'sin' and 'siúd' respectively).

The possessive pronouns include 'mo' *my* or *mine* and two words corresponding to the possessive pronoun *your*- 'do' for singular and 'bhur' for *your-plural*. The pronoun 'a' was also included, although it can mean *his*, *her* or *their* and is identified by either presence (*his*) or absence (*her*) of lenition or by eclipses (*their*) on the following noun (e.g. 'a c**h**ara' *his friend;* 'a cara' *her friend* 'a **g**cara' *their friend*). Subject pronouns in Irish are relatively straightforward and include 'sé' *he*; 'sí' *she*, 'siúd' *they*, although the forms 'é' *him*; 'í' *her* and 'iúd' *them* are used when the pronoun is the object of a sentence. There are no singular reflexive pronouns in Irish, instead the word 'féin' meaning *self* is added to the subject pronoun (e.g. 'mé féin' *myself*). Other reflexive pronouns belong to another category of pronouns called 'prepositional pronouns'.

Prepositional pronouns occur when the pronoun is an object of a preposition and is a feature of all Celtic languages (Doyle, 2001). Because prepositional pronouns are so central to the language, a subcategory of pronouns had to be added to the Irish adaptation to reflect this feature. Prepositional pronouns are often inflected in a unpredictable manner, thus many are learned lexically or in formulaic phrases and have been observed to emerge in Irish language acquisition between 1;6 and 1;9, beginning with the first person singular (Hickey, 1992). It was also noted that by 3 years the children used prepositional pronouns productively but these remained restricted to the 1st and 2nd person singular with limited use of the 3rd person singular. Owens (1992) also noted that 2nd person plural forms of prepositional pronouns were slow to develop in a preschool child acquiring Irish as a second language. As the ICDI was initially designed to cover the ages 16-30 months, only the 1st, 2nd, 3rd person singular and 3rd person plural forms were listed in the report form. The list of prepositional pronouns included those considered the most frequent in the language such as 'ag' (lit- *at*) + person (e.g. 'agam' *at-me; 'I have'*); 'do' (lit- *to*) + person (e.g. 'dom' *to-me*); 'le' (lit- *with*) + person (e.g. liom- *with-me/mine*), 'ar' (lit -*on*) + person (e.g. 'air'- *on him*); 'de' (lit- *from/off*) + person (e.g. 'díom' *off-me*)

and ‘ó’ (lit- *from*) + person (becomes ‘uaim’- *from-me*). As can be seen, when combined with the pronoun, the phonological structure of the underlying preposition inflects for person (i.e. ‘ar’ + 1st person singular ‘mé’ becomes ‘orm’ *on-me* etc.). In total there were 21 items under the category ‘pronoun’ and 30 under ‘prepositional pronouns’.

The next category ‘question words’ was generally straightforward in the adaptation, although as before, Irish uses many phrasal structures in questions. Much like the ‘Wh’ questions of English, Irish makes use of words beginning with ‘C’ or ‘C’ questions for a similar purpose. For example ‘cá’ means *where* but is generally used in a phrase with ‘bhfuil’ *to be-pres* literally meaning *where is* and often reduced to ‘cá ’il’. ‘Cé’ means *who* but joined with ‘acu’ *a- them* indicates *which* ‘cé acu?’. The translation of *why* depends on the dialect in question, and in the Munster dialect is expressed either in the phrase ‘cad ina thaobh?’ /kɑnʌ heɪv/ or via the standard form ‘cén fáth?’. For the category ‘prepositions and locations’ almost double the number of items were listed in the Irish version from the original MCDI. As previously discussed, Irish has a very rich prepositional system which often combines with verbs and adjectives to form idiomatic phrases such as ‘brón orm’ (Lit- *sad on-me*; ‘*I am sad’*) or with verbs like ‘teastaigh ó’ (lit- *want-from; ‘to want’*). As in other languages, the choice of preposition is lexically determined so that, ‘ar’ could mean *on, in, for* or *at* when used in a prepositional phrase and depends on the preceding verb or adjective. Therefore literal translation was not possible and led to many more items being included in this section which corresponded to a single item on the English form (e.g. there were 6 items corresponding to the English preposition *at*- ‘ag, ar, chun, faoi, le, and um’). As outlined in the introduction, because of the directional adverbs in Irish, there are three words corresponding to English prepositions *up* (‘suas’, ‘thuas’ and ‘aníos’) and *down* (‘síos’, ‘thíos’ and ‘anuas’). However, the initial adaptation did not list ‘thuas/anuas’ or ‘thíos/aníos’ as it was felt to be too complex for children in this age range (Hickey, personal communication). Other additions to this category from the original MCDI included the words ‘áit’ meaning *place*, ‘barr’ *top*, ‘bun’ *bottom*, and ‘os comhair’ *in front*. There were three words for *to* ‘chun’, ‘chuig’, and ‘go’ again the choice of which is lexically determined. Although many more items were included in this section of the Irish CDI it was decided to over-sample at this stage, and later when frequency of use data was obtained, some items

could be removed to have a more similar number of prepositions to other language adaptations.

For ‘quantifiers and articles’ the singular definite article ‘an’ and plural form ‘na’ were added and the indefinite article *a* removed as there is no equivalent in Irish. Irish prefixes, ‘ró’ meaning *too* and an additional quantifier from the original MCDI ‘an-’ meaning *very* (although pronounced as /ɑnə/ so written as ‘ana’ in the ICDI to distinguish it from the definite article ‘an’) were also included. The words meaning *another* and *other* in Irish are expressed by a single quantifier ‘eile’ and additional quantifiers added to the ICDI included ‘arís’ *again* (also in the British-adaptation); píosa (lit- *piece*) used to describe *a little*, and ‘faic/tada’ *nothing*, both of which came from spontaneous data samples (Guilfoyle, 1992). ‘Aon rud/ceann’ was added for *anything*; ‘saghas’ for *kind-of/sort-of* and a frequent quantifier of Irish, ‘aon/amháin’ meaning *one* was also added. The word *not* in Irish (generally translated as ‘ní) is always used to negate a verb and so was moved from its original quantifiers and articles category in the MCDI into the next category called ‘helping verbs’ along with the negative forms of the substantive verb.

Auxiliary and modal verbs are listed in the MCDI under ‘helping verbs’. As outlined in the introduction, Irish has two forms of the auxiliary verb *to be*- the copula ‘is’ and the substantive verb ‘tá’. The substantive verb also has two forms in the present tense- the present indicative from ‘tá’ which covers *am* and *are* in the MCDI and the present habitual (sometimes called existential) form ‘bíonn’ or ‘bí’ in the imperative and ‘bhfuil’ in the dependent form (following negative ‘ní’ or question ‘an’ particles) all of which were included in the checklist. The past tense of ‘tá’ is ‘bhí’ *was*, future tense is ‘beidh’ *will* and in the conditional mood is ‘bheadh’ *would* (although it was unclear whether children of this age would be using the conditional, it was included for the sake of completeness). Modal verbs are rarer in Irish when compared to English and modality is more often marked via verbal suffixes (e.g. ‘tóg’ *take* ‘thógfadh’ (*would)take*) (Bennet-Kastor, 2002). Although verbs were not listed with their suffixes, some verbs and verbs phrases which function as modals in Irish were listed, including ‘caithfidh’ (which covered functions *got-to/have-to/need-to* from the original MCDI) ‘(is) féidir/ ábalta’

can; '(ag) iarraidh' *trying*, and 'teastaigh' *want-to*. However there is no equivalent to the modal verb *could* in Irish and so this was removed. The negative form of the existential verb 'níl' was also listed, as it has been noted in early Irish acquisition (Hickey, 1992), as were other negative verbal particles, 'ní' and 'níor'/'nár' (used with regular forms in the past tense). The copula in Irish 'is' /ɪs/was also listed although its conditional form 'ba' *was/would be*, did not feature in the literature of child language acquisition for this age group and so was not included. As previously mentioned, 'dein' *do* was moved to the main verbs, although 'ná' which is used to negate imperative words and roughly translates to *don't* was included as it functions as a negative particle in Irish.

The final section in the vocabulary checklist was 'connecting words'. Again similar connectors for the English version were listed (e.g. 'agus' *and*, 'mar' *because* etc.) additions such as 'le' meaning *for* and 'nuair' *when*, which were reported in spontaneous data and function as connectors in Irish were included (Guilfoyle, 1992).

b) How children use words

The latter part of the section on 'words children use' asks parents to indicate how often (*never*, *sometimes* or *often*) their child uses language to refer to past and future events; to absent objects/people; to possession and whether they can comprehend simple instructions. As these are universal features of child language acquisition (Bates et al. 1995) these questions remained largely unchanged in the adaptation.

2.3.2 Adaptation of Part 2: Sentences and Grammar

This second section of the MCDI, addresses the development of morphology and the development of complex sentences. Again, the targets for this section were selected from the few studies on the acquisition of Irish and the ILARSP (Hickey, 1990b) in particular, as well as from the wider literature on child language acquisition, such as the increase in sentence length and morphological overgeneralisations on nouns and verbs (Caselli et al., 1999) to determine whether these are also features of Irish language acquisition. Again, significant language-specific adaptations had to be made, although

every effort was made to remain true to the original format of the MCDI to aid later comparison with other adaptations.

The first section addressed how frequently (*not yet; sometime* or *often*) children produce bound morphemes, and contained four questions from the original MCDI, with a fifth added in the Irish version due to the highly inflected nature of the language. As in the original, one question addressed the production of regular plural morphemes. As already outlined, the plural formation can be difficult to predict, but Hickey (1990a) noted that '–í' and '-anna' plural endings were used by preschool children, and so were chosen for the ICDI as examples of plural marking. The next question addressed the use of synthetic verb+ person marking where the verb and subject are united in a single word, a common feature of Munster Irish (Doyle, 2001). This was chosen as a morpheme as Wagner (1959) (cited by Ó' Sé, 1991) claims it is the only true suffix of Irish verbs. Therefore it was included to determine whether it may also be something that parents notice in their children's language acquisition. Although personal markings can also be inflected for tense, this question addressed its use in the present/present habitual tense (i.e. is the child using 'téim' (as opposed to the un-inflected/analytic 'téann mé' for *I go)*.

The next question asked whether the child was yet using the 'ag' particle of progressive structures ('ag obair', lit- *at work*, '*working'*) as it has been observed to be omitted in early child language studies of Irish (Hickey, 1990b). The fourth question addressed the use of regular past tense marking (similar to the MCDI), which in Irish involves lenition of the verb: thus 'dún' /dun/ *close* becomes 'dhún' /ɣun/. The use of lenition in possessive structures was the final question regarding bound morphemes as it has been found to be one of the earliest marking of initial mutations and as possessive structures (particularly of noun + noun format) are frequent in the early two-word stage (McKenna & Wall, 1986). Lenition on possessives occurs both in possessive+ noun and noun+ noun sequences (Hickey, 1991), where (second) noun becomes lenited – so that *coat* 'cóta' /koːt̪ə/ becomes 'mo chóta' /mʌ χoːt̪ə/ *my coat*; *Mom* 'Mamaí' /mɑmiː/ becomes 'cóta Mhamaí' /koːta wɑmi/ (or / koːta vami/ depending on dialect) *mom's coat*. It should be noted that in the latter example, the genitive form of the nouns is also used along with lenition, although it was lenition that was of most interest in this

question. The final question addressed the production of future tense marking, the most common of which are '-f(a)idh' and '-(e)oidh' suffixes (Ó' Siadhail, 1989).

In the next section, parents are asked to indicate whether the child has begun to use irregular plural and past tense marking. Although even 'regular' plurals are hard to predict in Irish (unlike the regular and predictable 'add -s' of English) there are some nouns that are particularly unique and irregular when inflected. 'Mná' *women* (singular 'bean'); 'lachain' *ducks* (singular 'lacha') and 'ba' *cow* (singular 'bó') are also irregular plurals as they do not fit with any other patterns noted in the language (Carnie, 2008). Carine (2008) also notes that that the plural suffix '(e)anta' in 'laethanta' *days* (singular 'lá') is so rare that it can probably be considered irregular also, and lists 'leapacha' beds (singular 'leaba') as another more irregular form. These were all included in the ICDI as well as the irregular plurals 'teach', *house*, → 'tithe' *houses*; 'leoraí, *lorry* → 'leoraithe' *lorries* and 'iasc' *fish* → 'éisc' *fishes* (from Ó' Siadhail 1989). Unlike nouns, the irregularly inflected verbs are more straightforward and include 'beir' *catch*; 'clois' *hear*; 'déan' *do*; 'abair' *say*; 'faigh' *get*; 'feic' *see*; 'tar' *come*; 'ith' *eat*; 'téigh' *go* and 'tabhair' *give*. In the original MCDI only the past tense of irregular verbs was listed, but as Irish has both irregular past and future tense marking, a number of future tense forms were also included. Moreover, the Munster dialect of the current study 'regularises' some of the irregular verbs. For example, the standard past tense of 'déan' *do* (or déin in this dialect) or 'clois' *hear* is 'rinne' and 'chuala' respectively. However, the Munster dialect inflects these verbs forms using regular past tense marking (lenition) and so they are produced as 'dhein' *did* and 'chlois' *heard,* respectively. Nonetheless, they were included in the current checklist for the sake of completeness and as it could not be assumed which dialect the parents may be using. The irregular verb forms are outlined in Figure 2.1:

BRIATHRA (16) *VERBS*					
béarfaidh	○	fuair	○	tabharfaidh	○
chonaic	○	gheobhaidh	○	tháinig	○
chuaigh	○	íosfaidh	○	thug	○
chuala	○	rachaidh	○	tiocfaidh	○
déarfaidh	○	rinne	○		○
dúirt	○	rug	○		○

Figure 2.1 Irregular verb forms

The next section addresses over-regularisation on nouns and verbs (see Figure 2.2 below). Because it is hard to find 'regular' morphemes in Irish- the term 'overgeneralisation' rather than 'overregularisation' will be used. As previously discussed, there are no regular plural markers which can be 'over-regularised' to other plurals in Irish. However, Hickey (1992) noted overgeneralization in the production of the noun 'éisc' *fish* which was realised as '*iascanna' from the overgeneralizations of the –anna suffix and Nic Fhionnlaoích (1984) reports the use of '*lachannaí' for 'lachain' *ducks*, from overgeneralising the –aí plural suffix (* = incorrect word/sentence formation). Previous research also noted a U-shaped curve in the development of plural marking (as for initial mutations) with initial item-learning resulting in early correct use, moving to errors revealing rule-learning and returning to the final correct form when the appropriate form was acquired (Hickey, 1992). It was therefore hypothesized that the children may over-extend the earliest-acquired and arguably more perceptually salient plural endings, '-anna' and '-aí' to irregular plural marking and to plural forms where there is less salient plural marking (for example where the final consonant is made slender as in 'milseán' /mɪlʃɔːn/ *sweet*; 'milseáin' /mɪlʃɔɪn/ *sweets*). Finally, there is also evidence in the literature (Brennan, 2004; Hickey, 1990a) that children may overgeneralise initial mutations to the root form of a noun. For example, a child produced table, 'bord' /bɔɹd/ as '**m**bord' /mɔɹd/ from the phrase 'ar an mbord' in the input. Therefore, some examples of initial mutation overgeneralisation were also added to the form as can be seen in Figure 2.2 below.

There was little in the way of examples of over-regularisation on verb marking in the literature, apart from Owens (1992) who reported overgeneralisation of future endings to the imperative (base + future ending) '*ithfidh' for 'íosfaidh', *will eat* albeit in early 2nd language acquisition. Thus the pilot form asked whether children were overgeneralising lenition (used to mark regular past tense) to the imperative (base) of irregular past tense verbs (e.g. '*f**h**aigh' instead of 'fuair' *got* from the imperative 'faigh' *get*) or whether they would similarly add regular future tense suffixes to the root of irregular verbs (e.g. '*rug**faidh**' instead of 'béarfaidh' *will catch* from the imperative 'rug' *catch*). This section also addressed whether children were using the verbal noun in place of past tense marking (e.g. '*dhéanamh mé' instead of 'rinne mé' *I did*), as this was

also observed by Owens (1992) in early 2nd language acquisition. The overgeneralisations of noun and verb inflections that were targeted are contained in Figure 2.2 below:

AINMFHOCAIL (23) *NOUNS*					
bóanna	○	fearanna	○	mílseánaí	○
bádanna	○	iascanna	○	mbord	○
bádaí	○	láanna	○	gcathaoir	○
bádanna	○	lachacha	○	t-eitleán	○
beanaí	○	leabanna	○	fhuinneog	○
beananna	○	leoraíanna	○	mhadra	○
leabanna	○	titheanna/ tigheanna	○	bhéal	○
éisceanna	○	teachaí/tighí	○	*(eile?)*	
BRIATHRA (24) *VERBS*					
bheir	○	dhéarna	○	dheir	○
chlois	○	thugann	○	d'fhuair	○
chloiseann	○	rugfaidh	○	fhaigh	○
d'abair	○	dúirtfaidh	○	fhuair	○
d'fheic	○	cúlfaidh	○	thabhair	○
fhéach	○	rinnigh	○	thagann	○
fhaca mé	○	dhúirt	○	thar	○
dhéanamh	○	dhul (mé)	○	théann	○

Figure 2.2 Overgeneralisation of noun and verb inflections

The next section, where parents are asked whether and how often their children have begun to combine words ('*not yet', 'sometimes'* or *'often'*) and to write the three longest utterances they have heard from their child recently, remained the same as the original MCDI.

The final section of the MCDI is called 'complexity'. Here parents are asked to choose between 37 sets of sentence pairs that represent increasing progress in their child's mastery of bound morphemes, functor words and development of early sentence structure. This scale has been found to correlate with laboratory measures of grammatical development, standardised assessments and with sentence elicitation tasks of grammatical targets (Caselli et al., 1999). As Irish has a rich system of morphological inflections, instead of forced choice pairs, the Irish pilot version presented parents with a list of three possible ways that a child could say a sentence with increasing complexity. For example, if a child was trying to tell someone that they had just fallen, parents were asked whether

their child would simply use the imperative form of the verb 'tit' *fall*, or whether they would use synthetic person marking on the verb '*titeas' *I fall* or whether they would use the verb in the past tense by leniting it (with person marking) 'thiteas' *I fell*. This multi-question format was similar to other version of the MCDI such as the Chinese (Tardif et al. in press) and Hebrew (Marital et al. 2000) versions. The Chinese version of the complexity section asked about features such as progressive and perfect aspect markers, possessives, temporal adverbs, auxiliary verbs, modals, sentence final particles and negation. The Hebrew adaptation presented parents with typical daily situations of young Israeli children and four possible child-responses, each representing an increasing level of morphosyntactic complexity from single words to complex sentences. However the Italian and Mexican-Spanish adaptation chose to use sentence pairs to target aspects of morphosyntax which are comparable to English instead of looking at the large set of morphological contrasts children learning these languages have to acquire (Caselli et. al., 1999; Thal et al. 2000). This has implications for the crosslinguistic analysis of grammar based on CDI scores as will be later discussed in chapter 8.

The pilot form of the Irish CDI had 39 groups of sentence-types for parents to choose from, and for the sake of comparatability with the MCDI, were grouped into items which mainly focused on either bound morphemes (1-12); functor words (13-26) or those which addressed syntactic structure (27-39), although there was overlap of target morphemes/syntax across the sentences. Hickey holds that "Irish-speaking children grasp quickly that the language is post-specifying and consistently place the verb in sentence-initial position, the adjective after the nouns and the genitive after the nominative" (Hickey, 2002, p. 263). Thus the complexity sentences aimed to address some of these features of language acquisition as well as the typical developmental errors noted in the literature. In addition, the sentence examples track universal language milestones of moving from single words to early word combinations through to multiword utterances.

a) Bound Morphemes

Developmental progress towards the production of bound morphemes included questions on the use of lenition and eclipsis, and based on previous findings included

examples of omission, overgeneralisations and accurate use (see items 4, 6, 8, 11 & 13 in Figure 2.3 (and Figure 2.4) below).

1. Tit!	O	5. Mise ag déan túr	O	9. Bí mé múinteoir	O
Titeas	O	Mise ag déanamh túr	O	Bí-idh mé múinteoir	O
Thiteas!	O	Mise ag déanamh túir	O	Beidh mé I mo mhúinteoir	O
2. Na bláth	O	6. beag bábóg	O	10. Is maith le mise Lego	O
Na bláthaí	O	bábóg beag	O	Is maith liom Lego	O
Na bláthanna	O	bábóg bheag	O	Is maith liomsa Lego	O
3. Na teachanna	O	7. Fhéach mé eitleán	O	11. Daidí carr	O
Na teachaí	O	D´fheach mé eitleán	O	Carr Daidí	O
Na tithe	O	Chonaic mé eitleán	O	Carr Dhaidí	O
4. Mo carr	O	8. Tá geansaí ró mór	O	12. Imríonn mise peil	O
Mo gcarr	O	Tá an geansaí ró mór	O	Imrí mise peil	O
Mo charr	O	Tá an geansaí ró mhór	O	Imrím peil	O

Figure 2.3 Sentences addressing the production of bound morphemes

Studies on the development of initial mutations have concluded that this is a relatively late-emerging linguistic achievement which may not emerge until as late as 30 months or stabilize until well into the school (Brennan, 2004; Hickey 1990a & Ó' Baoill, 1992). Therefore only a few examples of this process were targeted, and there were more examples of lenition 'séimhiú' than eclipsis 'urú' as it was found by both O' Baoill (1992) and Brennan (2004) to be the most common mutation used, and in many cases, replaced eclipsis. The targeted sentences were also based on findings from previous research. For example, Hickey (1990a) found that lenition was most likely to appear on the 2nd noun in possessive constructions ('carr D**h**aidí' *Dad's car*; no. 11); after 1st, 2nd, and 3rd masculine singular possessives ('mo c**h**arr' *my car*; no. 4); following the quantifier 'ró' meaning *too* ('ró m**h**ór' *too big*; no. 8) and on adjectives following a feminine noun (bábóg b**h**eag *small doll*; no. 6). Lenition was also targeted in regular and irregular past tense verbs (no. 1 & 7), focusing on overgeneralisation to omission, to accurate usage. There was one example of eclipsis, which is most likely to appear in preposition+ determiner + noun structures (e.g. 'ar an **m**bord' *on the table*; no. 13). Item 6 also attempted to address whether children were using the correct word order by

placing the adjective after the noun in noun + adjective constructions, as this was found to emerge early although not always accurately by McKenna and Wall (1986).

The suffixes used for the formation of the verbal nouns were also addressed. Although there is no account in the literature as to how children develop verb inflections for verbal nouns in Irish, Doyle (2001) describes how there is some degree of regularity in the derivation of the verbal noun from the root (i.e. the suffix –(e)adh is very common with all verbs in the first conjugation and –áil with loanwords). However, he also maintains that for a large number of verbs of all conjugations, the formation of the verbal noun is lexically determined, which could imply that children learn verbal noun endings on a word-by-word basis and do not go through a period of experimentation. Nevertheless there was one set of a sentences addressing this feature which involved moving from non-usage (i.e. using the root or imperative only '*ag déan' *at do*) to correct usage ('ag déanamh' *doing*) to the production of a genitive noun which is required following verbal nouns (ag déanamh *túr vs. ag déanamh tú**i**r; no. 5).

Other bound morphemes included person marking on verbs in synthetic single-word structures (no. 1 & 12) and overgeneralisation errors of plural suffixes '-í' and '-anna' in sentences (no. 2 & 3). The development of future tense marking was also targeted as Hickey (1990a) noticed the emergence of future tense marking around the two-word stage in Irish, initially on the future tense of *to be* 'beidh'. As with verbal noun formation, there was no evidence as to whether children go through a period of overgeneralisation, item-learning or otherwise with future tense marking. However, Ó' Siadhail (1989) noted that - f(a)idh is the most widespread ending in personal forms. Therefore a set of sentences was added which addressed omission ('*bí mé múinteoir' *be I teacher*) through overgeneralisaion of a future suffix '-idh' to the verb root (imperative) in '*bí-idh mé múinteoir' to correct use in 'beidh mé i mo mhúinteoir' *I will be a teacher* (no. 9). In addition, Hickey (1992) describes how the 1st person pronoun 'mise' *me* (emphatic) emerged between 25 and 32 months, and preceded the use of prepositional pronouns such as 'liom' (lit- *with me*, often used to indicate *mine*). Therefore a final group of sentences (no. 10) assessed whether children use the preposition and pronoun separately in the common phrase *I like* or 'maith le' moving from '*maith le mise' (lit-

like with-me-emphatic) to correct use of the prepositional pronoun in 'maith liom' *like with-me* and finally to emphatic stress on the pronoun as in 'maith liomsa' (lit- *like with me-emphatic; 'I like'*). The initial incorrect target was added as Owens (1992) noticed the combination of preposition and pronoun ('le mise') as a strategy towards the development of more productive use of prepositional pronouns. As with all the sentences in this section, parents were requested to mark the sentence that bared the closest resemblance to what their child was using at the time.

b) Functor words

The next set of sentences addressed the production of 'functor words' or words and bound morphemes whose role in language is largely grammatical, including prepositions, articles, pronouns and conjunctions (Crystal, 2002). Figure 2.4 outlines the sentence groups focusing (mainly) on the production of functor words.

13. Madra bord	○	18. Déan é	○	23. Mam aige?	○
Madra mbord	○	Déan é sin	○	Cá 'il Mam?	○
Madra ar an mbord	○	Déan damhsa	○	Cá 'il a Mham	○
14. Seán imigh	○	19. Neó cairéadaí	○	24. Seacláid mise	○
Seán imithe	○	Ní maith cairéadaí	○	Tá seacláid uaimse!	○
Tá Séan imithe	○	Ní maith liom cairéadaí	○	Tá seacláid agus cóc uaimse	○
15. Snámh mé	○	20. Sin caoire	○	25. Cad é caitín imithe?	○
Shnámh mé	○	Sin caoire sa pháirc	○	Cén fáth an caitín imithe?	○
Bhí mé ag snámh	○	Sin caoire istigh sa pháirc	○	Cén fáth go bhfuil an caitín imithe?	○
16. Baibín ithe	○	21. Tá sé ag tabhair póigín	○	26. Ní hea maith deoch	○
Baibín ag ithe	○	Tá sé ag tabhairt póigín	○	Ní hea maith liom deoch	○
Tá baibín ag ithe	○	Tá sé ag tabhairt póigín dom	○	Ní maith liom deoch	○
17. Níl nigh gruaig	○	22. Neó bhris	○		○
Ná nigh gruaig	○	Ní bhris mé	○		○
Ná nigh mo chuid gruaige	○	Níor bhris mé	○		○

Figure 2.4 Sentences addressing the production of functor words

This section also addressed the production of negatives, such as the overgeneralisation of neó (a loan word from then English *no;* no. 19) which was found to

be the earliest negative used by children (Hickey, 1990a) and often replaced the native form 'ní' to indicate non-existence/disappearance (McKenna & Wall 1986). Hickey (1990a) also found that by the time children were using two-word combinations, that they overextended 'níl' (negative of *to be*) and the negative copula 'ní hea' to negate other verbs (no. 17 & 26). The sentences in example 22 also addressed overgeneralization of 'neó' and asked whether the child could use the correct past tense negative marker 'níor'. Thus in total, there were four questions focusing on the production of negatives, from overgeneralization to correct usage (e.g. item 17: '*níl nigh gruaig!' *no wash hair!* to 'ná nigh gruaig!' *don't wash hair*!). Another feature of Irish language acquisition targeted was the formation of sentences referring to ongoing activity, involving verbal nouns, the substantive verb 'tá' (*to b*e-pres.) and the particle 'ag'. At the two-word stage, Hickey (1992) noted the emergence of these forms and felt that they had a high salience for young children. She observed that they were initially produced in subject initial utterances, and rather than ascribing this to verb misplacement or an 'SVO' strategy, she argued that is was due to deletion of the relatively redundant substantive verb 'tá' (Hickey, 1990b). It was also noted that the 'ag' particle was also often deleted in these sentences and could be attributed to the low phonological salience of this particle, often produced as /ə/ in connected speech. Sentences targeting the formation of these sentence types are contained in no. 15 (*I was swimming*) and no. 16 (*the baby is eating*) above. An additional target of no. 15 was whether children would use regular past tense marking to refer to past events, or use a past progressive sentence by using the irregular past tense form of 'bí', 'bhí' *was* with the verbal noun.

Omission of 'tá' was also previously noted in sentences involving the verbal adjective or past participle (Hickey, 1990b) and so there were examples of errors and correct use in sentences (see no. 14, *Seán is gone*). Expanding the length and complexity of sentences was addressed through the addition of adverbial clauses such as prepositional phrases ('tá sé ag tabhairt póigín dom' *he is giving a kiss to-me*; no. 21); 'ar an' *on the* (no. 13) and 'istigh sa' *in the* (no. 20). This section also targeted the formation of questions, from the early forms of 'cá bhfuil?' *where is?* (no. 23) to the overgeneralization of sentence forms (Guilfoyle, 1992) such as 'cad é?' *what?* for 'cén fáth?' *why?* (no. 25). This was based on the finding of McKenna and Wall (1986) and

Nic Fhionnlaoich (1984) who both report delayed acquisition of yes/no questions coupled with a high incidence of C-type questions (*where* and *what* developed before *why*, *when* and *how*). The use of the conjunction 'agus' *and* was also addressed (no. 24, *I want chocolate and coke*) and was noted by Owens (1992) as the earliest link between two nouns. The demonstrative pronoun 'sin' *that* was also found to be frequent in Irish children's use of locatives (Hickey, 1992; McKenna & Wall 1986) and was targeted in no. 20. Finally, as children acquiring Irish have been found to frequently use formulas, suggestions were made to address the development and productivity of typical 'formulas' such as those involving 'déin' *do/make*; (no 17), (Hickey, personal communication).

c) Syntactic Structures

The final group of sentences focused on the production of certain syntactic structures in multiword sentences, and are reproduced below in Figure 2.5.

27. Síos!	○	32. Tá briste agam	○	37. Tá an buachaill ag gol	○
Téigh síos dom	○	Tá sé briste agam	○	Tá an buachaill ag gol do a pheata	○
Téigh síos agus faigh ceann dom	○	Tá ceann eile briste agam	○	Tá an buachaill ag gol dá pheata	○
28. Dochtúir é	○	33. Tabhair capaillín	○	38. Sin bus	○
Tá sé dochtúir	○	Tabhair capaillín dom	○	Sin bus ar an sráid	○
Is dochtúir é	○	Tabhair dom capaillín le d'thoil	○	Sin bus ar an tsráid	○
29. Faigh liathróid	○	34. Bhí sé spéaclaí air mór	○	39. Táim níos mór	○
Faigh tusa liathróid	○	Bhí spéaclaí mór air	○	Táim níos mór ná Síle	○
Faightse liathróid eile mar is liomsa í seo	○	Bhí spéaclaí móra air	○	Táim níos mó ná Síle	○
30. Oscail doras	○	35. An mhaith leat tógáil?	○		
Oscail doras don madra	○	Ar mhaith leat a thógáil teach?	○		
Oscail an doras chun an madra a ligint isteach	○	Ar mhaith leat teach a thógáil?	○		
31. Níl Daid siopa	○	36. Ba mhaith liom imirt	○		
Níl Daid dul an siopa	○	Ba mhaith liom imirt leis an bábóg	○		
Níl Daid imithe go dtí an siopa	○	Ba mhaith liom imirt leis an mbábóg	○		

Figure 2.5 Sentences addressing the development of sentence structure

Using the ILARSP (Hickey 1990a) as a guide, sentences ranged from level I items and increased in complexity at clause, phrase and word levels through levels II, III and IV up to level V items (coordination/subordination), which would cover range of linguistic complexity for children aged 16-30 months. The summary form of the ILARSP is contained in Appendix 3. Starting with the substantive/copula, children (Hickey, 1992) and 2nd language learners (Owens, 1992) have been reported to mix up both these forms corresponding to the English *to be*. As previously outlined, the copula 'is' is used to describe a state or to identify someone, (e.g. 'is dochtúir é', *He is a doctor* (no. 28)). However to describe more temporary events, the substantive verb 'tá' is used. Other aspects of sentence structure included the development of word order with prepositional pronouns, a developmental error noted by Hickey (1992) '*bhí sé spéaclaí air mór' for 'bhí spéaclaí mór air' *he had big glasses on-him* (no. 34) and could be from the rule that places adjectives after the noun/pronoun. This sentence also targets the production of a plural adjective 'móra' *big(pl)* which is necessary after a plural noun ('spéaclaí' *glasses*). Other sentences targeted production of an indirect object following transitive verbs (i.e. whether the child would add the necessary object following a verb such as 'tabhair' *give*; no. 33) and the addition of clause element such as adverbials as described above (e.g. 'sin bus ar an tsráid' *there is a bus on the street*; no. 38). These sentences also assessed lenition following prepositions (33) and the initial mutation which places a 't' before 's' following preposition + article (no. 38).

An increase in syntactic complexity through the expansion of embedded clauses was also targeted for noun phrases ('tá ceann eile briste agam' *I broke another one*; no. 32); prepositional phrases ('níl Daid imithe go dtí an siopa *dad has not gone to the shop;* no. 31) and verbal phrase idioms where the complement noun phrase necessitates the inclusion of a preposition ('ba mhaith liom imirt leis an mbábóg' *I want to play with the doll;* no. 36). The expansion of phrases through coordination with 'agus' *and* was also addressed ('téigh síos agus faigh ceann dom' *go down and get me another one* no. 27) and was described by Owens (1992) as one of the earliest examples of subordinate complements. Other examples of subordinate clauses included the use of 'mar', *because*, which Owens (1992) also noted was salient for children ('faightse liathróid eile mar is liomsa í seo' *you-get another ball because this is mine*; no. 29); 'chun' *to* ('oscail an

doras chun an madra a ligint isteach' *open the door to let the dog in*; no. 30) and 'dá' *for his* (compound of preposition 'do' *for* and preposition 'a' *his*) with obligatory lenition on the following noun in no. 37- 'Tá an buachaill ag gol dá p**h**eata' *the boy is crying for-his dog*.

The formation of interrogatives in Irish is relatively straightforward as already outlined, and is achieved by placing a clitic before the verb of the positive declarative statement. In yes/no questions the clitic 'an' is used for present/future tenses and 'ar' for past/conditional (which is also assessed in item 35). However questions involving a verbal noun complement with transitive verbs were noted by Owens (1992) as a common source of difficulty for early second-language learners of Irish. This is because the complement involves a change in the canonical word order of Irish to SVO. For example, item 35 involved the direct relative particle 'a' + lenition, including a possible error by placing the verbal noun before the object:

	*Ar mhaith	leat	a	thógáil	teach?'
Lit:	*Q-good*	*with-you*	*particle build(Vn) house?*		

followed by the correct order:

	'Ar mhaith	leat	teach a thógáil?'
Lit:	*Q good*	*with-you house build(Vn)?*	

Gloss: *Do you want to build a house*?

In addition, sentence no. 30 targeted the production of a subordinate clause with the direct relative 'a' in the clause 'chun an madra a ligint isteach', *to let the dog in,* which also involved reversing the word order. Finally, the syntactic structure of comparative sentences with subordinate clauses was examined in no. 39 'tá mise níos mó ná Síle' *I am bigger than Síle*, which also addressed the obligatory inflection of the adjective 'mór' after the comparative.

2.4 Summary

Adapting the MCDI involved integrating previous Irish language acquisition studies, theories on universal features of child language acquisition, and the hypotheses of the researcher as to what might be salient features of Irish for children acquiring the language. Key features recommended by the original creators of parent-report assessments included targeting current levels of functioning that occur with enough frequency to be noticed and using a recognition format to reduce memory demands. Attempts were also made to stay as close to the original MCDI as was appropriate so that later cross-linguistic comparisons could be made. Following this adaption, the next phase of the study involved a pilot group of parents from the main sample completing the form and comparing the results to spontaneous language samples and general development of their children. Having the researcher present also allowed for the instructions to be elaborated on and to involve discussions with parents as to the types of developmental errors that their children may be using that were not targeted in the adaptation. This process is described in the following chapter.

3 The Pilot Study

3.1 Background to the Pilot Study

This chapter provides a summary of the pilot testing of the early-adapted MCDI to Irish, based on a small sample of children aged 16-30 months. As the initial participant recruitment identified very few participants who met the criteria for the study (outlined below) only four children were included in the pilot study. The aim was to create a more refined assessment from the initial adaptation reflecting the feedback from parents and qualitative findings from a spontaneous speech sample taken at the same time as the parent report. Once a more valid checklist was developed, it was then used longitudinally in the next phase of the study to monitor the language development of a larger sample of children. This chapter outlines the procedures used to recruit participants, the methodology used for the pilot phase and provides a detailed description of the language profile of the four children used in the sample. After this the refined adaptation to the ICDI form which was to be used in the remainder of the study is discussed.

3.1.1 Language Background of the Researcher

The principal investigator in this study is not a native speaker of Irish, but is reasonably fluent in the Munster dialect of the current study and during the course of the research, completed a University Higher Diploma in the language and became active in Irish-language University organisations. All of the verbal and written correspondence with the families and organisations involved was conducted primarily through Irish during the study. Nonetheless, the fact that the researcher was not a native speaker must be taken into account when addressing the outcome of the study, as some hold that successful investigation into a minority language requires the researcher to be sensitive to the context of the study, to have a willingness to overcome difficulties and an honesty about their own identity, their attitude towards the language and bilingualism as well as the agenda of their research (Wei, 2000, cited in Brennan, 2004).

3.2 Methodology of the Pilot Study

3.2.1 Selection Criteria

As the aim of the study was to focus on the acquisition of Irish as a first or majority language, one of the selection criteria for inclusion in the study was that Irish had to be spoken in the home at least 60% of the time (based on parental estimation in the background questionnaire, Appendix 4), allowing for inevitable exposure to English from television, visitors and occasional child minders. As already outlined, the parent checklist acknowledges the language contact situation by including a column where parents can indicate whether the child used the word in Irish, or English or both languages. Other criteria included that the children had no significant illness, were not more than six-weeks premature and had no speech, language and/or developmental difficulties. The children also had to be between the ages of 16 and 30 months, and to have started some word attempts as the checklist targeted expressive language only. In order to establish the level of exposure to Irish among the children, a bilingual background questionnaire (see Appendix 4) was developed for the project and designed to provide a comprehensive picture of the English and Irish input for each child. Parents indicated the primary language of the home as well as the language(s) they and others in regular contact with the child used with each other and with the child and the estimated proportion of time these languages were used. Other background questions included general health and developmental questions about the child, birth order, family size and questions regarding parental levels of education and occupation, although parents were not selected or excluded based on these factors.

3.2.2 Participant Recruitment

In the initial phase, contact was made with some of the main organisations that promote the Irish language and with Irish-language educational institutions, providing them with information about the study and inviting them to forward the information to interested families. All information was available in both Irish and English (see Appendix 5). The organisations and individuals contacted included:

- *Comhluadar*- a national organisation which supports parents who want to speak Irish with their children and bring them up through Irish
- *Comhairle na Gaelscolaíochta*- the council for Irish-medium education founded by the Department of Education
- *Gaelscoileanna*- a voluntary organisation to support Irish-medium education
- *Forbairt Naíonraí Teoranta*- a voluntary organisation to support education and child care services for preschool children through the medium of Irish
- *Tús Maith*- a family support project in the West Kerry Gaeltacht ('Chorca Dhuibhne') which provides visiting teachers to support families who wish to speak Irish in the home with their children
- *Údarás na Gaeltachta*- a government supported organisation which promotes economic and cultural/language development activities in local Gaeltacht communities and funds many of the Irish-medium preschools 'naíonraí'
- Public heath nurses for Gaeltacht areas across Munster who may be familiar with families speaking Irish in the home
- Irish-medium schools across Cork and Kerry
- The Irish-language development officer of the Heath Service Executive (HSE), Southern area

Following this, telephone contact was made with families who expressed interest in the project. They were given further information about what would be involved in the study and were invited to ask further questions. If parents fit the selection criteria and agreed to take part, they then were sent and completed a consent form which addressed issues regarding the information received, as well as confidentiality for the videotaping (see Appendix 6).

3.2.3 Participants

Considering that less than 4% of the population speak Irish as a first language, and that even fewer than this would be under 30 months, the initial drive for participant recruitment identified a relatively small number of children. Initially there were seven families who were willing to take part, and all of them from Chorca Dhuibhne in West

Kerry (mostly recruited through the 'Tús Maith' *A good start* scheme mentioned above). However, additional subjects were recruited when word of mouth spread amongst the individuals and organisations contacted in the early phases of the project and also when siblings of those involved reached the appropriate age for inclusion. Some families who were claimed to use predominantly Irish in the home could not be included as the parents reported that although the children could understand Irish, they always responded in English. This was most likely due to the fact that English was still the majority language used for most of the child's waking day, because they either attended an English-speaking child minder on a regular basis or they lived in predominantly English-speaking areas (generally outside of the Gaeltacht). This factor and the trend towards the decline of Irish as a spoken language (CSO, 2007) made subject recruitment difficult. In the complete study there were twenty-one children recruited for the study which was lower than expected and restricted the statistical power of the findings. Information regarding all twenty-one children included will be outlined in the next chapter.

The pilot form was designed to measure the vocabulary and grammatical abilities of children aged 16-30 months, in line with the original and many adapted forms of the MCDI: Words and Sentences. However, as will be outlined below, the first child tested in the pilot phase (aged 27 months) failed to achieve 50% of the vocabulary or grammatical targets. Therefore, it was decided to extend the age range to 40 months in order to explore the language abilities of children up to and including this age, and to determine the suitability of the instrument for older children. This is also in line with the new extension of the MCDI, known as the CDI-III (Fenson et al., 2007) for children up to 37 months, and the Swedish version of the CDI, which found that many aspects of early Swedish grammar were acquired after the age of 28 months and concluded that the grammar scales can be extended to older children (Berglund & Eriksson, 2000). Moreover, because of the inevitable exposure to English, some children could be considered to be sequential bilinguals, which may have affected their rate of language acquisition (Tabors, 1997), and so the inclusion of older children could reveal interesting outcomes. After 40 months however, it is questionable as to how valid parent report is, and other methods such as direct sampling, elicitation and standardised testing (where possible) are considered more appropriate (Dale et al., 1989). Table 3.1 below outlines the background information

regarding the four children involved in the pilot phase. For anonymity, the children were allocated identifying numbers, ranging from ICDI 1 to ICDI 4 below in order of their participation in the study.

Table 3:1 Background information of children in pilot testing phase

Subject	**Gender**	**Age** (months)	**Family Position**	**Mother's L1**	**Father's L1**	**% Irish in the home**
ICDI 1	F	27	4th	Irish	English	85%
ICDI 2	M	40	2nd	English	Irish	100%
ICDI 3	M	18	1st	Irish	English	100%
ICDI 4	M	24	2nd	English	Irish	100%

All four children in the pilot study were from the West Kerry Gaeltacht 'Corca Dhuibhne'. There was one girl aged 27 months and three boys aged 18, 24 and 40 months. All four children were reported to have spoken their first words between 11 and 13 months. Three of the mothers had received up to 3rd level education and the fourth had received education up to secondary level. Three of the fathers had also received up to 3rd level education (one of whom had post-graduate education) and the other father had received secondary level education. All of the families spoke the Munster dialect of Irish and three families reported 100% use of Irish in the home. The remaining families reported using Irish 85% of the time as it was noted that older siblings had started to speak English on occasion because of their increasing bilingualism. For all the families involved, at least one parent had Irish as a first language (two mothers and two fathers) which was reported to encourage them to bring their own children up through Irish. Those who did not speak Irish as a first language however reported that they had varying degrees of bilingualism in their own homes and always had an affinity with the language. For two of the children their mother was the primary caregiver, although one attended an Irish-medium preschool for four mornings a week where Irish was used over 75% of the time. Another child attended a child-minder five days a week, where Irish was used over 75% of the time and ICDI 3 attended a childminder for six months of the year (when his mother was involved in seasonal work) and Irish was used less than 25% of the time in this environment. None of the children had any report of health or developmental difficulties and there was no reported family history of speech and language difficulties.

3.2.4 Procedure

The children and parents were visited in their own homes at pre-arranged convenient times, particularly when older siblings were at school. Following a brief introduction where the procedure was explained to the parents and further questions answered, the following measures were completed:

a) Parent report form (ICDI)
b) Spontaneous language sample
c) Test of Pretend Play (ToPP); (Lewis & Boucher, 1997)

The parents were given an explanation and introduction to the parent report form and asked to complete it while the researcher familiarised herself and played close-by with the child. Completion of the form was carried out in a more open-ended format and parents were encouraged to suggest alternative words or sentences, as recommended for early CDI adaptations (Dale et al., 1993). Additional vocabulary items were scored accordingly. Parents were instructed to report on spontaneous production of the word rather than elicited repetition or imitations. The child was to be credited with a word even if they did not pronounce it accurately (e.g. 'wada' was accepted for 'madra', *dog*). Care was taken to remind parents to include dialectical variants not part of the 'caighdeán' or standardised language (e.g. 'tráigh' for 'trá', *beach*) or other word alternatives (e.g. 'casóg' for 'cóta' *coat*).

Depending on the age of the child and their level of expressive language, the checklist took between 20 and 60 minutes to complete. Following this, a conversational sample of approximately 15 minutes involving the parent and child (and sometimes involving a sibling for part of the sample) was recorded using a high quality Sony digital camcorder (model DCR-HC18E). The same parent who completed the ICDI checklist was involved in the language sample. Although the researcher remained in the room, she did not interact with the child during this period. Parents were provided with a standard set of toys in an attempt to reduce variability across the language samples (a doll's house containing four dolls, a dog, a car and five sound effects) as well as a selection of Irish picture books such as 'Céard é féin?' *What is it*? and 'Sa teach' *In the house* (An Gúm,

1994), and 'Céad Focal: The first hundred words' by Gill and Macmillan (2003). They were then asked to play with the child as he or she would normally do at home.

The third measure was the Test of Pretend Play (ToPP), a standardised assessment that tests the child's ability to produce symbolic play through structured nonverbal modelling and eliciting techniques, thus eliminating language comprehension variables. It was designed by Lewis and Boucher (1997), to measure various aspects of symbolic play such as object substitution and whether the child can sequence symbolic actions into meaningful scripted play. The items are organised into four sections:

- Section I assesses the child's ability to make reference to an absent object using everyday objects.
- Section II examines the child's ability to substitute one, two, three and four pieces of non-representational material for pretend objects in a related way in symbolic play with a doll.
- Sections III and IV look at the child's ability to engage in symbolic play with a teddy or themselves respectively, assessing substitution (substituting the toy/themselves for another object/person), property attribution (attributing an imaginary property to the toy/themselves), reference to an absent object and carrying out a sequence of at least three related pretend actions.

(See Appendix 7)

The ToPP has been found to strongly correlate with language scores in both typically developing populations (Lewis, Boucher, Lupton, & Watson, 2000) and those with language and developmental delay (Clift, Stagnitti, & DeMello, 1998; O'Toole & Chiat, 2007), which led researchers to conclude that it provides a reliable assessment of conceptual and symbolic skills that also underlie language. As the test can be administered nonverbally, it can be used with children for whom English is not their first language to give an overall measure of their development which is strongly related to language abilities. It was chosen for the current study as there are no standardised assessments available in Irish. The test is preceded by a warm up session to familiarise the child with the test and to establish whether the child has the capacity to engage in symbolic play. Then the child's ability to play symbolically is assessed by modeling symbolic play for the child to copy and by eliciting original symbolic play using

nonverbal means such as gestures or pointing, and short phrases such as 'Liam déan é' *Liam do it* or 'taispeáin dom' *show me* to encourage the child to produce his or her own play (see Appendix 7 for examples of symbolic play targets). The test takes between five and fifteen minutes to complete depending on the child's level of attention and cooperation.

3.3 Data Analysis

Quantitative and Qualitative analyses from the ICDI, spontaneous language sample and ToPP taken during the pilot study will now be outlined, and are similar to the analyses used in the later part of the study.

3.3.1 ICDI Checklist

All four checklists were entered into the SPSS (Version 12.0.1; 2004) programme for analysis. Language measures from the ICDI checklists included the following:

- *Total vocabulary*: the composite* number of words checked by the parent based on all 23 vocabulary categories
- *Total Irish vocabulary*: the total number of words checked by parents, excluding any words the children *only* knew in English
- *Total English vocabulary*: the total number of words checked by parents, excluding all the words the child *only* knew in Irish
- *Regular Morphemes* ('Word Endings- part 1'): the number of regular bound morphemes to which the parent reported the child used 'sometimes' or 'often'
- *Irregular nouns and verbs* ('Word Forms'): the number of irregular noun plurals (8) and verb tenses (20) reported by the parents
- *Overgeneralisations* ('Word Endings- part 2'): the number of noun overgeneralisations (for plurals and initial mutations) from 22 examples or verb overgeneralisations in past, present and future tense contexts from 40 examples which parents indicate their child used.
- *Combining Words*: how often (not yet/sometimes/often) parents specify their child joined two words together.

- *Maximum Sentence Length* (M3L): the mean length of the three longest sentences provided by the parents in words (which is held to be more reliable than MLU in morphemes for Irish, (Hickey, 1991)). Children who were reported to not yet combine words were assigned an M3L score of 1.0 (as in Fenson et al. 1994), compound words (e.g. seatbelt) were counted as single words and English loan words/code-switching were also included when estimating the sentence length
- *Grammatical complexity*: the total score derived from the final section of the ICDI where parents select the most complex sentences their child is currently using from a selection of 3-4 sentences arranged in increasing complexity.

*This measure of 'composite vocabulary' is calculated as the sum of the number of concepts reported in English only (i.e. child says *bath* not 'dabhach'); Irish only (i.e. child says 'madra' not *dog*) and both English and Irish (child says *bye* and 'slán'). This is because the total number of expressive vocabulary items across both languages for bilingual toddlers is the closest equivalent to expressive vocabulary scores reported for monolingual toddlers (Pearson, Fernández, & Oller, 1993). Thus a child received credit for only one concept when equivalent words are reported in both languages as was carried out for bilingual children assessed on the CDI by Marchman and Martinez-Sussmann (2002).

As described in Chapter 2 on the adaptation, some words were difficult to categorise in both the checklist and the spontaneous language sample as being either Irish or English as they have similar pronunciation (e.g. /pitsa/ for 'píotsa' and *pizza*) or they involved proper nouns and were the same word in the two language (e.g. banana). Although some parents could instinctively tell if their child was using the English or Irish version of the homonym, others were unsure and so as they reported a majority of Irish words, it was decided to categorise them as Irish in these instance also.

3.3.2 Spontaneous Language Sample

The entire videotaped conversational samples were transcribed in full accordance with the Codes for Human Analysis of Transcripts (CHAT), (MacWhinney, 2003) conventions which is part of the Child Language Data Exchange System (CHILDES, MacWhinney, 2000). As the phonological development of the children was not included

as part of the study, the utterances were not phonetically transcribed. However, if an initial mutation was used, it was included in the orthography and words were entered in their adult format, regardless of how the child produced them (in line with the MCDI). English words were also coded (using the symbol '@s' to indicate second language) so that they could be compared to the amount of English words noted by parents on the ICDI checklist. A sample of a transcribed CHAT file from the current study in contained in Appendix 8.

The CHILDES system also has language analysis software called CLAN (Computerised Language Analysis) which can be used to calculate a number of linguistic measures based on the child's spontaneous language sample and were important to validate the ICDI. These include measures of lexical density and diversity, which reflect the variety and specificity of the words and topics a child can talk about and partly the breadth of topics that can be discussed (Owen & Leonard, 1992). Measures of lexical diversity are intended to reflect the variety and specificity of words that a child chooses to use, and as they are based on what the child actually says in a given timeframe, they represent an estimate of how many words a child knows well enough to use in everyday conversations and make for excellent comparisons with parental checklist data (Owen & Leonard, 2002). Due to the limited knowledge on the acquisition and development of Irish, it was unclear at the outset which lexical diversity measures would most reliably capture the development in the data, and so three measures were calculated.

One measure of lexical diversity is the number of different words (NDW), and in line with Dale (1991), NDW measures were based on 100-utterance samples in the current study. Another measure is Type-Token Ratio (TTR), an index of vocabulary diversity which gives a ratio comparing the number of different words to the total number of words in a given sample. The larger the ratio of types of words to tokens, the less frequent the repetition of words in a sample (Owen & Leonard, 2002). TTR is often used in studies of early language development, although is held to have limitations including a dependency on sample size, sensitivity to high frequency words and lack of developmental change and reliability in the preschool and school years (Richards & Malvern, 1997). This led to the development of another measure of vocabulary diversity,

known as ‘D’ by Richards and Malvern (1997). Calculation of D involves mathematical modeling to compute the probability of introducing new vocabulary into progressively longer language samples, partly based on random sampling, and is computable via the VOCD function in CLAN. The higher the D value, the greater the lexical diversity (Malvern & Richards, 2000), D is held to be independent of sample size and more informative than TTR as it represents how the TTR varies over a range of token size (Owens & Leonard, 2002). In CLAN, ‘D’ is measured based on all intelligible and partly intelligible words (i.e. those marked with a < >? in the CHAT file) and, much like the ICDI, takes the production of a vocabulary item as evidence of the word being present in the child's lexical repertoire.

CLAN can also be used to calculate grammatical measures from language samples. There are a number of different measures that can be taken, including codes to assess morphology, although these have not yet been developed for Irish. For the current study therefore, the mean length of utterance in words (MLUw) was estimated based on the final 100 complete and intelligible utterances of the spontaneous language sample, (i.e. not those transcribed as xx in the sample) and is considered to be a reliable indicator of verbal complexity and grammatical development in both child and adult speech (Bornstein & Haynes, 1998). In addition, the FREQ command of the CLAN programme was used to determine whether the child used any of the regular morphemes or irregular word forms targeted on the ICDI checklist. As in the parent checklist where the child was credited with knowing the word if it was used ‘sometimes/often’, if the child used the morpheme on one occasion, they were credited with ‘knowing’ that morpheme. Although in general, more than one example of a target morpheme was used in the sample, so the researcher could be sure that the child was using it productively. Words that are generally learned in the plural form (‘stocaí’ *socks*, ‘buataisí’ *boots*, ‘bróga’ *shoes*) were not counted as plural markers. The measures derived from the spontaneous samples were important when addressing the validity and reliability of the ICDI checklist, as will be outlined in Chapter 5 later.

In summary therefore, the CLAN programme was used to obtain the following vocabulary and grammar measures:

- *Total Number of Words* (TNW): based on a 100-utterance sample
- *Number of Different Words* (NDW): based on a 100-utterance sample
- *Type-Token Ratios* (TTRs): taken from the 100-utterance sample
- *VOCD (or D)*: a measure of vocabulary diversity based on the entire sample size
- *Number of English words:* based on the 100-utterance sample
- *MLUw*: based on the final 100-utterances in the sample
- *Number of regular morphemes*: based on six morphemes targeted in the ICDI section II.A
- *Number of irregular word forms*: based on the 8 irregular noun plurals and 20 irregular verb tenses targeted in section II.B of the ICDI checklist
- *Test of Pretend Play*

Performance on the ToPP was scored during the administration of the test and double-checked against the video data according to the test instructions. An original example of appropriate pretend play scores twice as much as play in response to modelling. The child's total raw score from the structured test is converted to an age equivalent from the normative table in the manual. Samples of targeted play can be found in Appendix 7.

3.4 Results from the Pilot Study

Table 3.2 below outlines the results of the ICDI vocabulary and grammatical items (in terms of length of three longest utterances (M3L) and complexity scores) and the measures obtained from the spontaneous language sample. Overall the parents responded well to the checklist and were willing to suggest changes and additions to the checklist based on their own observations of their child's language skills and their experience of contemporary Irish. As recommended by Dale et al. (1993), additional words were included in the total vocabulary at this stage of the adaptation. The children reached the general language milestones as expected, that is, their first words were produced at around 12 months, and by 24 months they could produce over 50 words (Golinkoff & Hirsh-Pasek, 1999). From 24 months on, the children were reported to be combining words 'often' and from this age were also beginning to include words with a

grammatical function (pronouns, prepositions etc.) in their sentences although, as will be outlined in later chapters, there were some differences in grammatical acquisition from crosslinguistic studies based on the MCDI, which warranted further investigation.

Table 3:2 Results from Parent report and Spontaneous Language Sample

Subject	**Age** mths	**ToPP** (AE)	**ICDI** Vocab. Score	**NDW** (spon)	**TTR** (spon)	**D** (spon)	**Compl-exity**	**M3L**	**MLU** (spon)
ICDI 3	18	15.3	16	18	.22	2.2	0	1	1.07
ICDI 4	24	17.3	168	69	.38	32.65	35 /150	3	2.87
ICDI 1	27	29.3	387	129	.49	69.23	40 /117	4.33	1.51
ICDI 2	40	21.3	582	73	.45	82.36	131/150	7	1.82

(AE= Age Equivalent)

Visual inspection of the data reveals that, most of the measures increased with age, apart from NDW, TTR and MLU which, perhaps because of individual varation due to personality, talkativness and the context of the interaction, did not. Comparing the total vocabulary scores on the ICDI and those from the spontaneous sample, it seems that TTR did not capture the developmental progress for the children as well as the other measures (as ICDI 2 had a higher TTR score than ICDI 2, who had a larger vocabulary). The complexity scores of ICDI 1 and 4 are quite similar, and could be due to the fact that there were additional and more simplistic options available following the initial pilot for the parent of ICDI 4 to choose from, thereby increasing the child's score. It is also evident from the form that M3L is higher than the MLU found in the spontaneous language samples, although it must be remembered that M3L is based on the maximum number of words a child is using as opposed to an average over a wide range of utterances. In any case, the MLU from the spontaneous sample also increased with age and vocabulary size (although was slightly reduced for ICDI 1 as the child used many single utterance responses to questions). Age equivalent scores on the ToPP also increased with age, although not in the same degree for all children. Anecdotally, it appeared that the child's performance on this symbolic play test was related to their personality; those who were outgoing performed well and those that were shy did not always cooperate and so achieved a lower score. This is evident in the score of ICDI 1

which was much higher than the older child ICDI 2. Nonetheless, for exploratory purposes the raw scores on the ToPP were entered into SPSS and partial correlations with vocabulary, controlling for the affects of age, were significant ($r = .998$ $p < .05$), demonstrating that the ICDI is capturing the range of development in a similar way to the ToPP. Given the low number of subjects this outcome must be cautiously regarded.

As there were only four children involved in the pilot study, qualitative analysis of the checklist and spontaneous language samples from each child were also carried out and will initially be outlined beginning with youngest child and ending with the oldest child. This will be followed by a summary of the resulting adaptations made to the ICDI checklist for the main phase of data collection.

3.4.1 Results from ICDI 3

This child was an 18-month old boy, who had a vocabulary of just 16 words, and was still using lots of babble and jargon at the time. These words were predominantly from the 'social words' category, with five sound effects and animal sounds, five names for people and three words from games, routines and phrases. A suggested addition to the checklist was 'ta ta' which is a routine often used with very young children to elicit *thank you* instead of the more complex '(go raibh) maith agat' of Irish. His mother reported that he was not yet using language to talk about things that were not present, to talk about the future or about possessions. However she reported that he occasionally used language to talk about people who were out of sight and could sometimes understand simple requests for objects out of sight. In the spontaneous language sample he used mostly babble and jargon, although was beginning to approximate words, used in the appropriate context (e.g. 'lacha' *duck*; 'quack'; 'neo' and what sounded like 'oh dear' when something fell).

3.4.2 Results from ICDI 4

This 24-month old boy was the second of four children and achieved a vocabulary score of 168 items, 90% of which were Irish only. Suggested alternatives to the vocabulary checklist included the addition of 'cíonn' *see* as a variant to the present tense

of ‘feic’ and acquired early by children through games and routines involving *I spy* etc. It was also reported that the child wasn’t using pronouns (apart from ‘mise’ *me-emphatic*) and as will be described below for ICDI 1, and used his own/others names when a pronoun was required. Contrary to what was expected, this child was not reported to use the preposition ‘suas’ *up* although he was reported to use ‘thuas’ (lit- *to be up*), which led to its inclusion in the final draft of the checklist. For regular bound morphemes it was reported that he was often using the progressive particle ‘ag’ but was not yet using the other targets (e.g. regular plurals and past tense). He could use one irregular plural (‘ba’ *cows*) and there were no examples of overgeneralisations reported. The three longest utterances reported gave an M3L of 3 and included:

1. Tá Daidí deas (lit- *be-pres Daddy nice; ‘Daddy is nice’*)
2. ‘baby ag gol’ (lit- *baby at cryVn; Baby crying’*)
3. ‘baby ag rince’ (lit- *baby at danceVn; ‘baby dancing’*)

For the complexity items he achieved a score of 35 out of a possible 150. Again the items chosen involved ‘tá’ *to-be* omission and interestingly, for items involving lenition on past tense (e.g. t**h**it mé), it was reported that he was more likely to use a structure similar to ‘(own name) tithe’ *(name) fallen*, with the verbal adjective (past participle). The most complex item selected for this section involved the progressive sentence ‘Mamaí ag glanadh’ *Mommy is cleaning*, which was in keeping with the reported longest utterances.

A spontaneous language sample was taken during a picture book reading activity with his mother and the analysis matched well with the parental report. A detailed review of this sample revealed that the first negative he used was ‘neó’ in a single construction. Some of his two-word sentences involved noun + adjective with correct word order in ‘bainne mess’, *milk mess* and ‘bréagáin deas’ *nice toys*. However on the last example he omitted plural marking on the adjective as required following plural nouns, prompting his mother to model the appropriate structure ‘bréagáin deas**a**, nach ea? *nice toys aren’t they?’*. He also used a two-word phrase SVAdj to indicate past tense in ‘Mom tithe’ *mom fallen* and ‘stocaí ‘mithe’ *socks gone*, as was reported in the parent form. The finding that he used the past participle before lenition for regular past warranted further investigation

and led to an addition of sentences addressing this developmental progression in the final version of complexity section, as will be outlined below. There was also one example of the progressive particle 'ag' and verbal noun in 'ag gol' *at cry (crying)*. Also in line with the parent-report was the observation of proper nouns used instead of pronouns.

3.4.3 Results from ICDI 1

This child was the first to be included in the pilot, and so some adaptations were made to the form based on the findings reported. As previously mentioned the biggest change was to include older children (up to 40 months), but also, as will outlined below, changes were made to the grammatical complexity section following testing. As revealed in Table 3.2, ICDI 1 at 27 months used a total of 387 out of a possible 826 vocabulary items. Most of her words (83%) were in Irish only, although 14% were only in English. It was noted that the family used lots of English loanwords such as *jeep*, *nuggets* (chicken nuggets) and '*jamies'* (from 'pitseámaí' *pajamas*) which were not on the form and although some were assimilated into the Irish phonology, the parent ticked these items under the 'English' column. For example loanwords 'sioráf' *giraffe*, and 'tíogar' *tiger* were marked under the English column perhaps as the family were not using the adapted phonology of Irish or because they were not accepted as true Irish words by the mother, a native speaker of Irish.

Additions to the form as suggested by the mother were 'abhaile' *homewards* for the semantic notion of *home* rather than the form 'baile' *home* which also means *town*. The word 'gort', *field* was suggested as it was more in keeping with rural life than the term 'páirc' *park*, and the loanword 'haló' *hello* which is phonologically simpler for children than the 'Dia dhuit' was also suggested. Variations expressed by the parent included the Munster term 'péileacán' for the dictionary entry 'féileacán', *butterfly* and 'hoover' instead of 'folús ghlantóir' *vacuum cleaner*. For descriptive words, it was reported that the child used the verbal adjective 'oscailte' *opened* rather than the form on the list 'ar oscailt' (lit *on-open, open*) and an alternative for 'tuirseach' *tired*, 'traochta' *exhausted* was also suggested. One interesting report was the term 'sasagí' *sausages*, instead of the dictionary form 'ispíní'. This revealed an interesting loan pattern, whereby

an Irish morphological marker is attached to an English noun base with and is described by Doyle (1996) as a 'partial' loanword. The deletion of the copula in phrases such as '(is) maith liom' *I like* as observed in previous studies (Hickey, 1990) was also confirmed. Finally, the parent reported that the child was using very few pronouns (only emphatic forms 'mise' *me* and 'tusa' *you* which was consistent with her spontaneous language sample and used a limited number of prepositional pronouns (mostly 1st person: 'agam', 'orm', 'dom', 'liom', & 'ort' *on-you*). Where pronouns were omitted, the parent reported that the child tended to use her own name or that of the subject referent.

In the section addressing sentences and grammar, the parent reported that the child was not as yet using any of the bound morphemes targeted (e.g. regular plurals, progressive particle 'ag', future tense marking etc.), even though the spontaneous language sample revealed that she was beginning to use some of these morphemes, albeit inconsistently. It may be that some of these aspects are not salient enough for parents to observe, although this needed to be confirmed from the wider sample. However, it was reported that the child was beginning to use some irregular past tense items including 'dúirt' *said*; 'tháinig' *came* and 'thug' *gave*. The first indication that the form could be extended to an older age group was when it was reported that the child was not using any overgeneralisations at 27 months however her older brother (at 42 months) had recently used overgeneralisations on plurals.

The three longest utterances reported from the parent included the following (names are changed for anonymity):

1. Dolly dul	a	chodladh	2. (child's name)	ag ithe dinnéar
Lit: Dolly goVn	particle	sleep	(name)	at eat(Vn) dinner
Gloss: *'dolly is going to sleep*'			*'(name) is eating dinner'*	

3. Nuala agus Máire ar scoil
Lit/Gloss: Nuala and Máire at school

This gave an overall M3L of 4.33, and 'tá' be-pres deletion noted in all three sentences, with 'ag' deletion in 'ag dul' in the first sentence although it was reported to be present in the second sentence.

The final section of the ICDI completed by the parent was that of grammatical complexity. However, many of the items in the complexity section could not be selected by the parent as the sentences involved the use of a pronoun, something which this child avoided. For example, instead of using a pronoun in 'bhí mé ag snámh', *I was swimming*, or 'is maith liom Lego' *I like Lego*, the child would use a structure similar to '(name) ag snámh' or 'maith le (name) Lego'. This resulted in a score of '0' for many of the items and gave the child a score of just 40 out of a possible 117. It therefore became apparent that the complexity section was not capturing the developmental progress in sentence structure in Irish and that additional and simpler sentence structures were needed. It was decided that these changes should be made prior to the second pilot testing, so that they could be validated before the larger sample was involved. An example of one of the changes made is contained below for the target sentence *he had big glasses on*.

Bhí sé spéaclaí air mór	changed to:	Sé spéaclaí
Bhí spéaclaí mór air		Spéaclaí air
Bhí spéaclaí móra air		Bhí spéaclaí air
		Bhí spéaclaí móra air

This particular change was made because of the observation that the use of a prepositional pronoun 'air' *on him* may be acquired later, and so the earlier acquired pronoun 'sé' *he* (Hickey, 1990a) was included as an easier example. As the deletion of the auxiliary 'tá' in sentence-initial position was also confirmed from the first pilot, an example of deletion of the past tense of the auxiliary ('bhí', *was*) was included as a step prior to the more complex 'bhí spéaclaí air' *he had glasses on-him*. Therefore, although the target sentences largely remained the same, the developmental progress towards these sentences was broken down into smaller steps than in the original adaptation. Thus by the time the 2nd pilot was carried out, there was now a choice of up to 150 sentences instead of the initial 117 (broken into 39 groups of sentences). The changes made to the complexity section and the rest of the ICDI will be outlined in greater detail following a summary of all four children in the pilot study.

The spontaneous language sample of approximately 20 minutes was also taken and involved the target child, parent and an older sibling engaged in free play. The quantitative results from the spontaneous language sample are contained in Table 3.2 above. Some of the more interesting features of the sample included the emergence of progressive sentences with verbal nouns as in 'mise glanadh' (lit- *me(emphatic) clean(Vn)'me cleaning'*). This SVn clause structure was also described by Hickey (1992) and deletion of the progressive particle 'ag' was noted. There was also evidence of 'neó' *no* as a general negative in 'neó mótar sin jeep' (lit- *no car that's a jeep*) and 'neó teacht anuas mamó in aon chor' (lit- *no comeVn down-from-above granny at all 'Granny isn't coming down at all'*). This sentence (the longest of the entire sample) had two formulaic phrases. The first involved the use of the directional preposition 'anuas' (*down from above*) in the formulaic phrase 'teacht anuas' *come down*. The second phrase 'in aon chor' *at all* was also used on another occasion but wasn't considered productive as it was above the child's general level of linguistic competence. Another formulaic negative response 'n'fheadar' *(I) don't know* (with the impersonal form of the verb 'feadair' *to know*) was used nine times in the sample but always appropriate in response to a C (as 'Wh') question, thus was productive. The use of formulas in early acquisition of Irish has also been pointed out by Hickey (1993). Although not reported in the parent checklist, the child did have one example of overgeneralisation on regular plural in her spontaneous language sample where 'bád' *boat* (plural 'báid') was produced as 'bádanna' from overgeneralising the '–anna' plural suffix. Finally, there was no evidence of prepositional pronouns in her language sample, although consistent with parent-report, the emphatic pronouns 'mise' ('mise ithe'; 'mise glanadh') and 'tusa' ('tusa dána' *you (are) bold*) were used as was the demonstrative pronoun 'sin' *that*.

3.4.4 Results from ICDI 2

As previously outlined, the results from the first pilot administration of the checklist led to the extension of the age range to 40 months, and so the second child was 40 months at the time of testing. As noted in Table 3.2 above, he achieved a vocabulary score of 582 items (91% of which were Irish items). The parental response to the vocabulary checklist was relatively straightforward, although additions to the animal

section included ‘ciaróg’ *beetle*, and ‘bearra’ was added to the clothes category as a generic term for *top*. ‘Cinn cín’ (lit *head of head*) is another word for *nose* and was used instead of ‘srón’ by this family. It was also reported that ‘pota’ *pot* is used more often than ‘sáspan’ and instead of ‘cófra’ this child used the loanword ‘press’ (the mother noted that it would be lenited in phrases as in ‘chuir sa p**h**ress é’ *put it in the press* and so it was considered a loanword). ‘Mair’ was suggested as an alternative to ‘cónaigh’ *live*, and ‘sraic’ another alternative for ‘réab/rois’ *tear*. The words suggested as alternatives were listed as synonyms of their original counterparts instead of making them additional items per-se. This child was also reported to be using many of the grammatical ‘closed class items’ and had a high number of prepositional pronouns auxiliaries and modal verbs, which was largely in keeping with his spontaneous sample. This was encouraging as it seemed that the checklist was capturing the developmental range of the children being tested.

In the regular morphemes section of sentences and grammar, it was reported that the child was sometimes using synthetic verb+person marking and lenition for regular past tense. He was often using the progressive particle ‘ag’ and future tense marking ‘-faidh’ etc, but not yet using regular plural endings (‘anna’ and ‘í’) or lenition in possessive phrases. In addition, he was credited with knowing a number of irregular noun plurals and past and future tense verb forms. His mother also reported that he was overgeneralising the ‘anna’ ending on occasion (e.g. ‘bádanna’ for ‘báid’ *boats* and ‘fearanna’ for ‘fir’ *men*) even though on a previous section she noted that he wasn’t using regular plural marking so perhaps it was not productive at this stage. Any mismatches between the spontaneous sample and ICDI in this case may have been because this mother was not a native speaker of Irish and it was noted that she didn’t have consistent command of the initial mutation system in her own speech. As it was also difficult for the mother of ICDI 1, a native Irish speaker, to identify some morphemes that were observed in the child’s spontaneous speech, this could suggest that a language like Irish with complex inflections is too difficult for parents, particularly those who are non-native speakers, to make judgments about. However, further validity and reliability measures outlined in Chapter 5 will return to this issue using the larger sample.

It was also reported that ICDI 2 was overgeneralising initial mutations (eclipsis) on ‘mbord’ for ‘bord’, *table*. In verb morphology, it was reported that he was using the unmarked imperative for both verbal noun (progressive) and future tense forms involving the irregular verb ‘faigh’ *get*. Examples reported were:

	Tá	mé	chun	é sin	a *fhaigh (for ‘fháil’Vn)
Lit	be-pres	me	to	it that	part get(imp)

Gloss: *‘I am going to get that’*

However, it was interesting to note that he used the correct word order reported for verbal noun complements in this example, including the ‘é’ insertion rule before the pronoun, which is typical of the Munster dialect (Ó’ Siadhail, 1989). An example of using the unmarked imperative form of the verb for the future tense was:

	an	*faigh	tú?	(for ‘gheobhaidh’ -fut)
Lit	Q-part	get(imp)	you?	

Gloss: *will you get?*

The two other longest utterances reported included:

	‘Féach,	tá	an baby sin	ag gol’
Lit:	Look(imp)	be-pres	the baby that	at cry(Vn)

Gloss: *‘Look that baby is crying’*

	‘Mamaí caithfidh	mé imeacht suas an staighre’
Lit:	Mammy must	me go(Vn) up the stairs

Gloss: ‘*Mammy I have to go up the stairs’*

As already outlined, the complexity section now contained additional targets and for some items, sentence examples of up to four possibilities. This child reached the ceiling on most of the constructions in the complexity sections (achieving a score of 131 out of 150), which again indicated that that form was capturing the range of grammatical development in Irish. It was reported that he was using many of the targeted bound morphemes including past tense marking (lenition); regular and irregular plurals; eclipsis

following preposition + article; and verbal adjective endings '–the' in 'imithe' *gone* which was a new addition to this section. Under 'functor' targets he could use progressive particle 'ag'; yes/no and 'C' type questions, prepositions and negatives (using present/future 'ní' and past 'níor' particles). His reported abilities with syntactic structure included accurate word order for comparative and progressive sentences, use of adverbial phrases and including an indirect object following transitive verb 'tabhair' *give*. Some of the developmental errors reported were the deletion of sentence initial copula 'is' and omission of lenition on adjectives following feminine nouns. He was also unable to expand noun phrases involving plural nouns plus adjectives (spéaclaí móra), was not using 'mar' *because* or 'agus' *and* to form subordinate clauses, and could not use the correct word order for verbal noun complements, as in 'ar mhaith leat teach a thógáil?' *would you like to build a house?*.

A spontaneous language sample was taken of the child reading books with his mother and in free play with a peer. Some of the main strengths observed in this child's language included a strong command of the pronoun system of Irish, including prepositional pronouns, personal pronouns and their emphatic counterparts as well as object pronouns and possessive pronouns. He was also using synthetic verb+person forms (e.g. 'chím' *I see*; 'táimid' *we are*) and marking regular and irregular plurals. Lenition was also observed in possessive structures 'mo fhiacla' *my teeth* (which was in contradiction to the parent report); in compound nouns 'taos fhiacla' *toothpaste* and following negative particle 'ní' in 'ní mhaith liomsa iad' *I(emph) don't like them*, although there were also examples of incorrect and omission of lenition. He used all of the elements required in progressive sentences (described VSVn in the ILARSP) 'tá siad ag triomú', *they are drying* and expanded sentences with an object to VSVnX of level IV of the ILARSP (Appendix 3) in 'táim ag lorg iad' (lit- *be-pres-I at seek them, 'I am looking for them'*). His use of negatives was productive at this stage, as demonstrated by his use of the negative form of the present substantive verb 'tá' in the following NegVXY (level IV) examples: 'níl fhois agam', *I don't know*; níl éinne eile '*there is no-one else'*; and expanded this to NegVXY+ in 'níl aon ceann dubh againn' (lit *be-pres(neg) any one black at-us, 'we don't have any black one'*). He also used the conjunction 'agus' *and* to join simple sentences:

‘bíonn sé imeacht suas agus beimid suas an díon

Lit: *be-habitual he go(Vn) up and be-us(future) up the roof*

Gloss: *‘he goes up and we will be up (on) the roof’*

Finally, he also used yes/no questions ‘An bhfuil sé seo? *Is this?* and ‘An bhfuil tusa (ag) imeacht ann?’ *are you going there*, which was in keeping with his parental report.

Some of the developmental errors noticed were the omission of lenition for regular past tense marking (used déin /dɛn/ *do* for /jɛn/ *did*); following the possessive pronoun ‘do’ *your* ‘*do buachaill’ *your boy*; following the quantifier ‘an’ *very* (‘*an crosta’ *very cross*) and following the preposition ‘sa’ in ‘*sa bus’ *in the bus*. Eclipsis was also omitted following the preposition ‘i’ in ‘*i béal’ *in the mouth*. Other developmental errors included word order errors in identificatory copula sentences ‘*sin é juice’ *that is juice* (for ‘is juice é’); ‘*sin í gorm’ *that is green* (for ‘is gorm é’ which also had an error in the gender of the pronoun which should have been masculine) and finally ‘*sin é bréagáin’ *that is toys* (which should also have had the 3rd person plural pronoun ‘iad’ *them*, in the correct form ‘sin iad bréagáin’). The use of ‘sin é’ or ‘sin í’ may also be formulaic at this stage which might explain the word order errors. Finally, there was some evidence of language interference when he used the plural marking ‘s’ of English in the phrase ‘trí gorms’ *three greens*, even though in general, Irish does not require plural marking on the noun following a cardinal number.

The findings from the study will now be analysed in terms of how they led to further adaptation of the ICDI to be used in the remainder of the study.

3.5 Adaptation to the ICDI following the Pilot study

As already outlined, one of the main changes in the ICDI was to increase the upper age limit targeted by the checklist from 30 to 40 months as the first child tested at 27 months failed to achieve 50% of the vocabulary and grammatical targets. Hickey (1990b) in her adaptation of the LARSP noted that the complexity of single word

morphology in Irish means that many inflections must be learned lexically and so comparable morphemes (e.g. regular plurals) are acquired relatively later than in English-speaking children. The changes outlined below were carried out in order to improve the validity of the Irish version of the CDI, which will be examined for the entire sample in a later chapter, as validity and reliability statistics for this small sample produced statistically unreliable results. The revisions made following the pilot testing to the various sections of the ICDI will now be outlined.

3.5.1 Adaptations to the Vocabulary Checklist

Changes made to the vocabulary targeted following the pilot testing were the inclusion of alternative and additional words that were found to be frequently used by the children in the spontaneous speech samples as well as some of the suggestions from parents. Because of the influence of English and dialectal variations, Irish has many synonyms, however instead of items being listed separately, many were listed side by side as possible variations of the same lexical item. For example the dictionary or standard translation of *car* is 'carr' or 'gluaisteán' (An Gúm, 2003). However, dialectal variations include 'cairt' and a loan word from English, 'mótar' which also had to be included. Parents were then encouraged to circle the one used by their child. Although all 23 categories of words remained, the total of words changed from 826 to 843 in the final adaptation. It should be noted at this point, that the vocabulary content was divided into common nouns (animals, toys, food/drink, clothing, body parts, small household objects and furniture/rooms); predicates (verbs and adjectives); social terms (animal noises/sound effects; people and games, routines and phrases) and closed class items (pronouns, prepositional pronouns, prepositions, questions words, quantifiers/ articles, helping verbs (modals/ auxiliaries), and connecting words). This was in line with previous research using CDI data, where 'words about time' and 'places to go' were omitted from the analysis of 'common nouns' as it was ambiguous whether lexical items in these categories were actually common nouns or grammatical items, and the researchers wanted to include only words that had a truly naming function (Caselli et al., 1999). For the sake of comparison these categories were also left out for the analysis of the Irish

items (although this resulted in a possible 71 or 13% of vocabulary items being excluded).

This also changed the overall proportion of vocabulary categories from the initial adaptation as can be seen in Table 3.3:

Table 3:3 Percentage of total vocabulary by categories across CDI adaptations

Category	**Irish** *(pilot)*	**Irish** *(final)*	**English (US)**	**Italian**	**Hebrew**
Common nouns	38.9%	41.2%	38.7%	39.25%	47.2%
Predicate	20.9%	21.7%	24.4%	24.8%	24.8%
Social words	9.7%	8.9%	9.7%	9.85%	*(not reported)*
Closed class	17.4%	18.2 %	15%	13.7%	7.5%

The overall changes resulted in a small increase in the overall percentage of common nouns, predicates and closed class items and a decrease in the percentage of social items in order to reflect the feedback received on the form. In the final Irish adaptation there were a lot more vocabulary items than in the English (US) or Italian versions but this was carried out in order to gather as much information as possible at this stage, and following more testing and frequency information, would result in a decrease in vocabulary to be more in line with the other versions.

Following the pilot, minor changes were made to the vocabulary checklist, including the addition 'ah ah' to 'sound effects' thereby increasing the number to 13. 'Ciaróg' *beetle* was added to 'animals', 'jeep' to 'vehicles' with 'trírothach' *tricycle* being replaced with 'long' *ship*. Other changes included the addition of 'bearra' to the category 'clothing' as a general word meaning *top* while 'casóg' was listed as a synonym of 'cóta' *coat*, and 'muince' *necklace* was removed as it was not recognised by parents. For body parts, 'ucht' was included as an alternative for 'cliabh' *chest* and 'cin cinn' for *nose* and for 'small household' items, tinned *food* 'bia stáin' and 'éadach soithigh' *dish cloth* were removed and 'pota' *pot* added. Results from the pilot study also led to 'press' a loanword from English, being added as an alternative to 'cófra', *cupboard* and gort' *field* and 'abhaile' *homeward* were added to 'places to go'. 'Píobán uisce' *water pipe* and

'croiteoir' *sprinkler* were removed from 'outside things' based on parental recommendations and 'feirmeoir' *farmer* was added to names for 'people'.

The category 'games, routines and phrases' underwent the most significant change following the pilot. The main changes included the addition of '*ta ta'* as an early form of *thank you* and an alternative to the complex '(go raibh) maith agat' (*lit- particle be good with-you*) of Irish; 'in aon chor' *at all* was also added; haló *hello* was listed as an alternative to 'dia dhuit' and'n'fheadar' *dunno* was included as an alternative to 'níl fhois agam' *I don't know.* The copula 'is' was presented in brackets as optional in the phrase '(is) maith le' *I like*, as the children tended to omit it, and 'más é' (*lit- if it is*) was added to 'le do thoil' (*lit- with your wish*) as an early form of *please*. In the category 'action words' or verbs, the imperative form was generally recognised by the parents although alternatives were suggested and so were listed alongside words that had the same meaning. For example 'gabh' was added to 'tar' *come*; 'bruíon' to 'troid' *fight* and 'mair' to 'cónaigh' *live*. 'Féach' and 'breathnaigh' which both mean *look* were added, as were 'feic' and 'cíonn' for *see*. 'Traochta' *exhausted* was included as an alternative to 'tuirseach' *tired* in 'describing words' or adjectives. Adaptations to the items under closed class following the pilot were minimal and only included the addition of directional prepositions 'thuas'/'anuas' and 'thíos'/'aníos' as previously discussed. The last part of this section of the checklist, 'how children use words' remained unchanged following the pilot.

3.5.2 Adaptations to Sentences and Grammar

Qualitative analysis of the spontaneous samples and ICDI data from the pilot study also led to additions and alterations to assessment of grammatical development. Although there were no changes to the section addressing the production of bound morphemes, four additional targets were added to irregular noun and verb inflections, including dependent forms of irregular verbs (as noted in the language sample of ICDI 2 at 40 months) such as 'chonaic' *saw* but 'ní fhaca' *didn't see* and 'gheobhaidh' *will-get* but 'an bhfaighidh?' *will (you) get?*

The section on overgeneralisation of nouns remained largely the same, although examples of overgeneralising the 's' plural were added based on pilot samples and would be expected in contemporary use of the language, given the language contact situation (Stenson, 1993). As can be seen in Figure 3.1 below, the section addressing overgeneralization of verbs was also rearranged into 'errors' or overgeneralisation on present, past and future tenses, and based on the pilot, included the use of the imperative or unmarked form of the verb for present, past and future-tense marking; errors in the use of dependent verbs as well as overgeneralising verbal nouns to past and future endings and future endings '-óidh' and '-fidh'.

C. CODANNA FOCAIL/PÁIRT 2 (Parts of words/ part 2)					
AINMFHOCAIL (22) (Nouns)					
bóanna	O	dorasaí	O	mbord	O
bádanna	O	solasaí	O	gcathaoir	O
fearanna	O	milseánaí	O	t-eitleán	O
beananna	O	leoraís	O	fhuinneog	O
iascanna	O	liathróids	O	mhadra	O
leoraíeanna	O	stocas	O	bhéal	O
leabanna	O	cairéads	O	*(eile?)*	
titheanna/ tigheanna	O	madras	O		
BRIATHRA (40) (Verbs)					
'Botúin' ag caint ar an am atá caite (Errors on the past)		*Botúin' ag caint faoi láthair (Errors on the present)*		*Botúin' ag caint faoin todhchaí (Errors on the future)*	
abair (mé)	O	(ag) imir	O	abair	O
beir (mé)	O	(ag) oscail	O	beir (mé)	O
bí (mé)	O	(ag) abair	O	clois	O
bris (mé)	O	(ag) beir	O	déanóidh	O
clois (mé)	O	(ag) clois	O	déin	O
déan/ déin (mé)	O	(ag) déin	O	faigh	O
dhéanamh (mé)	O	(ag) faigh	O	feic (mé)	O
faigh (mé)	O	(ag) feic	O	feiceoidh	O
feic (mé)	O	(ag) glan	O	ithigh	O
tar (mé)	O	(ag) tar	O	téigh(fidh)	O
téigh (mé)	O	(ag) ith	O	tarfaidh	O
thabhair (mé)	O	(ag) téigh	O	tabhair (mé)	O
oscailt (mé)	O	(ag) tabhair	O	an faigh?/ní faigh?	O
ar feic?/níor feic	O				
ar téigh? níor téigh	O				
(eile?)		(eile?)		(eile?)	

Figure 3.1 Final version of 'word structure'

The final version of the complexity section underwent significant change following the pilot study. These changes were largely based on the poor results from

ICDI 1, where the child's development was not captured by the examples, as the parent felt the sentences did not match her abilities and the developmental progression between each sentence target was too large. For example, initial mutations were examined under the first group of sentences addressing the production of bound morphemes. However, following the pilot, it was discovered that although children may have been using more complex sentences in terms of the number of words they could put together, they were not likely to be using the initial mutations involved. Therefore a more complex set of graded examples had to be included, allowing for this omission, and resulted in many sentences having up to four steps. The changes and additions from the original ICDI are highlighted in red in Figure 3.2, 3.3 and 3.4 below.

1. Tit! Tit mé! Titeas Thiteas!	○ ○ ○ ○	6. Madra bord Madra bhord Madra mbord Madra ar an mbord	○ ○ ○	11. Imríonn mise peil Imrí mise peil Imrím peil	○ ○ ○
2. Na bláth Na bláthaí Na bláthanna	○ ○ ○	7. Maith le mise Lego Maith liom mise Lego Maith liomsa Lego Is maith liomsa Lego	○ ○ ○ ○	12 Carr Daidí Carr Dhaidí Carr Dhaidí ag teacht	○ ○ ○
3. Na teachanna Na teachaí Na tithe	○ ○ ○	8. Stop Caint! Stopaigí caint! Stopaigí ag caint! Stopaigí ag caint anois!	○ ○ ○ ○	13. Seán imigh Seán imithe Tá Seán imithe	○ ○ ○
4. Carr mise Mo carr Mo charr	○ ○ ○	9. Mise deán túr Mise ag déan túr Mise ag déanamh túr Mise ag déanamh túir	○ ○ ○ ○	14. Mise múinteoir Bí mé múinteoir Bí-idh mé múinteoir Beidh mé I mo mhúinteoir	○ ○ ○ ○
5. Babóg beag Bábógín Bábóg bheag Bábóg bheag agamsa	○ ○ ○ ○	10. Mise féach eitleán Féach mé eitleán Fhaca mé eitleán Chonaic mé eitleán	○ ○ ○ ○		

Figure 3.2 Adaptations to sentences addressing the production of bound morphemes

Starting with the sentences targeting bound morphemes in particular, it is evident that the first item (no. 1) included an additional verb + pronoun phrase as a step prior to

synthetic verb+person marking, although sentences 2 and 3 which addressed the production of plurals were left unchanged. Sentence 4 was changed to include the pronoun ‘mise’ *me-emphatic*, as parents reported that this was the earliest pronoun to emerge, and did so before the possessive pronoun ‘mo’ *my*. In addition, the example overgeneralisation of eclipsis ‘*mo gcarr’ *my car* was removed as it was reported that children were more likely to overgeneralise lenition than eclipsis. The initial example of a noun + adjective phrase in number 5 included word order error ‘*beag bábóg’ which is more like English word order, but as word order errors were not reported by parents or found in the spontaneous sample, this was removed. Instead the production of diminutive morpheme in bábóg**ín** (small doll/dolly) was targeted as was the inclusion of a prepositional pronoun ‘agamsa’ *at-me(emhphatic)*.

In number 7 the copula ‘is’ was omitted from the first three examples (as was observed in spontaneous speech samples) and a sentence where the prepositional pronoun ‘liom’ *with me* used alongside the emphatic pronoun ‘mise’ *me*, prior to emphatic marking of the prepositional pronoun in ‘liomsa’ was included. Number 8 was a new example, addressing the plural person suffix (-igí) on the imperative form of the verb, and an additional step was added to no. 9 which allowed for the deletion of the progressive particle ‘ag’, as is common in child language. Sentences in no.10 also included ‘mise’ as an early pronoun as well as the use of the unmarked form of the verb (imperative) ‘féach’ *look* to indicate past tense. No. 11 was unchanged and the example of incorrect word order in the possessive ‘*Daidí carr’ *Dad’s car* was removed and replaced with the expansion due to the verbal phrase ‘ag teacht’ *coming* in No. 12.. No. 13 was also new and focused on the production of verbal adjectives as was salient in the spontaneous samples. Finally the pronoun ‘mise’ was added to no. 14 as an example of an easier sentence structure target and to assess early pronoun use.

The developmental progression towards grammatical function words is outlined in Figure 3.3, again with the main changes in red.

15. Mamaí glan	○	20. Geansaí ró mór	○	25. Tá sé póigín mise	○
Mamaí glanadh	○	Tá geansaí ró mór	○	Tá sé ag tabhair póigín mise	○
Mamaí ag glanadh	○	Tá an geansaí ró mór	○	Tá sé ag tabhair póigín mise	○
Tá mamaí ag glanadh	○	Tá an geansaí ró mhór	○	Tá sé ag tabhairt póigín domsa	○
16. Na cóta?	○	21. níl bris	○	26. Cad babín gol?	○
Na cótaí?	○	ní hea bris mé	○	Cad é babín ag gol?	○
Cá'il na cótaí?	○	Níor bris mé	○	Cén fáth an babín ag gol?	○
Cá'il ár gcótaí?	○	Níor bhris mé	○	Cén fáth go bhfuil a babín ag gol?	○
17. Neó nigh gruaig	○	22. Mam?	○	27. Neó naíonra	○
Ná nigh gruaig	○	Cá 'il Mam ?	○	Neó chuaigh naíonra	○
Ná nigh mo gruaig	○	Cá'il mam agam ?	○	Ní chuaigh mé naíonra	○
Ná nigh mo chuid gruaige	○	Cá 'il mo Mham?	○	Ní dheachaigh mé naíonra	○
18. Déan é	○	23. Síos!	○	28. Buachaill gol	○
Déan é sin	○	Téigh síos	○	Buachaill ag gol	○
Déan damhsa	○	Téigh síos ansin	○	An buachaill ag gol	○
				Tá an buachaill ag gol	
19. Neó cairéadaí	○	24 Mise snámh	○	.	
Ní maith cairéadaí	○	Mise ag snámh	○		
Ní maith liom cairéadaí	○	Bhí mise ag snámh	○		

Figure 3.3 Adaptations to sentences addressing the production of functor words

As can be seen, no. 15, and 28 were new sets of sentences addressing the acquisition of the progressive particle 'ag' and the auxiliary verb 'tá' in progressive sentences. Sentence 16 was also new and addressed the development of 'C' type questions (16) including the use of the 3rd person plural possessive pronoun 'ár' *our*. In no. 17, the first example replaced the negative 'níl' with 'neó' as this was more likely used as an early form of the negative. In addition, an extra step where the possessive pronoun 'mo' *my* was used before the addition of the quantifier 'cuid' *part* was added to this target. Sentences in no. 21 were changed to address the overgeneralisation of the present negative 'níl' (with 'neó' removed) and negative response 'ní hea' (lit- *is not*) which has also been found to be overgeneralised (Hickey, 1992).

Earlier versions of the MCDI (Dale, 1991) included sentence pairs that attempted to look at the nominal/pronominal balance of child language acquisition (i.e. children who would say 'you pretty' vs. 'Mommy pretty'). Following pilot testing of the Irish version, it emerged that Irish-speaking children initially use a predominantly nominal procedure due to the complexity of the pronominal system of the language. Therefore sentences involving the development towards the use of pronouns were included. According to the pilot results, prepositional and personal pronouns were more likely to develop for 1st person. Therefore, the focus of no. 22 was changed with 'agam' (lit *at me, mine*) targeted prior to 'mo' *my*, because of its frequent use in formulas and as it tended to be checked earlier in the pronoun section by the parents. No. 23 was moved from its original section on syntax as the focus was changed to the use of functor words by the inclusion of a demonstrative pronoun 'ansin' *there.* No. 24 focused on the development of a past progressive sentence (by using 'bhí') and the use of lenition in 'Shnámh mé' was deleted as the children were not reported to be using it in the pilot. Again in no. 25, 'mise' initially was used instead of the more complex prepositional pronoun 'dom' *to-me* and an additional step was included to allow for 'ag' deletion. No. 27 was also a new example where the dependent form of an irregular verb ('ní dheachaigh' *didn't go*) following a negative particle was targeted.

The final group of questions focused on the development of more complex sentence structures, and are contained in Figure 3.4 below, with changes marked in red. Again, changes to this section were based on feedback from parents and analysis of the spontaneous language samples.

29. Mise cailín (buachaill) Is cailín (buachaill) mise Is cailín (buachaill) maith mise	○ ○ ○	34. Tabhair dom é Tabhair domsa é Tabhair domsa an liathróid	○ ○ ○	39. Maith leat tógáil? Maith leat tógáil teach? Ar maith leat a thógáil teach? Ar mhaith leat teach a thógáil?	○ ○ ○ ○
30. Seacláid mise Tá seacláid uaimse! Tá seacláid agus cóc uaimse	○ ○ ○	35. Faigh liathróid Faigh tusa liathróid Faightse liathróid eile Faightse liathróid eile mar is liomsa í seo	○ ○ ○ ○	40. Mise maith imirt Maith liom imirt Ba mhaith liom imirt Ba mhaith liom imirt leis an liathróid	○ ○ ○ ○
31. Sé spéaclaí Spéaclaí air Bhí Spéaclaí air Bhí spéaclaí móra air	○ ○ ○ ○	36. Oscail doras Oscail doras madra Oscail doras don madra Oscail an doras agus lig an madra isteach	○ ○ ○ ○	41. Mise níor mór Tá mise níos mór Táim níos mór ná Síle Táim níos mó ná Síle	○ ○ ○ ○
32. Mise abhaile Mise dul abhaile Caith' mise dul abhaile Caithfidh mise dul abhaile	○ ○ ○ ○	37. Bris mise ceann Ceann briste agam Tá ceann briste agam Tá ceann eile briste agam.	○ ○ ○ ○	42. Neó dinnéar! Dinnéar ite Mo dinnéar ite Mo dinnéar ite agam!	○ ○ ○ ○
33. Níl Daid siopa Níl Daid dul an siopa Níl Daid imithe go dtí an siopa	○ ○ ○	38. Sin caoire Sin caoire sa gort Sin caoire istigh sa gort Sin caoire istigh sa ghort	○ ○ ○ ○		

Figure 3.4 Adaptations to sentences addressing the development of sentence structure

The first set of sentences in this group focused on the production of the identificatory sentences involving the copula, and was changed from errors involving the substantive (e.g. *Tá mé cailín), as parents dismissed this as 'droch-Ghaeilge' *bad Irish* of second language users. No. 30 was moved from functor words as it focused on the early production of coordination with 'agus' but otherwise remained unchanged. No. 31, as already outlined, was also simplified in terms of the development of prepositional pronouns, and no. 32 included a new set of sentences based on the sentence structure involving the modal verb 'caithfidh', as was noted in one of the longest reported utterances reported for ICDI 2. No. 33 was unchanged, and the formula targeted in no. 34 was expanded with a noun phrase ('an liathróid' *the ball*). Sentence 35 had an additional sentence included to address emphatic person marking before the subordinate clause

'…mar is liomsa í seo' *because this is mine*, and this target also had an extra step where the clause level was expanded from VS to VSO prior to the expansion with a subordinate clause. The subordinate conjunction was also changed from 'chun' *to* to the coordinator 'agus' *and* in no. 35, as Owens (1992) noted that 'agus' was the earliest form of clause combination and it does not require a change in word structure to the verbal complement as 'chun' does. As in other examples, no. 37 included the earlier-acquired pronoun 'mise' *me-emphatic* in the developmental progression to a passive construction 'tá ceann eile briste agam' (lit- *be-pres one another broken at-me; 'another one was broken by me'*). In no. 38 'páirc' *park*, was changed to 'gort' *field*, based on parents' recommendations, and an intermediate sentence was included to allow for the omission of lenition. This example was reanalysed as involving sentences focusing on syntactic structure (as opposed to the second type of sentences, those assessing functor words as previously categorised) because the main feature was now the clause expansion with an adverbial 'istigh sa pháirc' *in the park*. Sentence 35 was changed to allow for omission of the question particle 'an' as found in the pilot, where ICDI 4 omitted the 'an' particles in yes/no questions. No. 40 included more basic sentences towards the development of pronouns (with subject pronoun 'mise' *me(emphatic)* targeted before the prepositional pronoun 'liom' *with-me*) and 'bábóg' *doll* was changed to 'liathróid' *ball*, to omit the complication of lenition (as /l/ does not mutate). No. 41 was also changed, again with pronoun fronting as previous examples, but also to allow for the production of verb and pronoun prior to synthetic verb+person marking, which is developmentally more complex. Finally, no. 42 was a new set of sentences focusing on the sentence structure of transitive verbal adjectives- VSVAdjX 'Ta mo dinnéar ite agam'. This version of the Irish-adapted MCDI was then used for the remainder of the study.

3.6 Summary

Although there were a limited number of subjects included in the pilot study, it was a very important part of adapting the MCDI to Irish. The results led to modification of the original adaptations, which would improve the validity and reliability of the form in the larger study. The next chapter will outline the participants and methods used for the remainder of the study before addressing these validity and reliability issues.

4 Methodology of Main Study

As discussed in the previous chapter on the pilot study, the checklist was amended based on the findings from the first four participants. The updated version of the ICDI checklist was then used for the remainder of the study. This chapter will outline all of the participants included in the current study, the procedures used for the remainder of the study, including a specifically-designed task to elicit salient morphemes in Irish, and the procedure of data analysis. The following chapters will then explore the results of this data analysis in greater detail.

4.1 Participants

The same inclusion/exclusion criteria were used for the remainder of the project as outlined in the pilot study involving ICDI 1-4. Figure 4.1 below demonstrates the areas in Munster where all of the final twenty-one children were recruited from. As in the pilot study, the children were allocated identifying numbers (ranged from ICDI 1 to ICDI 21 and the time point of the data collection is indicated by the following number (i.e. ICDI 4.3 indicates child '4' at time '3').

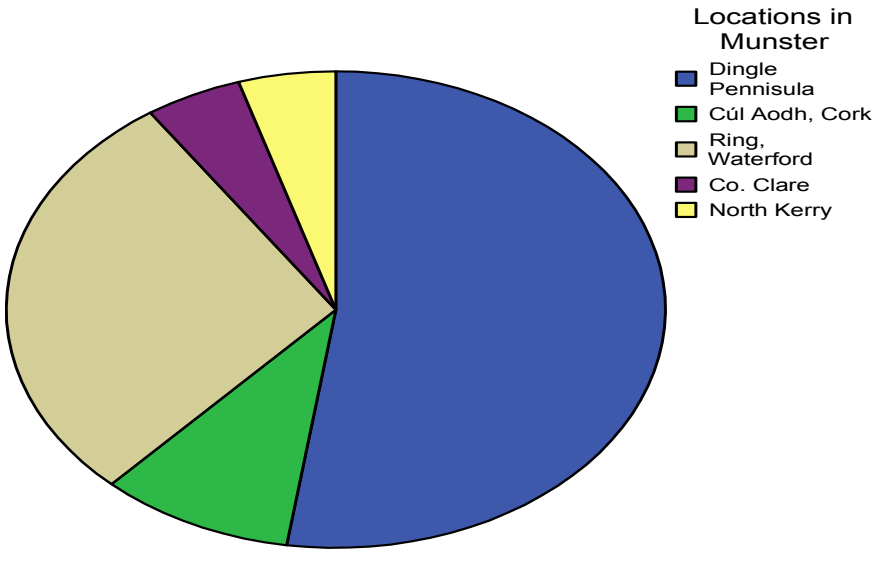


Figure 4.1 Locations in Munster for children in the study (n=21)

Eleven of the participants came from Dingle Peninsula area, known as 'Corca Dhuibhne', and included families from the villages of 'Baile an Fheirtéirigh', *Ballyferriter*; 'Dún Caoin', *Dunquin*; and 'Baile na nGall', *Ballydavid*. Six children were from the area around 'An Rinn' *Ring* in Co. Waterford, two were from the Cúl Aodh area of north-west Cork, one child came from Co. Clare (whose parents originally came from the Dingle Peninsula area) and one child lived in North Kerry. As can be seen, 'Corca Dhuibhne' had the largest amount of children speaking Irish as a first language in the study, followed by children from the Ring area. This is in keeping with the findings from the 2006 census (CSO, 2007) and with the recent study on the status of the Gaeltacht regions (Department of Community, Rural & Gaeltacht Affairs, 2007). It was interesting to note that there was no success in recruiting participants from another Gaeltacht region in Kerry, known as 'Uíbh Ráthach' *(the Iveragh Peninsula)* despite efforts. This area seems to be in decline as a Gaeltacht region, in contrast to Ring which is showing a revival, and is in keeping with recent assessments of the status of Irish in these areas (Department of Community, Rural and Gaeltacht affairs, 2007). There was no specific attempt made to recruit participants from 'Oileán Chléire' *Cape Clear,* due to the practical limitations of carrying out longitudinal research on this island.

Table 4.1 below summarizes the background information regarding the twenty-one children involved in the study. As already discussed, the age range criteria of the study was extended to 40 months to allow for the observation of potentially later developing grammatical structures. The age provided is the age at the first assessment, although as previously outlined, most of the children were seen at six-monthly intervals until they reached the age of 40 months to collect longitudinal information on the language development.

Table 4:1 Background information for all participants

Child	**Sex**	**Age** (mths)	**Location**	**Birth Order**	**L1 Mother**	**L1 Father**	**% Irish at home**	**Mother Education**
ICDI 1	F	27	*Dingle	4th	Irish	English	85%	4th level
ICDI 2	M	40	Dingle	2nd	English	Irish	100%	3rd level
ICDI 3	M	18	Dingle	1st	Irish	English	100%	2nd level
ICDI 4	M	24	Dingle	2nd	English	Irish	100%	3rd level
ICDI 5	M	22	NW Cork	5th	Irish	English	100 %	3rd level
ICDI 6	M	38	Dingle	1st	Irish	English	100%	3rd level
ICDI 7	F	20	Ring	2nd	Irish	English	80%	3rd level
ICDI 8	M	34	Ring	1st	Irish	English	80%	3rd level
ICDI 9	M	40	Dingle	2nd	Irish	Irish	95%	3rd level
ICDI 10	M	16	Dingle	3rd	English	Irish	100%	3rd level
ICDI 11	F	36	Ring	1st	Bilingual	Irish	100%	2nd level
ICDI 12	F	28	Ring	1st	Irish	English	80%	4th level
ICDI 13	F	33	Ring	4th	Irish	English	100%	2nd level
ICDI 14	F	17	Dingle	3rd	Irish	Irish	100%	3rd level
ICDI 15	F	19	Clare	3rd	English	Bilingual	60%	4th level
ICDI 16	F	16	Dingle	3rd	Irish	English	100%	3rd level
ICDI 17	F	18	Dingle	3rd	English	Irish	100%	3rd level
ICDI 18	M	18	Dingle	5th	Irish	English	85%	4th level
ICDI 19	F	34	N. Kerry	2nd	Irish	Irish	100%	4th level
ICDI 20	F	17	Ring	4th	Irish	English	75%	3rd level
ICDI 21	F	23	NW Cork	4th	English	Irish	100%	2nd level

**It should be noted that 'Dingle' indicates various locations around the Dingle Peninsula*

As can be seen, there were twelve girls and nine boys in the study. It should also be noted that there were a number of siblings in the study. ICDI 1 and 18; ICDI 2 and 10; ICDI 4 and 17; ICDI 7 and 8 and ICDI 9 and 16 were all siblings, and so in effect, a total of sixteen families were involved in the study. The birth order of the children were fairly evenly distributed with five first-born children, five second-born, five third-born, four third-born and two children were the fifth and youngest in their families. Of the 16 families involved in the study, eleven of the mothers had Irish as a first language, four had English and one described herself as 'bilingual'. Amongst the fathers, seven had Irish as a first language, eight had English and one was bilingual. Figure 4.2 below outlines the number of parents who had Irish or English as a first language or were bilingual.

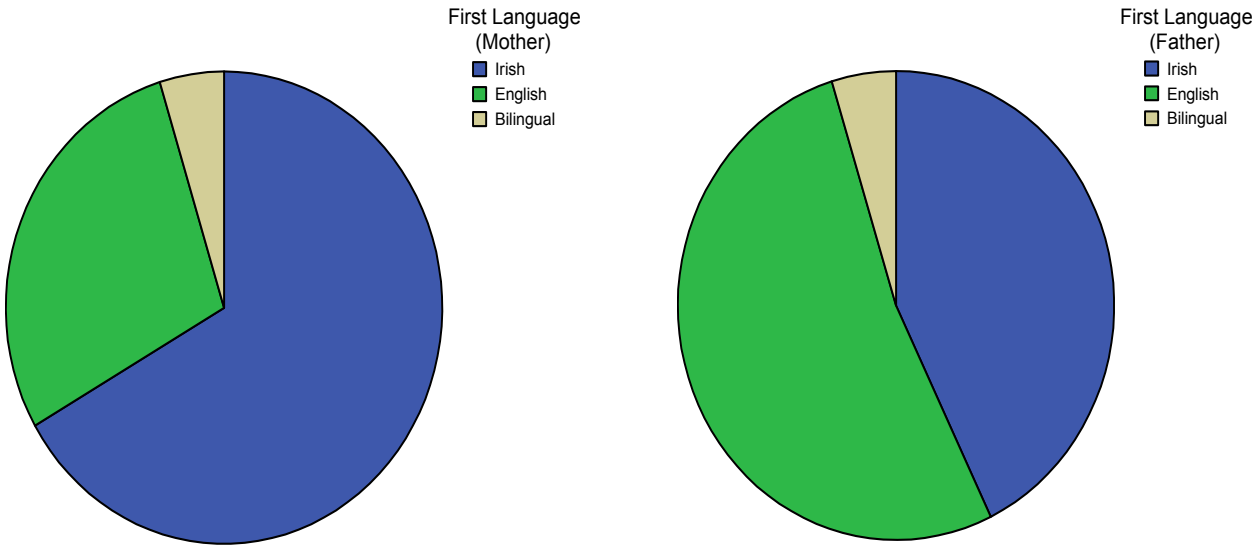


Figure 4.2 First language of parents (n=16)

The graphs demonstrate that it was mostly mothers who had Irish as a first language. Mothers generally were the primary reporters in terms of their children's language development, whereas only two of the fathers were involved. Although all of the families had at least one parent with Irish as a first language, there were only three families where both parents had Irish as a first language. Those who did not speak Irish as a first language had varying degrees of bilingualism in Irish-English and many availed of the support systems in the Gaeltacht to improve their Irish, including language classes for adults, which were held in the area. Many were also involved in local initiatives such as the previously mentioned 'Tús Maith' *A good start,* which provides language support teachers and advice to those wishing to raise their children through Irish. In terms of the amount of Irish spoken in the home, the majority of families (n=10) reported that they spoke Irish 100% of the time (see Figure 4.3 below). During the course of the study, one family reported that the elder boy (ICDI 8) began attending an English preschool, and so no longer spoke as much Irish in the home as on or at the time of the initial visit. This also affected the language use of his younger sister who was in the study (ICDI 7) and was evident from their spontaneous language samples where very little Irish was used on the second recording (ICDI 7 and 8) and even less on the third recording for ICDI 7. This indicates that the amount of Irish

spoken is not necessarily stable over time and so should be measured at each data collection. No child was exposed to languages other than Irish and English, although one child used some Welsh social terms (e.g. 'nana' for *granny*) from input from a maternal grandmother. Seven of the children were minded outside of the home for a portion of the week where the childminder used less than 25% of Irish. An additional four children attended a 'naíonra' or Irish-speaking preschool where Irish was used the majority of the time.

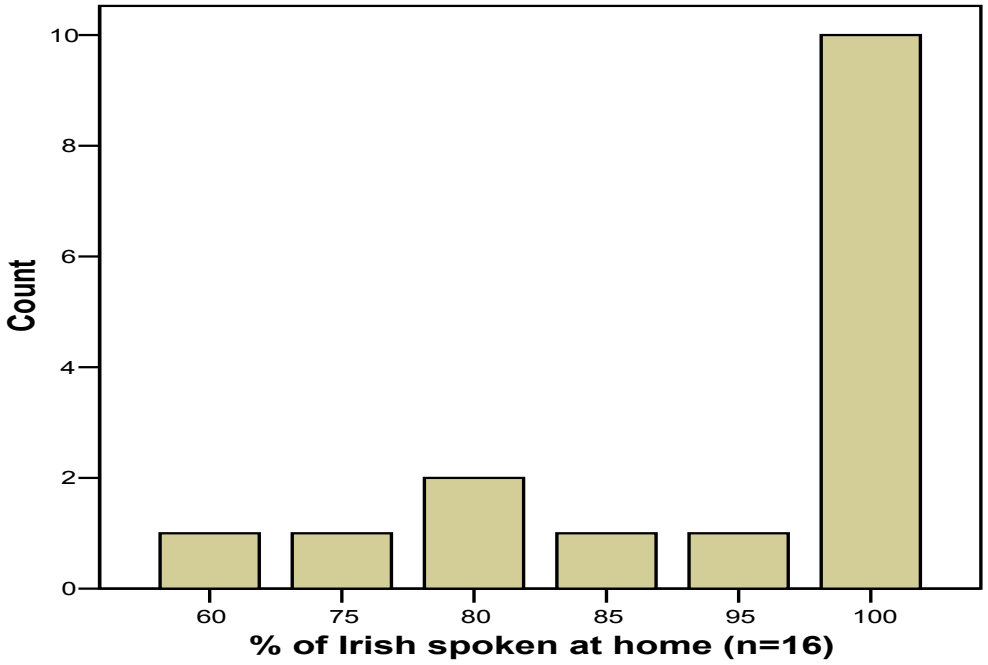


Figure 4.3 Percentage of Irish reported to be spoken in the home

Another interesting demographic variable was maternal education, which many studies have found influences the language achievements of children and is taken as a good measure of socioeconomic status (Bates et al., 1995; Fenson et al., 1994; Fenson et al., 2007; Pine & Lieven, 1990). As can be seen in table 4.1 above, the sample was fairly skewed towards those with a high level of education, with an average of almost 16 years reported (mean=15.94; SD= 1.69), which equates to 3rd level education. Similarly, the fathers also had a relatively high level of education with a mean of 15.63 years (SD= 1.82). Employment status was also classified according to ten specific socio-economic groups, as outlined in the census (Central Statistics Office, nd). The

classification aims to bring together people with similar social and economic statuses on the basis of level of skill or educational attainment. Analysis for the 16 families involved in the current study indicated that the majority of mothers (67%) were considered 'lower professionals' which included five teachers and three administrative assistants. Likewise, the majority (57%) of fathers had jobs in this category (including four teachers), and three fathers were in the 'employers and managers' group. This indicated that the group involved were largely middle-class. Twenty out of the twenty-one children lived with both parents (one lived with his mother only) and all families reported that extended family lived close by and also used mostly Irish with the children. More specifically, of the 16 families involved, 11 had extended family who used Irish with the children, the extended families of the remaining five used both English and Irish. As in the pilot, none of the children were reported to have speech and/or language difficulties, chronic otitis media or developmental difficulties. The mean age for the reported first word was 11.9 months (SD= 2.5 months). Fourteen of the mothers used the Munster dialect of Irish and two used the Connacht dialect, which did have implications for lexical items and morphology of plurals in particular, which will be outlined in Chapters 7 and 8 later.

4.2 Procedure

As in the pilot study, once families had agreed to take part, they were visited in their home by the principal researcher. The same assessment procedures were also involved, including completion of the ICDI vocabulary and grammar checklist; a 15-minute (on average) spontaneous language sample using the same toys and books as previously outlined and the Test of Pretend Play (ToPP, Lewis & Boucher, 1997). As in the pilot, the same parent who completed the ICDI checklist was the interlocutor in the language sample. The ToPP was completed on the first visit only for most children, but was re-administered for five children (ICDI 3, 5, 10, 16 and 18), as they did not perform within normal limits on the first occasion, mostly due to lack of interest and poor cooperation. For children who were involved in follow-up testing six-months after the initial visit, the checklists were posted one-week ahead of the data collection, and then further discussion and clarification of the completed forms were carried out during

the visit. Furthermore, an elicitation task was designed later into the project in an effort to elicit and assess the productivity of three grammatical morphemes targeted in the parental checklist and observed in the spontaneous language sample. This was generally carried out once children reached 24 months, and the procedure will now be outlined.

4.2.1 Morphological Elicitation Task

Spontaneous language samples do not always produce examples of morphological targets of interest for this age range. In addition, parents may not be able to distinguish between learned forms and productive use. Therefore, in order to explore salient morphemes in Irish, and as there are no standardised tests in the language, a colour picture-based elicitation task was designed. The task targeted the use of important morphological features in this age range, namely plural (regular and irregular), progressive (verbal nouns) and past tense (regular and irregular) markers. Results from this task were later used alongside the spontaneous language samples to validate the parent report on the development of these morphemes, as will be outlined in Chapter 5. Although the task was initially attempted when the child was approximately 24 months, some tests (particularly for past tense morphemes) had limited success even with children over 30 months, as will be discussed. The elicitation task began with the relatively easier plural task which was then followed by the present-progressive and finally with the past tense condition. As it could not be determined how the children would respond to the individual pictures and morphological targets in this task, there were no baseline or ceiling criteria added and so all of the items were attempted wherever possible. The task design and procedure are outlined below. The pictures were developed using Blacksheep Press Materials, as well as photographic and colour pictures accessed through Google images (see Appendix 9 for an example of the elicitation task).

4.2.2 Design

For all of the morphemes, there were a minimum of 16 trials used in each task to ensure that a representative sample could be elicited even if the child gave no response to some targets. There were 21 target items used in the plural task due to the complexity and range of plurals in Irish. In addition, target words were chosen based on the following criteria:

- Ease of representation in pictures (e.g. motion verbs are not always easy to represent pictorially)
- Target vocabulary item also included in ICDI checklist
- Range of phonetic possibilities available in Irish addressed

4.2.3 Plural Markers

As previously discussed, there is no simple 'regular' plural morpheme in Irish. Thus nouns involving the more frequent suffixes including vowel addition (-aí); slendering the final consonant (achieved through palatalisation) and vowel + consonant addition such as (-ta/ -acha/ -anna etc.) were included. A number of the more irregular plural nouns were also included (see Chapter 1 in the introduction section for a full explanation of the plural system of Irish). Another challenge was that in Irish, the singular form of the noun is mostly used after numbers, thus the only way in which the plurals could be elicited was by using a sentence completion task with the plural form of the definite article 'na' *the(pl)* used to indicate to the child that the plural was required.

The task began with three practice items, where the child was introduced to the pictures. The researcher then pointed to the first picture and said 'Féach ar seo! Seo é AN x agus seo hiad NA? *Look at this! The is THE (singular) x and these are THE (plural)*? If the child didn't finish the sentence or used an incorrect answer, the sentence was repeated once. If the child still failed to answer or continued to give the incorrect target, then the researcher said the target word and encouraged the child to repeat the word. If the child could follow this task then the test items were attempted. The same procedure was used for the test items, except that if the child failed to produce the word

after the second sentence completion, they received a score of 0 for that item and they were not encouraged to repeat the answer after the researcher. The order of the test items was randomised using a random table. The following targets were used for the practice and trial condition, with the target endings in italics (*indicates that the target was a (relatively) irregular noun plural):

Practice Items

Singular	***Plural***	***Gloss***
a. bad	báid	boats
b. bus	busanna	buses

Test Items

Singular	**Plural**	***Gloss***	**Singular**	**Plural**	***Gloss***
1) tigh	tithe	**houses*	12) scéal	scéal*ta*	*stories*
2) peann	p*i*nn	*pens*	13) bábóg	bábó*ga*	*dolls*
3) bó	ba	**cows*	14) beach	be*i*ch*e*	*bees*
4) carraig	carraige*acha*	*rocks*	15) caipín	caipín*í*	*caps*
5) deoch	deoch*anna*	*drinks*	16) fia	fi*anna*	*deer*
6) cathaoir	cathaoir*eacha*	*chairs*	17) léine	léin*te*	*shirts*
7) leaba	leap*acha*	**beds*	18) caora	caoir*igh*	*sheep*
8) carr	carr*anna*	*cars*	19) pictiúr	pictiú*i*r	*pictures*
9) ubh	uibh*eacha*	*eggs*	20) leoraí	leoraithe	**lorries*
10) milseán	milseá*i*n	*sweets*	21) bean	mná	**women*
11) iasc	éisc	**fish*			

It should be noted that 'uibheacha' *eggs* is produced as 'uibhe' /i/ (the genitive form of the noun) for the most part in the Munster dialect, and so this was accepted as correct. Also, 'pictiúirí' *pictures* is now being used in spoken Irish too, in line with a general trend for the more salient plural endings to replace the weaker ones (O' Siadhail, 1989) and so was also accepted as correct.

4.2.4 Progressive Marking

As outlined in Chapter 1, there are three main suffixes involved in the formation of the present progressive in Irish (also known as the verbal noun). This can either be the addition of no ending /ø/; addition of a –t /t/ or of –dh/–(e)adh /əɣ/ to the verb root (infinitive). There are also some more marginal endings such as the addition of -mh /v/

or of –m (‘seas’ *stand*, ag seasa**mh**, *standing* and ‘tit’ *fall*, ag titi**m**’, *falling*) to the verb root and deletion of the –igh suffix for certain verbs (‘suigh’ /sɪg/ *sit*, ‘ag suí’ /ə si/ *sitting*). As outlined in Chapter 1, the verbal noun does not carry tense or aspect and so is always used with the auxiliary verb ‘bí’ *to be* and the preposition ‘ag’ *at*, to indicate continuity of an event. A variety of verb targets were used in this part of the study. As with the plural task, this item also began with practice items to introduce the child as to what was required. The researcher pointed to the first picture and said “Ólann an buachaill an tae, agus anois tá sé AG? ….” *The boy drinks milk everyday and now he is AT(particle)?…* If the child did not finish the sentence or used an incorrect answer, the sentence was repeated once. If the child still failed to answer or continued to give the incorrect target, then the researcher said the target word and encouraged the child to repeat the word. If the child could follow this task then the test items were attempted in a similar fashion, except that if the child failed to produce the word they were not encouraged to repeat the answer after the researcher. The following items were used for the practice and test condition, with the target endings in italics (*indicates that the target was a relatively irregular noun plural):

Practice Items

Verb Root	**Present Progressive**	***Gloss***
ól	ag ól	drinking
ith	ag ithe	eating

Test Items

Verb Root	**Pres. Prog.**	***Gloss***	**Verb Root**	**Pres. Prog.**	***Gloss***
1. péint	ag péinte*áil*	*painting*	9. labhair	ag labhair*t*	*speaking*
2. ceannaigh	ag ceannach	*buying*	10. tit	ag tit*im*	*falling*
3. tóg	ag tóg*aint*	*taking*	11. seas	ag seas*amh*	*standing*
4. léim	ag léim*t*	*jumping*	12. imir	ag imir*t*	*playing*
5. bris	ag bris*eadh*	*breaking*	13. cuir	ag cur*ø*	*putting*
6. éist	ag éist*eacht*	*listening*	14. léigh	ag lé*amh*	*reading*
7. glan	ag glan*adh*	*cleaning*	15. fan	ag fan*acht*	*waiting*
8. suigh	ag suí*ø*	*sitting*	16. cabhair	ag cabhrú	*helping*

4.2.5 Past Tense

As outlined in Chapter 1, regular past tense in Irish is marked by the use of the proclitic morpheme 'do' which causes lenition on the verb root. Although nowadays it is rarely used (except for before vowels and words beginning with /f/), it was highlighted in the sentence completion task to indicate to the child that the past tense was required. Once again the children were introduced to this task with two practice items in which the child was given a model sentence containing the target verb in the present tense to cue the lexical verb target. Thus the researcher pointed to the first picture and said 'Féach ar seo! Caitheann an buachaill an liathróid gach lá agus inné DO?' *Look at this! The boy throws the ball every day and yesterday he (Past tense PROCLITIC)?* If the child did not finish the sentence it was repeated once with an accompanying gesture for the action where possible, and the child was encouraged to repeat the word after the researcher. If the child could participate, then all of the test items were attempted and scored in a similar fashion to the previous tasks on plural and present progressive marking. The following past tense verbs were included in this task, with the initial mutations on regular verbs indicated by italics (*indicates that the target was an irregular Irish verb):

Practice Items

Verb Root	**Present Progressive**	***Gloss***
caith	c*h*aith	*threw*
glan	g*h*lan	*cleaned*

Test Items

Verb Root	**Pres. Prog.**	***Gloss***	**Verb Root**	**Pres. Prog.**	***Gloss***
1. tabhair	t*h*ug	**gave*	9. beir	b*h*eir	***caught*
2. déin	d*h*ein	***did*	10. téigh?	chuaigh	**went*
3. clois	chuala	**heard*	11. pioc	p*h*ioc	*picked*
4. dún	d*h*ún	*closed*	12. buail	b*h*uail	*hit*
5. oscail	*d*'oscail	*opened*	13. fág	*d*'fhág	*left*
6. ith	*d*'ith	*ate*	14. abair	dúirt	**said*
7. tar	t*h*áinig	**came*	15. féach	chonaic	**saw*
8. siúl	s*h*iúil	*walked*	16. faigh	fuair	*got*

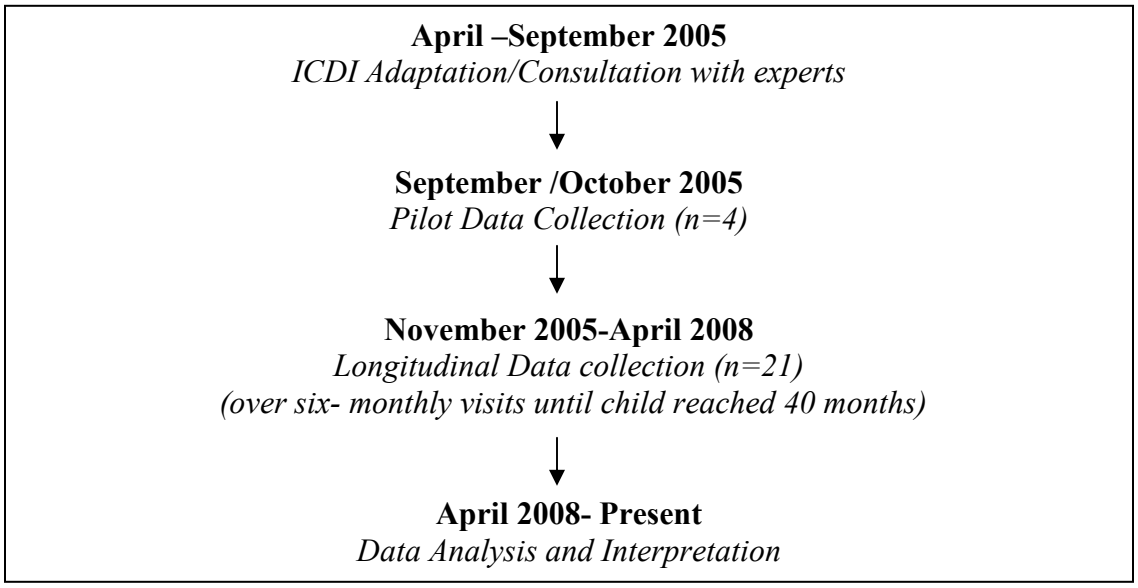
*** it should be noted that these are regular verbs in the Munster dialect but in other dialects are produced as an irregular past tense verbs' rinne' did and 'rug' caught.*

The children were initially tested on the plurals as this was felt to be the most straightforward item in the picture elicitation tasks. This was then followed by the

present progressive and then by the past tense condition which was considered the most complex.

4.3 Timeline of the Project

The study began in September 2005 and was completed in April 2008. The timeline of the project is outlined below.



As previously discussed, this study was interested in how language acquisition in Irish develops over time and so children who were within the appropriate age range (16-40 months) were assessed at six-monthly intervals. Table 4.2 below outlines the longitudinal data collected. Scheduling difficulties and completion of the data-collection phase in April 2008 meant that some children were not observed at all potential time points between 16 and 40 months.

Table 4:2 Participants involved in the longitudinal collection of data

ICDI	T1 Age (mths)	T1 Total Vocab*	T2 Age (mths)	T2 Total Vocab*	T3 Age (mths)	T3 Total Vocab*	T4 Age (mths)	T4 Total Vocab*
1 F	27	387	33	512	40	553		
2 M	40	582						
3 M	18	16	24	49	30	153		
4 M	24	168	30	312	36	496		
5 M	22	53	28	139	34	377	40	518
6 M	38	679						
7 F	20	378	28	667	35	733		
8 M	34	727	40	726				
9 M	40	420						
10 M	16	17	21	76	28	305		
11 F	36	793						
12 F	28	715	34	727				
13 F	33	661	39	824				
14 F	17	64	23	229	29	455		
15 F	19	147	26	338	32	534		
16 F	16	3	22	20	28	115		
17 F	18	72	24	393	30	514		
18M	18	9	24	171	34	487		
19 F	34	731						
20 F	17	30	23	432				
21 F	23	402	29	642				

** This is the total composite vocabulary score based on Irish-only + English-only + bilingual-only vocabulary*

As can be seen from the table, one child (ICDI 5) was seen on four occasions, ten children on three occasions and five children were involved in two data collections. It should be noted that the checklist from ICDI 18 at time three (T3) was returned 4 months after spontaneous language sample was taken. Therefore, as the checklist was not returned within one-month of the language sample, the data could not be used for validity/reliability analysis, as will be outlined in Chapter 5. However, for descriptive purposes the checklist was included for the overall analysis of vocabulary (Chapter 6 and 7) and grammar (Chapter 8).

4.4 Data Analysis

All of the ICDI checklists (n=49) were entered into the SPSS programme and the MPlus programme (Muthén & Muthén, 1998-2007) for longitudinal data analysis. Total vocabulary items used by each child for all 23 vocabulary categories were entered, as were the individual lexical targets (843 in total), and whether the child used each of the lexical items in Irish, English or bilingually. Ten percent (n=5) of the checklists were checked by a second researcher to determine the presence of any entry errors. Inter-rater reliability was estimated at 99% (based on 2618 agreements over 2645 items). The highly-detailed nature of this vocabulary data enabled the researcher to look at aspects of language development such as word frequency and age of acquisition and also led to the later removal of a number of lexical items that were either too frequent in the data or too rare (Dale et al., 1993). This will be further explored in Chapter 6 and 7 on vocabulary development.

The checklist data was then analysed in a similar way to the pilot analysis for vocabulary and grammar, with vocabulary analysed in terms of common nouns, predicates, social and closed class lexical items, as previously discussed. In addition, the spontaneous language samples were transcribed in the same manner as outlined in the pilot chapter, and again in full accordance with the CHAT (Codes for Human Analysis of Transcripts; MacWhinney, 2000) conventions. Spelling consistency was verified at the point at which frequency lists were automatically generated to ensure that the number of word types was accurate, and clear English words were also marked for analysis (excluding loan words such as ‘yea’ and ‘neó’). A randomly selected subsample of the transcriptions were selected (10%; n=5) and verified by a second transcriber who was a native speaker of the language to ensure that all intelligible talk was transcribed. The second transcriber was blind to the results of the other language measures. Words that were unintelligible to both transcribers were marked as unintelligible. Word-to-Word agreement was calculated with the following number of agreements out of the total words (2,681/2,706) which gave a percent agreement of 99%. All discrepancies were resolved and the resolution used in the analysis. As in the pilot, the CLAN programme was then used to obtain vocabulary and grammar measures

such as TTR, NDW, D and MLU of 100 utterances. Finally, the Test of Pretend Play was also scored in the same manner as in the pilot phase, and raw scores converted to age-equivalents as outlined in the manual.

4.5 Results

The results will be analysed in the following chapters relating to the main research questions of interest in the study. These include initially establishing the validity and reliability of the ICDI as a measure of early language development, followed by chapters focusing on the nature of vocabulary development, grammatical development and the relationship between lexical and grammatical acquisition in Irish.

5 Validity and Reliability of the Irish Communicative Development Inventory

5.1 Reliability and Validity

Given the impact that the ICDI could have on the clinical assessment of young Irish-speaking children and the contributions this study can make to the wider theoretical debate on language acquisition, it is important to initially establish that the ICDI is a reliable and valid instrument. Similar to other language adaptations of the MCDI (e.g. Thal et al. 2000), the major differences between English and Irish grammar make it especially interesting to determine whether parent report is a valid method of assessing grammatical development in Irish-speaking toddlers. It is possible that the highly inflected nature of Irish could require more sophisticated linguistic training for accurate observation and assessment when compared with English, which has a very limited number of inflections. This may reduce the validity of an Irish parental assessment of language. On the other hand, as Thal et al. (2000) noted in their Spanish-adaptation, the frequency of inflection in Irish (as in Spanish) may create a greater awareness of these aspects of the language in all speakers, thereby increasing the validity.

This chapter provides a summary of the scores achieved by the participants based on their ICDI results, spontaneous language samples and elicited language tests, to determine if the adapted form is suitable for the Irish-speaking population. Following a summary table which outlines these scores, each of the important reliability and validity measures pertinent to test evaluation are outlined and compared to other CDI studies and similar parent-report measures, such as the Language Development Survey (LDS) (Rescorla, 1989). It should be noted that reliability and validity studies of the CDI are relatively infrequent when compared to the extensive reporting of the nature of early language development using this method. Moreover, validation studies typically use a much smaller sample than that of the larger groups due to the time involved in direct language assessment. For example Dale (1991) included 24 children in his validation of the toddler scale; there were 17 in the Spanish adaptation (Jackson-Maldonado et al.,

1993); 17 in the Italian (Camaioni, Caselli, Longobardi, & Volterra, 1990) and 18 in the Icelandic (Thordardottir & Ellis Weismer, 1996). Therefore, the fact that the current study involved 21 children assessed longitudinally, resulting in 48 data points, (each validated with direct language measures) puts it amongst the largest studies of this nature, highlighting the significance of the study.

5.1.1 Measuring Reliability and Validity

Reliability and validity measures such as those used in the current study rely on correlations to determine the value of the instrument being tested. There is much debate around the size of the correlation that must be achieved in order to determine that an instrument is valid and reliable. For example some hold that reliability must exceed +.8. (Jahn-Samilo, Goodman, Bates, & Sweet, 2000) and Thal et al. (2007) also raise this issue, and recommend that correlations below r=.40 are considered low; r=.40 to r=.70 are moderate, and those above .70 are considered high. These interpretations were used in the current study.

5.2 General Results and Discussion

As outlined in the methodology, all of the tests used (including the ICDI checklist; spontaneous language samples; elicitation task and the Test of Pretend Play) were scored accordingly and the data entered into the SPSS and MPlus programmes for analysis. Table 5.1 below provides a summary of the descriptive statistics for all twenty-one children involved in the study, with the 48 data points merged in order to view the profile across the different ages. The participants were grouped based on six-monthly age ranges, as there were too few observations at each monthly age, and variability too large to provide meaningful descriptive statistics. The four age groups were composed of '18 month-olds' (ranging from 16-21 months); '24 month-olds' (ranging from 22-27 months); '30 month-olds' (ranging from 28-33 months) and finally '36 month-olds (ranging from 34-40 months of age). As previously mentioned, the third checklist from ICDI 18 was not included as the spontaneous sample and checklist completion was four-months apart. The scores reported on the elicitation task reflect the mean number of correct items produced by the child in this task.

Table 5:1 Mean level of performance of validation sample

Age Groups (in months)								
	'18 month olds'		**'24 month olds'**		**'30 month olds'**		**'36 month olds'**	
Measure	*16-21 (n=10)*		*22-27 (n=11)*		*28-33 (n=13)*		*34-40 (n=14)*	
	Mean *(SD)*	Range	Mean *(SD)*	Range	Mean *(SD)*	Range	Mean *(SD)*	Range
ICDI Parent Report								
Total Vocabulary (*composite)	81.2 (*113.1)*	3 – 378	240.3 *(157.4)*	20 – 432	440.1 *(214)*	115– 715	634.7 *(141.9)*	377 – 824
Complexity	4.2 *(11.2)*	0 – 30	27.6 *(27)*	0 – 77	68.5 *(50.4)*	5 – 145	118.6 *(21.93)*	79 – 149
M3L	1.6 *(1.17)*	1 – 4.7	3.3 *(1.5)*	1 – 6	5.8 *(3)*	2 – 11.3	9.1 *(3.4)*	6 – 18
Regular Morphemes (6)	.4 *(1.3)*	0 – 4	1.4 *(1.6)*	0 – 4	3.2 *(2.5)*	0 – 6	5.2 *(1.1)*	2 – 6
Irregular 'Word Forms'	0	0	1.7 *(2.2)*	0 – 7	7.4 *(5.9)*	0 – 17	13.9 *(4.8)*	4 – 21
Language Sample								
NDW (100)	26.4 *(23.2)*	3 – 60	63.1 *(25.4)*	24 – 105	98.9 *(27.8)*	49 – 143	117.5 *(23.6)*	89 – 174
TTR	.374 *(.1)*	.22- .54	.376 *(.08)*	.21- .50	.424 *(.12)*	.30- .68	.477 *(.12)*	.29- .72
D	10 *(11.5)*	1 – 32	35.2 *(26.3)*	3 – 86	59.2 *(32.7)*	16.3 – 117.5	80.1 *(45.5)*	36 – 195
MLU (100)	1.2 *(.2)*	1 – 1.4	1.6 *(.4)*	1 – 2.2	2.3 *(.8)*	1.1 – 3.7	2.6 *(.7)*	1.6 – 3.8
Regular Morphemes (6)	.4 *(.7)*	0 – 2	1.4 *(1.5)*	0 – 4	2.6 *(1.5)*	0 – 4	3.1 *(1.5)*	1 – 5
Irregular 'Word Forms'	0	0	.18 *(.41)*	0 – 1	.38 *(.87)*	0 – 3	.93 *(1.33)*	0 – 4
Elicitation Task								
					(n=8)		(n=12)	
Plural Marking (21)	n/a	n/a	n/a	n/a	2 *(2.77)*	0 – 8	3.1 *(2.84)*	0 – 9
Present Progressive Marking (16)	n/a	n/a	n/a	n/a	4 (*2.88*)	0 – 2	8.6 *(3.9)*	0 – 2
Past Tense Marking (16)	n/a	n/a	n/a	n/a	.25 (*.7*)	0 – 8	.38 (*.9*)	0 – 14
Test of Pretend Play								
	(n=10)		(n=7)		(n=3)		(n=6)	
ToPP Raw Score	2.9 *(1.9)*	0 – 6	6.1 (*2.5*)	4 – 10	9.3 (*4.9*)	6 – 15	10.7 *(4.7)*	6 – 18

M3L= MLU based on 3 longest reported utterances; NDW- Number of Different Words; TTR= Type-Token Ratio; D= lexical diversity; MLU= Mean Length of Utterance; n/a = not assessed

As can be seen, all vocabulary measures demonstrated developmental sensitivity (apart from TTR which did not demonstrate large increases over the age groups). For the younger ages, the standard deviations are larger, or almost the same as the mean scores on most language measures reflecting the wide range of early language development at this age. Feldman et al. (2000) concluded that this is a psychometric weakness of parent-report measures, yet Fenson et al. (2000) responded by saying that this in fact a true reflection of the considerable individual differences and variability of early language development, also captured in a recent study using the CDI to investigate factors that influence vocabulary in two year olds (Stokes & Klee, 2008). Given that the spontaneous language samples produced similar results, the ICDI also seems to be capturing the variability in language development at this age. This variability is reduced in the older age groups, although there remains a large variance in the use of irregular word forms, which may have been due to the low occurrence of irregular word forms in the spontaneous samples. The profile of language development in this period will be further discussed in relation to previous studies of Irish language acquisition and crosslinguistic research in later chapters.

Comparing reported language skills on the ICDI with those observed in the other measures, it is evident that MLU based on 100 utterances in the spontaneous samples is lower than the three longest utterances reported by the parents (M3L), as was noted in the pilot study. Once again, this was expected as M3L is a measure of the 'best' performance of the child whereas MLU is based on a sample of language containing utterances of varying length. Moreover, language samples based on parental interactions can often result in lower MLUs as parents are not experts in methods of eliciting extended conversations (Rice, Redmond, & Hoffman, 2006). Despite being asked to play as they usually would, the mothers in the current study tended to use a lot of test questions to elicit language, particularly when looking at books, which has been found to restrict child vocabulary to parental imitations in studies of other languages (Poulin- Dubois, Graham, & Sippola, 1995). This type of situation also resulted in a higher frequency of one-word answers in the current study. An attempt was made to reduce this bias by calculating MLU from the last 100 utterances in the sample, to ensure that the child had time to engage with the task and become accustomed to being video-taped. Also as expected, a

higher number of regular morphemes and irregular words forms were reported on the ICDI than observed spontaneously. However, it was interesting to note that the number of regular morphemes reported by the parents and that observed in the spontaneous samples (both based on a maximum of six morphemes from Part II.A of the ICDI checklist) was very similar for the 18, 24 and 30-month old groups, which could indicate that parents were accurate in their assessment of their children's use of regular morphemes. These issues will be further analysed in the validity measures below.

5.3 Reliability of the Inventory

Reliability is related to whether the measuring instrument gives consistent results each time it is applied. Eriksson (2001) describes how consistency and stability are important as they set the upper limit for the validity of an instrument. However, the estimation and interpretation of the reliability of parent-report instruments may present some difficulties (Fenson et al., 1994). For example, internal consistency and test-retest measures may produce artificially high values because of a 'halo effect', where parents overestimate their child's language skills in all areas. Moreover, when used longitudinally (as in the current study) parents may remember their previous responses, even if inaccurate, thereby affecting their reporting style and the reliability of the measure. Likewise, inter-rater reliability could be inappropriate because there may be only one individual who is sufficiently familiar with the child's language abilities to report on it. Because of this, Fenson et al. (2007) hold that the best evidence for the reliability of the MCDIs come from the strong concurrent validity, which will also be outlined below for the Irish version. It should be noted other CDI studies generally posted the forms to parents and so did not have the researcher on hand to answer questions and clarify issues. However in the current study, the ICDI was completed in an interview format, which would have increased its reliability and consistency when compared to others as the researcher helped parents complete the form each time.

5.3.1 Internal Consistency

Internal consistency is particularly important in connection with multiple-item scales such as the CDI, as it assesses whether the different items that make up the scale are measuring a single idea or content domain (Bryman & Duncan, 2001). Because of the relatively large number of categories in the CDI, Fenson et al. (2007) hold that Cronbach's coefficient alpha is an appropriate index to apply as it is based on the inter-correlations among all the items within a given category. It is similar to split-half reliability and yields the average split-half correlation across all possible splits which Bryman and Duncan (2001) say should be at .80 or above. Similarl to the original MCDI, the correlation coefficient for the ICDI was calculated for vocabulary ('words produced') and grammar ('sentence complexity') subscales of the ICDI. For vocabulary, scores on each word category (23 in total for the ICDI) were treated as individual items. The vocabulary scales demonstrated high internal consistency (.97) which was similar to that reported for English (r=.96; Fenson et al., 2007); Danish (r=.99 (Bleses et al., 2008); Hebrew (r=.98; Maital et al., 2000); Swedish (r=.99, Berglund & Eriksson, 2000); and Chinese (r ranged from.82 to .99 for each vocabulary category in Mandarin & Cantonese; Tardif et al., in press). On the ICDI, corrected item-whole correlations were above .89 in each case, apart from 'sound effects and animal sounds' which had a corrected item-whole correlation below of .45. A similar finding was reported by Fenson et al., (2007) for 'sound effects and animal sounds' and was linked to a ceiling effect for this category which tended to be completed early for children.

Also in line with Fenson et al. (2007), the grammatical measures of sentence complexity were analysed using scores from the three subcategories of bound morphemes (items 1-14); functor words (items 15-28) and complex sentences (items 29-42). These three subscales demonstrated high internal consistency with an alpha coefficient of .99 (.95 reported by Fenson et al., 2007) and corrected item-whole correlations above .97 in each case, which was higher than the .86 item-whole correlations reported by Fenson et al. (2007) and .83 found on the Swedish grammar scale (Berglund & Eriksson, 2000). Finally, the relationship between the two reported grammatical measures on the ICDI (complexity and M3L) was examined, and revealed a strong and significant correlation at

r=.89 (r=.76 when controlling for age) which was higher than that reported for Hebrew (r=.60) by Maital et al. (2000). This may have been due to the adaptation of the complexity measures used in the Hebrew version, where eight possible sentences (each with four levels of difficulty) were presented for parents to choose from, whereas the ICDI had 42 target sentences (each with three or four levels) and so may have targeted a wider range of language abilities.

5.3.2 Test-Retest Reliability

Test-retest reliability is sometimes referred to as external reliability and measures how consistent the scores are across two or more test sessions taken at a reasonably close proximity. Although Bryman and Duncan (2001) hold that the relative position of each person's score should remain comparatively consistent across time, Fenson et al. (2007) argue that on anything longer than a two-month interval on CDI measures, the rank order could not be expected to be constant given how variable and rapid language acquisition is at this age group. In their study, 216 pairs of tests with an average time-lag of 1.38 months produced a correlation of .95 for vocabulary production. Similarly, test-retest measures conducted and six- and eight-weeks after the first administration were found to range between .70 and .97 for the Spanish and Swedish CDIs respectively (Eriksson, 2001; Jackson-Maldonado et al., 1993) and .82 (.85 with age partialled out) for the German CDI (Stumper, Schramm, & Szagun, 2008). In terms of individual vocabulary items, one study found that item-by-item stability reached an acceptable standard (above .60) for three out of five word classes (nouns, action words and games/routines) on the infant form of the MCDI whereas 'descriptive words' and 'total words' fell below .60 (Yoder, Warren, & Biggar, 1997). In addition, they found good summary-level stability for the total number of words understood on the infant MCDI with children who were at high risk for language delay, although this stability was associated with parental socio-economic status (SES). As the children in the current study were re-tested six-months after the previous administration, strong stability could not be expected and so test-retest reliability was not measured. Instead the retest measures were used to estimate predictive validity as will be outlined later in this chapter.

5.3.3 Inter-Rater Reliability

Although inter-rater reliability was also not directly tested in the current study, it has been known to affect the reliability of parent-report measures, and so is briefly discussed here. Inter-rater reliability is an important aspect of language assessment in Western societies, as children do not only spend their waking time with their mothers, but are often attending day care and child minding services (De Houwer, Bornstein, & Leach, 2005). Therefore relying on a single reporter who only knows what a child can say from one context may underestimate a child's communicative behaviours. Moreover, as caregivers are less emotionally involved with children than parents, they may provide a more accurate assessment of a child's language (Bornstein, Haynes, & Painter, 1998). A study using the Dutch version of the CDI confirmed this, as considerable inter- and intra-family variation was found in the reporting of communication abilities of 13-month old children on the infant CDI form was found (De Houwer et al., 2005). They concluded that the reliability of the instrument can therefore be increased by having multiple reporters complete the checklist and a resultant cumulative score used. In a follow-up study with the same children at 20 months, this cumulative score was compared to that given by individual reporters (Bornstein, Putnick, & De Houwer, 2005). These researchers found that the cumulative scores were higher on average than individual reported scores for both receptive and expressive vocabulary, although the scores were highly associated (correlations ranging from r=.72 for two reporters to .59 agreement for three different reporters). Although reporters tended to agree about the child's overall language ability, specific words and phrases attributed as understood or produced by the child varied considerably.

The issue of cross-reporter reliability is particularly important when looking at bilingual language acquisition, as parents may have different views of the child's language acquisition generally because one parent/caregiver uses one language with the child and another the second language. Marchman and Martínez- Sussmann (2002) evaluated this with bilingual Spanish-English speakers. Their analyses indicated that the use of multiple reporters had little impact and in some cases improved the accuracy of the reports of both lexical and grammatical abilities. This is particularly relevant for the current study as some children were only exposed to English outside of the home and so

people speaking English to the children may have had a different view of their language abilities. Although cross-reporters were not used in the current study, it should be considered for future studies as the more reporters involved the potentially more reliable the estimate of the child's language is.

5.4 Validity of the Inventory

Dale (1991) outlines how it is particularly difficult to evaluate the validity of new measures of language development in the absence of well-established, highly-valid criterion measures for language development itself. This is particularly true for Irish where there are no structured assessment tools or norms available, and there is a very limited amount of literature to draw upon. Thus the validity measures used for this study were based on naturalistic language samples and a specifically-designed elicitation task. However, even if a standardised assessment had been available, it is argued that spontaneous language samples are more effective at encompassing a greater depth of language abilities, have greater ecological validity and are generally of greater clinical significance than performance on standardised tasks administered by a stranger at this age (Fey & Gillam, 2003; Patterson, 2000).

5.4.1 Face Validity

Face validity refers to whether the test appears to assess the target language skills in question. Fenson et al. (2007) hold that this is highly desirable for a parent-report as it facilitates a concerted effort by the parent to complete a CDI form fully and accurately. Although face validity can be affected by the professional appearance of a test, more importantly, the content should sample a wide range of communicative skills in considerable depth, so parents feel that they have an opportunity to portray their children's communicative skills accurately and completely. This was ensured in the current study by basing the appearance of the form on the original CDI, by presenting the form in a professional format and testing it on a small pilot group of parents, taking into account their suggested modifications (as recommended by Fenson et al., 2007). This increased the possibility of other parents recognising the vocabulary and the feeling that

their child's true competencies were being captured. The fact that there was an English column included in the checklist acknowledged the bilingual status of these children and environment, and allowed parents to demonstrate their child's abilities in both languages. This was important in making sure that the parents made a determined effort to complete the form, especially as it was very lengthy and detailed at this early stage.

5.4.2 Content Validity

Content validity refers to the extent to which the content of the test matches the skills that the investigator intends on measuring. In other words, the ICDI must sample the major features of expressive language development in Irish across the 16-40 month age range. Although the original CDI items were drawn from items in the developmental literature, Eriksson (2001) outlines that when the CDI is adapted to a new language or culture, content validity can be examined by comparing the vocabulary checklist with the words in culturally relevant speech corpora; with items on existing language or intelligence tests or with the words children were reported to use in their three longest utterances for the first time the instrument was employed. As previously discussed, there are no existing language or intelligence tests available for Irish, however the vocabulary items were compared to those contained in the Irish language corpora on CHILDES (Guilfoyle, 1992); to studies of word frequency in the language (Ó' Donnchadha, 1992) and through consultations with Irish-language experts including early childhood educators in the language. The grammatical targets were largely taken from the Irish-adapted LARSP (ILARSP) by Hickey (1990b). Furthermore, the form was piloted on four children in the earlier phase and adapted accordingly. Comparing the vocabulary items reported in the three longest utterances reported by parents with those on the ICDI, it was noted that the majority of the words reported were similar. There was only one item (*seatbelt*, a codeswitch from English) which was not included, and another word 'ag bobáil' *sleeping*, was a family-specific word and so was not included on the ICDI. These aspects further established the content validity of the ICDI.

5.4.3 Convergent Validity

Convergent validity relates to the degree of association between developmental patterns revealed by the new assessment and that of other observations of the trajectory of language development in childhood. In the original MCDI, it was found that the rate and profile of language development increased in a relatively stable and consistent manner across the relevant age ranges (albeit with significant individual variability) and was in line with longitudinal and cross-sectional findings reported in the literature (Fenson et al., 2007). Eriksson (2001) states that convergent validity in newly-adapted CDIs can be examined by comparing the developmental patterns and correlations achieved to that found on the original MCDI. As described above, the internal consistency correlations on the ICDI were in keeping with those found on the original and other language-adapted versions of the CDI. In addition, the mean number of words and maximum sentence length reported at the various age groups in Irish were in line with these measures found in English-speaking children at the 50th percentile on their original MCDI. Although these are not the same types of scores, it was interesting to note that at 18 months, Irish-speaking children were using an average of 81 words and an M3L of 1.6 (compared to 86 and 1.7 in the MCDI) and at 24 months had a mean expressive vocabulary of 240 words and an M3L of 3.3 (compared to 297 and 3.8 in the MCDI). However at 30 months, the Irish children had a mean vocabulary of 440 words and a M3L of 5.8 which was slightly lower than the 548 words and M3L of 7.7 reported for children at the 50th percentile in the MCDI. Italian-speaking children have also been found to lag significantly behind American-English speaking children on the original CDI in vocabulary production (Caselli et al. 2001), and these issues will be outlined in the following chapter on vocabulary development.

As can be seen below in Table 5.2, the number of words the child knew in English increased across the age ranges, as the child's exposure to English through various channels grew. In terms of word classes, there was a gradual increase in the number of function words (closed class) across the ages, which although similar to that reported for other languages, comprised a much larger proportion of overall vocabulary size in Irish. These issues will be explored further in Chapter 6 and 7 on vocabulary development.

Table 5:2 Mean level of performance on the ICDI measures

Age Groups (in months)								
	'18 month olds'		**'24 month olds'**		**'30 month olds'**		**'36 month olds'**	
Measure	*16-21 (n=10)*		*22-27 (n=11)*		*28-33 (n=13)*		*34-40 (n=14)*	
	Mean (SD)	Range	*Mean (SD)*	Range	*Mean (SD)*	Range	*Mean (SD)*	Range
Irish (only) **Vocabulary**	70 (*91)*	3 – 308	219.9 *(143.9)*	20 – 426	345.7 *(193.3)*	108 – 658	405.4 *(244.9)*	53 – 793
English (only) **vocabulary**	5.9 *(10.3)*	0 – 31	16.6 *(19.5)*	0 – 53	28.1 *(24.5)*	0 – 89	41.7 *(44.2)*	0 – 137
Bilingual Vocabulary	5.3 *(12.6)*	0 – 39	3.64 *(5.2)*	0 – 14	66.1 *(128.9)*	0 – 392	187.6 *(241.2)*	0 – 535
Common Nouns (composite)	40.7 *(59.9)*	0 – 193	123.9 *(81.3)*	6 – 234	195.1 *(87.3)*	52 – 279	264 *(48.7)*	172 – 336
Predicates (composite)	11.2 *(23.1)*	0 – 75	39.9 *(32.2)*	2 – 84	86 *(48.8)*	15 – 154	132.4 *(38.6)*	63 – 179
Social Words (composite)	19 *(12.7)*	3 – 48	34.3 *(15.2)*	10 – 56	50.1 *(17.8)*	22 – 72	65.1 *(17.75)*	22 – 72
Closed Class (composite)	3.8 *(8.3)*	0 – 27	18.6 *(23.9)*	0 – 80	62.5 *(51.1)*	8 – 142	101 *(39.4)*	43 – 152
Bound Morphemes (complexity)	1.6 *(4.1)*	0 – 13	9 *(9)*	0 – 29	23.2 *(16.2)*	1 – 47	39.1 *(5.9)*	26 – 47
Functor Words (complexity)	1.4 *(3.4)*	0 – 11	10.5 *(10.4)*	0 – 31	24.6 *(18.2)*	1 – 49	42.1 *(7.5)*	21 – 51
Syntax Score (complexity)	1.2 *(3.8)*	0 – 12	8.2 *(8.7)*	0 – 23	20.7 *(16.9)*	1 – 49	41.2 *(7.7)*	24 – 51

In terms of grammatical development, the results indicated that the children used single words from 11.5 months of age on average, 40% were combining words from 18 months (standard deviation = .516), with all children reported to be combining by 24 months. These findings were in line with the international literature on the course of language development. As will be later explored, noun inflections (in terms of plurals) emerged slightly before verb inflections and over-generalisations on noun and verb morphology did occur but were infrequent, as reported in other languages (Bleses et al., 2008; Fenson et al., 1993; Fenson et al., 2007; Thordardottir & Ellis Weismer, 1996). Furthermore, the children's use of tense was predominantly the progressive aspect (via verbal nouns) or the past participle (verbal adjectives) which was used to indicate past before regular past tense (marked by lenition) emerged. The children also frequently omitted the present form of *to-be* 'tá' from the verb-initial position and presumably due to the complexity of the pronoun system, often used proper nouns to refer to people and

themselves in the early stages of the current study. These aspects of grammatical development have previously been reported in studies of early Irish-language acquisition (Hickey, 1990b; 1992) and will be further analysed in Chapter 7 on grammatical development. Based on these results, it seems that parents and psycholinguists are generally reporting on the same developmental phenomena in language acquisition (Fenson et al., 2007).

The strongest evidence for validity that has been found on other versions of the CDI comes from criterion-related evidence, incorporating both concurrent and predictive validity, and will now be explored.

5.4.4 Concurrent Validity

Concurrent validity refers to how scores on the CDI for individual children correspond to the 'gold standard' tests from laboratory/home observations using language samples and standardised tests for the same children. Previous validation studies of the CDI report correlations in the range of .60 to .83 for language sample measures and parent report measures (Bates & Carnevale, 1993; Dale, 1991; Dale et al., 1989; Fenson et al., 1994). Moreover diary studies and parent report measures have also been found to have good agreement (Pine, 1992; Reznick & Goldfield, 1994) and direct assessment of language was found to have a high degree of agreement (r=.50 - .52) with parental report (Chaffee, Cunningham, Secord-Gilbert, Elbard, & Richards, 1990; Pine, Lieven, & Rowland, 1996). Furthermore, the short form of the CDI has been found to relate to language samples (Corkum & Dunham, 1996); standardised tests (Saudino et al., 1998) and parental diary observations (Reznick & Goldfield, 1994) of early language. For the current study, concurrent validity was investigated by comparing the outcome on the ICDI with spontaneous language samples, an elicited task for grammatical morphemes and a standardised test of symbolic play. It should be stated however, that in this difficult-to-test age group there is no fully satisfactory criterion measure or 'gold standard' with which to compare child language (Fenson et al., 1994). Bornstein, Haynes and Painter (1998) also recommend using multiple measures of language development, as were employed in the current study, because no one method is superior to others under all

situations. It has been claimed that "parental report is more likely to reflect what the child KNOWS, whereas free speech reflects those forms that she is more likely to USE" (Bates, Bretherton, & Snyder, 1988, p. 57). Concurrent validity will now be discussed in terms of vocabulary development and grammatical development across the entire group and then for those children in the 18, 24, 30 and 36 month age groups, to investigate how the correlations emerged over time.

Vocabulary

The validity of the vocabulary scale was examined by computing Pearson correlation coefficients between the various vocabulary measures on the ICDI and direct observations of language, contained in Figure 5.3 below. Due to the multiple comparisons involved, statistical significance was set at .01 to control for a Type 1 error rate (as recommended in other validation studies such as Feldman et al., (2005)). The Pearson correlations for the entire validation sample (n=48) are outlined below, with the correlations controlling for age in brackets. It is important to control for age so that the relationship between two measures independent of general developmental variables can be established. Apart from D, all spontaneous language measures are based on a 100-utterance sample, as they have been found to be affected by sample size (Owen & Leonard, 2002). All correlations are significant at $p \leq .001$ unless otherwise indicated.

Table 5:3 Correlations of Vocabulary measures on the ICDI and spontaneous sample

		Spontaneous Measure			
		D	*NDW (100)*	*TTR (100)*	*No. English Words (100)*
ICDI Reported Measures	*Total Vocabulary (composite)*	.75 *(.56)*	.88 *(.66)*	.52 *(.45)*	.5 *(.33*)*
	*Total Irish Vocabulary***	.71 *(.48)*	.87 *(.64)*	.48 *(.39)*	.46 *(.24, ns)*
	*Total English Vocabulary***	.68 *(.59)*	.46 *(.24, ns)*	.58 *(.52)*	.83 *(.80)*

** p<.05; df=46*

*** This is the composite vocabulary score excluding all the words the child only knew in English ('Total Irish') or excluding Irish only words for the 'Total English' score*

As can be seen, all spontaneous language scores were strongly and significantly correlated with the scores on the ICDI, although correlations were only moderate for

TTR. This is in line with other validity studies involving the CDI and spontaneous vocabulary development as measured by TTR. For example, the Icelandic CDI (Thordardottir & Ellis Weismer, 1998) found only moderate correlations between TTR and reported vocabulary, which was attributed to the fact that TTR is not particularly sensitive to normal development. Studies involving other languages, such as Dutch, have noted that TTR is also dependent on sample size and have recommended D to be a more reliable measure (de Grauwe & Bol, 2007). In addition, low and non-significant correlations were found between CDI and TTR vocabulary measures in a group of children with SLI (Thal, O'Hanlon, Clemmons, & Fralin, 1999). Furthermore, Dale (1991) found low but significant relationships between the CDI and both TTR from spontaneous samples and scores on the Expressive One Word Picture Test (EOWPT) in 24-month olds. Dale (1991) concluded that TTR is an unreliable measure of lexical diversity as it is particularly sensitive to high frequency words and also commented that the EOWPT only measures knowledge of concrete noun vocabulary. Therefore both of these measures only assess a portion of the child's semantic knowledge, thus correlating scores from these measures may underestimate the true validity of the CDI vocabulary scale (Dale, 1991). Moreover, Owen and Leonard (2002) also noted that the other measure of lexical diversity, NDW, is also affected by sample size and co-varies with MLU. This measure was also used in the current study, although was strongly correlated with both total vocabulary, and the number of words known in Irish. On the other hand, unlike D, NDW failed to correlate with the number of words the child only knew in English, and so for bilingual populations, (not least for its low reliance on sample size) it seems that 'D' is a more reliable measure of vocabulary diversity (Richards & Malvern, 1997).

Overall, the current study is in line with other versions of the CDI which have reported correlations in the range from .6 to .86 between various spontaneous vocabulary measures and total vocabulary (Eriksson, 2001). For example, Thordardottir and Ellis-Weismer (1998) reported a correlation of r=0.94 between total vocabulary and NDW in Icelandic, and Jackson- Maldonado et al. (1993) reported a correlation of 0.84 between the same measures in Spanish. Figure 5.1 below demonstrates the positive relationship

between the NDW and D from the spontaneous sample with total (composite) vocabulary on the ICDI.

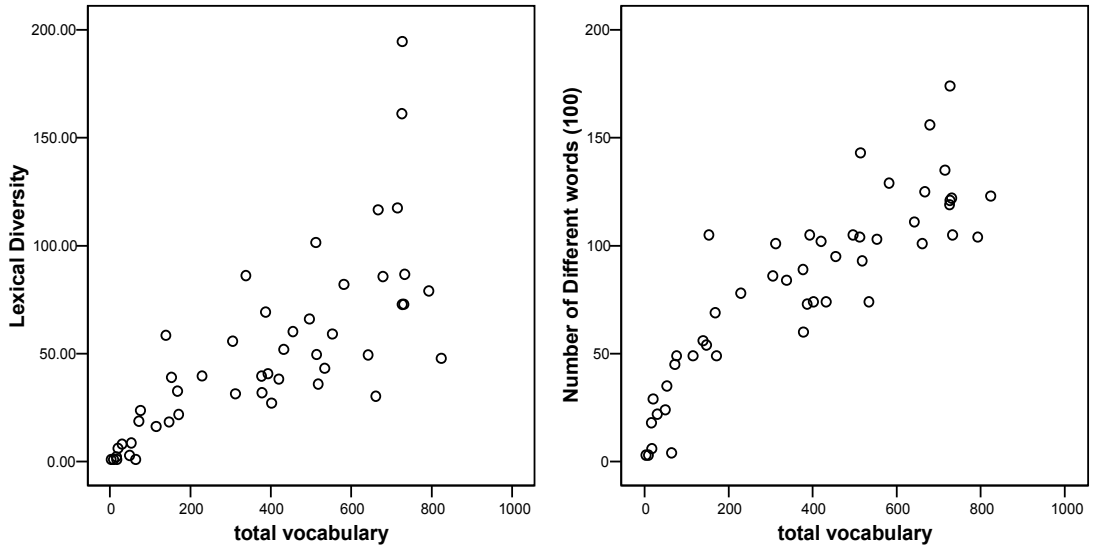


Figure 5.1 Scattergrams relating total vocabulary and lexical diversity (left); and total vocabulary and NDW (right)

In terms of the reported number of words known in English on the ICDI, not only was 'D' more strongly correlated with this measure, but also the number of English words in the spontaneous language sample (based on 100 utterances) was significantly related, indicating that the ICDI captures bilingual vocabulary development well. Similar to the report by Fenson et al. (1994), all measures correlated significantly with age (all in the range of r=.6 to .8), although Fenson et al. (1994) claim that the wide range of scores at each month renders age a poor predictor of vocabulary level. Therefore, the correlations independent of age were also carried out, revealing that the relationships remained significant for all, apart from the number of English words in the spontaneous sample, which only remained significantly related to the total number of English words in the sample. The current data is in line with previous studies of bilingual children, such as Patterson (2000) who reported strong correlations (r=.91) between observed and reported measures of language development on the LDS, and Marchman and Martinez-Sussmann (2002) who found high correlations between CDI and spontaneous language measures ($r \geq .79$ in all cases) for bilingual English-Spanish children. The latter study concluded that parents are "able to accurately discriminate children's English and Spanish word use when completing the [CDIs], even if they were speakers of both English and Spanish

themselves" (p. 994). This finding also appears to apply to the Irish-English bilinguals in the current study.

Consistent with the analysis used by Marchman and Martinez-Sussmann (2002), the robustness of the validity of the ICDI correlations with observed language measures were further examined after controlling for demographic factors including the amount of Irish spoken in the home and maternal years of education. This analysis revealed that total vocabulary and spontaneous language sample vocabulary measures (including NDW & D) were in the range of r= .65 to .98 ($p \leq .001$), and were similar to those found in the Spanish study (where correlations ranged from r=.61 to.70, $p < .05$ in the Spanish version). In addition, other studies of bilingual language development such as the Spanish-adapted version of the LDS found that parental estimation of the percent of time the child spoke Spanish to them was strongly and positively correlated with the proportion of Spanish words reported on the Spanish- English vocabulary test (Patterson, 1998; , 2000). The current study also estimated the percent of Irish-language input the children received from parents, however it was not correlated with the percent of Irish words reported either in the ICDI or in the spontaneous language sample. This was unexpected as the mean percentages for the measures were very similar (i.e., the parents reported that they spoke Irish to their child on average 92.4% of the time with a corresponding 94.5% Irish-only words reported on the ICDI and 92.2% in the spontaneous samples). As questions regarding the amount of Irish spoken were only asked on the first visit, these figures are only based on T1 correlations (n=21) and so if a larger group was involved, or repeated measures of Irish language input taken and correlated with subsequent vocabulary scores, perhaps the associations would have been different.

Finally, multiple regression analysis was carried out between two lexical measures on the spontaneous sample (NDW and D) with those found on the ICDI. It emerged that the best predictors of total vocabulary was NDW (accounting for 77% of the variance) and along with D, accounted for 80% of the variance. Dale (1991) used multiple regression analysis to confirm that the two observational measures (EOWPT and TTR) accounted for distinct, significant portions of the variance in CDI vocabulary at 24-months and used this to conclude that the CDI vocabulary checklist appears to assess a

broader range of vocabulary than either of the direct observation measures individually, with substantial validity. It also appears from the results above that the ICDI measures a wider range of vocabulary than spontaneous language sampling.

Vocabulary Measures across the ages

As the correlations reported previously are based on the same children seen at different time points, it is possible that this over-inflates the reported correlations. Therefore further analysis for individual children over the different age groups was also carried out. The findings were based on Spearman correlations due to the reduced numbers in each age-group, and as TTR was not found to be strongly associated with total vocabulary, it was removed from the analysis. The findings are summarised below:

- *18 month olds* (n=10): All ICDI vocabulary measures were strongly and significantly correlated with spontaneous language measures (r=.79 to .91, p≤.01). Correlations were similar to those reported in typically developing 17 month olds (r=.75 for NDW and CDI vocabulary; (Miller, Sedey, & Miolo, 1995)) and 18-month olds learning German (r=.92; Szagun et al., 2006). However ICDI correlations were higher than those found in 20-month-old English and Spanish speakers (r=.66; Thal et al., 2000; r=.67; Dale et al., 1989, respectively).

- *24 month olds* (n=11): All ICDI vocabulary measures were strongly and significantly correlated with spontaneous language measures (r=.74 to.82 p≤.01). This correlation was higher than the reported correlation of r=.53 between the NDW and CDI measures reported by Dale (1991) at the same age and those acquiring German (r=.65) at 25 months (Szagun et al 2006). However the number of English words on the ICDI was not significantly related to the spontaneous vocabulary measures, apart from the number of English words used in the sample (r=.72 p≤.05)

- *30 month olds* (n=13): This analysis showed that across spontaneous and reported measures, only NDW in the spontaneous sample correlated moderately with the total composite vocabulary (r=.66 p≤.05) and the number of words known in Irish

(r=.62 p≤.05). This is in line with the Spanish version which reported a correlation of r=.56 at 28 months (Thal et al., 2000) but was lower than that found in German (r=.77; Szagun et al., 2006) at a similar age. D failed to correlate with any vocabulary measure from the ICDI at this age and the number of English words reported on the ICDI was only significantly related to the number of English words in the spontaneous sample (r=.70, p≤.01).

- *36 month olds (n=14):* Finally, for the eldest group, total composite vocabulary failed to relate to any of the spontaneous language measures and the number of words known in Irish was only moderately related to the NDW in the spontaneous sample (r=.59, p≤.05). At this age, the number of reported vocabulary items known in English was the measure that was most strongly related to the spontaneous sample (including D (r=.76 p≤.01); NDW (r=.56, p≤.05) and the number of English words used in the spontaneous sample (r=.71, p≤.01)). Thus it seems that for the older children, more of their vocabulary diversity comes from their growing knowledge of words in English (including bilingual vocabulary) and it is important for the ICDI to capture this growing bilingual vocabulary as the children get older.

It was interesting to note that the composite vocabulary score in the ICDI showed lower concurrent validity as the children became older, particularly at 36 months, six-months beyond the age at which the original CDI: Words and Sentences was intended. Preliminary norming studies on the recently developed CDI- III for children aged up to 37 months have reported low but significant correlations (r=.35) between the NDW in a 15-minute language sample and vocabulary scores from the CDI-III (Feldman et al., 2005) and moderate correlations (.47 to .63) between CDI-III vocabulary scores and language measures on standardised tests (Mercure, 1999). Previous studies using the CDI beyond 30-months have mostly included children with language impairment and found it to be a valid measure for children of this age. These include studies of children with Specific Language Impairment (SLI; Thal et al., 1999), who reported correlations in the range of .52 to .86 with direct measures of vocabulary in 39 and 49 months olds; late talkers (Heilmann, Ellis Weismer, Evans, & Hollar, 2005); children post-cochlear implant

age 30-86 months (Thal, DesJardin, & Eisenberg, 2007) and children with Down syndrome (Miller et al., 1995), where significantly strong correlations (all $r \geq .70$) were found for children aged 16-68 months). Even though children in the current study continued to make gains in their bilingual vocabulary knowledge and grammatical development, the correlations between total vocabulary and spontaneous language measures were reduced and may have been due to the restricted distribution of language skills in this age range, with children achieving scores that were at or approaching the test ceiling. Dale et al. (1989) caution that parent report is only effective if focusing on newly-emerging skills that occur with enough frequency to be noticed, but are still within the limits of the casual observer. Thus mothers can evaluate comprehension vocabulary at 1; 0, and productive vocabulary in the second year of life, but both tasks would be beyond the ability of mothers of children a year or so older. This could have also reduced the validity of the ICDI after 36 months and is similar to the findings of ceiling effects of the CDI-III after 37 months reported by Fenson et al. (2007).

Finally, the only standardised test that could be used in the current study was the Test of Pretend Play (ToPP; Lewis & Boucher, 1997). As described in the methodology, five children participated on this test on two occasions, as their performance was not within normal limits on the first administration. However, all other children participated on one occasion only, leading to a total of 26 play assessment scores. As previously mentioned, the theoretical motivation for using this test was that symbolic play is held to be significantly related to language development, and can sometimes reveal a child's linguistic competence before verbal language begins (see Lewis et al., 2000, for further details). Analysis in the current study revealed that the raw scores from the ToPP were correlated with scores on the vocabulary scales of the ICDI and vocabulary measures from the spontaneous language sample taken from the same children. Spearman correlations revealed strong (all in the range of $r=.73$ to .77, $p<.001$) associations between the ToPP scores and all ICDI and spontaneous vocabulary measures (apart from TTR which was only moderately ($r=.41$) related to ToPP scores). However when age was controlled, the measures were no longer associated, which is in keeping with a study by Bornstein, Haynes and Painter (1998) who found that symbolic play scores (based on a non-standardised task) did not covary with measures of vocabulary (including

spontaneous sampling, direct assessment and maternal report). Nonetheless, the finding of raw score correlations further support the validity of the ICDI as a developmental measure of language.

Grammar

The validity of the ICDI was also examined by computing correlations between reported and direct observations measures of grammar, in the same manner as reported for vocabulary above. Previous studies have found that the CDI grammar scales correlated strongly and significantly with various measure of spontaneous and standardised grammatical assessments for typically developing children (Dale et al., 1989; Dale, 1991); children speaking other languages (e.g., Thal et al., 2000); children with SLI (Thal et al., 1999) and children post cochlear implantation (Thal et al., 2007). The Pearson correlations for the entire validation sample (n=48) and partial correlations controlling for age in brackets are contained in Table 5.4 below. All correlations are significant at p≤.01 unless otherwise indicated.

Table 5:4 Correlations of Grammatical measures on the ICDI and spontaneous sample

(partial correlations are in parenthesis)

		Spontaneous Measure		
		MLU (100)	*Regular Morphemes (n=6)*	*Irregular 'Word Forms'*
ICDI Reported Measures	*Sentence Complexity*	.77 *(.46)*	.68 *(.34)*	.30* *(-.02, ns)*
	M3L	.77 *(.53)*	.68 *(.40)*	.45 *(.26, ns)*
	Regular morphemes (n=6)	.69 *(.45)*	.66 *(.34*)*	.23* *(-.09, ns)*
	Irregular 'Word Forms'	.74 *(.34*)*	.59 *(.18, ns)*	.34* *(.07, ns)*

** = p≤.05 df=46*

The table above reveals that all of the ICDI grammatical measures were strongly and significantly correlated with MLU from the spontaneous sample, and moderately so when age was controlled. Dale (1991) estimated that the reliability of MLU itself to be between .80 and .85, thus, as was reported for the original CDI by Fenson et al. (2007),

the validity correlations for MLU are nearly as high as the reliability of MLU itself, indicating that nearly all of the reliability variance in MLU is captured by the ICDI. This relationship is illustrated in Figure 5.2 below.

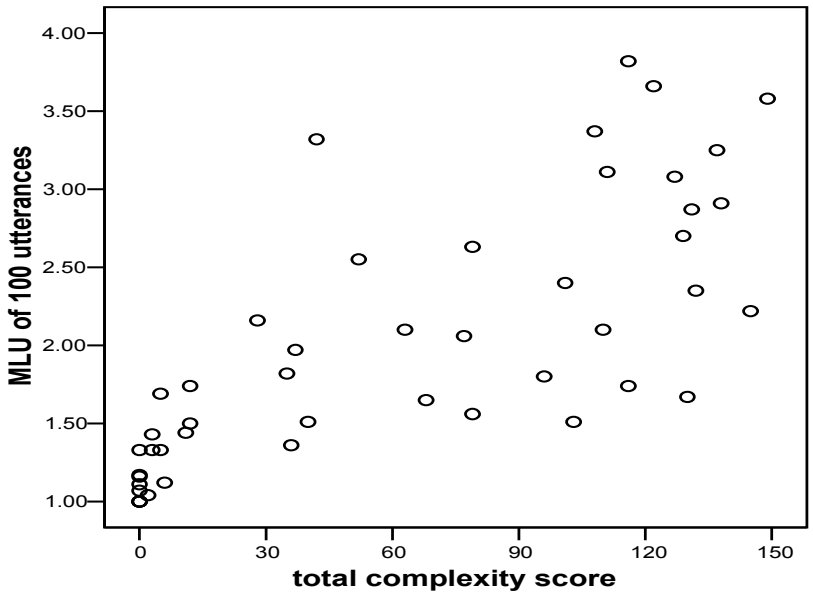


Figure 5.2 Scattergram relating total sentence complexity and MLU (100)

MLU has also been noted to be significantly associated with parental report of grammar in other CDI adaptations, including that of Icelandic, which like Irish, is a highly inflected language (Thordardottir & Ellis Weismer, 1998). In addition, there were moderate correlations noted between ICDI grammar scores and the six regular morphemes used spontaneously (which were low but generally significant when age was controlled). Dale (1991) also found that the index use of four regular bound morphemes derived from the English CDI was significantly correlated with spontaneous syntactic criterion variables, and the reported use of bound morphemes in Icelandic was also related to spontaneous measures of grammar (Thordardottir & Ellis-Weismer, 1996). Finally, the number of irregular nouns and verbs was only moderately correlated with the same measures from the spontaneous language sample (although this failed to reach significance when age was controlled for). It should be noted that although all the correlation figures reported above are generally moderate to strong and significant, they are slightly lower than those reported in other studies of languages. For example, Dale et al. (1989) reported correlations of up to .88 between observed and reported measures of

grammar in English. This may have been linked to the fact that the parents in the current study were bilingual reporters. Marchman & Martinez- Sussmann (2002) found that bilingual reporters had difficulty discriminating grammatical development in the two languages, and were poorer at this than at reporting of bilingual vocabulary development.

When multiple regressions were carried out in line with those for vocabulary above, the best predictor of ICDI measures of grammar (sentence complexity & M3L) was spontaneous MLU, accounting for 59% of the variance in both cases. In addition, the variance in the reported number of regular morphemes on the ICDI was also best predicted by spontaneous MLU (accounting for 47% of the variance) and, along with the number of regular morphemes used in the spontaneous sample, accounted for 52% of the variance. This indicates that grammatical complexity, M3L and reported number of regular morphemes from the ICDI capture grammatical development for this language and age range. The additional variance noted in grammatical development was explained by lexical measures and will be further outlined in Chapter 9, which addresses the relationship between vocabulary and grammar. Overall, the comparison of parental assessment of grammatical abilities with that observed spontaneously reveals that parents can reliably assess their child's early grammatical development in Irish, which is impressive given that they are considered 'non-experts' (Fenson et al., 2007).

Grammatical Measures across the ages

As with the vocabulary measures, validation of the four grammatical measures of the ICDI with the three measures from the spontaneous sample was also carried out for the various age groups. The results of the Spearman correlations are contained below:

- *18 month olds* (n=10): Both complexity and M3L were strongly and significantly correlated with MLU from the spontaneous sample ($r=.81$ $p\leq.01$). These were in line with the correlations of .88 (complexity to spontaneous MLU) and .77 (M3L to MLU) reported by Dale et al. (1989) in a group of 20 month olds. However the number of regular morphemes reported was not correlated with the same measure in the spontaneous sample, nor with complexity and M3L, highlighting the

instability of morpheme use at this age. As none of the children were reported to be using irregular word forms at this age, this was not analysed.

- *24 month olds* (n=11): The correlations between reported and spontaneous language measures were stronger at this age. They ranged from r(10)=.75 to .91 p≤.01 between complexity and M3L on the ICDI with MLU and the number of regular morphemes from the spontaneous sample. This was in line with the correlations found between the grammatical CDI and spontaneous grammatical measures reported by Dale (1991) (r≥.74) in the same age group and by Thal et al., (2000) for Spanish children aged 28 months. The number of regular morphemes reported by the parents was also moderately correlated with MLU (r=.67 p≤.05) and with regular morphemes in the spontaneous sample (r= .79 p≤.01). It appears that at this age grammatical acquisition is taking off, particularly with the use of regular morphology. Irregular word forms were not correlated with any other measures at this age, again most likely due to their infrequent use.

- *30 month olds* (n=13): A different picture emerged for this age group, whereby MLU in the spontaneous sample was only moderately correlated with sentence complexity and M3L (r= .64 and .57 respectively, p≤.05). The number of regular morphemes reported by parents was no longer correlated with any of the spontaneous measures, although the number of irregular word forms selected by parents was moderately correlated with MLU (r=.67, p≤.05) as these forms are beginning to emerge at this age.

- *36 month olds* (n=14): Finally at the oldest age group, spontaneous MLU appears to be the most stable grammatical measure as it was the only one to be moderately correlated with any of the parent report measures (including M3L (r=.61, p≤.05) and the number of irregular word forms (r= .54, p≤.05). However, MLU did not correlate with grammatical complexity measures. Feldman et al., (2005) also found significant but low correlations for a similar age-group between spontaneous MLU and CDI-III grammar scores, including sentence complexity (r=.42) and language use scores (.31), which include questions on syntax. These

findings suggest that direct assessment of grammatical abilities at this age may reveal more about the child's competencies than either spontaneous or reported measures.

The last concurrent validity measure was used to examine the relationship between grammatical scores on the ICDI (sentence complexity and M3L), and MLU on the spontaneous sample with scores on the ToPP, as was carried out for vocabulary. Once again strong and significant correlations were obtained for all measures ($r=.65$ to.73 $p<.001$), which supports the other validity results for the ICDI, however these were no longer significant when age was controlled for.

Regular Morphemes and Irregular Word Forms

Apart from correlational measures, another way of looking at the concurrent validity of the grammatical measures was to compare parental report of grammatical morphemes with results found on the elicitation task and spontaneous language measures. Quantitative and qualitative analysis of each child's elicited use of the major morphological targets was undertaken in order to compare these findings with the results on the corresponding items on the ICDI checklist and the spontaneous sample. As described in the previous chapter, there were six regular bound morphemes and 28 irregular word forms (8 nouns and 20 verbs) assessed on the ICDI checklist (Part II. A and B; see Appendix 2). In addition, questions were asked as to whether the child was using overgeneralisations on nouns (for plural marking or with initial mutations) and verbs (e.g., using the verbal noun for past and future tenses). Similarly, the elicitation task assessed plural marking on nouns and regular past tense marking on verbs. Irregular noun and verb marking were also targeted so that they could be cross-checked with parent report. A third elicitation task assessed the child's use of present progressive marking on verbs, however this was not included in the ICDI as it was considered too complex for an untrained linguist to assess. Instead parents were asked to indicate whether the child was using the progressive article marker 'ag'. These results were also cross-checked with those found in the spontaneous sample based on the FREQ output of the CLAN programme.

Table 5.5 below contains the percentage of 'yes' scores (i.e., selected by parents as used 'sometime/often' by the child on the CDI) of use of the targeted grammatical morphemes for the entire group across the ICDI, spontaneous and elicited language measures.

Table 5:5 Percentage of children using targeted morphemes across parent report, observation and elicitation assessments

	Morpheme	**Parent Report** (n=48)	**Spontaneous Sample** (n=48)	**Elicitation Task**
Regular Morphemes	*Plurals*	52.1%	60.4%	27.1% (n=20)
	Synthetic Verb+Person	35.4%	25%	n/a
	Progressive (ag)	62.5%	58.3%	35.4% (n=17)
	Regular Past Tense	50%	27.1%	8.3% (n=5)
	Possessive	47.9%	10.4%	n/a
	Future Tense	35.4%	20.8%	n/a
	Irregular Nouns	60.4%	14.6%	14.6%
	Irregular Verbs	54.2%	20.8%	4.2%
	Overgeneralising Nouns	35.4%	35.4%	33.3%
	Overgeneralising Verbs	31.3%	16.7%	8.3%

n/a= not assessed

Looking across the results reported by parents and observed in the spontaneous sample, there were no false negatives (where parents did not report a form that was found in the spontaneous sample) although there was a slightly higher use of regular plurals in the spontaneous sample than reported by parents. It is possible that there were false positive effects however, as parents reported higher use of certain structures than was observed spontaneously, particularly for future and past tense marking. This could have been due to the fact that conversations in the spontaneous samples were generally about the 'here and now' as opposed to events removed from time which would have triggered the use of different verb tenses, and so could be attributed to a sampling effect. In addition, the use of irregular nouns and verbs was also lower in the spontaneous sample, again most likely due to the fact that the number of irregular nouns is low (n=8) and irregular verbs are generally used in past, future and dependent forms (following a question or negative particle) and so were also infrequent in the spontaneous sample. Finally, the difficulty bilingual reporters can have in reporting grammatical development

in particular must be considered as it has been found to lead to under-or overestimation of abilities (Marchman & Martínez-Sussmann, 2002) especially in a one-parent-one-language situation. Although this was not the situation in the current study, it is worth taking the influence of the majority language into account in the outcome.

Comparison of the spontaneous language sample and the parent report revealed an over-reporting on the use of possessive marking (which is signalled by lenition in Irish) by the children. Although it is possible that the parents were accurate in their assessment of the child's ability in this reagard, and that a longer sample might have revealed the use of this marker, it is also possible that this may have been a true false-positive. The discrepancy could be due to a phonological constraint, as lenition mostly involves the use of fricatives. For example, in order to indicate possession, the child must change the initial phoneme in 'cóta' /koːtə/ *coat* to 'chóta' /χoːtə/ in a construction like 'mo chóta' *my coat*. On the CDI, parents are asked to select vocabulary forms, whether or not the child is using the correct phonological form of the word. Therefore it is possible that the parents extended this pattern into their assessment of the child's morphological abilities, selecting the form as present whether or not the child marked possession on the noun. In a language such as Irish where morphological development is intricately linked to phonological development (due to initial mutations) it may be too difficult for parents to determine whether children are using this structure as yet. Moreover, as Ó' Baoill (1992) reported that lenition does not stabilise until after 5 years it may be too early to detect this skill under 4 years, as was targeted in the current study.

Analysis of synthetic verb marking across the age groups also revealed a lack of significant association across spontaneous language sampling, elicitation procedures and the parental report. After further analysis, it was felt that the children did not go through a period of separating the verb and person (e.g. 'tá mé' *I am*) before moving to the synthetic form ('táim', *I'm*) in this dialect, and rather started out with the synthetic version from the beginning. Therefore the use of this morpheme is not particularly informative about a child's morphological development, and will most likely be removed in the next adaptation of the ICDI.

Overall, the morpheme targets could not be successfully obtained in the elicitation task which might have been due to the formal nature of this task. Although only a limited number of children took part, those that did generally didn't use the morphemes on this task, even though they may have done in their spontaneous samples or on the parent report. The most reliable morphemes across tasks appeared to be the use of irregular nouns and overgeneralisations on nouns which were used in a similar way across observed and reported situations. It also seemed that the ability to use the progressive aspect was also similar across the spontaneous, reported and elicitation tasks. These results of the elicitation task highlighted that direct assessment of morphological targets and spontaneous language sampling do not profile the achievements of children in this age range as well as parental report does.

In order to establish whether there was an association between the grammatical measures, as taken on the ICDI, spontaneous sample and elicitation task, chi-square analysis was carried out. This was carried out for ten morphological variables outlined in Table 5.6 below across all three conditions (although synthetic verb+person, possessive and future tense marking could only be compared across reported and spontaneous measures as these were not assessed in the elicitation tasks. Contingency tables based on counts (i.e., the number of children who score a 'yes' for a particular morpheme) were entered into SPSS. As only children aged '30' and '36' months could successfully participate in the elicitation task, the values are not provided for the younger ages.

Table 5:6 Number of children reported to use grammatical morphemes compared to spontaneous language samples and elicitation tasks

Age Groups (in months)										
	'18 month olds'		**'24 month olds'**		**'30 month olds'**			**'36 month olds'**		
Morpheme	*16-21 (n=10)*		*22-27 (n=11)*		*28-33 (n=13)*			*34-40 (n=14)*		
	ICDI	**Sample**	**ICDI**	**Sample**	**ICDI**	**SS**	**E**	**ICDI**	**SS**	**E**
Marking Plurals	1	3	4	4	9	8	4	11	14	8
Verb+Person	1	0	2	2	4	3	n/a	10	7	n/a
Progressive 'Ag'	1	1	6	6	9	10	5	14	11	11
Regular Past	1	0	1	1	8	6	1	14	6	3
Possessive ('h')	1	0	3	1	7	2	n/a	12	2	n/a
Future Tense	0	0	0	2	5	2	n/a	12	6	n/a
Irregular Nouns	0	0	5	2	11	2	1	13	3	5
Irregular Verbs	0	0	3	0	9	4	0	14	6	2
Overgeneralising Nouns	1	0	3	4	3	5	5	10	8	10
Overgeneralising Verbs	0	0	1	3	7	1	1	7	4	3

**SS= Spontaneous Language Sample; E= Elicitation Task*

As can be seen, in general there was a good correspondence between grammatical morphemes reported by parents and those observed in the spontaneous language samples for all age groups. For plurals, parents tended to under-report at the youngest and oldest age groups and some verb tenses were not observed as frequently in the spontaneous language samples as reported by parents, for reasons previously discussed. Results from the elicitation tasks, revealed again that children produced the fewest incidences of the morphemes on these measures, which may have been expected given the attentional demands and formal nature of this task. In order to observe these associations across age groups, further chi-square analyses were carried out for the following age groups:

- *18 month olds* (n=10): The elicitation task was not carried out with children from this age-group and so chi-square analysis was carried out only across reported and spontaneous conditions. Looking at the observed and expected counts, there were less than five expected counts for each morphological target and so all chi-square analyses were not significant. Observation of the reported measures revealed that generally only one child (ICDI 7) was reported to be using some of the regular morphemes although this was not revealed in the corresponding spontaneous

language sample. Otherwise what the parents reported (i.e., no use) was also consistent with that observed in the spontaneous sample.

- *24 month olds* (n=11): Children from this age group also did not participate in the elicitation task. As in the previous group, looking across observed and expected counts, there were less than five expected counts for all morphological targets. Therefore chi-square analysis found no significant association between reported and observed use of these measures. It was interesting to see however, that the number of children reported to be using plurals, synthetic verb+person, progressive and regular past tense marking was exactly the same as that found in the spontaneous samples. Moreover, this was generally accurate for the same individual children, indicating that parents are very accurate in assessing the use of these particular regular morphemes. Possessive marking (lenition) did not correspond well with that observed, as it was reported for three children but only observed in one child. This could also be attributed to the limited nature of spontaneous language sampling.

- *30 month olds* (n=13): Looking at frequency counts, in general what was reported by the parents was in line with that observed in the spontaneous sample. Analysis revealed a significant association between the use of possessive marking across reported and spontaneous conditions (χ^2 (1) = 4.25, $p \leq .05$) with higher reported and lower observed use than expected by chance. There was no association between reported and observed use of synthetic verb+ person or future tense marking. For the morphemes targeted across all three conditions, chi-square analysis revealed a significant association on the following morphemes:
    - *Regular past tense*- (χ^2 (2) = 8.45, $p \leq .05$) with higher reported use, expected observed use and lower elicited use than expected by chance.
    - *Irregular nouns*- (χ^2 (2) = 20.28, $p \leq .001$) with higher reported use, expected observed use and lower elicited use than expected by chance.
    - *Irregular verbs*- (χ^2 (2) = 14.01, $p \leq .001$) with higher reported use, expected observed use and lower elicited use than expected by chance.

- *Overgeneralising verbs*- (χ^2 (2) = 10.4, p≤.01) with higher reported use, and lower observed and elicited use than expected by chance.

Parents tended to report a higher use of irregular nouns and verbs than was observed spontaneously, but this was most likely due to their relatively infrequent use in spontaneous contexts and supports the claim that the development of these forms may be best captured by parent report at this age. There was no significant association for plural marking, progressive or overgeneralising on nouns across all three conditions.

- *36 month olds* (n=14) - Finally, three-year old children reached or approached ceiling on most morphological measures. The frequency counts for reported and observed measures were again very similar, apart from the low incidence of possessive 'h' marking, future tense and irregular nouns and verbs in the spontaneous sample, again which could have been attributed to a sampling effect rather than a false positive. Chi-square analysis revealed a significant association between possessive marking ($\chi^2(1)= 14.28$, p≤.001) and future tense marking ($\chi^2(1)= 5.6$, p≤.05) with higher reported use and lower observed use than expected by chance across reported and observed conditions. There was also a significant association across the three conditions for the following morphological targets:
  - *Plural marking*- (χ^2 (2) = 7.63, p≤.05) with higher spontaneous use, expected reported use and lower elicited use than expected by chance.
  - *Regular past tense*- (χ^2 (2) = 18.65, p≤.001) with higher reported use, expected observed use and lower elicited use than expected by chance.
  - *Irregular nouns*- (χ^2 (2) = 16, p≤.001) with higher reported use, and lower observed and elicited use than expected by chance.
  - *Irregular verbs*- (χ^2 (2) = 21.38, p≤.001) with higher reported use, expected observed use and lower elicited use than expected by chance.

There was no significant association between measures of progressive marking or overgeneralisation on nouns, possibly as they were at ceiling in this age group.

Overgeneralisation on verbs was also not significantly associated with other measures as it was not frequently observed or elicited.

Previous related studies such as Dale (1991) also reported associations between the use of the four regular bound morphemes targeted in the English version and that found spontaneously, however the parent report measure did not appear to provide differentiated information about morpheme use. In other words parents were just reporting on the child's specific ability in 'grammar' as opposed to specific morpheme usage. This was not the case for the Irish version where it appears from the results above that overall parents are very accurate at reporting specific morpheme usage. Moreover, Bryan, (2003), (cited by Oetting & Hadley, 2008) investigated the validity of parent report for assessing the emergence of finite verb morphology in particular. Looking across spontaneous language samples and reported measures (from the lexical verbs selected under 'helping verbs' and sentence complexity section) it was noted that parents were more accurate when sentence contexts were provided (i.e., on the complexity section), rather than when selecting the lexical forms of the auxiliary under the 'helping verb' section of the vocabulary checklist. Although beyond the scope of the current study, this aspect could be investigated using the Irish data set in a further study.

5.4.5 Predictive Validity

'An instrument possesses predictive validity to the extent that components of the instrument measured at one point in time correlate with the same or other component of the instrument or to other measures of the same construct measured at a subsequent point in time', (Fenson et al., 2007; 111). Singer and Willet (2003) outline how it is essential that the same carefully designed and piloted instruments are used on each occasion to ensure validity, as just because an instrument is valid and reliable on one occasion does not mean it will remain this way over time. Predictive validity is an important feature of any assessment tool, particularly for younger children where extensive variability in the rate of language acquisition and performance on tests can have an effect (Miller et al., 1995). Moreover, as children that have been identified as late talkers on parent report measures have been found to be a greater risk for later language impairment (Rescorla,

1989; Rescorla & Alley, 2001), the earlier and more reliable predictive validity can be established the better.

Previous studies using the CDI have found strong predictive power for later vocabulary and grammar scores (Bates et al., 1988) and for utterance length and semantic diversity (Tamis-LeMonda & Bornstein, 1994). Bornstein, et al. (1998) found that language measures on an earlier version of the CDI taken at 20 months, later predicted verbal and performance IQ as measured at 48 months (and was stronger for verbal IQ). Tsao et al. (2004) found significant correlations between speech perception at 6 months and language measures on the CDI at 13, 16 and 24 months. A longitudinal study by Bauer et al, (2002) found that vocabulary comprehension scores on the CDI: Words and Gestures form produced a relatively constant predictive correlation with vocabulary production scores on the CDI: Words and Sentences at 21 months. However, vocabulary production scores only became predictive at 11 months (r= .45), thereafter steadily increasing to r=.84 by 14 months. Finally, Miller et al. (1995) found significantly strong predictive validity on CDI scores and later language samples from children with Down syndrome tested eight-months after the initial assessment (ranging from r=.51 to .63 with NDW in a language sample and the expressive subtest of the Bayley scales of infant development respectively).

Predictive vocabulary correlations (using Spearman's Rho due to the reduced numbers) for nine children from the main ICDI sample assessed between 16 and 21 months (n=9) at Time 1 and six-months later (Time 2) at 22-27 months (n=9) are contained in Table 5.7 below. Seven of this same group were again tested six-months later (Time 3) at 24-32 months, and further predictive correlations calculated.

Table 5:7 Predictive Correlations for vocabulary measures at 16-21 months (T1; n=9); 22-27 months (T2; n=9) and 28-33 months (T3; n=7)

	ICDI		SPONTANEOUS			
	T2 Vocab	**T3 Vocab**	**T2 D**	**T3 D**	**T2 NDW**	**T3 NDW**
T1 Vocab	.83**	1***	.90**	.43 ns	.92***	.71 ns
T1 D	.78*	.78*	.73*	.14 ns	. 73*	.56 ns
T1 NDW	.76*	.79*	.86*	.39 ns	.73*	.50 ns
T2 Vocab		.96***		.71 ns		.86*
T2 D		.96***		.64 ns		.68 ns
T2 NDW		.93**		.68 ns		.82*

*** p≤.001; * p≤.05

The original norming study of the MCDI (Fenson et al., 2007) found that vocabulary between 16-24 months (T1) strongly correlated (r=.71, p<.001) with scores achieved by the same children tested six-months later (between 22-30 months) and was in line with the current study where ICDI vocabulary-vocabulary measures across both six- and twelve- month periods were strongly related (r= .83 to 1 p≤.001). This was also similar to an earlier study by Fenson et al. (1994) who reported correlations of .74 across a six-month period (20 to 27 months) and Reese and Read (2000) who reported strong predictive correlations (r=.81) between vocabulary scores on the New-Zealand version of the CDI in 61 children at 19 and 25 months. In the current study, all correlations from Time 2 (22-27 months) to Time 3 (28-33) months were stronger than those predicted from Time 1 (16-21) to Time 2 (correlations ranged from r=.76-.83 over the first time period and from r= .93 to .96 over the latter 60 months), indicating that the later period of vocabulary development is more stable. Increasing stability of MCDI scores over time was also reported by Fenson et al. (2000; 2007) who found that the predictive power of the MCDI increased over the 12-24 month age groups. Bates et al. (1988) also reported correlations in the range of .60 to .80 between parent report of productive vocabulary at 20 months and spontaneous and structured assessment of vocabulary at 28 months, with correlations increasing to r=.74 or greater after 24 months.

ICDI vocabulary scores at Time 1 also strongly predicted spontaneous language vocabulary measures such as lexical diversity (D) and the NDW at Time 2 and Time 3

(although D at Time 3 was not related to other vocabulary measures). Overall, the ICDI vocabulary was more strongly related to the same measure at T2 and T3 than either of the spontaneous vocabulary measures across the same period. This suggests that the ICDI gives a more reliable and stable prediction for vocabulary outcomes across a six- and twelve-month period. It was interesting to note that the predictions in ICDI vocabulary across twelve- months (T1 to T3) were slightly stronger than those across six months (e.g. T1 to T2). Had the study continued over a longer period, the predictive correlations may have diminished, as reported by Reese and Read (2000) who found long-term correlations ranging from .43 to .5 over a delay as long as 21 months on the New-Zealand CDI.

The same procedure was then carried out to see how the grammatical scores were related over time, and results are outlined in Table 5.8 below. Once again Spearman correlations were used because of the reduced numbers.

Table 5:8 Predictive Correlations for grammatical measures at 16-20 months (T1; n=9); 22-26 months (T2; n=9) and 28-32 months (T3; n=7)

	ICDI (REPORTED)				**SPONTANEOUS**	
	T2 Complexity	**T3 Complexity**	**T2 M3L**	**T3 M3L**	**T2 MLU (100)**	**T3 MLU (100)**
T1 Complexity	.77*	.78*	.68*	.78*	.73*	.17 ns
T1 M3L	.77*	.78*	.68*	.78*	.73*	.17 ns
T1 MLU (100)	.74*	.63 ns	.84**	.70 ns	.88**	-.08 ns
T2 Complexity		.85*		.82*		.57 ns
T2 M3L		.67 ns		.63 ns		.45 ns
T2 MLU (100)		.74 ns		.78*		.037 ns

*** p≤.001; * p≤.05

It seems that the ICDI grammar scores are also highly predictive over a six- and twelve-month period for the both complexity and M3L measures and for spontaneous MLU (although only from Time 1 to Time 2). These predictions were higher than those found in the original CDI where complexity predictions across 6-months were correlated at r= .61 (Fenson et al. 1994) and on the New Zealand CDI where correlations of r=.59 for complexity and .37 for M3L were reported in children assessed at 19 and again 25 months (Reese & Read, 2000). However M3L on the ICDI was less reliable than

complexity from Time 2 (22-26 months) to Time 3 (28-32 months). This may be because the children are not necessarily increasing their length of utterance at this age, but are acquiring grammatical morphemes (including initial mutations in Irish) which make their sentences more complex but not necessarily longer. As the Irish M3L and MLU were counted in words, this development would thus not be reflected in these measures, and so grammatical development at this later age seems to be better captured by complexity. On the other hand, the Swedish version of the CDI found that grammatical complexity and M3L at Time 1 significantly predicted grammatical complexity at Time 2 (over a 14-month period) but not M3L at Time 2 (Berglund & Eriksson, 2000). This was interpreted to mean that parents could not reliably recall their child's longest utterances at the later age of 3 or 3; 6 and could also explain the finding on the ICDI.

Finally, MLU from the spontaneous sample was also highly predictable across six-months, but not across twelve-months (as it is not correlated from Time 1 to Time 3). Unlike that reported for vocabulary, where the age-based predictions increased for the older age groups, MLU and M3L were actually better predicted from the young age groups at Time 1 to Time 2. Again this could be due to the limitations of MLU as a measure of grammatical complexity for older children. This finding was in contrast to previous research which found that the predictive power for grammatical complexity on the ICDI increased from 20-24 months (Fenson et al., 2007) possibly due to the limited variability in grammar at this age (Reese & Read, 2000). Moreover, previous studies have also found weaker stability in grammatical scores than vocabulary which was attributed to the reduced variability in grammar at younger ages (Fenson et al., 1994). Nonetheless, they hold that these cross-age stability measures are unusually strong for longitudinal studies in this age range.

The findings of the rise in predictive validity of the ICDI during the 2nd year of life are supported by several more recent longitudinal studies. For example, Feldman et al. (2000) reported only modest correlations from one- to-two years on the MCDI yet stronger correlations ($r = .58$, $p < .01$) for vocabulary production on the CDI: Words & Sentences (W&S) with the CDI: III scores in a follow-up study using older children (Feldman et al., 2005).The same study also found that M3L and sentence complexity

from the CDI: W&S predicted CDI-III sentence complexity scores ($r = .54$ & $.37$; $p<.01$, respectively). These predictive values were similar to those found in the Twins Early Development Study (TEDS) as described by (Dale, Price, Bishop, & Plomin, 2003) where 91% of a group of children who seemed to have typical language development at two-years also had typical language at four-years (although 56% of those with language delay at two-years had typical language profiles at three-years). Nonetheless Feldman et al. (2005) argue that it is hard to distinguish between the possibility that regardless of assessment, early performance is only loosely associated with later abilities.

5.5 Summary and Conclusion

To summarise, the relations among the several sections of the ICDI and the associations between spontaneous and elicited measures of vocabulary and grammar attest to the reliability and validity of the Irish inventory as a developmentally sensitive measure of lexical and grammatical growth. Having established this, the nature of early vocabulary and grammatical development will now be outlined. In addition, the possibility that behavioural measures of grammar (including MLU) are tied to vocabulary size (Thal et al., 2000) also needed to be considered and will be outlined later in the chapter looking at the relations between lexical and grammatical development.

6 Vocabulary Development in Irish

Having established that the Irish Communicative Development Inventory (ICDI) is a reliable and valid instrument, we now turn our attention to the features of vocabulary development that are captured by the assessment. Vocabulary development is a key marker of children's language acquisition and a major part of the language of children that parents hear and attend to (Bornstein, Tamis-LeMonda, & Haynes, 1999). Scores on vocabulary tests have been found to predict later success in learning to read (Chall, Jacobs, & Baldwin, 1990), reading comprehension (Anderson & Freebody, 1983) and vocabulary is a key component of most intelligence tests. Based on the ICDI checklist data, this chapter will explore aspects of vocabulary development including the rate of development over time, predictors of progress in vocabulary acquisition and the application of growth curve modelling to longitudinal vocabulary development. In addition, the relative importance of Irish vocabulary categories such as nouns, verbs and grammatical function words will be outlined. Chapter 7 will then examine the data in comparison with crosslinguistic studies of vocabulary development and analyse the contribution the findings make to wider theoretical aspects of how children acquire language.

6.1 General vocabulary development

General descriptive data for the vocabulary scores achieved by the participants have already been provided in previous chapters and are re-visited in Table 6.1 below (with scores rounded up to the nearest whole number). Vocabulary composition scores of the four major parts of speech and as a percentage of the vocabulary total are also presented and the variability in overall vocabulary development is captured in the box-plot diagram (Figure 6.1 below) across the 18, 24, 30 and 36 month-old age groups. In effect, the data is presented cross-sectionally, looking at similarities across age profiles as opposed to individual vocabulary scores over time, which will be subsequently analysed. It should be noted that data from participant ICDI 18.3, although not included in the reliability/validity analysis (as the form was returned more than one month after the

spontaneous sample), was included here so that as many data points as possible could be analysed.

Table 6:1 Vocabulary development across the ages from the ICDI (n=49)

	Age Groups (in months)											
	'18 month olds'			**'24 month olds'**			**'30 month olds'**			**'36 month olds'**		
Measure	*16-21 (n=10)*			*22-27 (n=11)*			*28-33 (n=13)*			*34-40 (n=15)*		
	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total
Total Vocabulary (composite)	81 (*113)*	3 – 378	10%	240 *(157.4)*	20 – 432	29%	440 *(214)*	115– 715	52%	625 *(142)*	377 – 824	74%
***Irish** (only) **Vocabulary**	70 (91)	3 – 308	86%	220 (144)	20 – 426	92%	346 (193)	108 – 658	79%	408 (226)	53 – 793	65%
***English** (only) **vocabulary**	6 (10)	0 – 31	7%	17 (20)	0 – 53	7%	28 (25)	0 – 89	6%	41 (43)	0 – 137	7%
Bilingual Vocabulary	5 (13)	0 – 39	7%	4 (5)	0 – 14	2%	66 (129)	0 – 392	15%	175 (237)	0 – 535	28%
Common Nouns (composite)	41 (60)	0 – 193	50%	124 (81)	6 – 234	52%	195 (87)	52 – 279	44%	262 (48)	172-336	42%
Predicates (composite)	11 (23)	0 – 75	14%	40 (32)	2 – 84	17%	86 (49)	15 – 154	20%	130 (39)	63 – 179	21%
Social Words (composite)	19 (13)	3 – 48	23%	34 (15)	10 – 56	14%	50 (18)	22 – 72	11%	64 (11)	42-78	10%
Closed Class (composite)	4 (8)	0 – 27	5%	19 (24)	0 – 80	8%	63	8-142	14%	99 (39)	43-152	16%

** This is the composite vocabulary score which represents conceptual vocabulary, excluding all the words the child only knew in English ('Total Irish') or only knew in Irish ('Total English')*

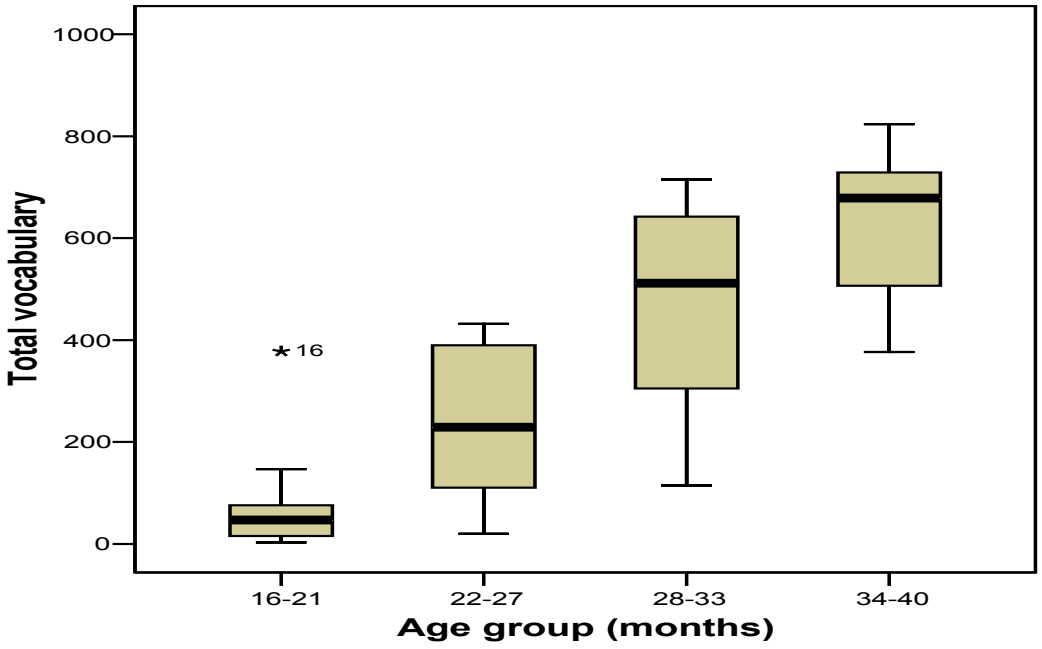


Figure 6.1 Total composite vocabulary development across the age groups

As outlined in Table 6.1 above, the children were using only a small percentage of the total vocabulary at 18 months (10%), but by three-years were using up to 75% of the 843 words on the checklist. It was also interesting that the majority of the total vocabulary items reported were in Irish-only, with English-only vocabulary items remaining stable at approximately 7% across all four age groups. However, when the words known in both languages were included, it emerged that the children were reported to know over one-quarter (28%) of their total vocabulary in both languages by three years. Vocabulary composition scores as a percentage of the total vocabulary indicated that common nouns made up the largest part-of-speech category at all time points, and the percentage of social words decreased in line with a slow but steady increase in the number of predicate and closed class words. This indicates that a 'noun bias' as reported for other languages may also be typical of the Irish language development, and on initial analysis it appears that the predicted 'verb advantage' did not emerge. These aspects will be analysed in more depth in the next chapter.

The boxplot diagrams are useful for providing a visual representation of the variation observed in the sample, of possible outliers and the skewness of data. The line across the middle of the box represents the median value and the box contains the middle 50% of the cases (from the 25^{th} to the 75^{th} percentile). The whiskers represent the minimum and maximum values. As can be seen, the boxplots demonstrate that although the interquartile range of the youngest age group is smaller than the other age groups (due to the smaller variability at this age), the range is from 3-378 words at this age, with ICDI 7 (observation 16 above) identified as an outlier, as this child was reported to have 378 words at 20 months. For 24- and 30-month olds, variability is fairly evenly spread across the children, and is larger than that at 18 months. At the oldest age group the variability reduces again, with most of the three-year-olds bunching towards the upper end of the vocabulary range, possibly reflecting a ceiling effect at this age. The wide-ranging variability reported above has also been found by other researchers. Typically developing 16-month olds have been noted to have expressive vocabulary size ranging from 9 to almost 200 words and from less than 41 to well over 405 words expressed by typically developing 20-month olds (Thal et al., 1999). Similarly, typically developing children aged 22-27 months were noted to have expressive vocabularies ranging from 77-518

words as tested on the British adaptation of the CDI (Klee & Harrison, 2001). Moreover, a longitudinal study of typically developing children, observed that the standard deviations are larger than the means for both CDI scores and laboratory tests until 17 months of age (Jahn-Samilo et al., 2000). After this age group, a 'fan effect' emerges, derived from the fact that some children begin to acquire words rapidly and others more slowly (Tamis-LeMonda & Bornstein, 1994). The explanations for individual differences in language acquisition have ranged from innate genetic predispositions to language (Pinker, 1994) to the amount and quality of linguistic input (Hoff, 2006, as cited by (Vasilyeva, Waterfall, & Huttenlocher, 2008). It should be noted that the range in vocabulary scores at 36 months was from almost 400 to over 800 words, indicating that there was still one child who was using only 50% of the total possible words on the ICDI. Although the original MCDI was designed for children up to 30 months, the recent revision which extended up to 37 months (CDI-III), shows that it can be used to represent a subset of the vocabulary of older children (Fenson et al., 2007) and, as found in the current study, may still be a useful method of assessing a subset of children who have lower levels of language skills.

6.2 Sources of variability in vocabulary competence

To evaluate developmental patterns in lexical production, a between-group repeated measure ANOVA was conducted on the total vocabulary scores, which indicated that there was a significant change across the four main age-groups ($F(3, 46) = 25.79$, $p \leq .001$). Post-hoc Bonferroni tests for pairwise comparisons revealed that this difference was not significant between 18 and 24 months but there was a significant difference between all other time points. Stepwise multiple regression was then carried out to determine the effect of a number of variables on vocabulary scores. Although genes have been found to account for between 12% and 20% of the variance in vocabulary size, these are considerably outweighed by environmental factors (Dale & Goodman, 2005). Previous studies using the CDI have reported that age, gender, SES and maternal education have an effect on vocabulary outcomes (Dale et al., 1989; Dale, 1991). However, there was not enough variability in SES in the current study (as measured by parental occupation) with the vast majority of the participants categorised as

'lower professionals' (CSO, 2007) from rural, middle class backgrounds, and so this was not entered as a variable. This was similar to a recent study investigating factors that influence vocabulary development in two-year olds which did not find that maternal education was implicated. However, this finding may have been due to a lack of variability of this factor in the sample (Stokes & Klee, 2008). Although similar uniformity was noted across parental education, it was decided that education would be included in the analysis to determine if it could explain some of the variance. The following variables were entered in the order of: age, gender, birth order (1^{st} or other), estimated percent of Irish spoken in the home, maternal education and paternal education. Results indicated that age is a significant predictor of vocabulary level, accounting for 63% of the variance; gender accounts for a further 15% of the variance and birth order a further 3%, with all three factors explaining 81% of the variance overall.

Gender differences in vocabulary development are well-documented in the literature, with girls scoring consistently higher than boys (Bornstein et al., 1998; Fenson et al., 1994; Reznick & Goldfield, 1992; Reznick & Goldsmith, 1989). Post-hoc analysis of the current data set indicated that there was a significant difference in total vocabulary between vocabulary measures for boys (n=22) and girls (n=27), ($t(47) = 2.1$, $p \leq .05$). Mann-Whitney U tests (used instead of parametric t-tests due to reduced numbers at 6-monthly age intervals) confirmed that the difference was not significant at the youngest age group, but significant differences between boys and girls at 24, 30 and 36-months were found ($z = 2.7$, 2.6 and 2.7 respectively; $p \leq .05$ in all cases). Inspection of the means indicated that, as expected, girls had a higher mean vocabulary score, (although at 30 months this finding may have been confounded by the fact that there were twice as many observations for girls as boys). The findings are similar to those of Fenson et al. (1994) who also found that females scored significantly higher than males, although gender only accounted for 1-2% of the variance in their study. Other adaptations of the CDI including the Dutch (Zink & Lejaegere, 2005), German (Szagun et al., 2006) and New Zealand (Reese & Read, 2000) versions found an effect of gender favouring girls to varying degrees, however no such effect was found for Hebrew (Maital et al., 2000), Swedish (Burglund & Ericsson, 2000) or Mexican-Spanish (Jackson-Maldonado et al., 1993). Overall, studies found that the advantage for girls is relatively small, occurs early in

development and attenuates over time, particularly by 20-24 months (Bauer et al., 2002; D'Odorico, Carubbi, Salerni, & Calvo, 2001; Huttenlocher, 1991). However, Bornstein et al (1999) noted that girls consistently outperformed boys in multiple measures of language, particularly until the fifth year of life, which was in line with the finding of the current study, where gender differences only became significant from 24 months and remained so up to 40 months.

Explanations of gender differences include various social, psychosocial and biological factors (Bornstein, Hahn, & Haynes, 2004). For example, some have linked vocabulary growth to the amount of parental speech to which children are exposed, and as girls spend more time with their mothers and adults in general, they have greater opportunities to learn (e.g., Huttenlocher., 1991; Bornstein et al.,1998). Psychological factors include the often quoted gender-role stereotypes which can influence life experiences and in turn the development of intellectual abilities. This means that girls and boys are encouraged to become interested in different tasks and gender-type toys, resulting in different conversational interactions thought to be important for language development in the favour of girls (Caldera, Huston, & O'Brien, 1989). Finally, girls may have faster neurological development related to a sexual dimorphism in brain lateralisation of language functions which has been uncovered in brain imaging studies (Shaywitz et al., 1995) . These robust differences have led researchers to develop different norms for boys and girls and this should be considered for all norm-referenced language tests, particularly as, otherwise, there is a risk of under-identification of language delay in girls (Dale, 2008).

Finally, previous studies have also noted that language skills decrease minimally but significantly as birth order increases (Fenson et al., 1994; Stumper et al., 2008). To investigate the impact of birth order, an independent sample t-test was carried out comparing the vocabulary scores based on nine observations of first-born children to that of the forty observations from other-born children. Although a significant difference was not found (most likely due to the uneven number of observations between the groups) those that were first born did have a slightly higher mean vocabulary scores (509 vs. 349)

overall. This difference was also not significant at the various age levels using Mann-Whitney measures.

6.3 Plotting growth in vocabulary development over time

Studies of vocabulary growth over time generally look at cross-sectional data, as they are relatively easy and quick to collect. However, because of the averaging effects across children, 'interesting paths to development can be lost by lumping results from heterogeneous groups of children into single summary figures' and the resultant profile may not represent any of the children in the sample (Robinson & Mervis, 1999; 178). Longitudinal studies on the other hand, through the use of growth modelling described below, help researchers to look at how change comes about, how much happens over certain periods and how change varies across individuals (Conboy & Thal, 2006; Hancock & Lawrence, 2006) and are among the better methods for extending results to the real world where children learn language (Dale & Goodman, 2005). Traditional methods of looking at growth included multivariate analysis of variance (MANOVA), auto-regressive and cross-lagged multiple regression techniques, among others. It was only during the 1980s that researchers were able to go beyond merely plotting change to appropriately and reliably studying change with the development of statistical models. These models, known generally as growth curve models, are a way of mathematically representing the developmental process of an attribute by looking at patterns of change in behaviour from the data of individuals within a population, and statistically specifying the relation between time and change in the level of the attribute.

When applied to language acquisition data, Dale and Goodman (2005) hold that the main advantage of statistically modelling growth is the ability to explore the hypotheses underlying theoretical models of language development. They hold that comparing the consequences of growth modelling assumptions with real growth data is a powerful form of hypothesis testing. For example, growth modelling can be used to answer questions concerning how much individuals vary in their development of language and the rate of change over time, as well as what predicts how much or how quickly individuals will develop language (Hayes, 2006). In this regard, growth modelling has been used to investigate the impact of time-invariant factors that influence

language development, such as maternal education and birth order, and the notion of a vocabulary 'spurt' that has been described in the literature (Bates et al., 1995; Marchman, Martínez-Sussmann, & Dale, 2004). The elements of linguistic growth that need to be examined in longitudinal research include the timing of language onset; the construction of subcomponents of the linguistic system and the acceleration rate and points of change in this rate (Rice, 2004). Using actual data from individual children, as opposed to averaging the results of children as adopted in cross-sectional studies, provides a clearer picture of the variation in lexical acquisition patterns (Fenson et al., 1994).

Previous researchers have reported both linear and curvilinear components in the growth of vocabulary development over time (Huttenlocher, 1991; Stoel, Roeleveld, Peetsma, van den Wittenboer, & Hox, 2006). The significance of linear growth is that development of language proceeds in a fairly even path over age, with no acceleration points or significant periods of change. Curvilinear growth on the other hand indicates that as the child's age increases, so does their rate of change (Alexander Pan, Rowe, Singer, & Snow, 2005). For example, Huttenlocher (1991) using Hierarchical Linear Modelling (HLM) observed that vocabulary increased as a quadratic function of age (from 14-26 months) with an accelerated rate of acquisition after an initial period of slow and steady growth leading to a more rapid surge. Quadratic growth in this manner means that as soon as children have a critical mass of words, subsequent vocabulary growth increases four-fold rather than in a steady and even trajectory (as in linear development). However, this quadratic growth is only seen up until about 24 months, after which a levelling off in vocabulary development is seen, producing an overall 'S'-shape of development. The accelerated rate of vocabulary has been used to support the theoretical notion of a vocabulary spurt often observed at around 18 months (Cress & Herzog, 2002; Goodman et al., 1999). Theoretical explanations for this phenomenon are varied and include the realisation by children that things have names (Baldwin & Markman, 1989); that words are members of categories (Gopnik & Meltzoff, 1987); an improved ability to segment word-size chunks from fluent speech (Plunkett, 1993) and a shift from an associationistic to a referential lexical acquisition mechanism (Nazzi & Bertoncini, 2003). Nonlinear growth in vocabulary patterns as described by Huttenlocher (1991) was confirmed by subsequent longitudinal studies (Rice, Wexler, & Hershberger, 1998; Stoel

et al., 2006). The data set for the Irish speaking children was therefore explored using modelling techniques to investigate the impact of the aforementioned predictors on vocabulary growth, as well as how the growth trajectory presented.

The majority of growth models described in the literature are either known as conventional growth modelling, Latent Class Growth Analysis (LCGA) or Growth Mixture Modelling (GMM). Jung and Wickrama (2007) outline how conventional growth modelling assumes that participants studied from a given population will have the same pattern of growth while allowing for different initial levels and rates of growth, and so is considered more suitable for small populations. Where larger populations are concerned, individuals may fall into distinct subpopulations and so more complex modelling can be carried out either through LCGA, (which estimates a mean growth curve for different classes of unobserved subpopulations, albeit without allowing for individual variation within classes) or GMM (which estimates the mean growth curve for each class *as well as* individual variation around these growth trajectories). As will be later outlined, the current study used a largely homogenous sample (i.e., typically developing children with relatively similar levels of Irish-language input) and because of the small number of participants and data points involved, growth was more appropriately modelled using conventional growth modelling.

In order to measure change over time appropriately, Singer and Willett (2003) outline three important features which are required:

1. *Three or more waves of data*: Generally, the more time points that can be collected for an attribute the better for any study, so that sufficient data is available to provide a reasonable view of each individual's growth trajectory. However, a minimum of three time points is recommended. When data from participants with less than three data points is included, it contributes to the estimation of fixed effects in the model but provides less information about the within-person variations and hence to variance component estimation (Singer & Willett, 2003). In the current study, ten out of the 21 children were tested on three occasions and one child was examined on four separate occasions. It was not possible to have three data points for all participants as some children were at, or

close to the upper age limit (40 months) when tested. This resulted in five children having two data points and five children just one data point. However, as will be outlined later, modelling using missing data and incomplete time points is now possible using modern software for statistical analysis, and is a major advantage of growth modelling as a more accurate observation involving individuals can be obtained. Singer and Willet (2003) do warn however that even if there are three time points in the study, it will only be possible to fit simpler models with more restricted assumptions regarding growth patterns. This usually means having to assume that growth is linear over time, as was the outcome of the modelling of the current study.

2. *An outcome whose values change systematically over time*: For the purposes of this study, age was used as metric of time but it is possible to use other measures (such as the number of sessions in an intervention study). It was decided to space the data collection periods at six-monthly intervals so that measurable change in the children's language over time could be detected by the parents.

3. *A sensible metric for clocking time:* Finally, it is essential that the same carefully designed and piloted instruments are used on each occasion to ensure validity, which was the ICDI in the current study.

6.3.1 Exploring vocabulary development over time

Fenson et al. (2007) hold that growth curve modelling is similar to linear regression but because it encompasses a wider range of mathematical functions it is not restricted to a straight line. The growth modelling programme that was used on the vocabulary data in the current study was MPlus (Muthén & Muthén, 1998-2007), a statistical package that takes a multivariate approach to growth modelling, allowing flexible modelling of the outcomes such as differences in residual variances over time. Hayes (2006) argues that specifically designed statistical packages such as MPlus often have better computational algorithms and are more likely to produce a solution than general data-analysis programs such as SPSS.

As already outlined, total-vocabulary was measured from the ICDI checklist and although ideally each monthly age from 16-40 months would be plotted, due to the small numbers of participants and data points (with no observations at 25, 31 and 37 months) it made sense to group the data points into four time periods. Singer and Willett (2003) describe how many researchers group time points and it does not have any effect on the outcome as the choice of the functional form of the model is more important. In order to decide on the trajectory and specification of a growth model, Singer and Willett (2003) recommend beginning with a descriptive analysis of how individuals within the sample change over time. This helps to identify general patterns for the group as well as for individuals, which will help with later attempts at modelling the data. In addition, previous research should also be taken into account, and for vocabulary, a non-linear growth pattern was anticipated, because of the reported slow development from 12-14 months until about 18 months at which point a marked increase or 'spurt' occurs in conjunction with the beginnings of word combinations (Marchman et al., 2004). In line with the results in Figure 6.1 above, time was indicated in four stages of approximately 6 monthly intervals with T1= 16-21 months (n=10); T2, 22-27 months (n=11); T3, 28-33 months (n=13) and T4, 34 -40 months (n=15). Previous statistical analyses indicated that change over the age groups was significantly different over the last three time points, although these group differences failed to capture individual profiles. Thus empirical growth plots for all participants were constructed over the four age intervals and are contained in Figure 6.2 below.

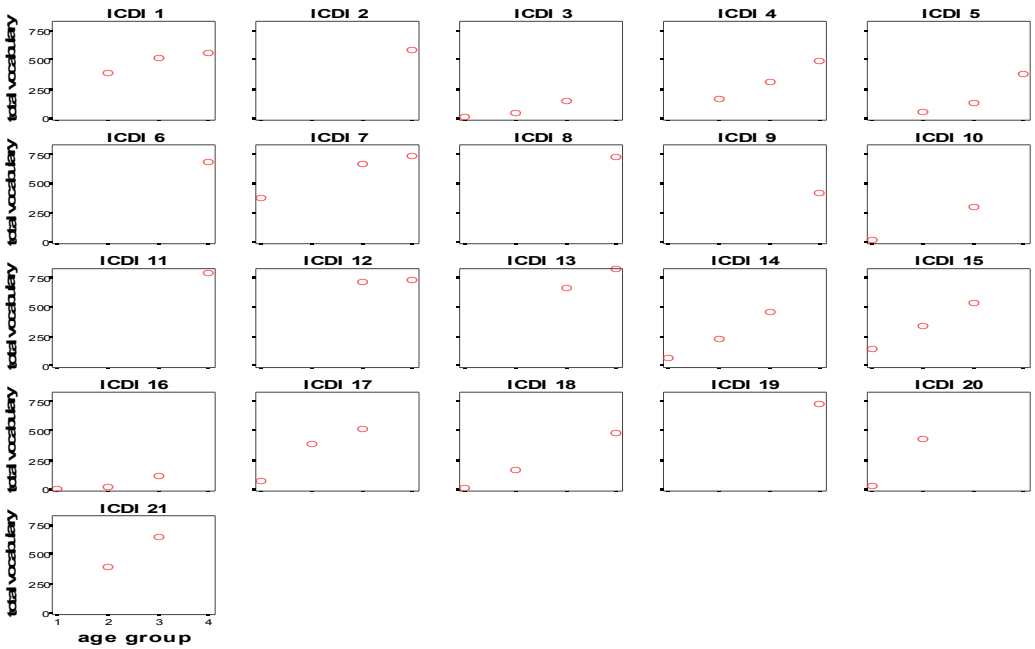


Figure 6.2 Empirical Growth Plots for all 21 children over time

This figure demonstrates that the trajectories were different across individuals, and is demonstrated more clearly by Figure 6.3 below when they are smoothed using nonparametric trajectories for each individual. According to Singer and Willett (2003; 26) this process makes no assumptions about the growth and lets the data 'speak for themselves'.

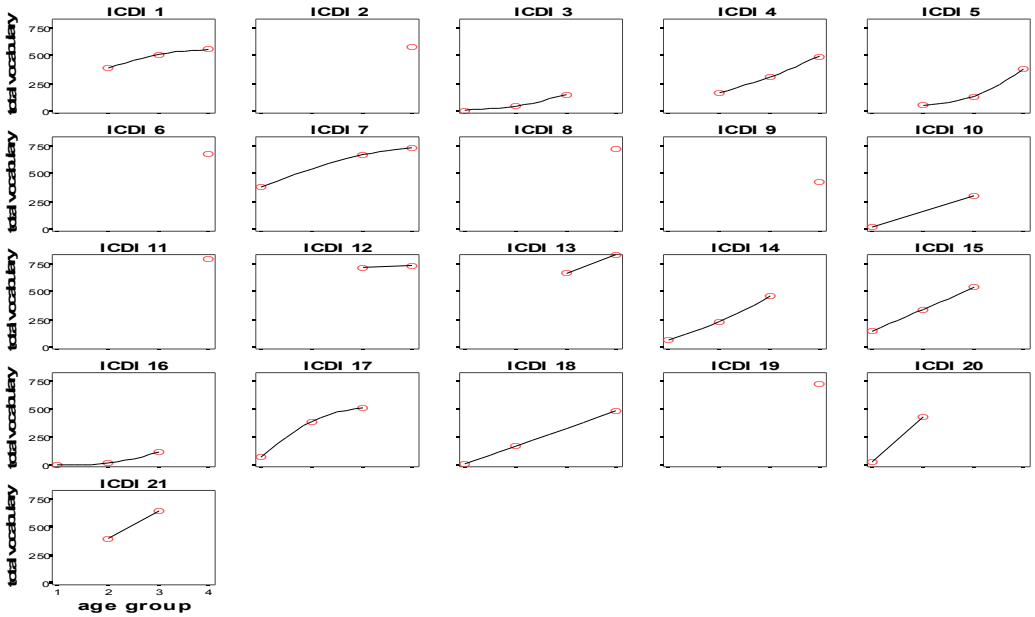


Figure 6.3 Smooth nonparametric trajectories superimposed on empirical growth plots for vocabulary growth in the ICDI study

As can be seen, growth is curvilinear for some children and linear for others. This means that some children's vocabulary growth takes on an exponential growth function as soon as they have a certain amount of words, whereas for others, vocabulary grows evenly over age, with no points of acceleration. The curvilinear growth for ICDI 1, ICDI 7, and ICDI 17 is concave with a plateau effect, due to a slowing down of vocabulary growth over later time periods. However for ICDI 3, 4, 5, 14 and 16 growth is convex in shape as vocabulary continued to grow over all time periods observed. ICDI 8 and 12 displayed no growth over the time period and this was probably as they were already at ceiling at the beginning of the study. Furthermore, ICDI participants 3 and 16 have very slow growth, and the vocabulary scores for neither child went above the 250 word mark at T3 (28-33 months). The individual differences in growth rates above confirm the large variation in vocabulary scores as described in Table 6.1 when results were grouped together and as found in previous studies (Bates et al., 1995; Fenson et al., 2007). The fact that growth was curvilinear for some and linear for others made estimation of the model difficult. Nonetheless Singer and Willett (2003) hold that the advantages to adopting a common functional form across everyone in the data are so compelling that they outweigh the disadvantages.

Therefore the next step prior to more complex modelling was to summarise each participant's growth trajectory by fitting a separate parametric model to each participant's data, and the easiest way to do this is through applying an Ordinary Least Square regression (OLS) model per individual. Although this may seem redundant after more formal modelling using the MPlus software is carried out, Singer and Willett (2003) hold that it helps the researcher to know their data in an intimate way. Based on the nonparametric observations, it was decided that a liner change model would be specified for the data set where vocabulary scores were regressed on the four time points. This was carried out by first estimating a within-person regression model using linear change in vocabulary over time for each participant separately. Table 6.2 below contains the summary statistics from all within-person linear regression models with each participant's estimated intercept (initial status) and slope (rate of change). R^2 and residual variance summarise the goodness of fit of the model. For Participants ICDI 2, 6, 9, 11, and 19 only one data point was collected so their model could not be estimated. This left 16 participants in the analysis.

Table 6:2 Results of fitting separate within-person exploratory OLS regression models for vocabulary as a function of linear time

	Initial Status		***Rate of Change***				
Participant	**Estimate**	**SE**	**Estimate**	**SE**	**Residual Variance**	**R^2**	**Gender**
ICDI 1	235	75.4	83	24.2	1176	.92	F
ICDI 3	-64.3	44.3	68.5	20.5	840	.92	M
ICDI 4	-166.7	35.9	164	11.5	266.7	.99	M
ICDI 5	-402.2	196.8	207	58.7	9470.8	.86	M
ICDI 7	267	57	122	19/4	1760.6	.98	F
ICDI 8	730	0	-1	0	-	1	M
ICDI 10	-82.75	48.9	129.25	25.5	1740.5	.96	M
ICDI 12	679	0	12	0	-	1	F
ICDI 13	172	0	163	0	-	1	F
ICDI 14	-141.7	38	195.5	17.6	620.2	.98	F
ICDI 15	-47	3	193.5	1.4	4.2	1	F
ICDI 16	-66	48.6	56	22.5	1014	.72	F
ICDI 17	-115.7	124.7	221	57.7	6666.7	.87	F
ICDI 18	-149	2.6	159	.99	4.57	1	M
ICDI 20	-372	0	402	0	-	1	F
ICDI 21	-78	0	240	0	-	1	F

Individuals can now be compared using the estimated intercepts and slopes of their fitted trajectories. As can be seen, the fitted intercept and slope estimates vary considerably, reflecting the heterogeneity in trajectories observed earlier. One child (ICDI 12) had very little change over time (just 12 words) while others (ICDI 5, 17, 18, 20 and 21) had much larger growth over the time periods. It is important to note that all of the children's estimated rate of change was positive (i.e., they all increase in vocabulary size), apart from ICDI 8 (who actually had one less word on the 2nd assessment, due to both ceiling effects and his increasing bilingual language development which is not captured by the total conceptual vocabulary score), however the difference in the slopes is considerable. Many children were estimated to have a negative starting intercept because trying to fit a linear model to their vocabulary growth placed the initial status at less than zero. Given that five children were only tested at two time points, the perfect linear model-fit (indicated by an R^2 value of 1) is misleading. Moreover, considering the exceptionally high residual variances for many participants it seems that a linear model does not fully capture the trajectories of the group. Nonetheless, the R^2 statistic in Table 6.2 is above 90% for most participants, indicating that the exploratory fitted linear trajectory fits reasonably well with the data and so was further explored using the modelling software below.

The next step was to superimpose each participant's fitted regression line (which in this case is linear) onto a plot of their empirical growth record (see Figure 6.4 below). This helps to see how well the exploratory fitted trajectory fits with the observed data points for each participant and confirms that although a linear model does not perfectly fit the data for all participants because of the large individual variations in the slopes, it does provide a fairly good summary of the overall growth trajectory.

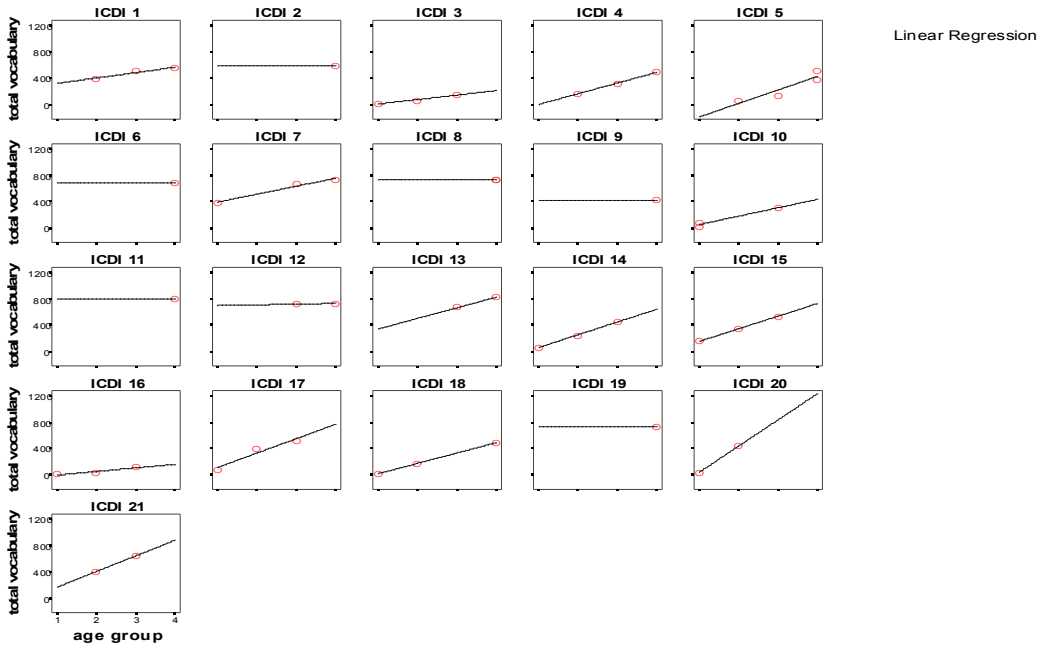


Figure 6.4 Fitted OLS trajectories superimposed on empirical growth plots for each participant

One final recommendation of Singer and Willett (2003) before formal modelling is to look at the growth trajectory for the entire group. As before, this was initially carried out with SPSS using a nonparametric trajectory and then smoothed using linear regression techniques (see Figure 6.5 below).

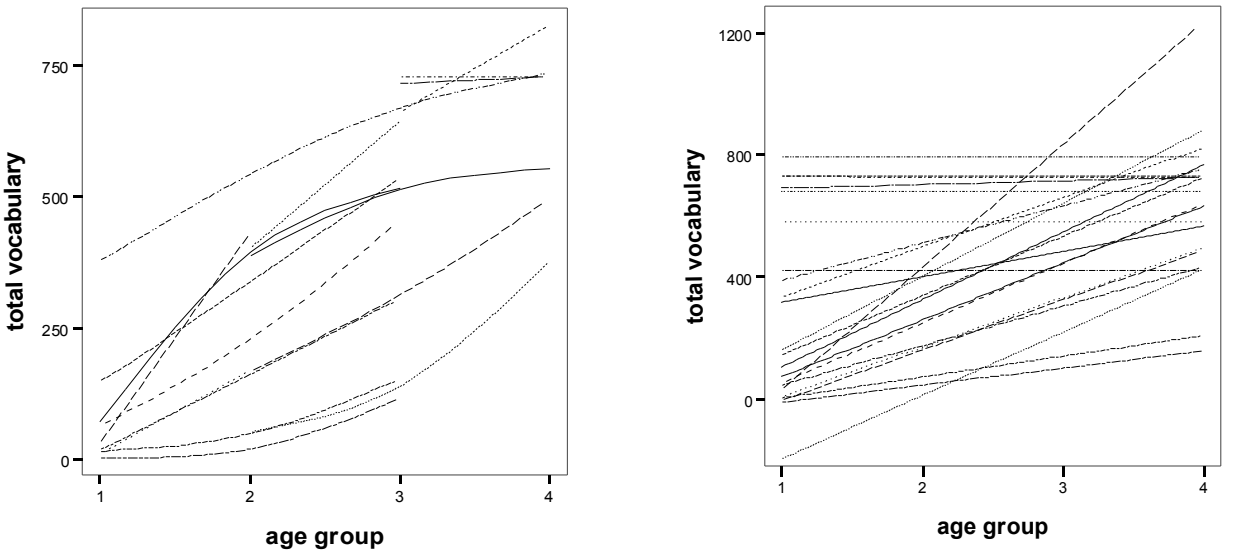


Figure 6.5 Smooth nonparametric (left) and OLS trajectories (right) for the group

As can be seen, the graphs demonstrate considerable variability across children with some increasing modestly over time and others substantially, causing a 'fanning out' of trajectories (as was previously described for vocabulary growth by Tamis-LeMonda & Bornstein, 1994). The next step is to provide formal answers to questions concerning the individual differences in change based on sample variances and standard deviations of intercepts and slopes. This tells us about the observed variability in growth including the sample covariances and correlations between the intercept and slope so we can learn about the observed relationship between initial status and the rate of change. Singer and Willet (2003) show how these can first be carried out descriptively using SPSS by working out the mean estimated intercept and slope values (based on Table 6.2 above for the 16 individuals), the sample variance for these values as well as the sample correlations between them. These results are contained in Table 6.3 below.

Table 6:3 Descriptive statistics for the individual growth parameters obtained by fitting separate within-person OLS regression models for vocabulary as a function of age (n=16)

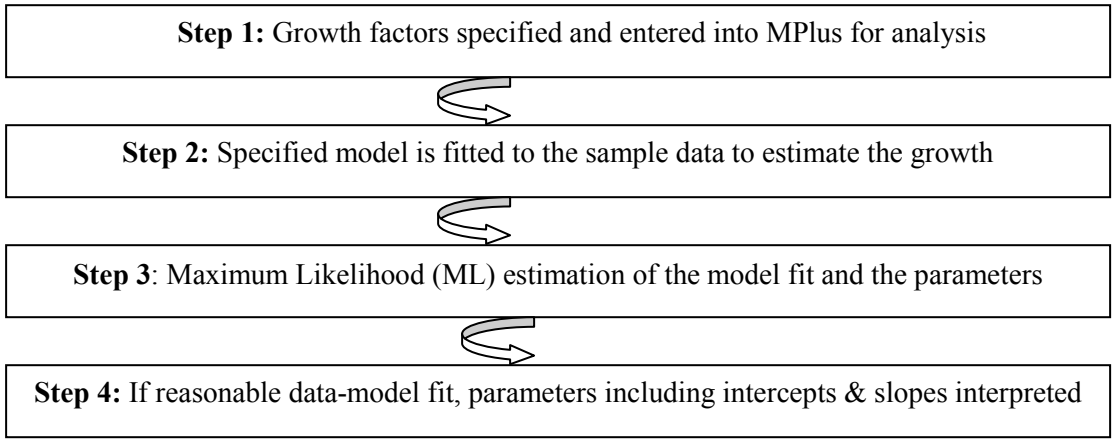
	Initial Status (intercept)	**Rate of Change (slope)**
Mean	24.85	150.95
Standard deviation	321.19	99.11
Bivariate correlation		-.746 ($p \leq .001$)

This table demonstrates that there is great variation in the initial starting point (with a standard deviation of 321 words). On average, children learn about 151 new words over each 6-monthly period, although the associated large standard deviation of 99 words needs to be considered. The starting point and rate of change are negatively correlated, indicating that the lower you begin, the faster the growth, or the higher you start the slower you grow. This is in contrast to other studies who found that children with more vocabulary tended to gain more than those with lower starting points (Kurland & Snow, 1997), but was inevitable in the current study given the extended time period (over two years) of development observed. This finding may also be in part an artefact of the ceiling effect for older children who generally had larger vocabularies to begin with.

Following this descriptive analysis, development over the time period studied was assessed using formal multilevel growth models for change. Although the previous ad-hoc analysis helped to specify a model that best resembles the data (i.e., for the current data set the large residual variances as well as the possibility of linear growth functions had to be specified) it still ignores information about the precision of the estimates of individual growth parameters and it replaces true individual growth parameters with their less-reliable estimates (Singer & Willett, 2003). To improve this we use additional software programmes that fit the multilevel model for change such as MPlus.

6.3.2 Growth Curve Modelling with MPlus

The steps involved in specifying a growth model are outlined in a graphic representation below.



Growth modelling begins by first entering a data file based on the individual vocabulary measurements into the MPlus programme. For the current data set, this was based on four time points (18, 24, 30 and 36 months of age); although as previously described there were missing and uneven data points for the majority of the participants (e.g., most children had two or three samples but others just one). Then, an input file is created, (see Appendix 10 for an example of an input file to MPlus) which provides a written description of a model, or what the researcher hypothesises is happening in the growth of the vocabulary over time (e.g., linear growth with x amount of variance). The specified model is then fitted to the sample data using statistical estimation known as maximum likelihood (ML) estimates. These 'estimates' are expressed as the product of probabilities or measures of 'goodness of fit' that outline how well the specified model 'fits' or describes the sample data. The fit indices of MPlus include chi square, RMSEA (e.g. Root Means Square Error of Approximation): SRMR (Standardized Root Mean Residual) and CFI (Comparative Fit Index). In general, the smaller the fit statistic, the better the fit. For example, there is a general consensus across the literature that RMSEA should be below .06, SRMR below .08 and CFI close to 1 to indicate a good model fit (Hu & Bentler, 1999).

Prescott (2004) describes how the chi-square test of model fit is obtained by comparing the specified model (H0) to the experimental (H1) model (which says that there is a significant difference between the data and the specified model). The chi square should return a non-significant output ($p>.05$) so that the null hypothesis cannot be rejected and the researcher can be sure that the specified model in the input file is the same as that demonstrated by the data. This test statistic is considered more appropriate for small samples, as large samples often inappropriately return statistically significant chi square values and so chi-square was the test of choice for the current study. If the fit between the observed and expected outcome is deemed poor, it is signalled by unsatisfactory data-model fit indices such as a statistically significant chi square or an RMSEA value over .06 (Hancock & Lawrence, 2006). If this happens, the hypothesis in the model has to be rejected and further theoretical and/or exploratory work through modification of the input file is required. On the other hand, if the data-model fit is deemed satisfactory, the researcher has gathered information supporting their hypothesis of growth in the observed factor proficiently, and the input file describes the growth in the data well (Hancock & Lawrence, 2006). Following the

establishment of reasonable data-model fit, the interpretation of the parameters of interest including intercepts (starting values), slopes (rate of change) and variances becomes permissible.

Although the previous exploratory analysis of the Irish vocabulary data indicated largely linear growth over time, the initial input files attempted to describe the data as having various curvilinear trajectories such as quadratic and numerous piecewise linear models in line with those described in the literature (Huttenlocher, 1991; Huttenlocher, Levine, & Vevea, 1998). However, the computer software could not make these models converge on the vocabulary data, most likely due to the small data set and limited number of observations per person with large variances across individual vocabulary scores. When such large variances occur, growth models find it difficult to find a common estimation of growth for the group and so it is recommended to rescale the observed variables by dividing by a constant (250 in this case) to bring the variances between 1 and 10 (Muthén, personal communication). This makes it easier for the model to converge with the data by centring vocabulary development around the approximate mean and puts the variance in a similar metric to aid interpretation of the output parameters (Prescott, 2004). Singer and Willett (2003) describe how these kinds of transformations have only 'cosmetic effects' on the model as they only change the value of the log likelihood of an associated statistic but the results of tests are unaffected.

As previously mentioned, the current data set was best described using conventional modelling. This meant that the input file had to specify a fixed slope for the group, and hold the residual variances equal, while allowing for the intercept values to vary for individuals. Fixing the slope in this manner means that although the group's growth trajectory has a common algebraic form, everyone can have their own intercept and distinct growth trajectory (Singer & Willett, 2003). Because residual variances are held equal, this implies that variation in the intercept and slope parameters is due to individual differences rather than to membership of an unobserved group (such as late talkers) which is only possible with LGCA (Jung & Wickrama, 2007). Conventional growth modelling uses two levels of statistical analysis: at level-1 change and growth trajectories over time *within* each individual in the sample is first examined and at level-2 the variance predicted in change and growth trajectories (the intercept and slope) *between* individuals is examined (Bryk & Raudenbush,

2002) and the influences of covariates such gender on this variation can be carried out at this level. Moreover, conventional growth modelling is more sophisticated than the previous preliminary exploratory analysis of the data, as it allows researchers to plot true individual profiles including missing data points, and the fit statistics indicate how well the specified model fits the data.

A final constraint on the model specified for vocabulary was to free the covariance parameters between Time 2 and Time 3 (see 'with' statement in model command in the input file, Appendix 10). This was because of a sharp increase in vocabulary scores from T2 to T3 and a strong correlation between residual error variances for these time points (due to large individual differences), making estimation of a common growth trajectory difficult. The final model will now be outlined using both a mathematical representation as well as a visual representation (Figure 6.7 below) of how modelling was carried out. Time was centred on the first wave of data collection (T1) and the slopes were defined for the first two time points and freely estimated for the last two. Thus the amount of change for an individual in the initial interval from T1 to T2 becomes a yardstick against which other change is measured (Hancock & Lawrence, 2006). Allowing the last two time points to be freely estimated provided better fit statistics that fixing the time points in an equally-spaced linear model (i.e., T1@0; T2@1; T3@2; T4@3) and revealed a non-linear (plateau effect) in the growth pattern towards the later part of development as demonstrated below.

The parameters in the growth models are represented using multilevel notation (Bryk & Raudenbush, 2002; Muthén, 2004) below so that the outcome 'Y' for time point 't' and individual 'i' with the following variables was considered:

Level 1: $Yti = \pi 0i + \pi 1i\ \alpha 1ti + \varepsilon ti$ (1)

Level 2: $\pi 0i = \beta 00 + \beta\ 01 + r0i$ (2)

$\pi 1i = \beta 10 + \beta\ 11 + r1i$

Yti = repeated measure on the outcome (vocabulary size)

$\pi 0i$ = intercept of change trajectory for individual i within the population

$\pi 1i$= slope of change trajectory for individual i within the population

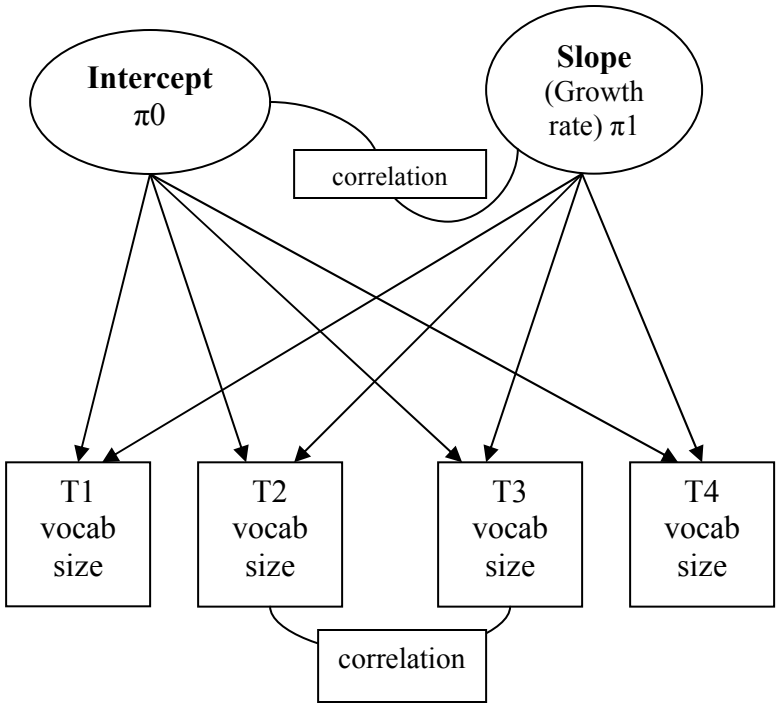
$\alpha 1ti$= time-related variable (time scores, e.g., T1: 16-21 months)

εti= the time specific residual for person i at time t

β00 = mean random effects

β10= mean fixed effects

In the current model (which is represented graphically below), the π0i is the random intercept while the slope π1i is constant across time and variation occurs across both t and i. The residuals ε, r0 and r1 need to be normally distributed in order for ML estimations, which meant fixing them at 1 in the current data set. The level 2 residual error variances r0 and, r1 are correlated for T2 and T3 to free the covariance in the model as outlined above and seen in the graphic display below. The intercept and slope were also correlated to observe the relationship between the initial status and the rate of change. Although not represented here, subsequent analysis also investigated the impact of group (Level 2) predictors of vocabulary development including gender.



6.3.3 ICDI Vocabulary Growth Modelling

Following accurate estimation of the model for vocabulary growth as outlined above, the fit statistics and parameter estimates for the data sets could be analysed. The chi-square measure of fit returned non-significant association (λ^2 (7) = 12.12 p=.097). This means that the null hypotheses cannot be rejected and that the specified model is not significantly different (in other words, is the same) as the specified model. Although the RMSEA and SRMR values were above the specified values however (at .19 &and .33 respectively) which might indicate a poor model fit, as previously discussed, chi square is a better fit statistic with small samples. In addition, the CFI statistic was close to 1 (at .85) which also indicates good fit. Another fit statistic provided by MPlus is the estimates divided by their respective standard errors. This tests the null hypothesis that the parameter estimate is zero in the population from which the sample is drawn and is evaluated as a Z statistic. Values that exceed +1.96 or fall below -1.96 are significant below p=.05. The current model returned a Z statistic of more than +1.96 at each time point, indicating that each parameter estimate (T1-T4), as well as the correlation between T2 and T3 were significantly different from 0. The variance component for the intercept and slope was also statistically significant (Z=2.51, $p \leq .05$) indicating that the amount of variance accounted for by each factor was significantly different from zero. Hypothesis tests and confidence intervals can now be used to make inferences from the sample back to the population. Although previous OLS regression statistics did give us some indication of what kind of growth to expect over time, we were dealing with flawed averages and a purely linear model, which we now know does not quite fit the data. The output in terms of a growth curve is presented in numerical format in Table 6.4 below and as graphical output in Figure 6.6 below. The output parameters were re-scaled up (x 250) in order to be provide meaningful output for vocabulary norms.

Table 6:4 Parameter details relating to growth curve model for vocabulary development

Parameter	**Coefficient**
Intercept (mean)	.567 (x250) = 141
Intercept (variance)	.28 (x250)= 70
Slope (mean)	.68 (x250)= 171
Slope (variance)	0 (fixed)
Slope change values	
Time 1	0
Time 2	1
Time 3	2.02
Time 4	2.68
Estimated Means	**Sample Means**
Time 1 = .567 + .681(0) x 250 = 142	121
Time 2 = .567 + .681 (1) x 250 = 312	302
Time 3 = .567 + .681(2.02) x 250 = 486	493
Time 4 = .567 + .681(2.68) x 250 = 598	600

The model estimates in Table 6.4 above indicate that the average starting value for vocabulary at Time 1 (16-21 months) was 141 words, with an estimated growth of 171 words over six months. Also, the variance at the intercept was 70 words, which indicated that there were large individual differences in the starting vocabulary size. As can be seen the sample mean for T1 was slightly below the estimated starting value, however at the other time points the estimated model results was very close to the sample means. As the slope had to be fixed to estimate the model, individual differences in rate of growth could not be estimated. As can be seen from the output and the graph in Figure 6.6 below, there were three segments of linear growth, with the first growth being more modest (0-1) than the slightly steeper growth seen from T2 to T3 (1 to 2.02). Had growth been truly linear, the slope change values would have been 0, 1, 2 and 3. However, the fourth time point value was 2.68, indicating a plateau in growth (as the change in growth from 2.02 to 2.68 was just over half (.66) the rate of the previous growth section at 1). The R-square value for the model was .74, indicating that the specified model explains 74% of the variance.

Overall, this profile is largely in line with the study by Alexander-Pan et al. (2005) who found that the average growth in vocabulary production based on CDI scores from children from low-income families was fairly linear with a slight increase in upward curvature between 1 and 3 years of age. The slowing down from T3 to T4 it was also similar to that described by Huttenlocher (1991) although we did not observe the sharp rise or 'spurt'

in the middle growth period as described in that study. The trajectory may be best described as an exponential curve where the largest growth occurred initially and slowed down as the attribute approached the final level, as has been described in other aspects of language development such as the suppression of phonological processes (Burchinal & Appelbaum, 1991). It appeared that vocabulary growth slowed down when the children were aged 28 to 33 months (at T3) as there are well-defined expectations of grammatical development at this age. It might be the case that lexical acquisition slows at this point when the grammatical development takes off, although the interface between lexical and grammatical skills will be explored later in Chapter 9.

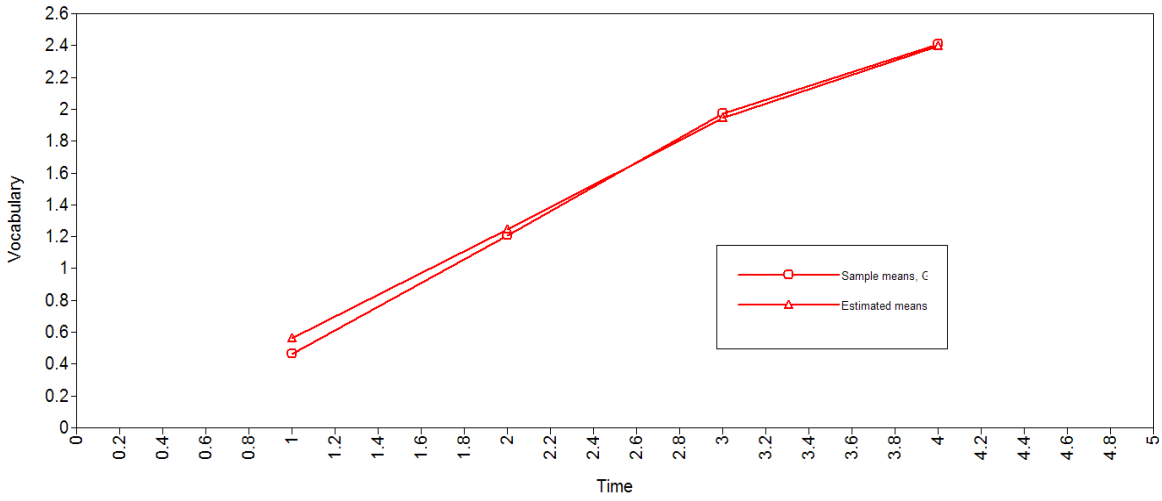


Figure 6.6 Growth in Vocabulary items over time (scaled)

6.3.4 Growth Curve Modelling and predictors of vocabulary development

In the current model, level 2 predictors including gender and birth order were investigated, as well as language factors such as the amount of Irish spoken in the home. When gender was regressed on the model, the output statistics (using estimates divided by standard errors) produced Z values just over -1.96 (z = -1.97 for the intercept and -0.133 for the slope) which indicated that gender did not have a significant effect on the growth, but was very close to having an effect on the starting point (between 16 and 21 months). This result was not surprising however, given that conventional modelling was used which does not allow for differing trajectories or latent groups. Nonetheless, this finding is at odds with

previous analyses based on cross-sectional vocabulary scores for the group, which did not find a significant difference between boys and girls at the first time point. The longitudinal data presented here is more in line with the crosslinguistic literature which holds that although gender can have an influence early in development, boys tend to catch up pretty early (Bauer et al., 2002). It may be the case that different trajectories for boys and girls are more reliably captured by longitudinal data and statistical modelling than through cross-sectional data. As maternal education and other predictors were fairly uniform across the group, there was not enough variability in the data to specify a model.

From the current data on Irish, a vocabulary spurt was not evident from formal modelling of the total composite vocabulary. Previous cross-sectional and longitudinal studies have found some evidence of this spurt, although it is by no means a universal phenomena and the types of words involved (i.e., largely nouns or verbs) varies across languages (Alexander Pan et al., 2005; Fenson et al., 1994; Goodman et al., 1999; Gopnik & Choi, 1995). Robinson and Mervis (1999) observed a 'spurt' in vocabulary development based on longitudinal data from diary reports and CDI checklists. They attributed this rapid growth to the interaction between lexical growth and the acquisition of plural morphology (which the children acquired before the onset of syntax). They hypothesised that an initial slowing in vocabulary growth is caused by a competition for cognitive resources required for learning morphology. Once plural morphology is mastered, resources are freed and vocabulary growth rate increases once again. A possible reason for the lack of a spurt in the current data set may have been due to the grouping effects across children, as previous studies used observations at each monthly-age. However, it was also worth investigating whether the bilingual nature of Irish language acquisition had an influence on the overall profile noted. As the data described above was based on total conceptual vocabulary scores, this meant that at a given time point, a child may have acquired the English or Irish equivalent of a word already in their vocabulary but this would not have changed their total composite vocabulary. Cross-sectional data in the earlier Figure 6.1 indicated that the children's knowledge of vocabulary items in two languages did increase significantly over the last time point, and this was re-analysed using the longitudinal data. A growth model input file was created in MPlus in the same way as previously outlined, although this time

only using those vocabulary items that were known to the child in both languages. The result of modelling for these data is contained in Figure 6.7 below.

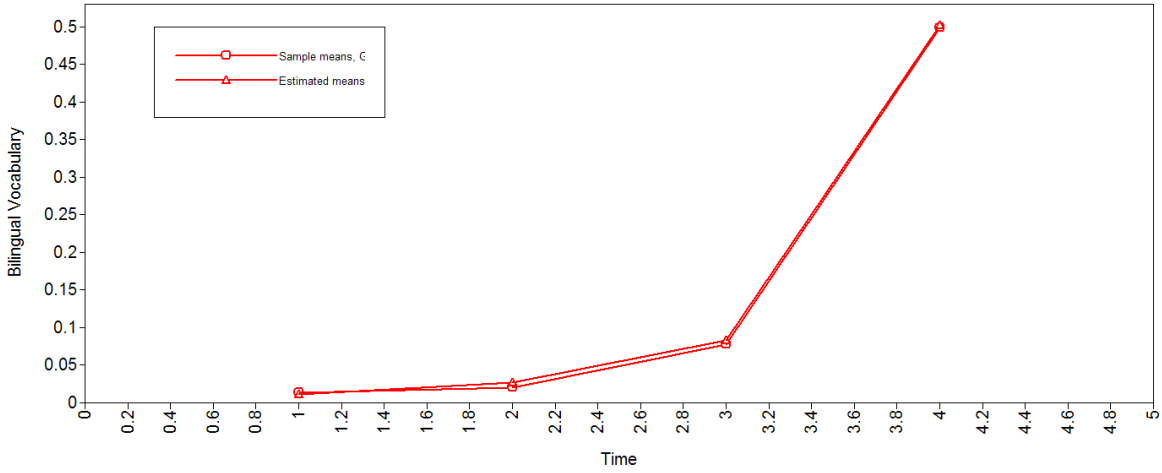


Figure 6.7 Growth in bilingual vocabulary over time

This growth seen here, of a slow initial trajectory, followed by a spurt at 28 months is more in line with the cross-sectional data described above (albeit slightly later than that observed in the literature) and as previously mentioned, most likely due to increased exposure to English. Although the sample is limited, it is possible that the plateau effect in vocabulary development and the lack of a 'spurt' in overall vocabulary described above is hidden by the total conceptual vocabulary data, and so for bilingual learners it is more appropriate to look at their vocabulary acquisition across both languages.

6.4 Stylistic variation in vocabulary acquisition

Vocabulary profiles from many of the adaptations of the MCDI have been extensively analysed in terms of how the composition of vocabulary changes over time. These have produced much fruitful research in terms of the stylistic variation within and across languages in the growth of word types (see Caselli et al., 1999 for examples). For example, as mentioned in the introduction, many cross-linguistic studies have noted that children learn nouns before verbs (Bates et al., 1995; Gentner, 1982) and this has been attributed to a set of universal principles that lead children to learn 'names for whole objects' before they do for

actions or events (Gopnik & Choi, 1995). However recent studies of children acquiring Korean and Chinese using CDI data have noted that verbs emerge just as early or even earlier than nouns (Gopnik & Choi, 1990; Tardif, 2006). Because of the saliency of verbs in Irish, as previously outlined, one of the main hypotheses of the current study was to investigate whether Irish-speaking children would acquire verbs relatively earlier than nouns, and in comparison to children speaking other languages. Therefore the next stage of the vocabulary analysis was to investigate the stylistic variation in how Irish-speaking children acquire the various parts of speech. This will be firstly outlined for the current sample, and compared to the wider crosslinguistic literature in the following chapter.

The analysis began by grouping children based on their total vocabulary sizes as opposed to monthly age, not least due to the limited observations at each month, but also as previous research has noted that observing language development over age profiles has resulted in extensive variability (Bates et al., 1994) and obscures some of the more interesting aspects of vocabulary development including stylistic variations (D'Odorico & Fasolo, 2007; Pine & Lieven, 1990). The most interesting aspect of how Irish-speaking children acquire language in comparison to those speaking other languages is to focus on the profile of *Irish* vocabulary only. Therefore, if the children were reported to *only* know a lexical item in English, it was removed from the analysis. Overall, the children knew less than 5% of their total vocabulary items in English-only and so this did not represent a substantial number of words. All bilingual vocabulary remained in the analysis, and total vocabulary scores were adjusted as relevant. The children were divided into eight vocabulary groups as follows:

(1) 1-50 words (n=7)
(2) 51-100 words (n= 4)
(3) 101-200 words (n= 6)
(4) 201-300 words (n= 3)
(5) 301-400 words (n= 6)
(6) 401-500 words (n= 7)
(7) 501-600 words (n= 8)
(8) >600 words (n=8)

As outlined in the pilot study, the definitions of vocabulary categories from the ICDI were based on Caselli et al (1999) and included eight nominal categories to calculate *'common nouns'* (including animals, vehicles, food & drink, toys, body parts, clothes, furniture & rooms and small household items); *'predicates'* were made up of adjectives (descriptive words) and verbs (action words); *'social items'* included sound effects, words for

people and games, routines and phrases and *'closed class'* was made up of grammatical function words including pronouns, prepositions, question words, quantifiers and articles, auxiliaries, connecting words and prepositional pronouns. Figure 6.8 below plots the mean scores across word classes. The circles represent the mean score for each word type produced at a particular vocabulary level for the children, and the horizontal dotted line represents the total number of common nouns (341), predicates (183), social (81) and closed class items (153) possible from the ICDI checklist.

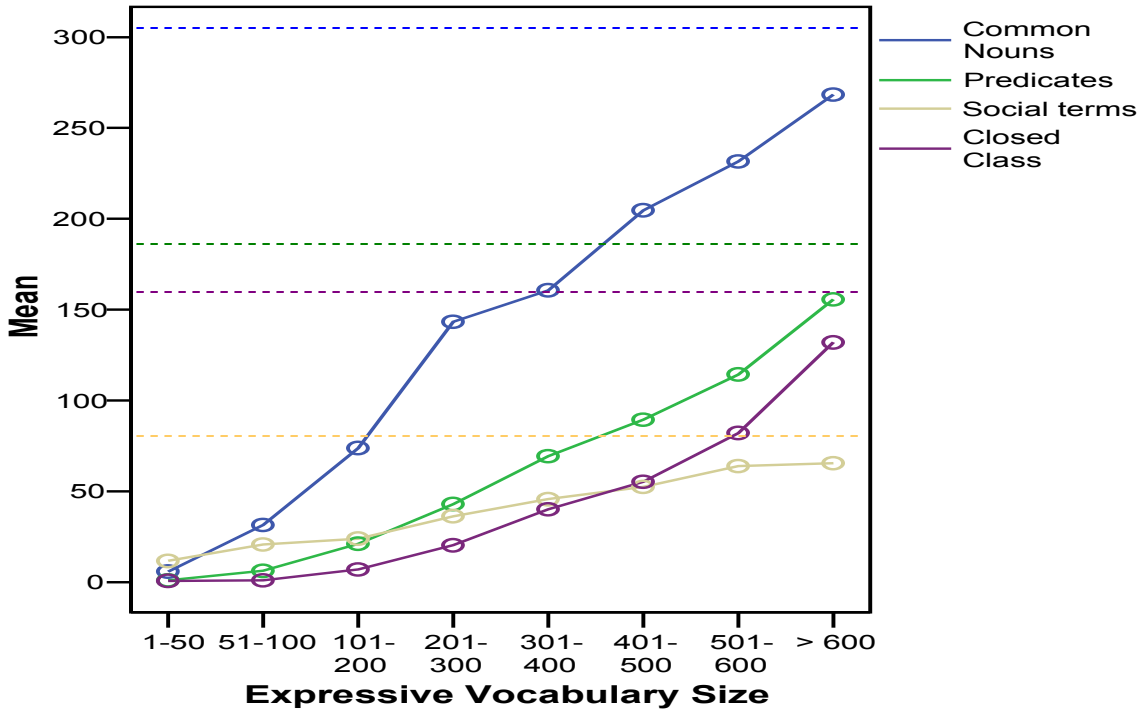


Figure 6.8 Mean vocabulary composition scores across vocabulary size

This profile was similar to that descried by Bates et al (1994) in that all categories display positive growth and all word types converge on their respective ceilings in children with more than 600 words (this is slightly lower for the Irish children however which may have been because words they only knew in English were removed from this analysis). Another similarity is the different growth trajectories for the various word classes. As can be seen, mean vocabulary scores are roughly similar when the child has 50 words or less, however after this common nouns have a higher mean score at each vocabulary level in comparison to other word classes, which increases over each vocabulary size. The mean

number of social words per vocabulary size is fairly similar across all the sizes, and both predicate and closed class mean words scores steadily increase with a corresponding increase in vocabulary size. In order to see if this difference was statistically significant across the word classes, a mixed ANOVA was carried out for vocabulary levels (8) by word class (4). As expected, a main effect of vocabulary level was found ($F(7, 41) = 292.1$, $p \leq .001$) a main effect of word class ($F(3, 21) = 315.6$, $p \leq .001$) and a significant interaction ($F(3, 21) = 23.1$, $p \leq .001$) was also observed. The interaction indicates that the mean number of each word classes was only significantly different at certain vocabulary sizes. A series of post-hoc, one-way ANOVAs with Bonferonni corrections indicated that the mean number of common nouns was significantly higher between 100-200 and 300-400 words; for social words there was only significant growth between 400-500 words and predicates and closed class items were only significantly higher over the final two vocabulary levels.

Another way to represent this growth is to look at the overall percentage of word class as a function of total vocabulary. Figure 6.9 below shows the percentage of common nouns, predicates, social and closed class words as a function of vocabulary level in Irish (the dotted line represents the checklist ceiling- i.e. absolute proportion of words from the category on the checklist as a whole).

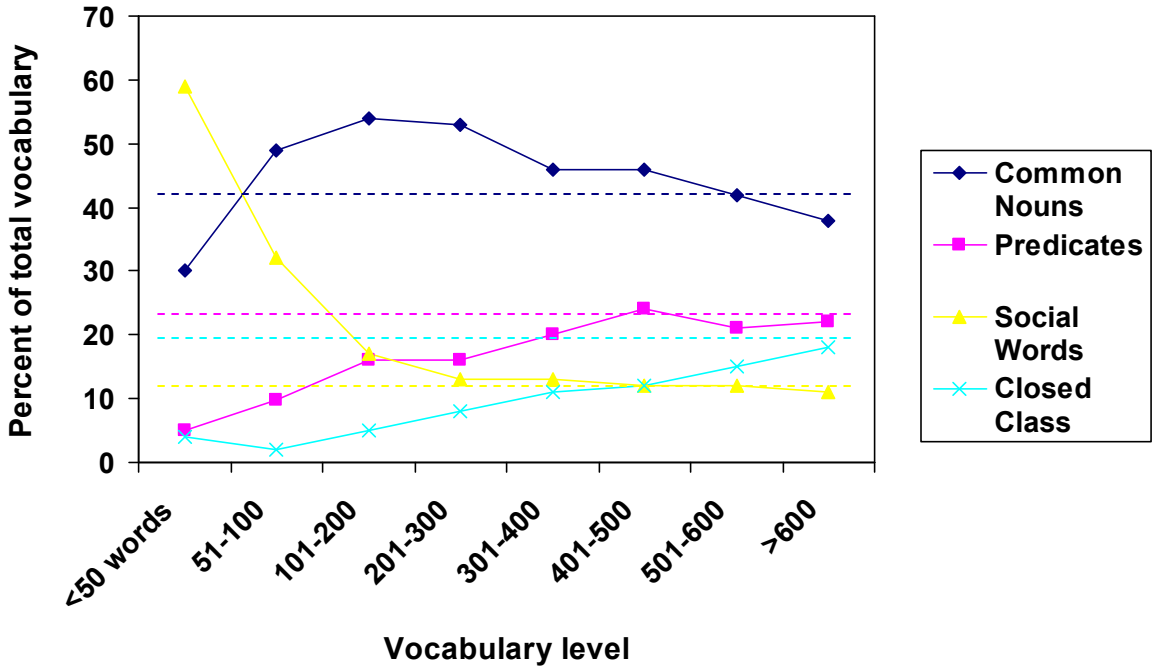


Figure 6.9 Vocabulary composition for Irish-speaking children aged 16-40 months

If development proceeded evenly across all word classes, with words added in accordance with their representation on the checklist as whole, then the developmental functions would be flat. However what we see is an uneven trajectory of word class development across the vocabulary sizes, which has also been described in Italian and English (Caselli et al., 1999, 2001). Overall we see a predominance of common nouns early on, slow growth of predicates, a sharp nonlinear drop in social proportion scores after the earliest level and limited closed class growth until the final vocabulary level. For Irish, common nouns represent around 30% of the words the children say with less than 50 words, and then this sharply increases to more that 50% of available vocabulary at 100-200 words, before it begins to decline to less than 40% at 500-600 words. However, apart from the first vocabulary level, common nouns represent the highest vocabulary category for all ages. By contrast, predicates represent very little of overall vocabulary but start to rise after the 200 word point in accordance with a decline in overall common nouns. Thus unlike which was predicted, verbs do not make up more of the total vocabulary size of Irish-speaking children than nouns. Social words represent the largest vocabulary category when the children have 50 words or less, but this undergoes a sharp decline at 200 words where it then levels off. One difference in Irish vocabulary development from studies of other languages is the relative contribution of closed class items to total vocabulary, particularly at the higher vocabulary levels. As will be seen, Irish closed class items seem to make up a slightly larger proportion of overall vocabulary items when the children have over 400 words than has been noted in other languages. However before this can be confirmed, opportunity scores across the different word classes were explored to confirm that patterns seen were not due to over-representation of a particular class.

6.4.1 Opportunity scores

As outlined in the pilot study, the ICDI has a higher number of nouns, and closed class items, but a slightly lower number of predicates and social words than the English and Italian adaptations. Tardif et al (in press) hold that word opportunity scores are a more stable indicator of cross-linguistic differences in the total number of words, as they also account for differences in the total number of words that can be scored. Opportunity scores were

calculated by dividing the number of each vocabulary class achieved by the child at all time points by the absolute numbers on the checklist (in other words what percentage of the 341 common nouns, 183 predicates, 81 social and 153 closed class items were reported at each vocabulary level). Figure 6.10 compares growth in vocabulary types as a function of word opportunity scores (the dotted line represents the 50% level).

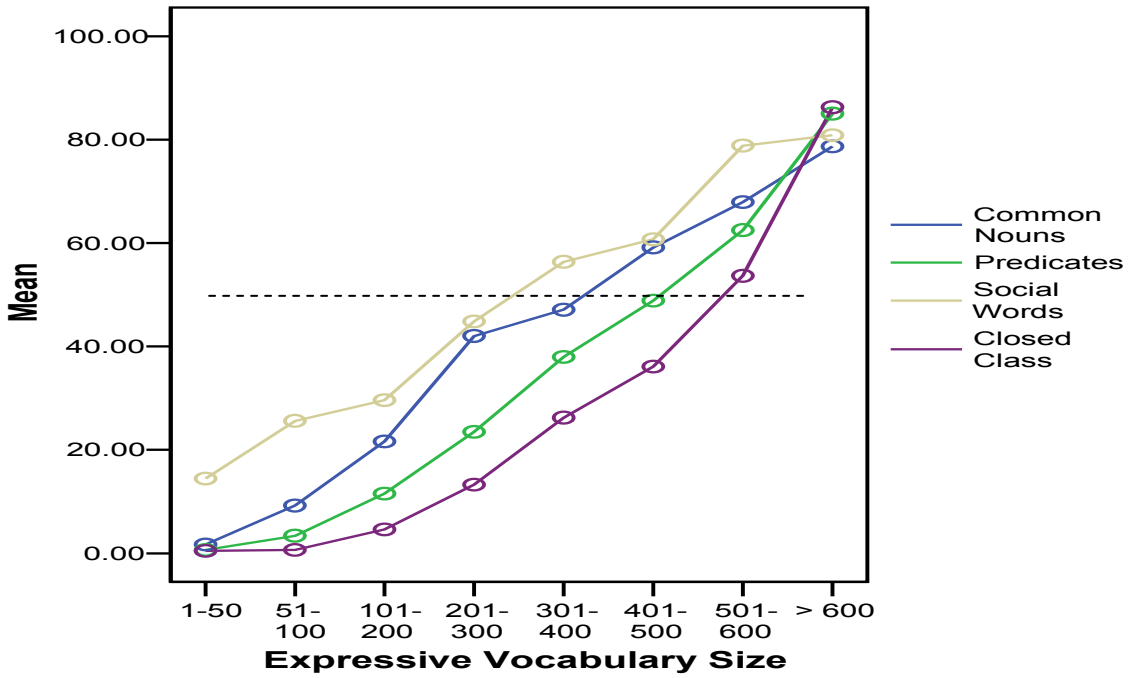


Figure 6.10 Percent opportunity scores for word types across vocabulary size

This graph reveals a different profile of development from the previous one in that the growth of all word classes is in a fairly similar trajectory, apart from social words which has the highest representation at less than 50 words, but gradually comes in line with the number of common nouns by 200 words. Bates et al (1994) carried out a similar analysis where they examined growth in word opportunity scores provided by the CDI checklist. They reported that when total vocabulary is between 200 and 300 words, about 50% of the nouns have been checked, but for predicates this was not achieved until the child has a reported vocabulary level of between 300 and 400 words and for closed class when the child had between 500 and 600 words. Common nouns were also reported to develop significantly faster in Italian-speaking children (Caselli et al., 2001). When we compare this to the Irish children, there is a slight delay in that 50% of the nouns were not achieved until they reached a vocabulary level

of 300-400 words and 50% of the predicates were not achieved until 400-500 words. However 50% of closed class items were achieved at the same vocabulary level as the English-speaking children (just before 500-600 words). The reliability of these trends was verified in a mixed 8 (vocabulary size) x 4 (word class) ANOVA, treating vocabulary size as a between-subjects variable and word classes a within-subjects variable. As was found in a similar analysis by Bates et al. (1994), there was a significant effect of vocabulary level ($F(7, 41) = 192.3$, $p \leq .001$), of word-type ($F(3, 21) = 10.85$, $p \leq .001$) and a significant interaction between size and word type ($F(3, 21) = 2.2$, $p \leq .001$). To determine the locus of the interaction, a series of one-way ANOVAs with Bonferonni corrections were also carried out at each vocabulary size. This confirmed the profile observed previously in mean scores, with common nouns growing significantly at lower vocabulary levels (100-200 words), and predicates and closed class items growing at a significantly larger rate over later vocabulary levels (400-500 for predicates only & 500-600 words for both classes). Thus in Irish the lack of an observed verb advantage cannot be attributed to its under-representation on the ICDI nor the over-representation of nouns as indicated above in the saturation index. What is clear is the strong growth in closed class items at higher vocabulary levels, which was further explored using rate of change in their growth over time.

6.5 Rate of change

Further confirmation that the growth patterns in word classes observed was not due to differences in word opportunity was calculated by observing the rate of change. This analysis was based on that by Bates et al. (1994) who calculated rate of change as follows: the mean opportunity score for number of common nouns for children at 1-50 words is 5.86 and 31.5 between 51 and 100 words, so the difference in the two means is 25.64 which represents an increase of 438% (25.64/5.86) in common nouns. The percent increase across all four vocabulary categories was then calculated accordingly, and the results are plotted in Figure 6.11 below.

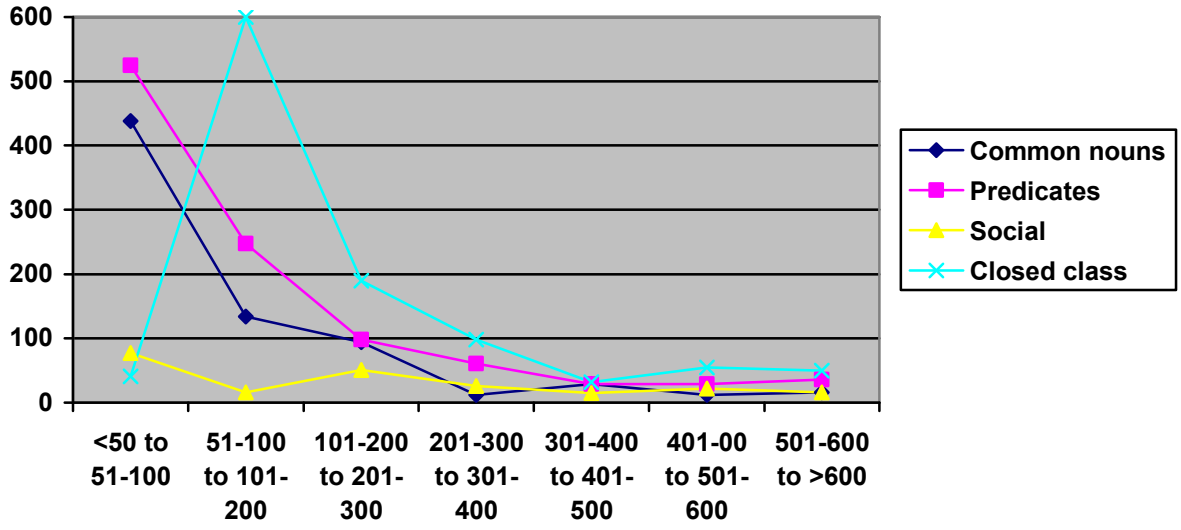


Figure 6.11 Percent rate of change in word class opportunity scores across vocabulary level

As can be seen, the percentage increase for nouns and predicates showed considerable growth at the first vocabulary transition point (438% for nouns, 535% for predicates), which Bates et al. (1994) attribute to the fact that the children have begun to talk. The growth was not as substantial for social items (at 77%) probably because this category made up the largest proportion of the words for children with less than 50 words in their vocabulary. In English and Italian (D'Odorico et al., 2001) closed class items has the largest growth at the first vocabulary transition (from less than 50 to 51-100 words), in line with the profile of growth in other word types, however this did not occur for the Irish-speaking children until they had a larger vocabulary sizes, moving from 51-100 to 101-200 words. Thus, although nouns, predicates and closed class word types display a similar trend (with all falling sharply after the initial sharp increase), this happens at a later point for closed class items in Irish than observed in English and Italian. For the Irish-speaking children, the growth in common nouns and social words represent the slowest rate of change (both dropping to just 16% at the final transition point), followed by predicates (which drops to a growth rate of about 30% over the final three vocabulary sizes) with closed class items representing the most consistent and highest growth rate over all vocabulary sizes (and are still growing by 50% over the final two time points). This growth in closed class items was higher than that observed in the other languages.

Previous differences in growth rates across languages have been attributed to the make up of the target language. For example, a higher growth rate in predicates than that observed in English-speaking children was noted in a longitudinal study of Italian-speaking children moving from the 100 to the 200 word level (D'Odorico et al., 2001). Despite the fact that nouns predominated in both languages, they failed to grow significantly and this trend remained in a follow-up study of the children moving from 400-650 words, where the only significant growth was noted in predicates (and verbs in particular) and closed-class word types (D'Odorico & Fasolo, 2007). The conclusion was that Italian-speaking children acquire proportionally more verbs than English-speaking children as verbs have a higher level of salience and informativeness in Italian. This outline suggests that vocabulary development after the first 100 words is more linked to the target language than noted by Caselli et al., (1995). Based on the analysis of Irish above, it is worth investigating the features of Irish which might make grammatical function words easier to acquire.

One interesting outcome from the longitudinal study of vocabulary acquisition in Italian discussed above (D'Odorico et al., 2001) was that children with a higher percentage of function words at the 50-word mark were slower overall in their vocabulary acquisition. This finding was taken to confirm Bates et al.'s (1988) suggestion that the early use of 'closed class' words reflects a 'holistic' approach to language development and may be associated with a slower rate. This may be relevant to the finding that the Irish-speaking children were slightly delayed when compared to children acquiring other languages as noted in the chapter on the validity and reliability of the ICDI, and may suggest a trend towards a holistic/expressive style of vocabulary acquisition in Irish. This will be explored in the following chapter but is in keeping with Hickey's finding of the frequent use of 'formulas' in Irish language acquisition (Hickey, 1993) and was also explored in the current data set for two children who were noted to be slower in their vocabulary acquisition than others in the sample.

6.6 Late talkers

Individual growth trajectories as outlined in Figures 6.2 and 6.3 for ICDI 3 and 16 above indicated that these two children had slower growth trajectories when compared to the

rest of the group. Generally, children who fail to reach the 50 word mark by 2 years fall in approximately the lowest 15% of toddlers their age in terms of expressive language and if they also are not combining words, are considered to be 'late talkers' (Rescorla, 1989). One child had less than 50 words at 24 months but was reported to occasionally put words together (although examples given were largely formulaic); the other had 20 words at 22 months and was not reported to be joining words together. At the third time point (when the children were aged 30 and 28 months respectively) they had both doubled their total vocabulary (to 153 and 115 respectively) and so may have been 'late bloomers' who eventually catch up, as opposed to true late talkers (Rescorla, Mirak, & Singh, 2000).

As one child was a first-born male, and the other a third-born female, gender or birth order could not be linked to their relative delay. Therefore, their vocabulary composition was analysed because of the previously-mentioned research which indicated that late talkers have a lower proportion of common nouns at 50 and 100-word vocabulary sizes when compared to average talkers (Bates et al., 1995; D'Odorico & Fasolo, 2007). However this proportion may then increase over two- and three-years for children considered to be 'late bloomers' (Rescorla et al., 2000). Table 6.5 below compares their overall vocabulary composition scores in line with the group averages for the particular age.

Table 6:5 Vocabulary composition for potentially late-talking children

(group averages in parenthesis)

Child	Age	Total Words	% Common Noun	% Predicate	% Social	% Closed Class
ICDI 3.1	18 mths	16	18% (50%)	0% (14%)	82% (23%)	0% (5%)
ICDI 3.2	24 mths	49	53% (52%)	2% (17%)	45% (14%)	0% (8%)
ICDI 3.3	30 mths	153	59% (44%)	12% (20%)	22% (11%)	6% (14%)

Child	Age	Total Words	% Common Noun	% Predicate	% Social	% Closed Class
ICDI 16.1	16 mths	3	100% (50%)	0% (14%)	0% (23%)	0% (5%)
ICDI 16.2	22 mths	20	30% (52%)	10% (17%)	50% (14%)	10% (8%)
ICDI 16.3	28 mths	115	54% (44%)	13% (20%)	19% (11%)	14% (14%)

As can be seen, the profiles for the two children are different. ICDI 3 had an above-average proportion of social words in his vocabulary at 18 months, and much lower percentage of common nouns than the group average, which is fitting with the previously mentioned

research. However at 24 and 30 months, his vocabulary profile was more in line with the rest of the group for common nouns, although he continued to have an above-average proportion of social words and a lower than average proportion of predicates and closed class words. This style of vocabulary acquisition where children used more personal-social words and formulas in the one-word stage is known as 'expressive/pronominal', in contrast to referential/nominal children who favoured concrete nouns (Nelson, 1973). According to Bates et al. (1995) children who use more an 'expressive/pronominal' style in their vocabulary acquisition can have relatively slower vocabulary development than 'referential' children which might explain this child's observed delay. ICDI 16 on the other hand, had an above average number of common nouns at 16 months, with no other words types at this age. This goes against what the literature says about late talkers having fewer nominals in their vocabulary (Bates et al. 1995). Once this child reached 22 and 28 months, her vocabulary was more in line with other children of her age, particularly in her acquisition of closed class items. Overall, what might have been captured in these profiles are two children who have different word-learning styles, although both children had lower-than-average predicate scores. It may be that in Irish, a slower rate of development is associated with a lower-than-average proportion of predicates, and so, in contrast to what has been reported in the English literature, Irish-speaking late takers may benefit from intervention focusing on verbs and adjectives instead of nouns (Rescorla et al., 2000). One final possibility which was beyond the scope of the current study was to investigate further if these children had lower level of phonological skills, as previous research has noted a relationship between phonological abilities and word learning using CDI measures (Fletcher et al., 2004; Rescorla & Bernstein Ratner, 1996; Stoel-Gammon, 1988).

6.7 Bilingual Language Acquisition

As Irish is a minority language, the ICDI accounted for the influence of English and measured the vocabulary acquisition of Irish-speaking children in both languages. In effect, the children in the current study could be considered successive bilinguals, as according to their parents, Irish was the dominant language at least until about three years of age. Although the children did not have dramatically different profiles to monolingual children overall (in line with Pearson et al., (1993) who found that lexical development in bilingual

children generally proceeds at the same rate when based on 'total conceptual vocabulary' as adopted in the current study), there were indications of a minor delay. Two significant studies based on parent report for bilingual children also noted a relative delay in vocabulary acquisition when compared to monolingual peers (Marchman & Martínez-Sussmann, 2002; Rescorla & Achenback, 2002) which was attributed to a possible burden on bilingual families in identifying English equivalents of lexical items the child used in a different language. This could also have been a factor in the current study as the vocabulary items on the ICDI were listed in Irish only, and parents had to translate the items to English to determine if the equivalent was used. This in effect goes against Dale's (1991) recommendation of using a 'recognition format' for parent assessment. Anecdotally this was helped by having the researcher present as parents sometimes asked what certain words meant (e.g. 'riteoga', 'líreacán' and 'gráin rósta' were not readily recognised by parents as the English equivalent *tights*, *lollipop* and *popcorn* are more often used). A final consideration was the possibility that bilingual households focus less on vocabulary and more on the production of phrases (Rescorla & Achenbach, 2002) which must be considered in the light of the frequent use of formulaic phrases in Irish (Hickey, 1993).

In terms of the words the children knew in both languages, as previously noted in Figure 6.1, these accounted for only about 7% of the total vocabulary at 18 months, but grew to 28% of total vocabulary at 36 months, and were also found to produce a 'spurt' when the data was modelled over time (Figure 6.7 above). The number of words known in both languages increased more than the words they only knew in English, which remained at about 7% of the total vocabulary over the entire age profile. Looking across word types, Figure 6.12 below demonstrates the amount of total words known in Irish and English-only and those known in both languages.

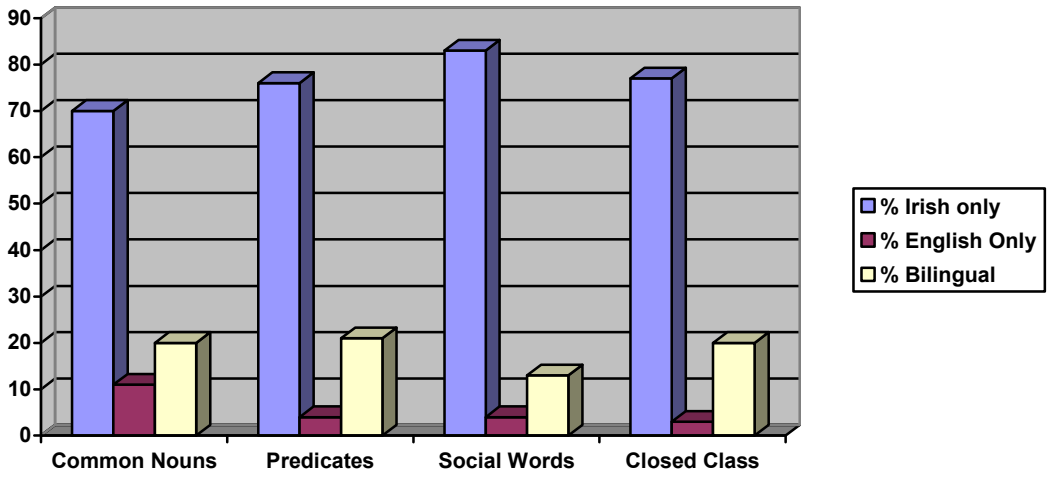


Figure 6.12 Percent of total vocabulary known in each language over word classes

As can be seen, the children overall knew most of their words in Irish only (over 70% for all categories), however they were more likely to know common nouns in English-only which is to be expected given the language-contact situation, and (at least for children under 40 months) they were not as yet learning English grammatical items such as verbs and closed class items. In addition, the 'social' words (people, sound effects etc) are predominantly Irish-only. Analysis of how individual vocabulary items were acquired (i.e., in Irish or English only or bilingually) will be analysed in the next chapter, based on frequency and age of acquisition data.

6.8 How children use words

The final section of the vocabulary checklist looks at how children use language to refer to past or future events, absent objects and people and whether they can follow instructions about absent objects. Fenson et al. (2007) provide a breakdown of the percent affirmative responses (i.e., parents selected either 'sometimes' or 'often) to each of these five questions across the monthly ages. Although there were too few observations at each age month in the Irish data to draw strong conclusions, the results were largely in line with those found in the American children, in that children could refer to ownership and understand references to absent people and objects before they could refer to past and future events. This

was a similar trend observed for how children use words in Mandarin (Tardif, 2006). Summary statistics for these aspects are contained in Table 6.6 below.

Table 6:6 Percentage of children with affirmative (sometimes/often) response for items on How children use words in American-English and Irish

Age (mths)	Past (US)	Past (Irish)	Future (US)	Future (Irish)	Absent Object (Prod) (US)	Absent Object (Prod) (Irish)	Absent Object (Comp) (US)	Absent Object (Comp) (Irish)	Absent Owner (US)	Absent Owner (Irish)
16 (n=2)	17.6	50	18.9	100	60.8	100	90.5	100	59.5	100
17 (n=2)	27.2	0	34.6	100	65.4	50	93.8	100	66.7	100
18 (n=3)	37.9	0	43.7	66.7	72.8	33.3	91.3	66.7	74.8	33.3
19 (n=1)	46.9	100	54.1	100	79.6	100	90.8	100	81.6	100
20 (n=1)	57.3	100	60.7	100	80.3	100	95.7	100	82.9	100
21 (n=1)	56.8	100	55.8	100	81.1	100	93.7	100	83.2	100
22 (n=2)	68.9	50	70	50	86.7	100	98.9	100	91.1	100
23 (n=3)	77.9	100	74.0	100	91.3	100	95.2	100	93.3	100
24 (n=4)	80	75	78.5	0	88.9	100	97.8	100	94.8	100
25 (n=0)	75.7	-	78.5	-	90.7	-	95.3	-	93.5	-
26 (n=1)	82	100	85	100	93	100	98	100	97	100
27 (n=1)	86.7	100	82.3	100	89.4	100	95.6	100	92.9	100
28 (n=5)	85.7	60	83.3	60	90.5	100	96.4	100	95.2	100
29 (n=2)	88.8	100	86.3	50	97.5	100	98.8	100	97.5	100
30 (n=3)	93.8	100	93.8	100	96.3	100	98.8	100	98.8	100

6.9 Summary and Conclusions

The longitudinal nature of the data in this study facilitated the use of sophisticated techniques for modelling change over time, and highlighted similarities in the trajectories of vocabulary development as measured by parental report and spontaneous samples, and similarities with previous research. "By increasing awareness of what can be done statistically while simultaneously providing models of people actually using those tools, communication researchers will be prompted to think differently next time they design a study and hopefully will be inspired to try their own multilevel analysis" (Hayes, 2006; p385). Mean vocabulary size and variability among children as well as word opportunity score for the Irish checklist clearly indicate that for the ages studied, the inventory captures individual differences in a satisfactory way and is a developmentally sensitive measure of lexical growth. However, differences which were largely due to the bilingual nature of the vocabulary acquisition were also highlighted. Although a predicted 'verb advantage' was not observed, the Irish-speaking children did acquire as many grammatical function words, and these findings must first be analysed in the context of crosslinguistic literature, as will be outlined in the following chapter.

7 Irish Vocabulary Acquisition in the Context of Crosslinguistic Research

Having looked at Irish vocabulary development in some depth in the previous chapter, we now analyse how this data compares with the crosslinguistic literature. This chapter will focus on how the Irish-speaking children's overall vocabulary compares to that of children acquiring other languages. Particular emphasis will be placed on how Irish-speaking children acquire certain parts of speech, considering the initial hypothesis that they may acquire verbs relatively earlier because of their saliency and importance in the Irish language. The findings will then be considered in light of the theoretical debate as to how children acquire language and vocabulary in particular. This chapter will then conclude with a fine-grained analysis of how individual lexical items are acquired in Irish-speaking children, in terms of age of acquisition, frequency of individual vocabulary items and bilingual aspects of vocabulary development.

7.1 Crosslinguistic Analysis of Vocabulary Development

One of the major benefits of using the CDI to study Irish language acquisition is that comparisons are possible with over 40 other languages which have used similar methodology and are reasonably straightforward for vocabulary acquisition in particular. Vocabulary scores across the various monthly-age groups were plotted for a number of adaptations of the CDI and are displayed in Figure 7.1 (based on mean score comparison) and Figure 7.2 below (based on median score comparison) across a variety of languages. The age comparisons were grouped into 3-monthly age groups as comparisons at individual months was unreliable due to the limited sample size for the Irish-speaking children. Not all studies publish similar measures of central tendency, necessitating both mean and median-score comparison. Furthermore, the Swedish study (Berglund & Eriksson, 2000) included only children with an age at even months and so in line with the comparative analysis by Bleses et al. (2008), interpolation was used to obtain values for odd months. Similarly, data from the Italian, British English and Croatian (Kovacevic, Kuvac, & Cepanec, 2005) adaptations are read from graphs.

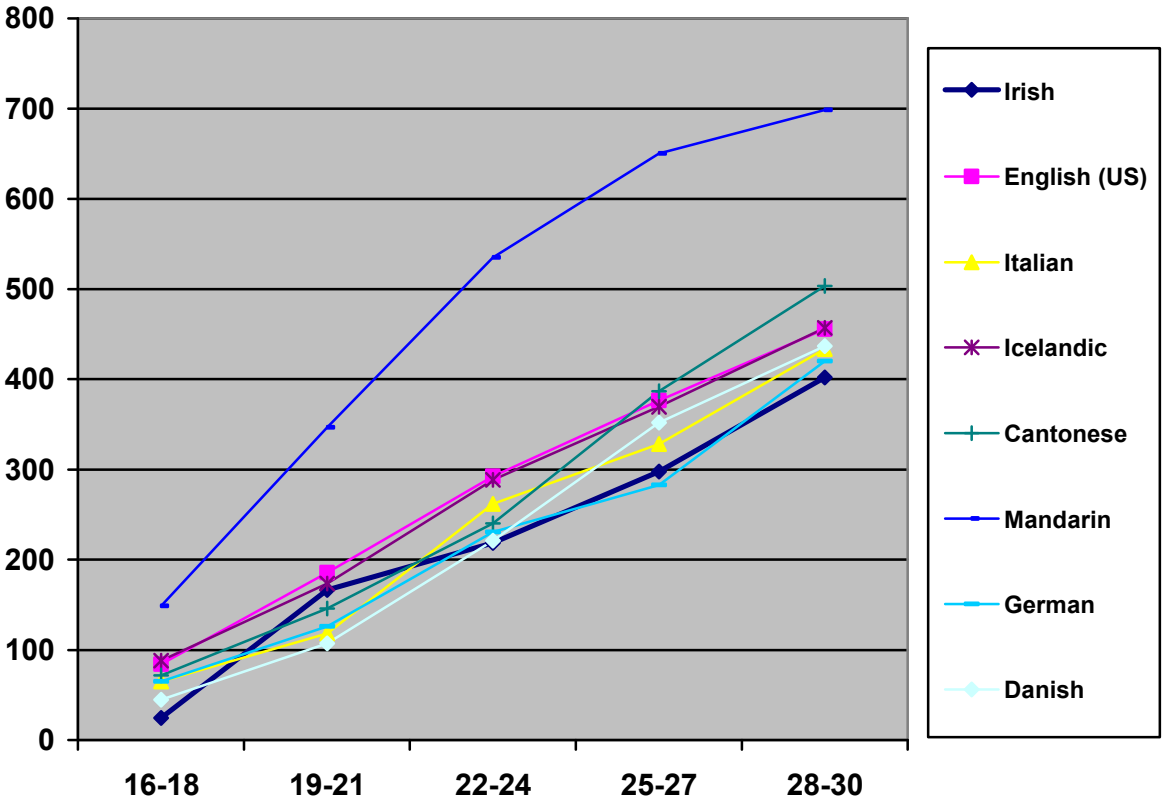


Figure 7.1 Mean vocabulary scores over age from crosslinguistic CDI adaptations

Sources: *English*- (Fenson et al., 2007)*; Italian*- (Caselli et al., 1995)*; Icelandic*- (Thordardottir & Weismer, 1996)*; Cantonese*- (Tardif et al., in press); *Mandarin*- (Tardif et al., in press); *German*- (Szagun et al. 2004); *Danish*- (Bleses et al., in press).

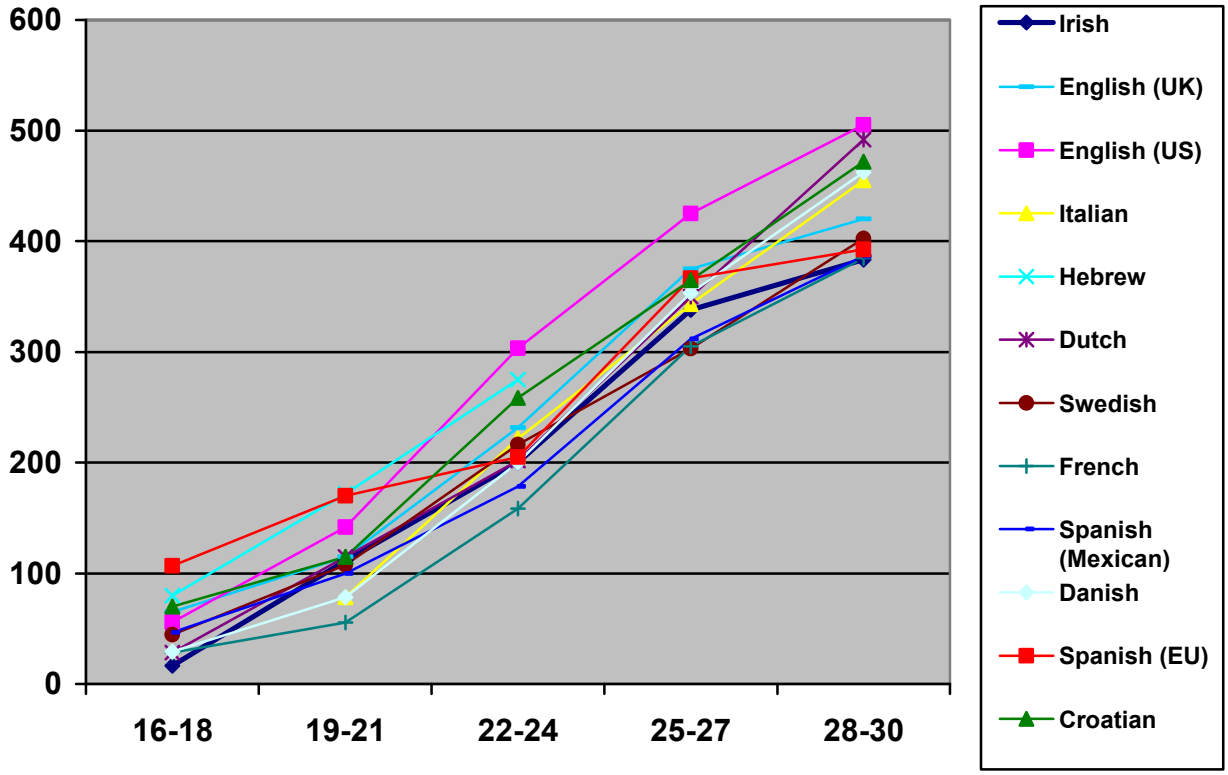


Figure 7.2 Median vocabulary scores over age from crosslinguistic CDI adaptations

Sources: *English (UK)*- (Hamilton et al., 2000)*; Hebrew*- (Maital et al., 2000); *Dutch*- (Zink & Lejaegere, 2005); *Swedish*- (Bergland & Ericsson, 2000)*; French*- (Kern et al., 2001)*; Spanish (Mexican)*- (Jackson-Maldonado et al., 2003); *Spanish (EU)*- (López Ornat, Gallego, Gallo, Karousou, & Mariscal, 2005); *Croatian*- (Kovacevic et al., 2005).

Looking across the age range from 16-30 months it seems that for the most part, the vocabulary scores of the Irish-speaking children are similar to that of children speaking other languages, although the mean scores fall towards the lower end of the range. Previous cross-linguistic comparisons have noted that the vocabulary scores of Italian, British-English, Danish and Icelandic-speaking children were on average, lower than American-English speaking children (Caselli et al., 1995; Hamilton et al., 2000; Thordardottir & Ellis Weismer, 1996; Wehberg, Vach, Bleses, Madsen, & Basboll, 2007) but not those speaking Hebrew (Maital et al., 1998); Spanish (Jackson- Maldonado et al., 1993) or Finnish (Lyytinen & Lyytinen, in press). It has been acknowledged that this delay could be due to differences in sample sizes across studies, but has also been attributed to possible influences of parental

expectations, child-care practices and differences in infant-directed speech in America, although empirical evidence is as yet lacking (Hamilton et al., 2000). Moreover, studies of typically developing Mandarin-speaking children (Figure 7.1 above), have revealed that these children acquire words significantly faster than children acquiring other languages (Tardif et al., in press). This advantage was tentatively linked to the fact that most children were first born or from single-child families, had high parental education and were from largely monolingual environments. Linguistic reasons for this vocabulary advantage included the relative simplicity of the phonological structure of the language (Tardif et al., in press). On the other hand, explanations for the possible vocabulary delay for the Irish-speaking children could be linked to the fact that Irish is acquired in a minority and largely bilingual language-learning setting, which has been linked to early vocabulary delay (Marchmann & Martinez-Sussmann, 2002; Rescorla & Achenbach, 2002). However, validation of this hypothesis would warrant further replication with larger numbers.

7.1.1 Crosslinguistic Comparison of Stylistic Variation in Vocabulary Composition

Comparisons based on age-related vocabulary measures are thought to be unreliable due to the variability observed within and across languages (Bates et al., 1994), as they give false advantages to some languages (Caselli et al., 1999) and obscure stylistic variation in including the so-called 'noun bias' in vocabulary development (D'Odorico & Fasolo, 2007; Pine & Lieven, 1990). As previously described, the bias towards nouns in early vocabulary acquisition had been found not only for English, but also for children acquiring Italian (Caselli et al., 1999, 2001), Spanish (Jackson-Maldonado et al., 1993), Hebrew (Maital et al., 2000), Finnish (Lyytinen & Lyytinen, in press), German (Kauschke & Hofmeister, 2002), French (Bassano, 2000; Kern, 2007; Parisse & Le Normand, 2000; Poulin- Dubois et al., 1995) and Dutch (De Houwer & Gillis, 1998; Verlinden & Gillis, 1998). However data for Asian languages such as Korean, Mandarin and Cantonese (Au et al., 1994; Gentner, 1982; Gopnik & Choi, 1995; Pae, 1993; Tardif, 1996) and Tzeltal (Brown, 1998), a Mayan language, have produced conflicting results.

Explanations for the noun bias have been linked to a universal set of cognitive principles favouring nouns (e.g., which refer to stable, whole, concrete objects with

hierarchically organised semantic structures) over verbs (which refer to dynamic, intangible actions and events and have more complex organising principles) in the process of language acquisition (Gentner, 1982; Tomasello 1995). On the other hand, children's preference for particular word-types early in language acquisition may also be due to the nature of the input language and the situations in which children hear language. For example, naturalistic studies of Korean have noted that verbs are acquired earlier than nouns which was attributed to the fact that verbs occur in a salient sentence-final position (due to the SOV structure of Korean) and the fact that parents are more likely to request actions rather than object names in their interactions with their children (Gopnik & Choi, 1990). On the other hand, Au et al. (1994), using parental report to measure vocabulary, did not find this 'verb bias' in Korean, and in fact noted that the children were more likely to use nouns in their early vocabulary. As will be explored later in this chapter, Irish provides a good test case of the predominance of early nouns and verbs as it has a VSO word order in sentences among other verb-promoting features. In addition, as some have claimed that the noun-bias is an artefact of western-cultural, emerging from an emphasis on object naming (Tardif, Shatz, & Naigles, 1997). Exploration of the findings using a structurally different language within a western culture should clarify the conflicting results noted above.

In order to compare the acquisition of parts-of-speech in Irish, with that found in other languages, the percent of each word type as a function of vocabulary size was plotted for Irish, and compared to that found for other languages where data were available. The comparisons are illustrated in Figure 7.3 below. The scales for each of the word types are slightly different given that common nouns and social words comprised a larger percent of overall vocabulary at different vocabulary sizes than either predicate or closed class words. This should be taken into account when interpreting the graphs.

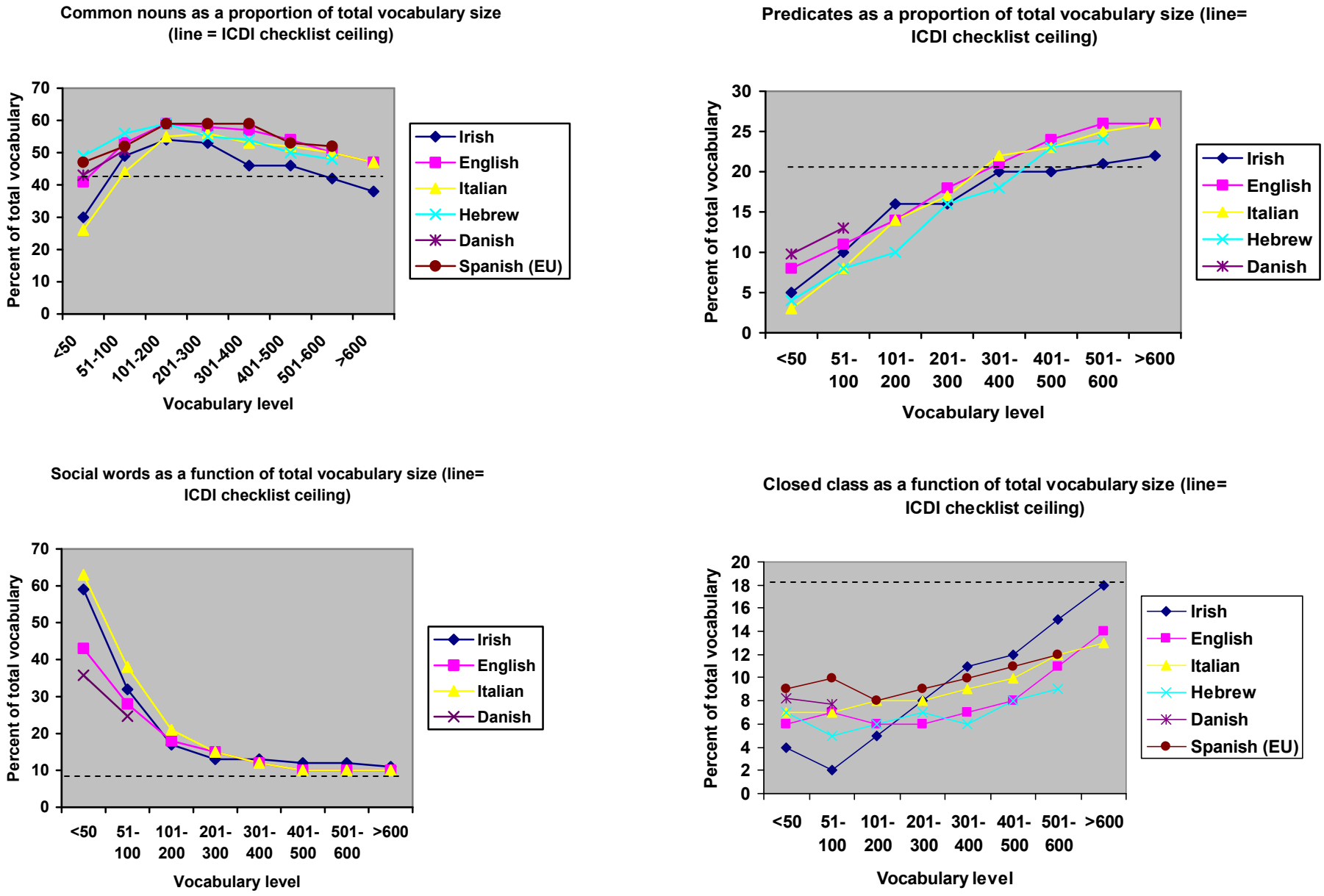


Figure 7.3 Crosslinguistic proportions of common nouns, predicates, social and closed-class words across languages

Looking across vocabulary development for toddlers we can see that there are many similarities in growth trajectories and early vocabulary composition across languages. For instance, when the children have less than 50 words, social words seem to dominate in all languages, but particularly in Irish and Italian. In Italian, this was attributed to cultural factors and the tendency for Italian families to live in the same cities with an extended family, providing 'more relatives to be named, [..] to elicit routines, sound effects and other language games on their frequent visits' (Caselli et al., 1999; 93). Anecdotal evidence from the current data suggests that this may also be the case in Irish, as in the predominantly rural areas where children in the study lived, friends and neighbours lived close by, with 11 out of the 16 families involved having relatives that were reported to regularly speak Irish to the children. However, this would warrant further investigation and more systematic collection of background information. In any case, the dominance of social words in Irish reduces to the checklist ceiling of about 10% for all of the languages after the 300-word mark.

It was interesting to note that the Danish children had fewer social words in the early stage of development compared to other languages (although social words still made up the largest category of the early-acquired words). This finding was linked to the observation that words for people, particularly parental terms, are phonetically complex in the Danish language (Wehberg et al., 2007). As Danish has 'an abundance of vowels, weak syllable codas, unstressed syllables without any vowel sounds and fairly impressive prosody', perceptually it is 'a harder nut to crack' than most comparable languages (Grønnum, 2003; as cited in Blesses et al., 2008; 129). The developmental implication of this is that linguistic cues play an important role in the early segmentation of words (Peters, 1997) and as these are weakly signalled or in some cases entirely non-existent in Danish, it makes segmentation difficult. The issue of linguistic complexity in the acquisition of parts-of-speech and grammatical morphemes will be further outlined later in this chapter and the following chapter on grammatical development.

After 50 words, common nouns have a high growth rate and demonstrate an 'inverted U-shaped pattern' of development across languages including Spanish, Dutch,

French, Hebrew, Italian, Korean and American English, as they emerge relatively slowly before a peak at about 200-300 words, and finally decline at higher vocabulary sizes (Bates et al., 1994; Bornstein, Cote et al., 2004). Similarly for Irish, common nouns occupied an increasing proportion of total vocabulary from 50 words and peaked at a mean of 53% between 200 and 300 words. However, after the 300-word mark, the dominance of nouns in Irish was lower than that observed in English, Italian and Hebrew and was reduced to just 38% of total vocabulary (below the checklist ceiling of 41%) when the children had more than 600 words. This could indicate that there is a 'weaker' version of the noun bias in Irish compared to that observed in English, as was noted for German (Kauschke & Hofmeister, 2002) and French (Bassano, 2000).

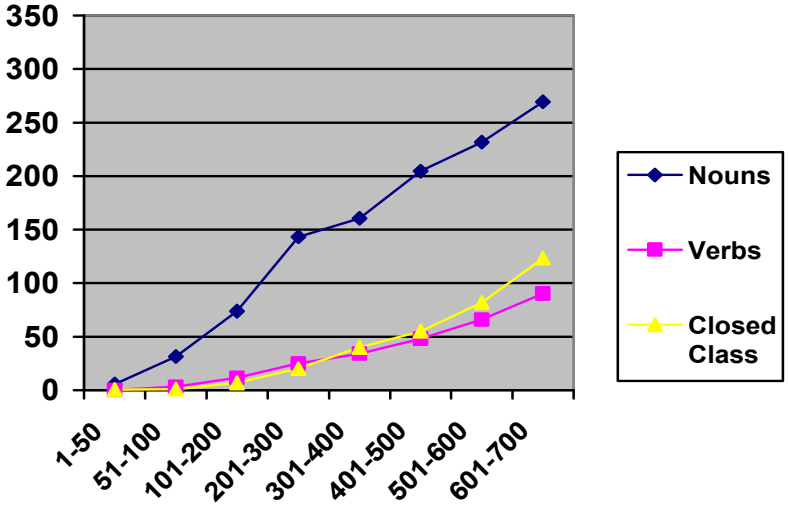
The graphs also demonstrate that crosslinguistically, predicates and closed class vocabulary items are relatively rare when children have less than 100 words in their vocabulary, making up less than 15% and 10% of total vocabulary sizes respectively. In terms of predicates, it actually seems that the English-speaking children are relatively advanced in their acquisition of predicates when the children have less than 50 words. Moreover, contrary to predictions, we did not see a 'verb advantage' for the Irish-speaking children, who in fact demonstrated lower proportions of verbs and adjectives in their vocabulary after 400 words when compared to children speaking English, Italian and Hebrew. This discrepancy appeared to be offset by a relative advantage in the acquisition of closed class items in Irish vocabulary acquisition.

The developmental profile in the acquisition of grammatical function words demonstrated for English, Italian and Hebrew above, indicates that these words have a rather flat growth trajectory and although a slightly steeper growth trajectory is seen in the Spanish data (Mariscal, Gallego, & López Ornat, 2007), closed class items never comprise more than 14% of total vocabulary in any of these languages. However, in Irish, once children have more than 50 words, closed class items grow in a steadily rising fashion, and seem to occupy a larger proportion of the total vocabulary than that observed in other languages (particularly after 300 words). Bates et al. (1994) observed that closed class items grew in a predominantly non-linear fashion in English, with little growth

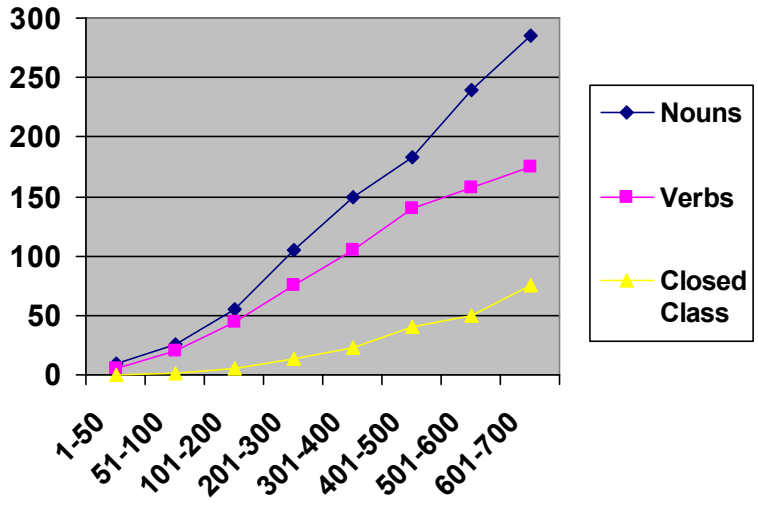
observed until after 400 words, which led to the argument that the development of grammatical function words may require the presence of a certain critical mass of nouns, verbs and other content words (Marchman & Bates, 1994). It also seems to be the case that for Irish, a particular number of other word types is needed before grammatical morphemes develop, although it may be that a smaller 'mass' of words is needed than in English. The growth of closed class vocabulary in Italian is argued to be more linear than that observed in English (Caselli et al., 2001), as demonstrated by a gradual increase in the contribution of closed-class items to total vocabulary. Although the Italian children had proportionately more closed class items than the Irish-speaking children at the lower vocabulary levels, once they reached 300-words, Irish children appeared to have a sharper, or non-linear growth rate than that observed for Italian. Finally, spontaneous language data from French-speaking children revealed that they also had earlier acquisition of grammatical items than English speakers, which was associated with the 'wealth in grammaticality which characterizes French' (Bassano, 2000: 527). As will be later discussed, it may similarly be that the wealth in grammatical function words in Irish is associated with this relative advantage.

Looking at the overall pattern of Irish vocabulary development, it seems to fit the pattern described by Bates et al., (1994) and later expanded by Caselli et al., (2001) who noted that early lexical development undergoes four 'waves' of reorganisation. It begins with a concentration on words for routines and social functions (with early predominance of social items), moves to 'reference' (as demonstrated by an early increase in common nouns) followed by an emphasis on 'predication' (characterised by a decrease in nouns offset by an increase in predicates) and culminates in an increased emphasis on grammar (as demonstrated by a sharp increase in closed class items after 400 words). It appears that the hypothesised verb advantage did not occur in the Irish data, although in order to confirm this finding, analysis of growth using verbs-only was carried out and compared to the mean scores across vocabulary sizes, as reported in other languages including English (Fenson et al., 2007), Mandarin and Cantonese (Tardif et al, in press). Results of this analysis are contained in Figure 7.4 below.

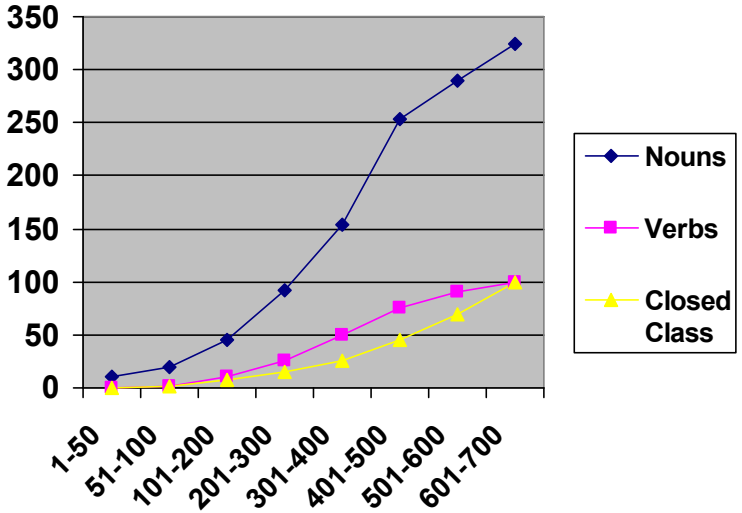
Figure 7.4 Comparison of mean noun, verb and closed class items as a function of vocabulary size



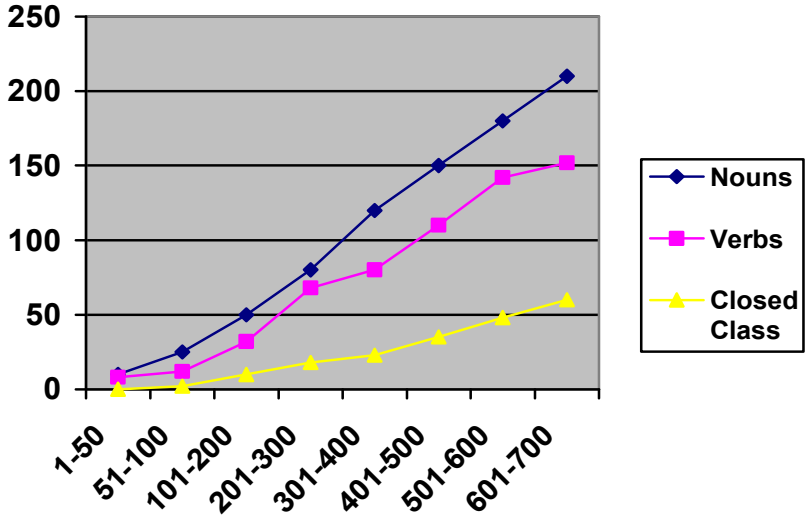
Irish



Mandarin



English



Cantonese

Focusing on the acquisition of verbs-only, we see that for Mandarin and Cantonese, although nouns made up the largest vocabulary category in parent-report measures, verbs grew in a highly similar linear fashion and were just as likely to be used as nouns, particularly under 200 words (Tardif et al., in press). For Irish and English, verbs follow a much slower trajectory in comparison to nouns, and are relatively rare in smaller vocabularies. As noted in the previous graph, the difference in the Irish trajectory is that the predominance of nouns is not as pronounced as for English, where it is well documented that after 300 words, nouns undergo a sharp rise. In contrast, at the same vocabulary size in Irish, it is closed class items that increase, and have a higher mean score than verbs, a profile that is not observed in the other languages. Due to the fact that raw data on the other studies is not available, this advantage cannot be confirmed statistically, nor can it be compared to previous studies of Irish-language acquisition. Furthermore, explanation for this profile of development cannot be linked to an over-representation of closed class items on the CDI, as analysis of word opportunity scores refuted this, as indicated in the previous chapter. Therefore, this stylistic variation in the acquisition of Irish vocabulary will be analysed in terms of the linguistic structure of Irish, as well the saliency and frequency of word classes noted in the crosslinguistic literature.

7.2 Stylistic Variation in the Acquisition of Irish

Theories on the order of acquisition of word classes include the 'constraints account' which holds that when children hear words, they make certain default assumptions about the meanings of those words from universal cognitive principles, most of which are favoured towards the learning of nouns (see Bornstein et al., 2004; Gentner, 1992 but also Tomasello, 1995). These include constraints from Gentner's (1982) 'Natural Partitioning Hypothesis' such as the whole-object constraint, which assumes that when children hear a new word, they assume that it applies a whole object rather than its parts, substance, or motion. Similarly, the 'taxonomic constraint' which holds that a novel label extends to objects of the same kind rather than those with spatial, causal or other thematic associations (Au et al., 1994). These may not be strictly linguistic constraints but products of a more

general learning mechanism that finds objects easier to learn than referents of verbs or adjectives. However, it has also been shown that these constraints fail to explain the differences that have been noted in vocabulary acquisition across languages. More recent explanations of these variations across languages consider the phonological, morphological, semantic, and/or syntactic characteristics that separate nouns, verbs, function words and other word types (Smiley & Huttenlocher, 1995). For example, languages which have regular and transparent morphological makers on nouns have been linked to their relatively earlier acquisition than verbs, which have more opaque morphological inflections (Gentner, 1982; Slobin, 1985). In contrast, Kim et al (2000) refute this by saying inconsistency and variety in morphological marking makes words more salient for children. Nonetheless, the results of studies of Mandarin (Tardif, 1996; Tardif et al., 1997), where verb stems are marked by a separate morpheme for aspect only, with no subject-verb agreement, have indicated earlier acquisition of verbs, in contrast to English (with its inconsistent and frequently irregular verb morphology) and Italian (which has regular, albeit richer morphological marking than Mandarin). A similar profile was noted for Korean, which, due to its agglutinative features, makes the boundaries between verb stems and suffixes clear and results in relatively earlier acquisition of verbs than nouns, which have a more complex system (Choi, 2000). These aspects will now be explored in relation to the profile of acquisition of Irish parts-of-speech.

7.2.1 Morphology

As phonology and morphology are intrinsically linked in the initial mutation system of Irish (Ó' Siadhail, 1989), these issues will be explored together in an attempt to explain the differences in vocabulary acquisition noted. Moreover, Peters (1997) holds that it is not possible to understand the acquisition of morphemes in a language in isolation from its phonological properties, as these help them to segment word-like units in the adult input which transfer to morphosyntatic acquisition. As already outlined in Chapter 1, Irish verb morphology is similar to English, in that although most verbs are regular, the most commonly used verbs have irregular inflections (including 'bí', *to be*; 'déan' *to make/do*;

'faigh', *to receive/find*; 'tabhair', *to give/bring*; 'tar', *to come* &and 'téigh' *to go*). In addition, although verbs can occur in their bare form (imperative) in Irish, as noted for English, they more often occur in the infinitive form, which in Irish takes the form of the 'verbal noun' combined with the particle 'ag' and auxiliary verb 'bí' *to be* (which inflects for tense). Doyle (2001) however noted that the formation of the verbal noun is irregular and so lexically determined. Moreover, 'regular' past tense marking in Irish is through the use of lenition, which has been found to be acquired relatively later in children's morphophonology (Brennan, 2004; Ó' Baoill, 1992). Considering that the outcomes of crosslinguistic studies of morphosyntactic acquisition have identified general acquisition strategies for the acquisition of grammatical morphemes ('operating principles'; Slobin, 2002), including the attention to variation in the ends of words to express role relations, this means that the principal morphosyntactic rule of Irish, which is at the beginning of words, may make verb morphology more complex but no less consistent in Irish than English. Although the notion of 'operating principles' has not gone unchallenged (Ingram & Pinker, 1989; Pinker, 1989), both for their theoretical status and the limited supporting data used to support them, if 'simpler' morphology that occurs as suffixes enhance acquisition of word stems, then Irish learners may be at a disadvantage compared to English learners especially for the acquisition of verbs, which may explain some of the findings above. Moreover, studies of Korean have noted relatively earlier acquisition of verbs than in English-speaking children, which was linked to the fact that in Korean, morphological structure is more consistent than English, due to its agglutinative feature which gives clear boundaries to stems and suffixes (Choi, 2000). The issue of complexity in the acquisition styles and rate of grammatical morphemes across languages will be further explored in the following chapter.

It is also interesting to note however, that Ó' Siadhail (1989) maintains that the verb is far more predictable in terms of its phonetic shape and grammatical function than the noun in Irish. Nouns in Irish inflect for vocative, gender, number, genitive, comparative and diminutive forms, thus their morphological complexity is also higher for Irish than English (which only marks nouns in possessive and plural situations; see Bornstein et al.,

2004). Morphological transparency in noun marking has been linked to advances in overall vocabulary acquisition in Mandarin, where regular noun inflections make little phonological difference to the noun stem (Tardif et al., 1997). Irish noun morphology, on the other hand, makes substantial changes to the noun stem (e.g., 'Séamus' /ʃeməs/ becomes 'cóta Shéamais' /koṯə hemʷɪʃ/ *Séamus's coat* in the genitive). This complexity could also be linked to differences in the acquisition of Irish nouns and the weaker version of the 'noun bias' than observed in other languages, which was noted earlier. Crosslinguistic differences in the acquisition of grammatical morphemes will be further outlined in the following chapter addressing grammatical development in Irish.

7.2.2 Semantics

In order to explain the lack of a predicted verb advantage in favour of a relative closed class advantage noted for Irish, we turn to semantic features which have been noted to influence the timing and sequence of the emergence of vocabulary categories. Bowerman's (1994) review of the language acquisition data shows that from an early state, children develop language-specific lexicalisation patterns of motion events and attend to a number of critical features in the adult system that distinguishes one semantic category from another. For example, English conflates manner and motion within the verb (e.g., floating) and uses particles and prepositions to indicate the path (floating into the cave). On the other hand, Spanish has verbs that conflate the path and motion within the verb such as 'entró/salió' *to enter to /to exit from* as in the often cited example 'La botella entró/salió a/de la cueva (flotando)' *The bottle entered/exited to/from the cave (floating)* (Choi, 1997). Therefore, both of these languages (like Irish) rely on other parts of speech (such as prepositions) to specify the meaning (either manner or direction) of the verb. On the other hand, in a language like Korean, verbs have very specific meanings without the necessity of an additional particle, so verbs specify change of location and motion within the verb- (e.g. 'kkita' *put in/on tightly*; 'nehta' *put in loosely*). The richness of the verbal semantic system of in Korean, (also observed in Mandarin) has been linked to the finding that early

on children acquire as many verbs as nouns in vocabulary acquisition (Tardif, 2006), whereas verbs are relatively delayed in a language like English.

Semantic features could also explain the lack of a verb advantage noted in Irish, which has been described as having 'verb poverty' (Ó' Baoill & Ó' Tuathail, 1992). This 'verb poverty' results in an abundance of 'phrasal verbs' where a semantically light verb such as 'cuir' *put*, combines with a particle (generally a directional adverb, an intransitive prepositions, or a prepositional pronoun) to indicate meaning, often having only a narrow semantic link with the spatial meaning (Doyle, 2000; , 2001). Examples include: 'cuir'; + fút' *live/stay*; 'cuir + ort' *get dressed*; 'cuir + duit' *send;* 'cuir chugat' *hide* and 'lig + fút' *be quiet;* 'lig +ort' *pretend*; 'lig + duit' *allow,* 'lig uait' *let go.* Wigger (2008) claims that the similarities between Irish and English on this aspect are substantial (e.g., 'cuir as' *put out* and 'cur síos' *put down*) not least because both phrases in this example can go beyond these meanings in certain contexts, to mean *annoy* (put out) and *describe* (put-down; Irish) or *belittle* (put down; English) depending on the context. The use of semantically weak verbs has also been noted in English, and associated with the relative delay in acquiring verbs in the language. The opposite pattern has been noted in Mandarin, in which verbs are highly specified and nouns are 'semantically weak' (Tardif, 2006), resulting in a pattern of vocabulary development favouring verbs.

Semantics may also be the reason behind the observation of a relative advantage in the acquisition of closed class items in Irish, and prepositions in particular, as previously noted. Although there are similarities between Irish and English in the use of particles (which are generally prepositions) in verbal phrases, it is interesting to note that this did not lead to a similar 'closed class' advantage in English. Moreover, English-speaking children have been found to use prepositions (or verb particles) such as *up*, *down* and *off* for events and relations before they use verbs for this purpose (Gopnik & Choi, 1995; Smiley & Huttenlocher, 1995). Irish has a more semantically rich prepositional system than English, as previously described, which most likely led to the relative advantage observed in these items in the current study. For example, Korean and Spanish specify deixis (motion towards the speaker vs. motion away from the speaker) within a motion event or verb

(Choi, 1997), while Irish uses prepositions for this function. Thus directional prepositions specify location and motion relative to the speaker/listener perspective (deixis), so that the location of the speaker is indicated by a specific preposition, generally those beginning with a 'th' (as in 'thuas' *up*). Prepositions that indicate direction or movement towards the speakers beginning with an 's' (as in 'suas' *(going) up*), and those that indicate movement away from the speaker are prefixed with 'an-' (e.g. 'aníos' *up (from below)*). Likewise, there are two prepositions corresponding to the English preposition *out* and *in* depending on whether there is motion involved ('amach'/'isteach') or whether a location is being described ('amuigh/istigh'). In addition, by expressing a relative location to another thing/person, adverbs can also begin with las/lias, as reported in the ICDI data (e.g., 'lasmuigh' *outdoors*). Finally, as Irish has a full set of inflected prepositions (prepositional pronouns) which are marked for person, gender and number (Doyle, 2002 as outlined in Chapter 1), it could be argued that this focuses the speakers of the language on prepositions, and results in the relative advantage of closed class items observed.

In order to confirm that this pattern is significantly different from that observed in other languages, the online database of crosslinguistic norms based on CDI data (CLEX) was consulted as it currently has age-based norms for American-English (Dale & Fenson, 1996) and Danish (Bleses et al., 2008) speaking children. Thus the mean prepositional scores for children aged 16-30 months were compared to those found for the Irish-speaking children and are contained in the boxplot in Figure 7.5 below. As previously described, boxplots provide a visual representation of the variation observed in the sample; the box itself contains the middle 50% of cases (from the 25th to the 75th percentile) and the line across the middle represents the median value.

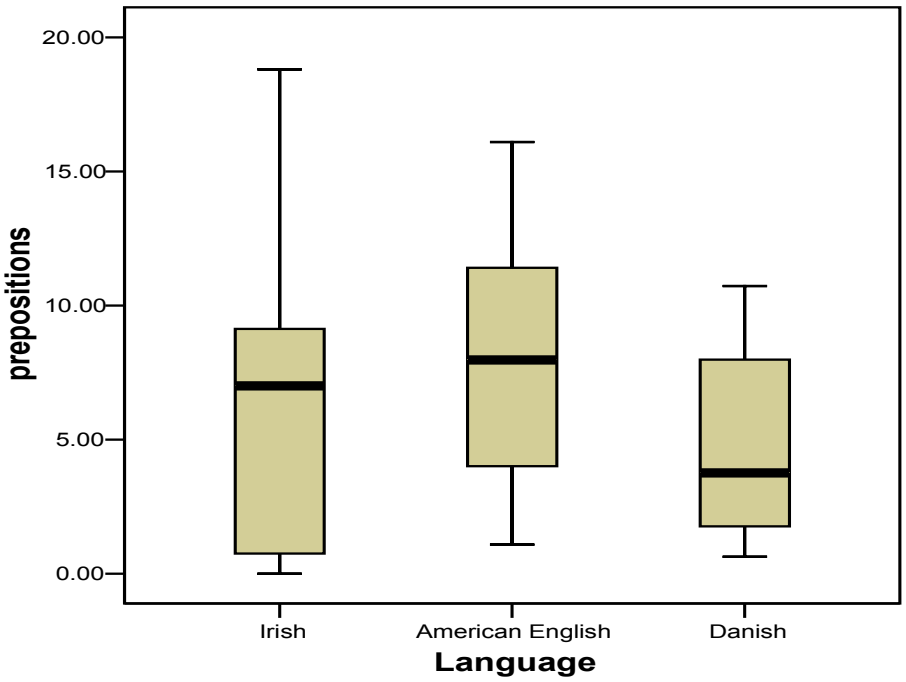


Figure 7.5 Boxplot comparing mean preposition scores for Irish, English and Danish-speaking children

The median scores for the American-English speakers were slightly higher than those observed for Irish and Danish, although a one-way ANOVA indicated that the difference between the languages was not significant. Nonetheless, the range for the Irish-speakers is larger than that observed in other languages, and most children are in the 75th percentile range when compared to American-English and Danish children (who in contrast mostly fall towards below the 50th percentile). Due to the limited observations of Irish speakers at the monthly ages, conclusions are tentative. A more reliable comparison might have been possible had data been available based on vocabulary sizes instead of ages. Nonetheless, it is clear that the semantic space is 'carved up' differently by different languages, which has an influence on the acquisition of syntactic categories (Choi, 1997). In Irish, prepositions appear to be a governing factor in 'carving up' the semantic space associated with verbs, leading to an advantage in the acquisition of these forms in early child language.

7.2.3 Saliency

Another language-related factor which affects the order of word acquisition relates to saliency or position within the utterance. Previous studies have noted that words that appear at the beginning or end of an utterance are more salient relative to words appearing in medial utterance positions (Gentner & Boroditsky, 2001; Gleitman & Gleitman, 1992; Slobin, 1985). Words that appear in salient utterance positions have been claimed to be more easily extracted from the sound stream for interpretation (Naigles & Hoff-Ginsberg, 1998) and are likely to be acquired earlier. Therefore, in SVO languages such as English, nouns are more likely in initial and final position and thus learned earlier when compared to pro-drop languages such as Italian and Mandarin, where verbs are equally or more likely than nouns to appear in initial or final position. The issue of utterance position led to the previously-mentioned hypothesis that Irish, with its VSO word order, places verbs in a more salient sentence-initial position, and may result in the earlier acquisition of verbs. However, analysis of the data revealed that this was in fact not the case. On the contrary, nouns were more dominant in early vocabulary acquisition in Irish and there was also an advantage in the learning of grammatical function words. Saliency may nonetheless explain the lack of a predicted 'verb advantage' as word classes that appear at the ends of utterances have been claimed to be learned more quickly and easily by children than those in sentence initial position (Gentner, 1982). This is because words presented in utterance final position tend to be bound by silence and produced with an exaggerated pitch, which according to Bornstein et al. (2004) helps with the extraction of words from the speech stream. They hold that final position is more salient than initial position and state that it has been proven in sentence recall and memory tasks, as well as the finding that postpositions and suffixes are learned earlier than prepositions and prefixes (Johnston & Slobin, 1979 as cited by Bornstein, et al., 2004). Therefore the sentence-initial status of verbs in Irish may not be presenting children with as much of an advantage as predicted.

Moreover, even when a verb is used in the initial position, it is often the auxiliary (substantive) verb 'tá' *to-be* which, as will be seen in the next chapter on grammar, was

frequently omitted in the child data. It has also been suggested that 'tá' is also omitted in the adult input when it is an auxiliary, as the tense can be understood from the context, meaning that children are not exposed to as many verb-initial sentences as might be expected (Hickey, 1990a). 'Tá' omission often occurs in the progressive tense, with the sentence structure VSVn, resulting in the possibility that utterance-final verbal nouns (equivalent to the infinitive in English) are more frequent in child-directed speech as it is focused on the here and now (Cameron-Faulkner & Hickey, 2008). Moreover, this recent study on early language acquisition of Irish found that children's early multiword speech is lexically based and directly related to the frequency of lexically based patterns in the speech of their caregivers.

The importance of utterance-final position has been demonstrated in crosslinguistic studies of child directed speech, which suggest that word classes appearing in utterance-final position in parental input make up a larger part of the children's productive vocabularies than other word classes. This was the reason to explain why nouns are more predominant in Italian children, despite previous findings that parental input is more verb-oriented than in English (Camaioni & Longobardi, 2001). Italian parents tend to use more verbs in initial and more nouns in utterance final position (Bornstein et al., 2004), which might cause the dominance of nouns in acquisition. English-speaking parents also use more nouns in utterance-final position, whereas in Mandarin and Korean, mothers tend to use more verbs in utterance final positions, resulting in the relative verb advantage seen in these children (Au et al., 1994; Kim et al., 2000). The current version of the ICDI listed the imperative form of the verb as the base form and the observation above suggests that it might in fact be the verbal noun which is heard and thus used more frequently by children. Perhaps if the verbs were listed in their 'verbal noun' format it might have aided recognition from the parents, although this would need to be confirmed by observing the spontaneous language data and experimental data. In fact, revision of the ICDI is likely to see verbs presented in their verbal noun (progressive) format. It would also be worth investigating if the 'closed class' advantage, as noted for Irish, can be traced to the adult input, given the general rule whereby pronouns and prepositional pronouns are moved to

the end of a sentence in Irish (Doyle, 2000; Ó' Siadhail, 1989). There is some indication that this may be the case, as (Stenson, 1997) noted that although Irish and English idiomatic phrases may show semantic similarities as previously described, they differ syntactically, with Irish preferring to put the preposition or prepositional pronouns at the end of the clause.

7.2.4 Frequency

Other researchers including Tardif et al. (1997) and Bornstein et al. (2004) suggest factors outside of the linguistic structure of the target language that need to be considered to explain crosslinguistic differences in vocabulary acquisition. These include frequency in the input language as measured by types (number of different nouns/verbs) and tokens (the total number of nouns/verbs) of parts of speech that occur in the target language. Although the effect of frequency is not simply linear, there appears to be a general theoretical consensus on the positive effect of frequency in that the greater the frequency with which a word is produced in speech directed to children, the earlier it will be learned (Goodman et al., 2008). For instance, Naigles and Hoff-Ginsberg (1998) report that total frequency, frequency of occurrence in utterance-final position and occurrence in a greater range of syntactic frames all contribute to the order of acquisition of verbs. This is an important finding as although highly frequent words (i.e., closed class items) are not learned earlier over other vocabulary categories, within particular categories, the more frequently the word is heard, the earlier it is acquired in expressive vocabularies (Goodman, Dale , & Li, 2008).

Most crosslinguistic studies have reported a noun bias in frequency of words directed at young children (Tardif et al., 1997), with the result being that children hearing these languages learn nouns earlier. However, studies of Korean have found more verbs in the adult input language, which consequently resulted in more verbs in the children's lexicon relative to English-speakers (Gopnik & Choi, 1995; Goldfield, 2000; Kim et al., 2000). It is as yet unclear as to whether Irish-speaking children hear more nouns or verbs, although it is possible that they hear more noun types (as in English) due to the previous

argument that Irish tends to make more use of a limited number of general all-purpose verbs and the overall 'verb poverty' of Irish. The only previous study to mention adult input in Irish noted that the mothers tended to emphasise the names, whereabouts and ownership of objects and accounted for the preponderance of interrogatives, possessors and directives from the children (McKenna & Wall, 1986).

Although Tardif et al. (1997) suggest that the effects of adult-input are likely to be complex and different for children learning different languages or at different stages of vocabulary learning, input frequency could explain why we did not see the verb bias on one hand, and a relative advantage of closed class items on the other hand. Dale and Goodman (2005) describe how closed-class items are very frequent in the input and because they constitute a smaller set than nouns and are characterised by greater syntactic and semantic heterogeneity, this may help children acquire them. Moreover, Doyle (2000, 2002) holds that the grammatical category of prepositional pronouns plays a central role in Irish, almost as central as that of the verb, and their morphology is remarkably similar to that of verbs in other languages as they are, in effect, inflected prepositions. Given the importance of these grammatical function words, they are likely to be heard as often, if not more frequently than verbs in the input, although this awaits confirmation from further analysis of the input.

7.2.5 Pragmatics

Other accounts of how children learn language focus on the role of parent-child interaction. These include social-pragmatic theories and the emergentist theory, which characterises lexical acquisition as the emergent product of cognitive constraints, social-pragmatic factors and global attentional mechanisms (Hollich, Hirsh-Pasek & Golinkoff, 2000). The role of pragmatics has also been linked to the timing and sequence of the emergence of word classes across languages. For example, English-speaking parents have been observed to focus on eliciting nouns in the 'naming game' and 'test questioning' associated with their culture (Tomasello, 1992) while Japanese-speaking mothers focus on kinship (Fernald & Morikawa, 1993) and Korean parents are more focused on eliciting

actions from their children (Choi, 2000). It is quite likely that the 'naming game' is a feature of western culture, which would also account for the predominance of nouns observed in Irish. Moreover, the argument for a verb advantage in Irish as outlined in Chapter 1 was linked to the pragmatic function of yes/no questions, where the verb of the question must be 'echoed' in the answer- either positively or negatively. The use of 'yea' and 'neó' was noted in the spontaneous data of the current study, and although 'yea' was not listed on the vocabulary checklist (because of phonological proximity to 'sea' /ʃa/ *it-is*), neó was one of the top 100 most frequently reported words for this age group (see Appendix 11). Due to the close contact with English, the loan words 'yea' and 'no' (naturalised to Irish phonology as neó /nʲoː) have infiltrated the language, and are more likely to be used by young children as a response to a yes/no question, further diluting the role of the verb in the language. According to Owens (1992), in reality, both the Irish and English systems of yes/no question response are used in the language.

In explaining the predominant finding of a lack of verb bias crosslinguistically, Tomasello attributes it to the fact that verb learning occurs in much more diverse context than nouns, and so it "seems to demand from children some fairly sophisticated abilities to understand a very wide array of social-pragmatic cues for determining adults' semantic intentions" (Tomasello, 1995; 121). In other words, children learn words more readily in situations in which it is easiest to read the adult communicative intentions. Finally, early situations for word learning occur when parents label their children's basic intentions such as hunger/thirst, likes/dislikes. In Irish, these intentions are expressed primarily using a noun and utterance-final prepositional pronouns (e.g. *hungry* 'ocras orm' *lit-hunger on-me*; *thirsty* 'tart orm' *lit- thirst on-me*; *liking* 'is maith liom' lit- *be good with-me*; *loving*, 'is breá/áille liom *lit-fine/wonderful with-me*; *hating* 'is fuath liom' lit- *be hate with-me*). Prepositional pronouns are also used for aspects such as ownership ('is liomsa é' *lit- be with-me(emphatic) it*). Therefore, these pragmatic intentions could be argued to be fairly transparent for the children to attend to from the adult input and important and motivating for children to be able to produce early on, and so may lead to an early use of prepositional pronouns and explain the relative advantage of closed class items in Irish.

7.2.6 Methodological Artifacts

A final reason for the lack of verb bias found in the data must be linked to the methodology. Due to the conflicting findings in the relative emergence of word types found across and sometimes within the same language (such as the conflicting reports for Korean reported by Au et al., 1994; Gopnik & Choi, 1995) the 'grammar advantage' observed in Irish at this stage remains tentative and would need to be confirmed from observational data in spontaneous language. Pine, Lieven and Rowland (1996) argue that there may be systematic quantitative differences between parental checklist, diary and direct observation measures of vocabulary which may be responsible for some of the conflicting findings reported in the literature. Some researchers have argued that parental report measures may themselves incorporate a noun bias by sampling more exhaustively across the range of nouns in children's vocabulary than studies based on other methods (Gopnik & Choi, 1995). For example, one study noted that mothers checked more of the nouns and fewer of the verbs that their children produced when checklist and observational measures were compared, and a greater proportion of routine phrases have been noted via observational measures which are not possible to assess via parental checklist (Tardif, Geltman, & Xu, 1999). On the other hand, it is argued that checklists such as the CDI assess all aspects of vocabulary development and control the sample from which parents are able to report vocabulary items, thereby eliminating maternal reporting biases (Fenson et al., 1994). As both methods yield complementary but different information, they should ideally be combined to explain variations in language acquisition. Although such analysis was beyond the scope of the current study, Hickey (1993) noted the frequent use of formulas in early Irish acquisition and so further investigation into the features of spontaneous child language in Irish should be investigated.

To summarise, Goodman et al. (2008) hold that many factors will ultimately affect order of acquisition or word classes, and include the role of semantics, syntactic complexity, informational load, use in joint attention context and ease of perception of the word referent. Irish speaking children do not learn verbs as easily as predicted as they are morphophonologically complex (at least for past tense); occur in utterance-initial as

opposed to the more salient utterance-final position; are often dropped in utterance-initial position, with the resultant final position being taken up by a word which has both verb and noun features 'the verbal noun', and as they are semantically and pragmatically 'light'. It is worth investigating whether Irish-speaking mothers use more nouns/verbs and/or grammatical function words in the input and whether they emphasise object naming in social interactions, as has been found in other western cultures to confirm the stylistic variations found on the checklists. Although this finding awaits confirmation from further research, possible reasons for the relative advantage of grammatical function words can be linked to the fact that they generally occur in the more salient utterance-final position, are semantically and pragmatically central to the language and therefore quite likely to be frequent in the adult-input. Just as Tardif (2006) described Mandarin as being 'verb friendly', as verbs are highlighted in input frequency, morphologically transparent and highly specified in pragmatic emphasis on 'doing' games, Irish could similarly claim to be a 'preposition friendly' language.

7.3 Item analysis of vocabulary targets

In line with the individual item analysis by Fenson et al. (1994), frequency data for all 843 vocabulary items were analysed into two developmental-difficulty indices. The first involved the mean proportion of all children aged 16-40 months for whom parents responded with an affirmative answer, and the second was the earliest age at which children were reported to say a particular word. It was essential to carry out this analysis on the Irish data, not least as the results would be useful for developing stimulus material for experimental studies and clinical use, but also in order to establish which items could be removed from the list for the final version of the ICDI as it was considered too long in its current format. Other adaptations of the CDI, including Hebrew (Maital et al., 2000) and Turkish (Acarlar et al., 2008), carried out similar revisions of their vocabulary checklists, ensuring that words varied by age of acquisition and showed developmental trend (Fenson et al., 2000). This process entails removing some extremely low frequency words while maintaining certain types such as question words, which although low in frequency and

later acquired, capture individual differences and eliminate ceiling effects for those at the upper range of vocabulary achievement. In addition, early appearing words were included to eliminate floor effects at the lower end for low-scoring and very young children. In the final revision of the checklist, every effort was made to maintain the balance between semantic categories, as in the original CDI.

An added complication to the current data set however was that vocabulary frequency and age of acquisition data was obtained not only for Irish words but also for the English and bilingual equivalents. As there were insufficient data points for each monthly age to establish reliable age-of-acquisition data, it was decided to break the children into six, four-monthly (approximately) age groups, which are contained in Table 7.1 below. This did result in an uneven balance of males to females in certain age groups (e.g., 16-20 months and 37-40 months) and although chi-square analysis indicated that this difference was not significant (χ^2 (5, 49)= 4.53, ns) this should be taken into account in the interpretation of the results.

Table 7:1 Breakdown of groups for establishing age-of-acquisition

Age Group	**No of observations**	**No of Females**	**No of Males**
16-20 months	9	6	3
21-24 months	10	4	6
25-28 months	7	5	2
29-32 months	5	3	2
33-36 months	11	7	4
37-40 months	7	2	5

The criterion for deciding whether a vocabulary item has been acquired was in line with the Turkish CDI by Acarlar et al. (2008), who used the criterion of an item being produced by 40% of children in an age group. The usual criterion of an item being produced by 50% of the sample was not used in the current study due to the small number of participants involved and the bilingual measure of vocabulary acquisition. The frequency data for all 843 lexical items is contained in Appendix 11 and only the most salient outcomes will be reproduced here. As will be outlined in the final chapter, items

were omitted if they had very low frequency (i.e., used by 10% or less of the entire group), which resulted in approximately 100 items being removed, mostly involving nouns. Another criterion was to remove late appearing lexical items (acquired after 37 months) and finally, item-whole correlations were used to choose between late appearing words (in line with Maital et al., 2000). Using the CLEX database, it was then possible to compare acquisition of equivalent lexical items across languages.

7.3.1 Crosslinguistic acquisition of lexical items

Cultural and language-specific variation is to be expected when comparing words learned across other language adaptations, as although words mean the same things across languages and are similar in frequency, interest and conceptual difficulty for children, due to relative phonetic difficulty they tend to emerge at different times (Bleses et al., 2008; Caselli et al., 2001). Crosslinguistic studies have described the top 20 words for children who had between one and ten words in English, Mandarin and Cantonese (Tardif et al., in press) and are contained in Table 7.2 below. Comparing across the top 20 words used in Irish from both frequency and age-of-acquisition data (acquired by 16-20 months), three are common across all languages and involving social words 'Daddy', 'Mommy', and 'uh-oh'. In line with the English data, 'baa baa', 'banana', 'ouch', 'vroom', 'yumyum' and 'no' were also acquired early by the Irish speaking children, although the kinship terms for the two Chinese languages were more frequent. In addition, English-speaking children had more nouns that verbs, Mandarin-speaking children had more verbs than nouns and Cantonese-speaking children had roughly equal numbers of nouns and verbs. The Irish-speaking children also had more nouns than verbs based on the frequency data, but like the English-speaking children, had a high number of 'sound effects/animal sounds' in their early words. Finally, names for 'food' items and 'animals' appeared early in vocabulary of the Irish children.

Table 7:2 Top 20 Words* for Children who "Can Say" 1 to 10 words on CDI and Percent of Children producing them, by Language

United States	**Hong Kong**	**Beijing**	**Irish (Frequency)**	**Irish (Age Of Acquisition)**
1. Daddy	Daddy	Mommy	1. Daddy (95.8)	Daddy (89)
2. Mommy	Aah	Daddy	2. Mommy (95.8)	Mommy (89)
3. BaaBaa	Mommy	grandma-paternal	3. milk (91.8)	uhoh (78)
4. bye	yumyum	grandpa-paternal	4. banana (89.9)	vroom (78)
5. hi	sister-older	hello?	5. shush (89.6)	ahah (67)
6. uhoh	uhoh	hit	6. nose (87.5)	baa baa (67)
7. grr	hit	uncle-paternal	7.cow (85.7)	yumyum (67)
8. bottle	hello?	grab/grasp	8.teddy (85.7)	granny (57)
9. yumyum	mild	auntie-maternal	9.shoes (85.4)	milk (56)
10. dog	naughty	bye	10. cat (85.7)	banana (56)
11. no	brother-older	uhoh	11. baa baa (84.7)	moo (56
12. woof woof	grandma-maternal	ya/wow	12. apple (83.7)	meow (56
13. vroom	grandma paternal	sister-older	13. hand (83.3)	cow (56)
14. kitty	bye	woofwoof	14. hot (83.7)	teddy (56)
15. ball	bread	brother-older	15. meow (83.7)	hot (56)
16. baby	auntie-maternal	hug/hold	16. moo (83.7)	tata (56)
17. duck	ball	light	17. drink (82)	shush (56)
18. cat	grandpa-paternal	grandma-maternal	18. sheep (81.6)	ouch (44)
19. ouch	car	egg	19. horse (81.6)	horse (44)
20. banana	woofwoof	vroom	20. bird (81.6)	cat (44)
				hen (44)
				apple (44)
				shoes (44)
				leg (44)
				fork (44)
				spoon (44)
				no (44)

** Items have been translated to their English equivalents*

Another interesting observation from the data above is the phonological structure of the early-acquired items in Irish. In terms of phonology, Dale and Goodman (2005) point out that words beginning with /b/ make up 10% of the entire CDI list and 24% of the first 100 words reported. Looking at the Top 100 most frequently reported words in Irish it is also evident that words beginning with /b/ make up a significant proportion (14%) of the words, although velars were just as likely (13%) to be in word initial position of the most frequent words. This pattern was in line with the findings of the early phonological skills of Irish-speaking children noted by Brennan (2004), with an early emergence of velars,

plosives and fricatives in comparison to English. However, it should also be noted that the length of the words, difficulty of the initial consonant and complexity of the first stressed syllable (in that unstressed syllables are often deleted by children) also affect rate of acquisition (Dale & Goodman, 2005). Further analysis of the data in a later study may reveal further information of the phonotactic structure of early-acquired words in Irish.

When the overall vocabulary categories were analysed in terms of those earliest acquired (i.e., by 40% of children aged 16-20 month olds), 'sound effects and animal sounds' were the most frequent (with 8 items) followed by 'animals' (4); 'people', 'games, routines and phrases' and 'food' (3 each) 'clothes' and 'furniture and rooms' (2 each) and finally 'toys' (1 item). This was generally in line with the earliest vocabulary categories acquired in English (Fenson et al., 2004). The findings from the Irish data will now be briefly compared to those found in previous studies of Irish language acquisition and across other languages, based on the four major categories previously outlined (i.e. that of common nouns, social words, predicates and closed class items).

7.3.2 Common Nouns

Kern (2007) describes how no matter what language is being acquired, objects used every day by the child, animal names, food, drink and toys are very frequent semantic categories and generally come after social words in terms of age of acquisition. As described above, these categories were also the most frequent in the Irish-speaking children. Looking at the number of words selected in English, it was also common nouns that had the highest number of any word type, which is not surprising and confirms that nouns are most susceptible to infiltration from the majority language (Stenson, 1993). An analysis of all the lexical items which were more frequent (or as frequent) in English than Irish is contained in Table 7.3 later in the chapter.

7.3.3 Social Words

As previously discussed, 'sound effects and animal sounds' were the earliest acquired category overall, although 'people' and 'games, routines and phrases' were also early-emerging. In terms of names for people, as well as the earliest emerging 'mamaí', 'daidí', and 'mamó' *granny* (all acquired by 16-20 months), highly frequent names for people included the child's own name, the name of the child-minder and family pet. It was interesting to note that the child's own name emerged relatively early (by 21 months) and spontaneous samples and parental interview revealed that the children were inclined to use personal names before they acquired pronominal forms for self (and others). This was also noted in the language samples from the three children studied by Hickey (1990a) who attributed it to the fact that first (and second) person pronouns are morphologically and syntactically more complex than in English. Thus in the input, children generally hear the verb form inflected for person (e.g. 'chuas' *I went* or 'théidís' *they-used-to-go*) and so are not exposed to individual pronominal forms as often as children acquiring English.

With regards to 'games, routines and phrases', 'shush' 'ta ta' and 'neó' (a loan words adapted phonologically from 'neó') were the earliest acquired. Hickey (1990b) noted that 'neó' is also used in the input language by adults (although generally followed by the Irish negation of the verb), but can be used in isolation as an early negative by children. Spontaneous samples also indicated that 'yea' was a frequent loan word and used as a general response to questions (before the verb which is the answer required for yes/no in Irish). However, this was not included in the pilot version of the checklist and so may be added in future versions. Previous researchers have noted a difficulty with yes/no questions early in Irish acquisition, and so the children may be using the yes/no loan words from English as an early strategy to overcome this (McKenna & Wall, 1986; Nic Fhionnlaoich, 1984). Other highly-frequent words in this category included 'slán' *bye*, 'dinnéar' *dinner*, '(go raibh) maith agat' *thanks*, 'lón' *lunch*, 'oíche mhaith' *goodnight* and 'póigín' *kiss* (diminutive).

7.3.4 Predicates

The most frequently reported verb was 'suigh' *sit*, which was generally acquired in the formulaic phrase 'suigh síos' *sit down*. The next most frequently acquired was 'ól' *drink*, followed by 'póg' *kiss*, 'oscail' *open*, 'dún' *close*, 'ith' *eat* and then 'siúl' *walk*. When age-of-acquisition data was included, additional verbs to those previously mentioned that were early-acquired (all reported between 21 and 24 months) included '(ag) bualadh bos' *clap(ping) hands*, 'dúisigh' *to wake*, 'féach' *to look*, 'léim' *to jump*, 'stop' *to stop* and 'tit' *fall*. These were largely in line with a study of early lexical verb use by Ó' Donnchadha (1992), who also noted that 'ith' and 'féach' were common. These verbs were also largely in line with early verbs noted in children acquiring English (e.g., *eat, open, fall*) although '*go, play* and *tickle*' were not noted in the Irish data (Naigles & Hoff-Ginsberg, 1998). Previous studies of Irish acquisition have observed that 'dún' *close* was also produced early as well as the auxiliary verb 'tá' *to be* (as assessed under 'helping verbs' in the ICDI but also found to be acquired by 21-24 months) and '(ná) déin' *don't* and 'tabhair' *give* were other early Irish-verbs (Hickey, 1992), although not reported until 25-28 months in the current study. It was interesting to note that the previously mentioned 'all-purpose' verbs like 'déin' *do* and 'cuir' *put* which are important in verb-idioms did not emerge early, but this may be because young children's earliest linguistic productions revolve around concrete items and structures, in particular verbs such as *push*, *pull*, *cut* and *draw* (Tomasello, 2000).

With regard to adjectives, the earliest acquired and most frequently reported was 'te' *hot*, followed by 'beag' *small*, 'bocht' *poor*, 'buí' *yellow*, 'briste' *broken*, 'dána' *bold*, 'deas' *nice*, 'fliuch' *wet*, 'fuar' *cold*, 'imithe' *gone*, 'maith' *good*, 'mór' *big*, 'salach' *dirty* and 'tinn/breoite' *sick* (all acquired by 21-24 months). Hickey (1992) also found that the adjectives 'te' and 'deas' were earliest acquired at the single word stage, followed by verbal adjectives 'imithe' *gone*, 'briste' *broken,* and 'déanta' *finished* at the two-word stage to refer to an event just completed. These findings also follow the crosslinguistic literature as the earliest acquired adjectives in English based on naturalistic data, which included *big, little, red, good, broken, cold, pretty* and *poor* (Akoyunoglou- Blackwell,

2005), and CDI data which had *hot* as the earliest acquired adjective (at 16 months) followed by *all gone, cold* and *good* (Dale & Fenson, 1996).

7.3.5 Grammatical Function Words

In terms of overall categories, the earliest acquired grammatical categories in the Irish data (based on items reported at 21-24 months) were quantifiers and articles, followed by auxiliary verbs, prepositions and pronouns. A naturalistic study of French-speaking children found that pronouns and adverbs developed earliest, followed by determiners, whereas prepositions, conjunctions and auxiliaries were less frequent. This was attributed to the rich morphological marking and function of noun determiners and pronouns in the French which favoured their development (Bassano, Eme, & Champaud, 2005). This could also be linked to the Irish data which has rich auxiliaries (e.g., two forms of the verb *to be*), prepositions and pronouns, as previously described. Two studies based on CDI data from the Italian and English checklists (Caselli et al., 1999; 2001) found a high degree of similarity in the order of acquisition of function words, despite the differences in content across the two lists, such as the multiple reflexive and clitic pronouns in Italian. They noted that the pronominal determiner 'mine!' is the first item in the pronoun class in both languages and 'more' is the first quantifier, which might reflect social and material concerns of one-year-olds. As previously discussed, the pronominal system of Irish is more complex, with 'mine!' being expressed by a variety of pronouns and prepositional pronouns, and so develops later than pronouns in other languages, although it did emerge that the emphatic pronoun 'mise' *me* was the earliest to develop (at 21-24 months). With regard to quantifiers and articles, the lexical item corresponding to *more* ('breis/ tuilleadh') was not found to emerge early, as was also noted by McKenna and Wall (1986) and attributed to the linguistic complexity of these forms in Irish. However, 'eile' *another* and 'arís' *again* were early emerging and reflect similar semantic intentions to *more.* Emergence of the key individual closed class items as measured by the ICDI will now be analysed.

Hickey (1992) describes how there is a prediction of how pronouns should emerge universally from semantic analysis from first person singular, to second person singular to third person singular, with plurals emerging later (see also Caselli et al., 1999; 2001; Jackson-Maldonado et al., 1993). This was linked this to the child's egocentric world view and natural conceptual progression for the self outward (Chiat, 1986). In English, *I* precedes *you* and *it*, while *he* and *she* emerge last. The order of acquisition of Irish pronouns based on age of acquisition data was 'mise' *me-emphatic*, (at 21-24 months) followed by 'mo' *my*, 'sé' *he(subj)* and 'tusa' *you-emphatic*, then 'é' *he(obj)*, 'sí' *she*, and 'seo' *this* (at 25-28 months). The early acquisition of 1st person pronouns was also found in Irish by Hickey (1992), as well as the early emergence of 3rd person masculine pronouns 'sé' (subject) and 'é' (object), which she attributed to the fact that they are less variable in form and have a wider range of use when gender distinction is ignored. It was interesting to note that overall, 'é' had a low frequency count, but was acquired early due to its high perceptual salience. This is similar to the acquisition of the Italian first person pronoun 'io' which has a low frequency, because of pronoun omission, but was acquired early. Caselli et al. (1999) therefore concluded that this demonstrates that saliency rather than frequency may be more important in the first stages of grammatical development and accounts for the highly salient Irish pronouns 'mise' *me-emphatic* and 'tusa' *you-emphatic* emerging early. Previous research has also noted that prepositional pronouns (and feminine 3rd person subject pronoun 'sí') emerge later than other singular pronouns (Hickey, 1992), although prepositional pronouns despite their complexity were relatively early in the children's language, most likely due to their conceptual saliency. Moreover, the current data found that the following prepositional pronouns 'agam' *at-me*, 'agat' *at-you*, 'dom' *to-me*, 'duit' *to-you*, 'liom' *with-me*, 'orm' *on-me* and 'ort' *on-you*, also emerged relatively early at 25-28 months.

As previously mentioned, the Irish-speaking children were noted to use their own name more frequently than pronouns (40% were reported to use their name by 18 months and 70% by two years, compared with only 30% using the pronoun 'mise' *me-emphatic* at 18 months and just over 50% at 24 months). This is unlike the results found in English,

where children didn't acquire the proper name for self until the early multiword period (Smiley & Huttenlocher, 1995). By 30 months, however all children had acquired the first-person pronoun 'mise' along with other pronouns for self, such as 'mo' *my*. It should be noted however that a relative delay in pronoun acquisition in comparison to proper names could be linked to the fact that in the Munster dialect, pronouns are more often produced in synthetic forms with the verb (e.g., 'téim' *I go*) as opposed to a separate word and so may not have been captured on vocabulary form. Finally, gender marking on pronouns was also problematic for some children in the current study (Owens, 1985), with one mother noting that the child confused the prepositional pronoun 'aici' *at-her* for 'aige' *at-him*.

Irish question words emerged in the order of *what, why, where, who, how, when* and *which* (not being reported to be acquired by 40 months). This is slightly different to the findings of McKenna and Wall (1986) and Nic Fhionnlaoich (1984) who noted that *where* and *what* developed before *why*, *when* and *how* (why developed earlier in the current study). Overall, this was in line with the English and Italian literature overall (Caselli et al., 1999; 2001), although in both languages, '*which'* was also acquired by 30 months. It is unclear why *which* 'cé acu (ciacu)' was late to emerge, but may be related to the fact that phonologically, it is produced as /kʲukə/ which when written orthographically (as two words), was not easily recognisable by the parents. This was also noted for the west-Kerry word for *why* 'cad ina thaobh' which is phonologically realised in a very different way to its orthographic form (/kɑnəhev/). Overall, Mac Mathúna (1979) noted that C-questions were not likely to cause particular problems in Irish, unlike the yes/no question format which involve a pre-verbal particle, and have high morphosyntactic complexity as discussed in the introduction. However, yes/no questions were not assessed on the ICDI.

It has been argued that prepositions and location have been argued to show a number of universal parallels in their order of acquisition, both from free speech and experimental studies (Slobin, 1985). These have been argued to reflect logical universal cognitive constraints so that locatives that express complex spatial relations like *'in front of*' and '*behind'* emerge later than locatives that encode simpler relations like '*in'* and '*on'*.

Studies of English and Italian have noted that words that express direction or location of a single element (e.g., *down, up, off, out, here* and *there*) emerge first, followed by locatives (*on, inside, under, over*), which mark a simple relationship of one entity to its base. Prepositions that are acquired last are those that express a relationship between two entities and/or a relationship that requires assumptions about the orientation of the array relative to the speaker and listener (*next to, beside, behind*). The order of acquisition of preposition and locations in Irish was similar and included 'amach' *outward*, 'isteach' *inward*, 'anseo' *here*, 'síos' *downward*, 'suas' *upward* followed by 'ag' *at*, 'ansin' *there*, 'i' *in*, and 'timpeall' *around* (all acquired before 28 months). The latest to emerge were 'thiar' *behind/westward*, 'aníos' *up-from-below*, 'chun' *to*, 'ós (cionn)' *above*, 'thar/thall' *over(there)* and 'thart' *over* (generally not acquire until 36 months). Although Hickey (1992) noted that 'ar' *on* and 'sa' *in* appeared before 'faoi' *under* and 'in aice' *beside*, in the current study, children were reported to produce 'faoi' *under* earlier than the other prepositions. However, 'os cionn' *above* and 'taobh thiar' *behind*, which are conceptually more complex, were not found to emerge until 3 years or later in both studies.

The category of quantifiers and articles, as previously mentioned, had two early-emerging quantifiers, 'eile' *another* and 'arís' *again*. This was in contrast to the lack of recurrence used in the spontaneous data of Irish-speaking children by McKenna and Wall (1986) which could be linked to the different data-collection methods used. The next items acquired in terms of age were 'faic' *nothing,* 'píosa' *piece/some, '*aon/amháin' *one,* and 'gach' *all.* The English data showed that quantifiers *too, some*, and *all* were among the first to develop which is largely in line with the data above (Dale & Fenson, 1996). With regard to auxiliary verbs, the present habitual form of the verb 'tá' *to be* was the first to be acquired, followed by the negative form níl *is-not*, the past tense form 'bhí' *was,* future tense 'beidh' *will-be,* 'raibh' (*dependent)* and the copular form of the verb 'is' in 'sea' *(it)is.* This order was exactly as found in the spontaneous data of Irish children as reported by Hickey, (1992).

Finally, the earliest connecting word was ‘agus’ *and*, followed by ‘ansin’ *then* with all others emerging at the same time (at 29-32 months). Much like that found in English, *and* precedes *because*, although the opposite pattern has been reported in Italian (Caselli et al., 1999).

7.3.6 Bilingual Vocabulary Acquisition

Previous analysis revealed that the Irish-speaking children acquired vocabulary in line with monolingual and other bilingual children and were more likely to use English common nouns over any other vocabulary category. Item analysis of the words only known in English (either based on frequency or age of acquisition data) or those equally likely to be used in Irish or English are contained in Tables 7.3 and 7.4 below.

Table 7:3 Vocabulary items most likely used in English

Item	% Freq	AOA (months)	Irish Equivalent	% Freq	AOA (months)
1. chips	60.2	21-24	sceallóga	22.4	33-36
2. tractor	46.9	21-24	tarracóir	53.1	25-28
3. swing	42.8	29-32	luascán	38.8	25-28
4. pyjamas	40.8	25-28	pitseámaí/culaith leapa	42.8	33-36
5. ham	40.8	29-32	liamhás/más	24.5	29-32
6. jigsaw	38.8	25-28	mír méaraí	32.7	29-32
7. slide	38.8	25-28	sleamhnán	28.6	33-36
8. sweets	36.7	21-24	milseáin	53.1	25-28
9. grapes	36.7	29-32	caora fíniúna	32.3	29-32
10. party	33.3	33-36	cóisir	29.2	33-36
11. lollypop	32.7	29-32	líreacán	8.2	x
12. vacuum cleaner	31.3	29-32	folús ghlantóir	6.3	x
13. motorbike	31.7	29-32	gluaisrothar	32.7	33-36
14. bubbles	30.6	25-28	bolgáin/boilgeoga	14.3	37-40
15. digger	30.6	37-40	tochaltóir/bainteoir	16.3	37-40
16. spaghetti	28.6	25-28	spaigití	44.9	29-32
17. corn flakes	28.6	29-32	calóga arbhair	14.3	37-40
18. giraffe	28.6	29-32	sioráf	38.8	33-36
19. video (DVD)	26.5	29-32	fístéip (DVD)	28.6	33-36
20. hug	25	29-32	barróg	22.9	29-32
21. nappy	25	29-32	clúidín	8.3	x
22. tights	22.9	29-32	riteoga	22.9	x
23. tap	22.9	33-36	sconna	18.8	33-36
24. jelly	22.4	37-40	glóthach	8.2	x
25. vest	20.8	25-28	veist/foléine	43.8	29-32
26. videorecorder	20.8	29-32	fístaifeadán	10.4	x
27. chicken nuggets	20.4	29-32	cnaipí sicín	4.1	x
28. zebra	20.4	29-32	séabra	22.4	33-36
29. playdoh	20.4	33-35	taos súgartha	22.4	37-40
30. camera	18.8	25-28	ceamara	41.7	29-32
31. medicine	18.8	29-32	leigheas	27.1	33.36
32. tissue	18.8	29-32	fíochán/ciarsúr páipéir	20.8	33-36
33. icepop	16.3	37-40	reoiteog	12.2	37-40
34. chewing gum	14.3	37-40	guma coganta	4.1	x
35. corn	10.2	37-40	arbhar	6.1	x
36. coke	12.2	29-32	cóc	26.5	33-36

Table 7:4 Vocabulary items equally likely in English and/or Irish

Item	% Freq	AOA (months)	Irish Equivalent	% Freq	AOA (months)
1. dolly	40.8	21-24	bábóg	40.8	16-20
2. toast	38.8	29-32	tósta	40.8	29-32
3. bye	29.2	21-24	slán	79.2	21-24
4. shower	29.2	29-32	cith	35.4	29-32
5. couch	27.1	29-32	tolg	29.2	29-32
6. mobile phone	27.1	29-32	fón-póca	29.2	29.32
7. tiger	26.5	25-28	tíogar	61.2	25-28
8. shampoo	25	25-28	seampú	37.5	25-28
9. helicopter	24.5	25-28	héileacaptar	55.1	25-28
10. disgusting (yuck)	24.5	29-32	uafásach (yuck)	36.7	29-32
11. runners	20.8	33-36	bróga reatha	22.9	33-36
12. washing machine	20.8	33.36	meaisín níocháin	29.2	33-36
13. truck	20.4	37-40	trucail	22.4	37-40
14. crayon	20.4	33-36	crián	40.8	33.36
15. clown	14.6	33-36	fear grinn	27.1	33-36
16. fire engine	14.3	37-40	inneall dóiteáin	18.4	37-40

Hickey (2002) noted that examining the English development of children who have Irish as a first language offers an insight into the process of change within a minority language. As can be seen in the table above, most of the lexical items that were more or just as likely in English were nouns either from the 'vehicle', 'food' or 'small household' categories, which is in line with previous studies (Hickey, 2002). The process of assimilation of English loanwords into the Irish language was reported as early as 1928 by Sjoestedt-Jonval (1928) (as cited by Stenson, 1993). This study also showed that lexical loans fall into a number of clearly delineated semantic categories, and similar to the current study, were mostly related to modern household items, urban trades, clothing and abstract nouns and interjections imported to the rural Gaeltacht setting, whereas vocabulary pertaining to traditional rural life (nature, daily life, emotional life etc.) remained unaffected in this period.

It was also interesting to note that some loans have undergone phonological assimilation to Irish sound patterns, although they coexist with English words borrowed without phonological assimilation (Dale & Fenson, 1996). These include the words for

exotic animals such as *giraffe, zebra, tiger*, as well as food items *toast, coke* and *spaghetti*. Thus when a parent selected the English *giraffe* instead of the Irish counterpart, 'sioráf' it may have been because they are no longer using the phonologically assimilated forms. However (Ó' Baoill, 1987) argues that these type of loans show total disregard for the basic tenets of linguistic borrowing in a bilingual community, and cites 'spaigití' *spaghetti* as a word which should be spelled so as to adhere to general English pronunciation as opposed to forcing an Irish spelling on it. Sjoestedt-Jonval (1928) noted a tendency to accept non-native Irish sounds such as English affricates in loanwords at the beginning of the century (see Stenson, 1993), a phenomenon which was evident above in the more frequent reporting of *jelly, chips, chewing gum* and *chicken nuggets* over their Irish counterparts, as well the loan words *JCB* and *jeep*. Moreover, some of the Irish translations for English words involved two-word phrases or single words with more syllables than their English counterparts (e.g. míreanna méaraí for *jigsaw*) and so were more likely acquired first in English. Although borrowings and code switches as outlined above might be rejected by language purists, it is clear from these findings that most native speakers accept and use them, and this highlights some of the language change that has occurred in Irish over recent years. Overall, the outcome is in line with previous research of bilingual first language acquisition learners who exhibit the same basic milestones in language development at approximately the same age as monolingual children (Genesee, 2006).

7.4 Summary and Conclusions

"Valid conclusions concerning universal versus language specific patterns in early lexical development require careful construction of parallel measures and the use of culturally adapted similar procedures across multiple languages or cultures" (Bornstein et al., 2004; 1130). The CDI allows for more straightforward crosslinguistic comparative research, and revealed that overall, children learning different languages do talk about similar topics and the content of their early lexical acquisition often looks remarkably similar (Bowerman, 1994). In the current study, this revealed that words for people and nouns were the most common words first used by the Irish-speaking children, and was overall in line with the crosslinguistic literature. However, more fine-grained analysis

reveals that their early lexicons are shaped in accordance with language-specific principles of lexical and syntactic structuring in the input language, which for Irish, revealed a relative advantage in the acquisition of grammatical function words. Although the hypothesised verb bias was not noted in this study, there are various linguistic and extralinguistic features that might have led to this as discussed above. The next task was to investigate the acquisition of morphosyntax in Irish as revealed by the ICDI, in the context of crosslinguistic research.

8 Grammatical Development

This chapter focuses on the acquisition of grammar, and morphosyntax in particular, as captured by the ICDI. As described in the adaptation of the MCDI (Chapter 2), although aspects of morphosyntax thought to be universal in language acquisition were included in the ICDI (such as over-regularisation on nouns and verbs) this section was significantly adapted in order to capture the grammatical profile of Irish, including the acquisition of initial mutations and the verb-fronting word order. Where relevant, results from the elicitation task for salient morphological markers developed in conjunction with the ICDI (plurals, progressive and past tense morphemes) will be presented, to support and expand on the parental report measures. Similar to the previous chapters on vocabulary acquisition, this chapter will first describe the general developmental profile of grammatical development captured by the ICDI, and the various predictors of the same. The main findings will then be compared to the literature on morphosyntactic acquisition across other languages. This was carried out in order to determine whether there were any common conceptual starting points for grammar and to explore how children construct their morphosyntactic systems across various languages (Slobin, 1985). Finally, grammatical development over time, as captured by the longitudinal data and analysed using growth curve modelling for the group, will then be explored, as well as the individual profiles captured by the same.

Table 8.1 below outlines the overall results for all aspects of grammatical development covered by the ICDI for the four main age groups (18, 24, 30 and 36-month olds). The third column indicates the total percentage of the possible targets presented in the ICDI that the children were using at the particular age groups.

Table 8:1 General grammatical development

Age Groups (in months)												
	'18 month olds'			**'24 month olds'**			**'30 month olds'**			**'36 month olds'**		
Measure	*16-21 (n=10)*			*22-27 (n=11)*			*28-33 (n=13)*			*34-40 (n=15)*		
	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total	Mean *(SD)*	Range	% Total
Regular Morphemes (6)	.4 *(1.3)*	0 – 4	6.7%	1.4 *(1.6)*	0 – 4	23%	3.2 *(2.5)*	0 – 6	53%	5.2 *(1.1)*	2 – 6	87%
Irregular Word Forms (28)	0	0	-	1.7 *(2.2)*	0 – 7	6.1%	7.4 *(5.9)*	0 – 17	26%	13.9 *(4.8)*	4 – 21	50%
Over-generalisation	.1 *(.32)*	0-1	0.2%	.36 *(.77)*	0-2	0.6%	.77 *(.96)*	0-2	1.2%	1.26 *(.73)*	0-2	2 %
M3L	1.6 *(1.17)*	1 – 4.7	n/a	3.3 *(1.5)*	1 – 6	n/a	5.8 *(3)*	2 – 11.3	n/a	8.97 *(3.3)*	6 – 18	n/a
Complexity	4.2 *(11.2)*	0 – 30	2.7%	27.6 *(27)*	0 – 77	18%	68.5 *(50.4)*	5 – 145	44%	116.7 *(22.4)*	79 – 149	75%

In addition, 40% of 16-20 month olds and all (100%) children in the other age groups were reported to be combining words either 'sometimes' or 'often'. As demonstrated in the table, the mean scores in all of the grammatical measures increased steadily across the age groups (although the use of overgeneralisations remained low). The variability across all grammatical scores was lower at the younger ages, indicating that at this age, children have barely begun to acquire the relevant grammatical structures. This finding was similar to the profile observed for English-speaking children by Fenson et al. (1994). From 24-months, the Irish-speaking children seemed to acquire morphosyntax at varying rates, particularly in terms of grammatical complexity as indicated by the wide range of scores and large standard deviations observed at 24 and 30 months. As the children approached 3-years however, the variation in grammatical complexity scores reduced (as indicated by the decrease in the standard deviation) and the scores approached ceiling. It is worth noting that Huttenlocher (1991) found larger individual differences in vocabulary acquisition than syntactic development. She noted that unlike that observed for vocabulary, syntactic acquisition resulted in similar achievement levels across children, and it appears from the above data that a similar profile was observed for the Irish-speaking children. Furthermore, the Irish-speaking children made steady progress in the acquisition of regular morphemes and irregular word forms, and by three-years were using nearly all (87%) of the regular morphemes consistently, although were still only reported to be using 50% of irregular

words forms on the ICDI. Possible reasons for this, including the nature of the dialect studied, will be discussed below. Overgeneralisations were a relatively rare occurrence, and as later outlined, were reported more often for overgeneralisation of initial mutations on noun bases rather than plural forms or verb tenses. Finally, M3L and grammatical complexity scores increased in a steady and regular fashion over the ages, with almost 75% of the complexity targets used by three-year-olds. Each of the six major areas of grammatical development captured by the ICDI will now be described in turn.

8.1 Regular Morphemes

In line with the original MCDI, the first area of grammar on the ICDI addresses how often children were reported to use regular morphemes. These aspects have previously been discussed in Chapter 2 on the adaptation, but it should be noted that due to the highly complex nature of morphological markers in Irish, and the variance observed in the adult-input due to language change (Hickey, personal communication) it was difficult to identify those morphemes that could be considered 'regular'. In the end, six morphemes were targeted based on previous child-language acquisition studies, analysis of the Munster dialect and early piloting. These included 'regular' plural marking (as indicated by the addition of a vowel '–í' or vowel and consonant '-anna' suffix); synthetic verb+ person marking (whether the child used 'téim' *I go* as opposed to the un-inflected 'téann mé' for *I go*); progressive marking through the use of the 'ag' (literally- *at*) progressive particle; regular past tense marking (verb lenition); possessive marking (noun lenition) and future tense marking (as indicated by the use of the '-f(a)idh' and '-(e)oidh' suffixes). Figure 8.1 below demonstrates the percentage of children reported to use each of these individual morphemes 'sometimes' or 'often' at the various age groups.

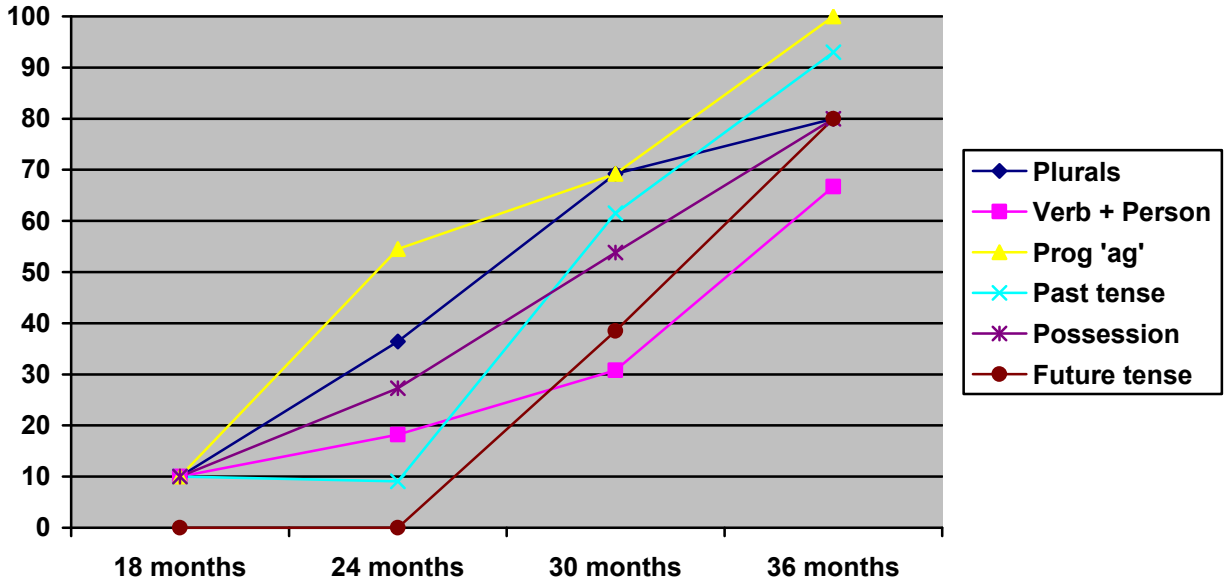


Figure 8.1 Percentage of children with affirmative responses for regular morphemes

As can be seen, at 18 months, about 10% of children were using most of the morphemes, apart from future tense marking, which was not used by any of the children. By 24 months however, over 50% of children were reported to be using the progressive particle 'ag', just under 40% were using plurals, and possessive marking (noun lenition) was used by approximately 30% of children. Synthetic verb + person and past tense inflections were still very rare at this age, and once again no child was reported to be marking future tense. At 30 months, past tense in particular grew sharply and was reported to be used by over 60% of children. The use of all other morphemes steadily increased at this age, with the first signs of future tense marking at 30 months in about 40% of children. Finally, by three years, all regular morphemes were used by the majority of children (80% or more), and parents reported that just under 70% of children were using synthetic verb+person marking. It was interesting to note that although possessive and past tense marking in Irish involves the same morphophonolgical marking (lenition of the initial phoneme), children began using this slightly earlier on verbs than nouns.

In order to determine whether progress in the use of regular morphemes increased in a statistically significant way over the age groups, a between-group ANOVA was conducted. If the parents reported that the child was using the morpheme 'sometimes' or 'often', they were given a score of '1', thus each child could receive a maximum score of 6 (this was in line with the scoring used by Fenson et al., 2007). Analysis indicated that there was a significant change over the four main age groups ($F(3, 45) = 16.01$, $p \leq .001$), although post-hoc tests with Bonferroni correction for pairwise comparisons revealed that this difference was not significant for any of the successive age groups (i.e., there was no significant difference between 18-month and 24-month olds in the number of regular morphemes produced, or between 24-month and 30-month olds etc.). Stepwise multiple regression was then carried out to determine the effect of variables including age, gender, birth order and parental education, on the number of regular morphemes used, and indicated that age accounted for 53% of the variance and gender a further 7% of the variance. The effect of gender on the various aspects of grammatical development will be analysed below.

Age of acquisition data also supports the pattern of morpheme development outlined above. As described in the previous chapter, age of acquisition was determined by splitting the group into six, four-monthly age groups. The criterion of production by 40% of children within one of those age groups was taken as an indicator of acquisition. Analysis revealed that the progressive particle 'ag' was the earliest to develop (by 21-24 months), followed by plural, past tense and possessive marking (at 25-28 months). Future tense was developed by 29-32 months, and finally, synthetic verb + person marking was reported to be acquired by 33-36 months. Previous research similarly found plural marking in the language samples of Irish-speaking children at 22 and 30-months (McKenna & Wall, 1986), although sometimes with classic overgeneralising on singular nouns (e.g., 'lachann**aí'** for 'lacha**i**n', *ducks*; and 'bean**aithe'**/'fear**aithe'** for irregular plurals 'mná' *women* and 'fir' *men*). Another study of early language acquisition of Irish also noted overgeneralisation of plural endings in a child aged 3 years 10 months, and it was noted that this child used a strategy for marking plurals whereby the quantifier 'go léir' *all* was

added to singular nouns (Ó' Murchú, 2001). Furthermore, data from the plural elicitation task developed for the current study revealed that plurals could be elicited correctly by 28 months, even though the preference at this age was to use the singular form of the noun. It should be noted that the singular form of the noun is mostly used following numbers in Irish, and the plural is only used after the plural determiner 'na' *the-pl*, which may account for this pattern. Overall, it has been noted that most plural forms are learned lexically (Hickey, 1992) because of the relative complexity and inconsistency across dialects.

Previous research on Irish acquisition found that noun lenition for possessive marking developed between 25 and 30 months (McKenna & Wall, 1986; Nic Fhionnlaoich, 1984), initially after the possessive pronoun 'mo' *my* and 'do' *your(singular),* as in 'mo t**h**eidí' *my teddy,* as opposed to the noun phrase (e.g., cóta Mhamaí, *Mommy's coat*). However, as both examples were given for possessive marking in the ICDI, it is unclear which example parents were responding to, and so we cannot tell in which context it first emerged. Nonetheless, the age of acquisition of possessive marking (25-28 months) was in line with previous studies of Irish, along with the age at which lenition has been noted to stabilise in expressive language (Brennan, 2004; Ó' Baoill, 1992). With regard to past tense marking, although noted early on by parents (from 24 months) on the ICDI, direct elicitation was only successful with two children, aged 34 and 40 months. In most cases, the children omitted the regular past tense marker (lenition) and used the unmarked form of the verb or the imperative (i.e., they said 'dún sí' /duːn ʃiː/ *she close* instead of 'dhún sí' /ɣuːn ʃiː/ *she closed*). Responses to this task also indicated that these children could produce the irregular past tense forms more accurately than the regular, which is in line with findings for other languages (Fenson et al., 2007).

Comparing these results with the crosslinguistic literature on regular morphology is complicated and not particularly meaningful, given the different phonological make up of the morphemes in various languages. Nonetheless, comparisons have produced surprisingly similar results across languages in terms of the order in which the various morphemes appear, indicating a cognitive underpinning to the acquisition of grammatical morphology

(Slobin, 2002). Although there were too few numbers at each monthly age group in the current study for meaningful comparisons, it is possible to broadly compare the acquisition of the various morphemes in Irish with comparative forms across other language adaptations. For example, data for the American-English CDI (MCDI) revealed that overall, possessive 's' was the earliest to develop, followed by regular plurals ('-s'), progressive ('-ing') and past tense marking ('-ed') (Fenson et al., 2007). The German adaptation reported that plural marking was the first to develop, followed by gender marking, case marking, verb inflections and finally forms of modals and copula (Szagun et al., 2006). The pattern was similar for Irish, in that progressive marking and plurals emerged before past tense, although overall, a higher percentage of English-speaking children were using regular morphemes when compared to the Irish children. More specifically at 30 months, 67% of Irish-speaking children were reported to be using plurals, and just over one-third were marking past, compared to 93% and 74% reported for plural and past tense marking respectively by the English-speaking children. Past tense marking was also relatively delayed in the Swedish CDI when compared to those acquiring English, with only 14% of children using past tense at 22 months (Erikson, 2002).

The data above seem to indicate a seemingly marginal delay in the acquisition of grammatical morphology in children acquiring Irish, in comparison to children acquiring English. However, it is important to interpret these findings not only in light of the fewer participants in the Irish-speaking group but also in light of the fact that English has limited inflectional morphology in comparison to Irish. Previous researchers have noted that the limited inflectional morphology of English enables children to easily identify the stem noun or verb and then to acquire morphemes as additional material (Behrens, 2006). However, it is argued that children acquiring languages with richer and more complex inflectional morphology, first have to identify the stem and then the inflectional processes that act on the stem. Moreover, the complexity of the grammatical morphemes of a language will affect how children acquire morphemes (i.e., in a more analytical or formulaic way) and also the age at which they are acquired (Lieven, Pine, & Dressner-Barnes, 1992), which might account for the differences in the age of acquisition profiles

noted crosslinguistically. With regard to grammatical morphemes in Irish, Hickey (1992) has argued that they are largely irregular and phonologically and semantically complex. Peters (1997), in a comprehensive analysis of the acquisition of grammatical morphemes across languages, noted that it is not possible to understand the acquisition of morphemes in isolation from phonology. She argued that there are a number of phonological features that are important, including the degree of prosodic contrasts between stressed and unstressed syllables, whether morphophonemic changes occur at morpheme boundaries (which obscure these boundaries) and whether they coincide with syllable boundaries, as well the number of phonemes from which grammatical morphemes are drawn.

The classification of languages in terms of their morphological complexity is outlined by Comrie (1981) (as cited in Peters, 1997) along two aspects, the analytic-synthetic continuum which relates to the number of morphemes per word, and the agglutinating-fusional aspects which reflect how easy or hard the morphemes are to segment from each other phonologically. Peters (1997) adds a 'unitary-portmanteau' dimension to this classification which incorporates the degree of semantic fusion or the number of meanings per morpheme. Although a language like English would be more analytic in terms of its inflectional morphology, Irish could be argued to be more towards the synthetic end of the continuum as it can combine up to three morphemes in a single word (e.g., bog*faimid we-will-move* where the future tense morpheme 'faidh' and person ending '–mid' are fused onto the verb root 'bog' *move*). For the most part, however, two morphemes are combined, particularly in the Munster dialect as previously outlined, in synthetic verb + person marking. Thus Irish does not have the same potential for complexity as Turkish or Finnish where verbs in particular can be composed of long strings of morphemes, or the extreme example of West Greenlandic where it is possible to express the equivalent of an entire English sentence in a single word. The richness of inflectional morphology in Finnish was cited as the reason for the finding that Finnish children start to pay attention to verb endings 'earlier' or with a smaller verb lexicon size compared to those children acquiring languages with less intensive verb inflectional morphology (Lyytinen & Lyytinen, in press). As Irish has fewer bound morphemes than Finnish, this may have

contributed to the relative delay observed in the current study, but does not account for the fact that the Irish-speaking children were slower than children acquiring English. For this explanation we need to explore the second feature of grammatical morphemes, related to the segmentability of morphemes.

Many synthetic languages such as Turkish are also agglutinative, in that morphemes are expressed by affixes (not internal changes to the root of the word) and moreover, these affixes do not become fused with others. According to Peters (1997), this makes it relatively easy to segment the phonological boundaries of morphemes, unlike languages where segmentation is made complex, as affixes are perceptually obscured by opaque, morphologically conditioned sound changes. The latter description could apply to the Irish language, as many bound morphemes become fused when added to words. For example, the future tense morpheme 'faidh' /fɪg/ is reduced to /ɪ/ when the plural person ending 'mid' /mid/, lit-*we* is added – thus bog*faimid* is realised as /bʌgɪmid/, *we-will-move*. According to Peters (1997), it is particularly hard to extract the forms of the base lexeme when sound changes such as the neutralisations described above occur, meaning that a sound encountered on the surface could have resulted from more than one underlying sound or sound combination.

Phonological fusion also occurs with one of the main morphological rules of Irish, that of mutations, where the initial consonant of a word undergoes phonological change under specific morphological and syntactic conditions (as outlined in Chapter 1). Initial mutations also cause fusion of the initial phoneme with the governing mutation (either lenition or eclipsis) and it could be argued thus make extraction of the rule more complex. Moreover, there is a considerable degree of allomorphy in this rule, so that an initial phoneme /b/ could be realised as /v/ or /m/ depending on the syntactic environment where the rule is applied, and another added complexity is that not all sounds are mutated. According to Peters (1997) this aspect adds to the complexity of the segmentation task as the variants present the learner with the problem of how to determine an appropriate base upon which to create new forms through morphological processes. Initial mutations are

also a feature of Welsh (and all Celtic languages), and because of their complexity, including the different syntactic rules that trigger different mutations of the same phoneme and the variability in adherence to the mutations in adult speech, means that they are acquired slowly and in a piecemeal fashion, with learning of the system still evident at age nine (Mon Thomas & Gathercole, 2007).

A final feature affecting the acquisition of grammatical morphemes relates to the number of meanings per morpheme. At one end are languages in which each affix expresses a single clearly distinguishable grammatical notion (e.g., Turkish) and at the other, are languages in which many semantic functions are fused into a single phonological form. Peters (1997) suggests that most Indo-European languages (e.g., German, Italian) are the latter. This also applies to Irish where the phonologically unsegmentable affixes of mutations (particularly lenition) can be used to indicate tense, gender and possession, although the syntactic category of the word (e.g., verb or noun) gives an indication as to the meaning. Taken together, all these features of Irish, with its synthetic, fusional and semantically complex features, may account for why the acquisition of grammatical morphemes is relatively delayed in children acquiring this language.

8.2 Irregular Word Forms

The acquisition of irregular word forms represents another sign of morphological progress (Oetting & Hadley, 2008). As is the case for regular morphemes, it was equally difficult to select word forms in the current study that are particularly 'irregular' in the language, most notably for noun plurals. Nonetheless, for comparative purposes with the MCDI, eight 'irregular' noun plurals and 20 irregular verbs forms were selected based on previous acquisition studies and early piloting. Beginning with item-analysis of frequency and age-of-acquisition data for noun plurals, Table 8.2 below indicates that 'ba' *cows* was the most frequent and earliest-acquired (at 25-28 months), followed by 'éisc' *fish*, 'tithe' *houses*, 'lachain' *ducks* and 'leoraithe' *lorries* (all acquired by 29-32 months). The plural for 'bean' *woman*, 'mná', was not reported to be used by any of the children in the sample.

There is very limited literature on the acquisition of irregular plurals in Irish, although the plural for 'leoraí' *lorry*, *leoraíos (target 'leoraithe') may occur in child speech due to borrowing of the English plural morpheme (Ó' Siadhail, 1995), and is common for nouns ending in a '–í' vowel or 'r' consonant (Hickey, 1985). This might be linked to the relatively low reporting on this particular irregular plural. Overall, due to the difficulty in identifying truly irregular nouns, it is questionable whether the category of 'irregular plurals' should be included in future research on Irish acquisition (Doyle, personal communication). This links with the observation of limited overgeneralisations in early Irish acquisition in that their rarity may be an indication that the children just don't recognise these forms as irregular in the same way that 'sheep' is recongised in English. Consequently, it may be that overgeneralisations are the result of a very recognisable highly regular marking.

Table 8:2 Frequency and age of acquisition data for irregular noun plurals

Irregular plurals	**% sample**	**AOA** (% of age group)
ba *(cows)*	49 %	25-28 (71%)
éisc *(fish)*	30.6 %	29-32 (60%)
tithe *(houses)*	28.6 %	29-32 (40%)
lachain *(ducks)*	24.5 %	33-36 (46%)
leoraithe *(lorries)*	16.3 %	29-32 (40%)
laethanta *(days)*	14.3 %	*not acquired by 40 months*
leapacha *(beds)*	12.2 %	29-32 (40%)
mná *(women)*	0	*not acquired by 40 months*

The irregular verbs are listed in Table 8.3 below in order of age of acquisition. As outlined in Chapter 1, there are eleven irregular verbs in Irish and some have an 'independent' and a 'dependent' form (used following negatives, question particles and complementisers in subordinate clauses). Overall, there were twenty irregular verbs listed in this section. As can be seen, 'thug' *gave* is the earliest form to be acquired, followed by 'tháinig' *came*. Six of the verbs were not reported to be used by any of the children by 40 months. Two of these ('rug' *caught* and 'dhearna' *did*) were most likely not acquired as they are 'regularised' with only initial mutation applied to the verb base in the Munster dialect (thus produced as 'b**h**eir' and 'd**h**ein' respectively, Stenson, 2008). In addition, this

dialect tends to regularise the past tense of the verb 'feic' *to see* (i.e., 'chonaic' *saw*), by using the negative particle 'níor' *didn't* (used only in past tense) + 'chonaic' *see* instead of the dependent form 'ní' (negative particle for present/future tenses and irregular verbs in the past tense) + 'fhaca' *saw(dependent)*. The replacement of the negative particle 'ní' with 'níor' is particularly prevalent in the West Kerry dialect (Ó' Siadhail, 1989). The other three irregular verbs that were not reported to be acquired by 40 months were all future tense verbs which may account for them being later acquired.

Table 8:3 Frequency and age of acquisition data for irregular verbs

Irregular verb form	**% sample**	**AOA** (% of age group)
thug *(gave)*	49 %	25-28 (43 %)
tháinig *(came)*	38.8 %	25-28 (43 %)
fuair *(got)*	46.9 %	29-32 (60 %)
dúirt *(said)*	38.8 %	29-32 (60 %)
fhaca *(saw-dependent)*	28.6 %	29-32 (60 %)
chonaic *(saw)*	44.9 %	29-32 (40 %)
chuaigh *(went)*	38.8 %	29-32 (40 %)
íosfaidh *(will-eat)*	26.5 %	29-32 (40%)
gheobhaidh *(will-get)*	26.5 %	29-32 (40%)
chuala *(heard)*	36.7 %	33-36 (82 %)
rinne *(did)*	22.4 %	33-36 (46 %)
rachaidh *(will-go)*	20.4 %	37-40 (57%)
tabharfaidh *(will-give)*	38.8 %	37-40 (43%)
(bh)faighidh *(will-get-dependent)*	16.3 %	37-40 (43%)
tiocfaidh *(will-come)*	14.3 %	*not acquired by 40 months*
rug *(caught)*	8.2 %	*not acquired by 40 months*
dheachaigh *(went-dependent)*	8.2 %	*not acquired by 40 months*
dhearna *(did-dependent)*	6.1 %	*not acquired by 40 months*
déarfaidh *(will-say)*	6.1 %	*not acquired by 40 months*
béarfaidh *(will-catch)*	6.1 %	*not acquired by 40 months*

Addressing the acquisition of irregular word forms in general, as can be seen in Table 8.1 above, there were no examples of irregular nouns or verbs at 18 months, and subsequent analysis revealed that the first report of irregular word forms was at 21 months, after which it grew steadily (see Figure 8.2 below). It should be noted that the score for the child at 21 months is significantly higher than other children, including those acquiring English, but as it was based on a single child should be interpreted with caution. In order to

evaluate the developmental profile of the irregular words, a between-group ANOVA was conducted and indicated that there was a significant change across the four main age-groups ($F(3, 45) = 26.23$, $p \leq .001$). Post-hoc tests with Bonferroni corrections for pairwise comparisons revealed that this difference was only significant between the last two time points, (i.e. 24 -30 months and 30-36 months). As with regular morphemes, regression analysis was carried out and indicated that age accounted for 59% and gender for a further 6% of the variance.

Comparing the number of irregular words used by the Irish speaking children with the MCDI data (which had 25 irregular word forms compared to 28 in the ICDI) revealed that the Irish-speaking children again had lower scores than those acquiring English, on age-based comparisons (see Figure 8.2 below). For example, acquisition of irregular word forms seemed to accelerate after two years for those acquiring English, so that by 30 months the majority of children were reported to be producing about half the nouns and verbs on the list. Although the smaller sample size must be taken into account, the data for the Irish speaking children revealed that the acquisition of irregular words did not accelerate until after 27 months, although not in a steady increasing fashion, as indicated by the decline in the number of irregular words used at 30 months.

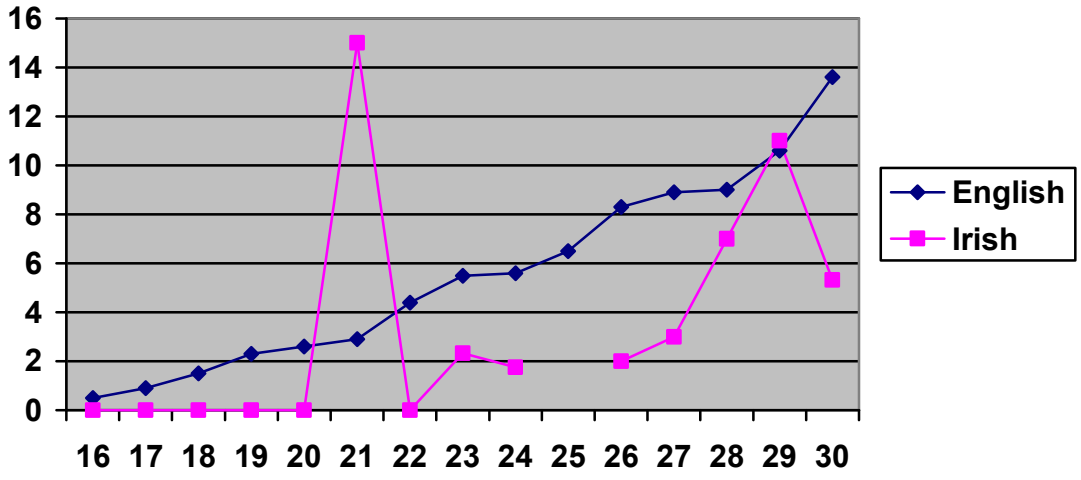


Figure 8.2 Mean number of irregular words by age in months for Irish and English-speaking children

Previous literature has indicated that irregular verb tenses are acquired before regular (Fenson et al., 2007), which is in line with the current study in that regular past tense was not consistently produced by the children until 30 months (see Figure 8.1 above), whereas irregular word forms emerged from 23 months. This was supported by the results from the past-tense elicitation task developed for the study. For example, one child (ICDI 12, aged 34 months), accurately used the irregular verb forms 'dúirt' *said*; 'chuaigh' *went*; 'rinne' *did* and 'fuair' *got*, but omitted regular past tense marking (lenition or d' before words beginning with a vowel or /f/) on verbs 'd**h**ún, *closed*; 's**h**iúil' *walked* and '**d'**oscail' *opened*. Moreover, Owens (1992) noted that irregular verbs were very frequent in a spontaneous sample of a child acquiring Irish, making up to 50% of the child's verb usage, which was claimed to be a similar pattern to English language development and similarly, most likely due to their high frequency (e.g. 'bí' *to be*; téigh *to go* and déan *to do*).

8.3 Overgeneralisation

Overgeneralisation is viewed by psycholinguists as a sign of progress in acquiring linguistic rules (Behrens, 2006) and is often considered to be the first indication of productivity in morphosyntactic development. Overgeneralisation has also been attributed to an attempt by the child to regularise the inflectional system in the input language, although it is not clear whether this is a common feature in language acquisition across languages (Slobin, 1985). Many versions of the CDI, including the original MCDI have examples of overgeneralisations on nouns and verbs, although they found that it was a relatively rare phenomena with considerable individual variation among children in the use of these forms (Fenson et al., 2007). Furthermore, longitudinal data shows that although overregularisations in English do occur between the ages of about 2 ½ to 5 years, there is extensive variation across individuals (Maratos, 2000). As revealed in Table 8.1 above, development of this aspect increased marginally across the age ranges for the Irish-speaking children but remained very low. One study involving the MCDI (Fenson et al., 1994) found that the incidence of overgeneralisations increased between 25 and 27 months

(from an average of 2 to 4 examples) and peaked at a mean of 5.5 examples at 30 months. The incidence was much lower for the Irish children, although it did peak to a mean of .75 words at 24 months. This was mostly likely due to the fact that morphological complexity is higher in Irish, as previously mentioned, and so much of noun and verb morphology in Irish tends to be irregular and so learned lexically rather than through the use of a generalisable rule. The piecemeal, item-by-items acquisition of morphological rules was also noted in the acquisition of initial mutations in Welsh (Gathercole, 2007; Mon Thomas & Gathercole, 2007).

Beginning with the data reported for nouns, frequency analysis and age of acquisition for each of the examples listed revealed that '**m**bord*' *table* (+ eclipsis) was most commonly overgeneralised (as used by 27% of the sample), and was first noted in 29-32 month olds. Overgeneralising of eclipses has previously been noted in child acquisition data (Hickey, 1992, Ó' Baoill, 1992) and is thought to be due to the input of the prepositional phrase 'ar an mbord' *on the table*, where eclipsis is required on the noun governed by the prepositional phrase. Due to the difficulty in segmenting phonological mutations as described above, this results in the child processing the word base for *table* 'bord' /bo.ɹd/ as /mo.ɹd/. Overgeneralisation was also identified on some noun plurals such as 'bád*anna*' (*boats*, for the target plural 'báid'); iasc*anna** (*fish* for 'éisc'); fear*anna** (*men*, plural 'fir') and tithe*anna** (houses, for the target plural 'tithe) which occurred relatively later in children aged 37-40 months. All of these examples involve overgeneralising the salient plural suffix '-anna' where irregular plural formation is required, and also noted by McKenna and Wall (1986) in a sample from a 30-month old child and by Hickey (1992) in children under three-years. All other examples of overgeneralization listed in the ICDI occurred with 10% frequency or less and were not reported to be acquired by 40 months.

Further evidence for the use of overgeneralisations on plural forms came from the error-analysis of the sentence-completion elicitation task. Overall, this task could only be successfully administered to children aged over 28 months and the results are outlined in

Table 8.5 below. As can be seen, children mostly used the singular form of the noun. Children also overgeneralised the plural suffix '–anna' as found in the parental-report data above, and they were also observed to overgeneralise '–aí' and '-a' vowel-addition plurals. Furthermore, the English plural marker '–s' was observed, particularly for the older children, which was in line with the finding of increased bilingualism with age noted previously. Borrowing of the 's' plural was also noted in loan words by Stenson (1990; 1993), who commented that the 's' plural has even spread to native words (e.g., 'gadaís' *thieves* and 'séaras' *berries*) in her study of language change in Irish. Table 8.4 below presents a summary of the mean number of responses per category in the task addressing the elicitation of plurals.

Table 8:4 Mean number of responses to the plural elicitation task

Age group	*Correct Plural*	*Singular form*	*-anna OG*	*-aí OG*	*-s OG*	*-a OG*	*-acha OG*	*other*
28-33 (n=4)	2	5.13	.5	.5	.38	.63	0	0
34-40 (n=5)	3.08	7.75	.83	.17	.92	.58	0	.67

OG= overgeneralisation

Errors on verb tense marking were also somewhat infrequent in the Irish data and were similar to reports of infrequent rates of overregularisations of the past tense in early English acquisition data (Marcus et al., 1993). Based on the 49 checklists collected, examples of verb errors or overgeneralisation were noted on 16 (involving twelve of the twenty-one children in the sample), although for the majority this involved use of the unmarked form of the verb. Errors on past tense marking were the most frequent, relatively speaking, and reported for 60% of 29-32 month olds. Looking at the individual data, the majority of errors were due to omission of the past tense marker (lenition) and resulted in the unmarked form of the verb (or imperative). According to Peters (1997) grammatical morphemes are vulnerable to omission if the phonetic form is difficult to perceive due to its location in a word. It could be argued that this applies to the lenition rule for past tense. Moreover, Marchman and Bates, (1994) noted that the first production of irregular verb

forms in particular are likely to be stems which are not marked for tense and/or are restricted to use in non-past tense contexts, which is in line with the frequent use of imperative verb forms, particularly for the irregular verb 'faigh' *get* as will be outlined below. It was noted that as children get older and acquire more verbs, they also tend to make more errors of overgeneralisation.

Other examples of verb errors included the addition of lenition to a verbal noun structure, as reported for one child (i.e., 't**h**abhair mé' for 'thug mé' *I gave* from the verbal noun 'tabhair' *give*), and two children used the verbal noun 'oscailt' *open* for the past tense verb 'd'oscail mé' *I opened*. Overgeneralisations or errors on present and future tense were less frequent, and the predominant pattern was to use the verb base (imperative) for both tenses. Owens (1992) also noted that the imperative was used for past, present and future marking for an early 2nd language learner of Irish. There were two examples of overgeneralisation of the future tense stem '-idh' for present, past and future tenses in the current study, particularly where irregular verbs were concerned (e.g., 'ith**idh***' for 'íosfaidh' *will-eat* from the verb 'ith' *eat*;), and was also noted by Owens (1992), albeit in early 2nd language acquisition. She holds that the imperative may provide an easy way into the tense system as it can also be used for regular past tense marking (without lenition). Hickey (1992) also found that the imperative was the earliest tense exhibited by children and attributed it to pragmatic reasons based on the adult input.

As previously mentioned, the verb that seemed to cause the most difficulty for the children was 'faigh' *get*, with this imperative form extended to both past ('faigh mé*' instead of 'fuair mé' *I got*) , present progressive ('ag faigh*' instead of 'ag fáil' *getting*) and future tense ('faigh mé*' for 'gheobhaidh mé' *I will-get*). The profile of errors as reported by the parents was mirrored in the elicitation task. These findings are similar to those of young Hebrew-speaking children, where many early verbs take non-finite forms, which led researchers to conclude that during the pre-grammatical stage there are minimal effects of the rich morphological structure of the Hebrew lexicon on its acquisition (Maital et al., 2000). Moreover, Peters (1997) notes that crosslinguistically, when verbs have an

uninflected form, as in the imperative, these are often the first ones produced. It is also similar to the observation by Rice and colleagues who noted that in many languages children show an acquisition period in which they produce infinitival forms of verbs (uninflected forms) where finite forms (marked for tense and/or subject/verb agreement) are required in the adult grammar (Rice, 2004; Rice et al., 1998). Therefore, in some languages, children go through a period where they treat finiteness marking as optional in contexts in which it is obligatory in the adult grammar, until they have figured out other aspects of the grammatical system. In line with this observation, it could be argued that the findings above indicate that children who speak Irish go through an 'optional imperative stage'.

Finally, there were very few errors noted on the verbal noun (present progressive) elicitation task, despite the fact that the morphology is relatively irregular on these forms (Doyle, 1996) and the 15 children aged between 28 and 40 months who participated in this task performed at ceiling. Parents also reported very few errors in the present tense context on the ICDI checklist. There are a number of possible explanations for this finding. Firstly, it could be input-related. For example, a recent study on child-directed speech involving Irish-speaking mothers (Cameron-Faulkner & Hickey, 2008) noted that parents tend to talk about the 'here and now' or engage in ongoing activity with discussion of joint focus and negotiation of activities in child-directed speech. Thus, based on frequency alone, the children seem to be learning this form with relative ease. Another reason could be linked to the fact that many verbal nouns are based on their noun format, and it is only when the progressive particle 'ag' is added that they signify ongoing activity. As the previous chapter on vocabulary acquisition identified that children acquire nouns relatively earlier than verbs, this might be linked to their ease-of-acquisition. Moreover, as the base noun form of many verbal nouns does not undergo any morphological change (no ending added to verbs ending in –áil), this also reduces their complexity. Other morphological markers on verbal nouns as described in Chapter 1 include the addition of '–t', or the most frequent morpheme involving the addition of –dh/–(e)adh /əɣ/ to verb roots. In line with the previous account of the complexity of initial mutations being linked to the relative delay in

the acquisition of regular morphemes, the ease of segmentation of these phonological forms could be linked to their relative ease of acquisition.

8.4 Combining Words

The next question on the ICDI asked parents to indicate whether children were joining two words together- either 'not yet', 'sometimes' or 'often'. The ability to combine words is held to be a significant aspect of linguistic growth where children move further into syntactic and semantic development, and is particularly important for English which has relatively modest inflectional morphology (Fenson et al., 2007). It has been stated that children demonstrate some knowledge of the syntax of their language when they combine words productively, that is they use combinations that are novel, not just imitations (Bavin, 2006). Figure 8.3 below demonstrates the average percentage of boys and girls reported to be combining words 'often' or 'sometimes' in Irish (with the English-speaking data also plotted for comparison).

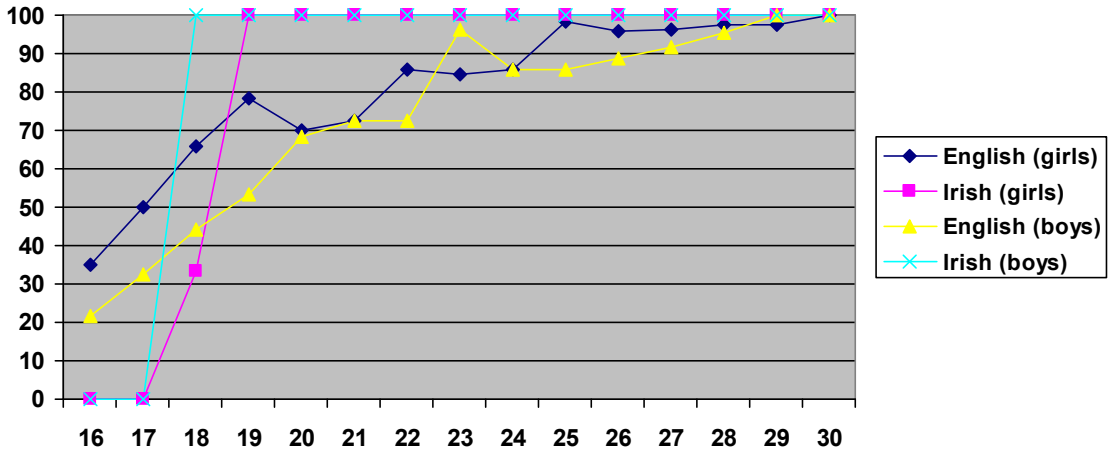


Figure 8.3 Percent of children with affirmative responses in combining words

As can be seen, there were no reports of word combinations for Irish-speaking children at 16 and 17 months, but by 18 months, 33% of girls and all the boys were

combining words. After this all of the Irish speaking children were reported to combine words, and this was slightly earlier than that reported for the English-speaking children. Although this could point to an Irish-advantage in combining words, Fenson et al., (1994) argue that 'often' might be a better criteria for emergence of word combinations as 'sometimes' might reflect rote phrases, and is particularly important given the prevalence of formulaic sentence production in Irish (Hickey, 1992). To determine whether there was significant change in the ability to combine words across the four main age groups, a chi square analysis was carried out which found a significant association between the four age groups and those reported to be combining words sometimes/often (χ^2 (3,49)= 26.67, $p \leq .001$). Looking across the cells for observed and expected results, there were fewer children combining words at 18 months than expected (4 and 8.8 respectively), although slightly more children were combining words than expected at 24, 30 and 36 months. When entered into a regression analysis in a similar fashion for the other grammatical measures, age was the only factor to account for the variance (over 33%) in combining words. Fenson et al. (2007) previously noted that gender accounted for .9% of the variance but this was only at the 18 and 19 month time points.

Overall, the data for word combinations in Irish is similar to studies of both monolingual and bilingual children. For example, combining words was the first grammatical skill to emerge in Swedish with almost 20% of 16-month olds reported to be combining words (Eriksson, 2001). In addition, over 80% of bilingual children aged 23 to 25 months were reported to be able to combine words, and those that were not had vocabulary scores of less than 50 words (Patterson, 1998). In the Irish data, those that were not yet combining words had an average vocabulary of 23 words (ranging from 3 to 64 words) which was similar to the necessary minimum of 50 words before word combinations appear, as identified in other versions of the CDI (Fenson et al. 2007). The fact that the CDI can identify mean vocabulary production scores for children not combining words as substantially lower than for children who do combine words is described as a notably positive feature, and supports the internal consistency between parental report of vocabulary and syntax (Feldman et al., 2000).

8.5 Maximum Sentence Length (M3L)

Once children were reported to combine words, parents were then asked to write the three longest utterances they had recently heard from the child. MLU is a valuable measure of children's syntactic development and is often used to examine individual differences (Vasilyeva et al., 2008). The three longest utterances reported by parents are reproduced in Appendix 12. The mean length of utterance was calculated based on words, as morpheme counting in Irish has greater arbitrariness and uncertainty regarding productivity (Hickey, 1993). MLU in words has also been found to be as effective as MLU in morphemes in predicting syntactic development in Dutch and Icelandic (Thordardottir & Ellis-Weismer, 1998) and is held to be more valid as a gross index of development for Irish. Table 8.1 above indicated that progress in M3L increased steadily over time and a between-groups ANOVA showed that there was a significant change across the four age groups over time, ($F(3, 45) = 19.45$, $p \leq .001$). However, post-hoc tests with Bonferroni corrections for pairwise comparisons revealed that this difference was only significant between 24 and 30 months. Stepwise multiple regression was then carried out to determine the effect of various variables on M3L, and revealed that age accounted for 51% of the variance, gender a further 11% and birth order a further 5%, with all three accounting for 67% of the variance. Figure 8.4 below demonstrates the M3L mean scores across the ages for Irish alongside those found in CDI studies of other languages.

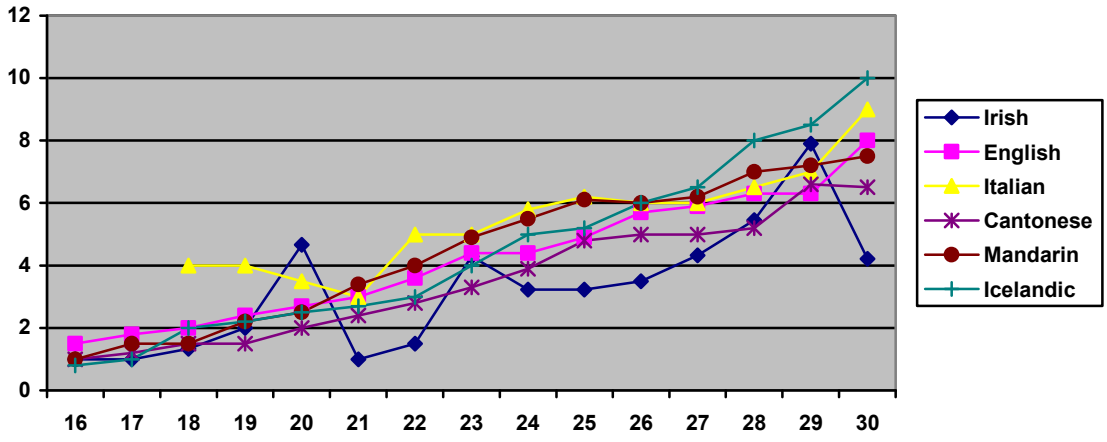


Figure 8.4 M3L mean score comparisons across languages by age in months

As can be seen, at the younger ages the Irish-speaking children seem to have similar scores in comparison to children acquiring other languages. However at 21, 22, and 24 months through to 27 months the Irish-speaking children seemed to have slightly lower scores than those observed in other languages. Notwithstanding the smaller sample size for the Irish data, and the fact that studies of other languages mostly measured MLU in morphemes, it is worth noting that Thordardottir and Ellis-Weismer (1996) found that in highly-inflected languages, children get by with a smaller number of words as most of the meaning is carried by the inflections. This finding was used to explain the relative delay in Icelandic MLU when compared to English, as certain forms of pronouns that are separate words in English are single words with different bound morphemes attached in Icelandic. This is similar to the synthetic verb+ person marking in the dialect of Irish used in the current study. Crosslinguistic research has demonstrated that typical language skills at a particular age entail different things for different languages (Thordardottir, 2005), reflecting differences in the structure of languages as well as cultural differences (Slobin, 2002). This means that MLU levels at particular ages cannot be compared directly across languages, and more reliable comparisons are based on vocabulary size, as will be elucidated in the next chapter.

Looking briefly at the morphosyntactic complexity of the three longest utterances reported by the parents in the current study, it was evident that 'tá' *to-be* and progressive marker 'ag' omission was frequent in early two and three-word sentences. For example:

	'Dolly dul a chodladh*'	for	'Tá Dolly ag dul a chodladh'
Lit	*Dolly going to sleep*		*be Dolly at going to sleep*
Gloss	*Dolly is going to sleep*		

	'mise dul go tigh Joan inniu*'	for	'Tá mise ag dul go tigh Joan inniu'
Lit	*Me going to house Joan today*		*'be me at going to house Joan today'*
Gloss	*'I'm going to Joan's house today'*		

This resulted in seemingly subject-initial sentences. In her study on word order acquisition of Irish, Hickey (1990a) found frequent omission of 'tá' (the verb *to be*), particularly in

agent + action utterances containing verbal nouns and adjectives ('moncaí ag ithe' *money eating*). The explanation was that the child is focusing on the verb elements which occur at the end of sentences, placing constraints on production, and so redundant elements such as 'tá' are omitted. Moreover, tá omission did not occur as often when 'tá' was the main verb of the sentence. The sentence examples reported by the parents in the current study revealed that once the children reached the age of three, they began to use various forms of the verb 'to-be' (e.g., 'tá' *is*, 'bhí' *was* and 'beidh' *will-be*) and combined them with the verbal noun (Vn) in clause structures of the VSVnX type. Examples included, 'tá siad ag tógaint láimhín dá chéile' *they are holding each others hands*; 'bhí Santy anseo inné' *Santy was here yesterday* and 'beidh mamaí ar ais ar a 3 a chlog' *Mommy will be back at 3 o'clock*.

Complex sentences were largely formed relatively easily using the coordinator 'agus', (e.g., 'tá mise ag iarraidh dul amach as an cot agus dul isteach sa leaba sin' *I want to go out of the cot and go into that bed*). On the other hand, subordinate clauses involving verbal noun complements (non-finite clauses), involve a word-order shift to an SVO-type structure in the subordinate clause which is triggered by the particle 'a' (+ lenition) (Bondaruk, 2006; McCloskey, 1980). This shift is known as 'raising' which involves taking the subject of a subordinate clauses and raising it to the direct object position of the embedding verb and has been noted to be particularly difficult for 2nd language learners of Irish (Mac Fhlannchadha, 1999; Owens, 1992). There were only two examples of subordinate clauses reported by the parents, both appearing in a question construction as analysed below:

ICDI 13 (39 months)

	An	bhfuil cead	agam	dul 'dtí an siopa	chun milseáin	a fháilt,
Lit	Q-PART	be permission	at-me	go to the shop	to sweets	relative-PART getVn
Gloss	*Can I go to the shop to get sweets?*					

ICDI 21 (29 months)

	An	bhfuil	cead	agamsa	hello	a	rá	leis an	gcailín	sin?
Lit	Q-PART	be	permission	at-me(emph)	hello	relative-PART	say	with def. article	girl	that
Gloss	*Can I say hello to that girl?*									

Finally, there were a number of English words reported in the three-longest-utterances, such as *party, budgie, canary, dolly, baby* and *seatbelt*, but overall these made up very little of the sentence examples. It should be noted that MLU does not provide as accurate an assessment of grammatical skills in later stages of syntactic development, nor does it provide information about the syntactic structure of utterances the child produces, such as how many clause elements are included in the sentences (Vasilyeva et al., 2008). Thus using MLU alone does not indicate what aspects of grammar or syntax contribute to differences across children, and so the final section of the ICDI which addresses grammatical complexity of sentence types in more detail, was used to capture this aspect.

8.6 Grammatical Complexity

This section addresses the development of morphosyntactic complexity which represents a very important aspect of language development. The acquisition of syntactic structures allows the child to represent the world by mapping meanings onto forms and to create an unlimited number of sentences that go beyond the 'here and now' and talk about past, present and future events (Hirsh-Pasek, Golinkoff, & Hollich, 1999). As previously outlined, much of this section on Irish was based on crosslinguistic similarities in child language syntactic development, such as moving from simple constructions with limited morphology, to the expansion of constructions at phrase level and the addition of clausal elements (Bates et al., 1995). However, language-specific elements of Irish that have been found in previous studies and in early piloting such as inclusion/omission of auxiliary 'tá' *to-be* and the development of prepositional pronouns, also helped to devise the targets for this section. As described in the adaptation and pilot chapters, there were 42 groups of sentences targeting the developmental progress in the use of bound morphemes, function

words and syntactic structures. The first sentence in each group was the most basic, and increased to three and four alternative sentences with growing morphosyntactic complexity, each conveying approximately the same meaning (as was carried out by Fenson et al., 2007). Parents were asked to select which form best resembled their child's current language abilities, although they also could select none of the alternatives (and receive a score of zero). Scores therefore ranged from 0-4 with a maximum score of 155 for all items.

The sentences are contained in Chapter 3 (pilot study) and in Appendix 2. Table 8.1 above indicated that the children's scores grew steadily over the age groups, and by 3-years, the children were reported to be using 75% of the targeted sentences. In order to evaluate this developmental profile, a between-groups ANOVA was conducted and indicated that there was a significant change ($F(3, 45) = 29.98$, $p \leq .001$) across the four age groups. Post-hoc tests with Bonferroni corrections for pairwise comparisons revealed that this difference was not significant between 18 and 24 months but there was a significant difference between all other time points. Stepwise multiple regression was then carried out as before to determine the effect of variables on grammatical scores. This indicated that age accounted for 66% of the variance, gender a further 7% and birth order a further 3% of the variance (with all three accounting for 76% of the variance).

In an earlier version of the MCDI, Fenson et al. (1994) found that scores for sentences which addressed bound morphemes were the highest, followed by sentences targeting function words, and complex sentences returned the lowest scores. However, data for Irish revealed that the mean score for function words (21.86) was actually slightly higher than that reported for bound morphemes (20.43) although complex sentences had the lowest mean score for the group (19.73). Although a one-way ANOVA indicated that this difference was not significant, this finding could be linked to the fact that bound morphemes in Irish are relatively irregular, and full mastery continues into the school years (particularly for initial mutations, Hickey, 1990b). Table 8.5 below provides a summary of the ages at which the most complex sentences targeted which addressed bound morphemes,

function words and syntactic structure were reported to be acquired (i.e., produced by 40% of children within that age group). However, for some of these sentences, the most complex example was not acquired by 40 months, thus the sentence that was found to be acquired with the highest complexity for the group is provided below. In terms of age of acquisition, there appeared to be a developmental progression amongst the sentences, from bound morphemes, to function words to complex sentences, which was the same as that reported in the original MCDI (Fenson et al., 1994). It should be noted that this profile was not of a directly linear fashion in either the Irish or American-English versions. This is held to be in line with the observations of Slobin (1985a) and others who noted that although certain grammatical structures emerge in a set order, other factors such as meaning and frequency influence how other structures are acquired. These aspects are discussed in turn below.

Table 8:5 Age at which items with highest complexity were reported for 40% of children

Bound Morphemes	**Age of Acquisition**	**Function Words**	**Age of Acquisition**	**Complex Sentences**	**Age of Acquisition**
1. Thit mé* *I fell*	25-26 mths	15. Tá Mamaí ag glanadh *Mommy is cleaning*	29-32 mths	29. Mise cailín* *Me (a) girl*	21-24 mths
2. Na bláthanna *The flowers*	25-28 mths	16. Cá'il na cótaí?* *Where are the coats?*	29-32 mths	30. Tá seacláid agus cóc uaimse *I want chocolate and coke*	37-40 mths
3. Na tithe *The houses*	29-32 mths	17. Ná nigh mo gruaig* *Don't wash my hair*	33-36 mths	31. Bhí spéaclaí móra air *He had big glasses on*	37-40 mths
4. Mo charr *my car*	25-28 mths	18. Déan damhsa *Do a dance*	29-32 mths	32. Caithfidh mise dul abhaile *I have to go home*	33-36 mths
5. Bábóg bheag agamsa *I have a small doll*	37-40 mths	19. Ní maith liom cairéadaí *I don't like carrots*	33-36 mths	33. Níl Daid imithe go dtí an siopa *Dad isn't gone to the shop*	29-32 mths
6. Madra ar an mbord *dog on the table*	29-32 mths	20. Tá an geansaí ró mhór *The jumper is too big*	33-36 mths	34. Tabhair domsa an liathróid *Give me the ball*	33-36 mths
7. Is maith liomsa Lego *I like Lego*	33-36 mths	21. Níor bhris mé *I didn't break*	33-36 mths	35. Faigh tusa liathróid* *You get (a) ball*	33-36 mths
8. Stopaigí ag caint!* *Stop talking!*	37-40 mths	22. Cá'il mo Mham? *Where is my Mom?*	37-40 mths	36. Oscail an doras don madra* *Open the door for the dog*	29-32 mths
9. Mise ag déanamh túr* *Me making a tower*	29-32 mths	23. Téigh síos ansin! *Go down there*	29-32 mths	37. Tá ceann briste agam* *I've broken one*	37-40 mths
10. Chonaic mé eitleán *I saw an aeroplane*	29-32 mths	24. Bhí mise ag snámh *I was swimming*	33-36 mths	38. Sin caoire istigh sa ghort *That (is) a sheep in the field*	33-36 mths
11. Imríonn mise peil* *I play football*	37-40 mths	25. Tá sé ag tabhairt póigín domsa *He is giving me a kiss*	29-32 mths	39. Ar mhaith leat teach a thógáil? *Do you want to build a house*	37-40 mths
12. Carr Dhaidí ag teacht *Daddy's car is coming*	33-36 mths	26. Cén fáth go bhfuil an babín ag gol? *Why is the baby crying?*	33-36 mths	40. Ba mhaith liom imirt leis an liathróid *I want to play with the ball*	37-40 mths
13. Tá Seán imithe *Seán is gone*	29-32 mths	27. Ní chuaigh mé naíonra* *I didn't go to preschool*	29-32 mths	41. Táimse níos mó ná Síle *I'm bigger than Síle*	33-36 mths
14. Mise múinteoir * *Me (a) teacher*	29-32 mths	28. Tá an buachaill ag gol *The boy is crying*	29-32 mths	42. Mo dinnéar ite agam! *I've eaten my dinner*	29-32 mths

** indicates that this was not the most complex target sentence*

The first fourteen sentences addressed the production of bound morphemes. The targets included regular past tense, regular plural and possessive marking, and all were reported to be acquired between 25 and 28 months of age. Other bound morphemes, such as lenition on adjectives following a feminine noun (item 5) and the plural form of the imperative (item 8) were not acquired until the children were between 37 and 40 months. The most complex examples in the sentences targeting synthetic verb + person marking (1 and 11) failed to be acquired by 40 months (which was in line with the low reporting of this feature by parents in the section addressing regular morphemes). Even though this feature is very prominent in the Munster dialect, it may be that it is not as yet productive at 40 months, or may be too complex for parents to detect, and this should be taken into account in the next adaptation of the ICDI. Another aspect of morphology that was not reported by the parents was the use of the genitive (7 and 9) as required after the verbal noun. The omission of the genitive has also been noted in other Irish child-language acquisition studies (McKenna & Wall, 1986) and there is increasing evidence that this rule may no longer be productive in the language as it is used only sporadically, even by adult speakers (McCloskey, 1996). Finally, the most complex sentence in item 8 may not have been acquired as it demanded the use of the adverbial 'anois' *now*, and the most complex sentence in item 14 required that the child be using future tense marking which was relatively difficult for the children are previously outlined, and might account for the fact that it was not observed.

Sentences targeting function words were next acquired, mostly between 29 and 32 months. These sentences addressed the development of negatives (17, 19, 21 and 27), interrogatives (16, 22 and 26) and declarative sentences involving the substantive verb 16, 20, 24, 25 and 28) among other phrase and clause level constructions. As found for sentences addressing bound morphemes, some of the most complex targets in this section also failed to be acquired by 40 months. These included the possessive pronoun 'ár' *our* in item 16, and the quantifier 'chuid' *lit-portion* in item 17. Finally the dependent form of the irregular verb (item 27) 'chuaigh' *went* which is required after the negative particle 'ní' was not used, as it is more common to use the past tense negative particle 'níor' and

the independent form ‘chuaigh’ in the Munster dialect (i.e., ‘níor chuaigh’ is more common than ‘ní dheachaigh’).

The set of sentences targeting syntagmatic development were the last to be acquired, generally between 33 and 40 months of age. As previously described, these addressed increasing syntactic complexity such as the addition of adverbial phrases (31, 32, 33 and 38), object phrases (34), compound sentences and early complex sentences involving subordinate clauses (39 and 40). The subordinate clauses targeted both involved the construction copula+ adjective+ ‘le’ *with* and were previously noted as being relatively easy for an early 2nd language learner of the language, because of their importance in conversational interactions (i.e., ‘is maith le’ (*lit- be good with), I like*). Although the examples reported in the longest sentences by parents included early examples of coordination and subordination, none of the targets in the complexity section were acquired. This may have been because the conjunction ‘mar’, *because,* was the target in sentence 35 although the easier construction with ‘agus’ *and* in 36 was also not reported to be acquired by 40 months. In addition, sentence 29 aimed to target use of the identificatory sentences involving the copula ‘is’ but this was also not used. Finally, the most complex sentence in item 37 was not acquired as expansion of the subject noun phrase with the quantifier ‘eile’ *another* was not noted by the parents.

8.7 Crosslinguistic comparison of grammatical complexity

Qualitative analysis of the grammatical complexity section of CDIs adapted to other languages is negligible compared to that devoted to the vocabulary analysis, undoubtedly due to the difficulty in comparing morphosyntax across typologically different languages. Nonetheless, some similarities with the Irish data across languages are found. For example, Bleses et al. (2008a) found that in Danish, inflectional endings for plurals emerged first and past tense much later. They also noted that subordinated sentences appeared late and none were mastered by more that 50% of children at 33 months, which fits with the data for the Irish subordinate clauses above.

Quantitative comparisons based on the numerical scores achieved on the grammatical complexity section across other language-adaptations of the CDI are also possible, where data are available. Fenson et al. (2004), recommend taking the total composite complexity score as a comparative measure, therefore complexity scores across the various adaptations first had to be converted to be on the same scale (e.g., the total score for Irish was a maximum of 155; 81 for Mandarin and 37 for English and Italian). It was decided that 37 would be taken as the comparative maximum scores, and Figure 8.5 below contains monthly age comparisons of achievements in grammatical complexity scores across the various adaptations.

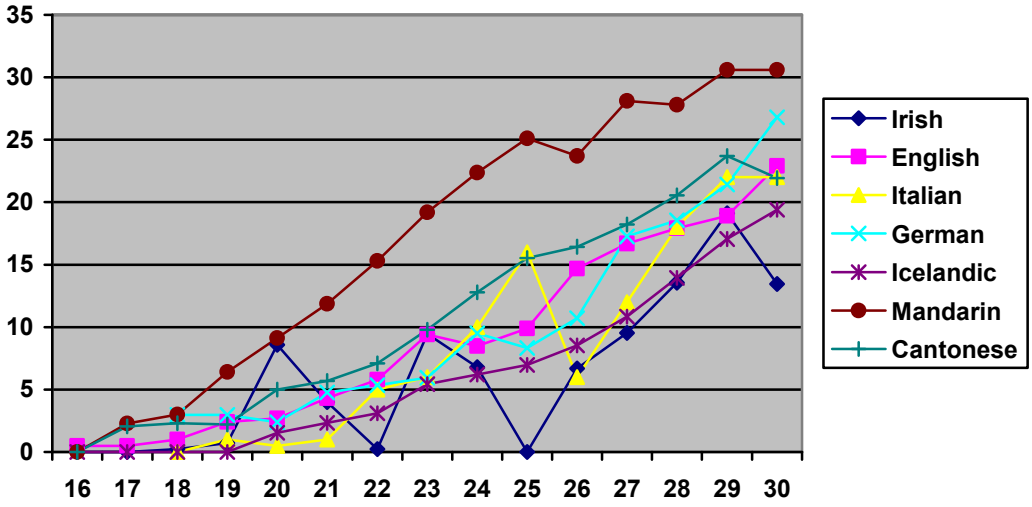


Figure 8.5 Grammatical complexity mean score comparisons across languages by age in months

The graph demonstrates that, similar to the findings for vocabulary development, the Mandarin-speaking children outpace children acquiring other languages in their grammatical complexity scores, and the Cantonese-speaking children also appear marginally ahead of the other children. As raw data is not available for these scores it is not possible to ascertain if these differences are statistically significant. Overall, the Irish-speaking children achieved similar scores at the various ages to those speaking other languages, particularly the Icelandic children. As discussed above, this may have

something to do with the morphological structure of these languages. More specifically, Cantonese and Mandarin are highly analytic, inflections are lacking and there is often only one morpheme per word. On the other hand, Icelandic is a synthetic language with many inflectional morphemes on a single word. For example, the definite article is a bound morpheme which inflects for gender and is attached to the end of nouns (Thordardottir & Ellis- Weismer, 1996). In addition, there are frequent vowel changes in inflected forms of the same word that are seldom predictable from the nominative form of the word (Thordardottir & Ellis-Weismer, 1998). These factors would lead to the segmentability of morphemes to be relatively more straightforward in Mandarin and Cantonese than in Icelandic, and as previously outlined, also more difficult in Irish.

Looking at the differences in grammatical achievement between children acquiring Italian and those acquiring English, Caselli et al. (1999) noted that the American children had higher grammatical scores than the Italian children at most of the monthly age comparisons. However, when they matched the children based on vocabulary size and compared their grammatical attainment, there were no longer any differences. As Italian children have to learn to produce far more grammatical morphology than English-speaking children (including gender marking, gender agreement on nouns and a far richer array of verb inflections), it is more appropriate to contrast grammatical development with the kinds of sentences produced at comparable levels of vocabulary development. When the researchers did this, it was clear that Italian children produced far more complex morphology than the English-speaking children. This finding should also be interpreted in light of the observation that although semantically, many functions are fused onto a single phonological form in Italian, verb grammatical morphemes in this language are prosodically highlighted (stressed and lengthened) in a clause-final position, and so their extraction is less problematic for typically developing children as well as those with SLI (Peters, 1997). Overall, even though grammatical development appears to be paced by vocabulary growth in both languages, the amount of grammar displayed by Italian children appears to be greater when vocabulary size is controlled (Caselli et al., 2001). The relationship between

vocabulary levels and grammatical attainment for the Irish children will be explored in the next chapter looking at the links between grammar and the lexicon.

8.8 Sources of variability in grammatical competence

Regression analysis above indicated that gender accounted for a relatively large proportion of the variability noted in regular morphemes, irregular word forms, M3L and grammatical complexity scores. Figure 8.6 demonstrates the mean scores achieved by boys and girls on the grammatical measures, including the use of overgeneralisations, and Figure 8.7 shows the development of grammatical complexity items for boys and girls across the ages.

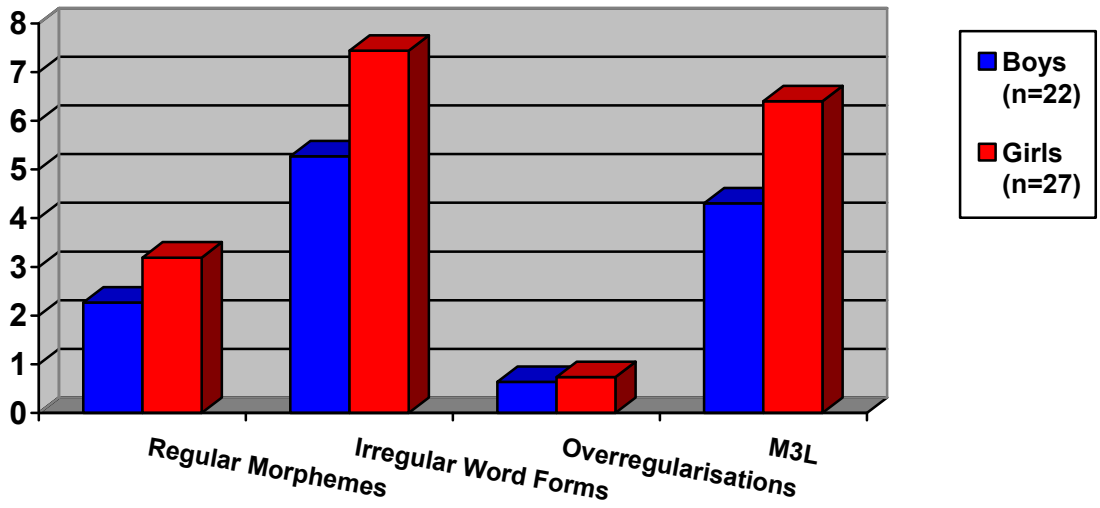


Figure 8.6 Mean scores for boys and girls on grammatical measures

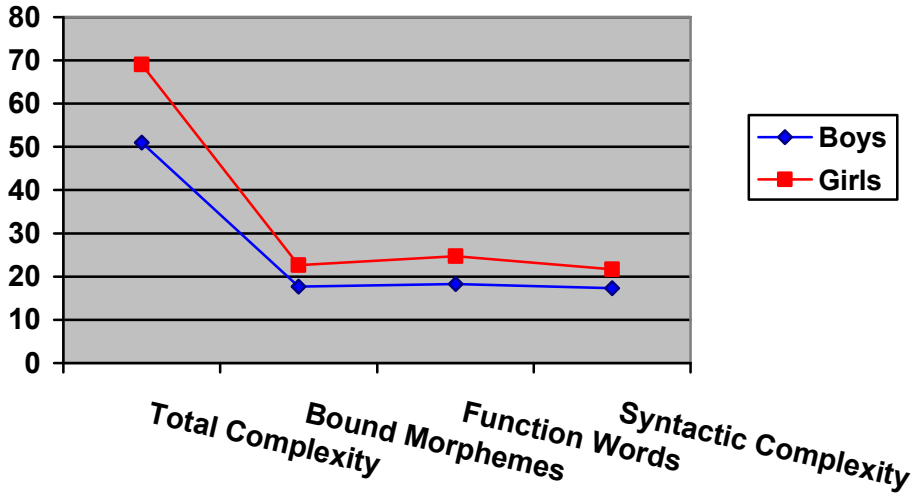


Figure 8.7 Mean scores for boys and girls on grammatical complexity

As can be seen, girls scored marginally higher than boys in all of the grammar targets, however, t-tests based on the entire group scores indicated that there was no significant difference on any of the measures. Other versions of the CDI, such as the German version, found that gender accounted for 1.08% of the variance in grammatical complexity, with girls having higher scores overall. However, much like the current study, the difference was not very large (Szagun et al., 2006). Fenson et al. (1994) noted that on overall measures, girls do seem to have slightly higher scores, but this difference is not captured at the individual ages, even despite the large numbers involved in their study. On the other hand, they did find that birth order accounted for a portion of the variance in M3L and grammatical complexity, which also accounted for 5% and 3% of variance in the current study respectively, with grammatical skills decreasing minimally as the order in the family increased. Overall, these findings reflect the outcome of the vocabulary scales, with boys and later-born children being marginally behind girls and first born children at certain stages of development.

Finally, although there was not enough variability in socioeconomic (SES) status in the current study to produce meaningful results, previous research has found a link between SES and syntactic development in children, as mothers with higher SES tend to talk more to their children and use longer, more syntactically complex utterances

(Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002). One study based on CDI data (Feldman et al., 2000), noted that SES was positively associated with most sections on the words and sentences version, including sentence length and complexity, although there was a negative correlation between SES and the use of overregularised and irregular word forms (significantly so for overregularisation). It was concluded that the sections of the CDI which require more subjective interpretation (such as vocabulary comprehension and expressive grammatical development), may be overestimated in parents with lower SES. This is also noted by Vasilyeva et al. (2008) who hold that the syntactic part of the CDI may be more vulnerable to errors in parental interpretation than vocabulary as they require judgement around lexical items, do not indicate how productive an item needs to be and involve some degree of syntactic analysis. Their own study, which involved a longitudinal study of children from diverse SES backgrounds, found striking similarities among children on measures of basic syntax (including declaratives, imperatives and questions). However significant differences were noted in the acquisition of complex sentences, both in frequency and diversity. For example, children from high SES backgrounds began using object complements earlier and started using other types of complex sentences soon after that, while those from lower SES backgrounds persisted in having object complements as their only type of complex sentences. This finding would be worth exploring further with a larger and more diverse sample of Irish speaking children. On the other hand, as will be seen in the next chapter, the best predictor of grammar scores overall is most likely to be the child's productive vocabulary.

8.9 Plotting growth in grammatical development over time

The final aspect in the analysis of grammatical development captured by the Irish CDI is to describe the longitudinal profile in grammatical development. As described in the chapter on vocabulary development, growth curve modelling was used to profile the growth over time based on the six-monthly visits to the children. Once again, time was divided into four stages of approximately six-monthly intervals with T1 at 16-21 months (n=10); T2 at 22-27 months (n=11); T3 at 28-33 months (n=13) and T4 at 34 -40 months (n=15).

8.9.1 Maximum Sentence Length (M3L)

Starting with exploratory analysis for the maximum sentence length (M3L), Figure 8.8 below demonstrates the smoothed non-parametric growth trajectories for all 21 individual children over time.

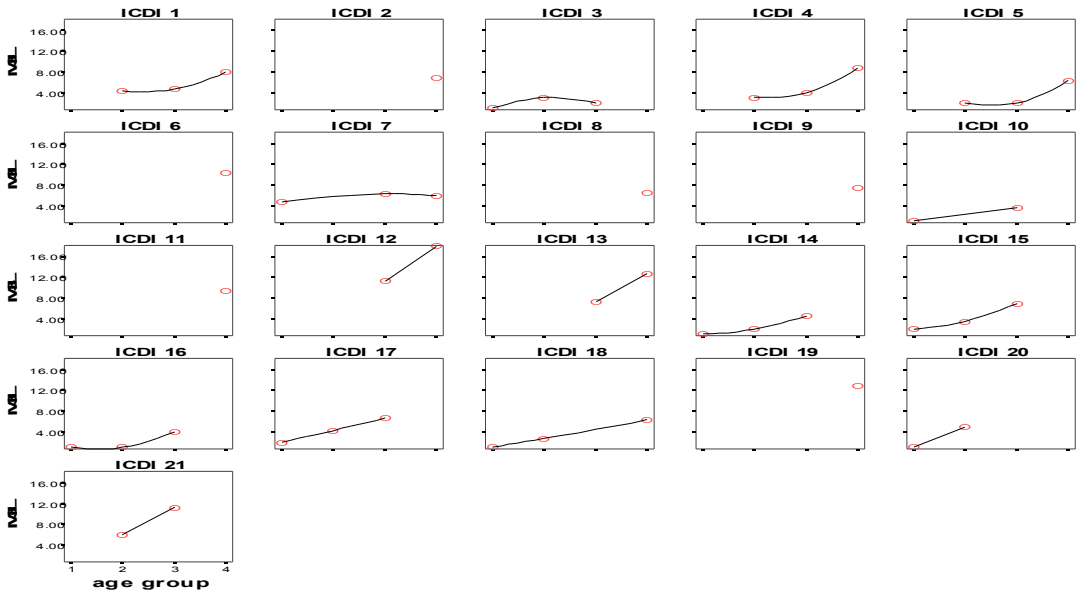


Figure 8.8 Smooth nonparametric trajectories superimposed on empirical growth plots for growth in M3L

As was observed in the trajectory for vocabulary development, the growth demonstrated here is largely linear for ICDI 10, 12, 13, 17, 18, 20 and 21, albeit to varying degrees. This demonstrates that the growth in M3L is relatively steady over time for these children, and there are no points of sharp acceleration. On the other hand, the growth trajectories for ICDI 1, 4, 5, 14, 15 and 16 are curvilinear in a concave fashion, with slow early growth followed by a spurt at the third time point. This could indicate that extensive grammatical acquisition for these children does not 'take off' until they have acquired a more solid basis of vocabulary acquisition, as in the 'critical mass' theory (Marchman & Bates, 1994). However, the growth for ICDI 3 and 7 is curvilinear in a convex fashion, with growth slowing down at the third time point. Thus early gains in grammatical development appear to reduce for these children once they have achieved a foundation in grammar. It is worth noting here, that ICDI 3 had previously been

identified as a potential late talker, and ICDI 7 came from a family with the largest amount of English-language input, which may have influenced the slow-down in their growth trajectories. ICDI 16 had also been previously identified as a potential late talker based on vocabulary scores, however her growth in MLU on first examination, appeared to be in line with other children in the sample. The issue of late-talking children will be explored later.

The next step was to estimate a within-person ordinary least square regression model, again taking linear growth as a descriptive estimate of each individual's trajectory to see if this fit with their data. Table 8.6 below contains the summary statistics with each participant's estimated intercept (initial status) and slope (rate of change). R^2 and residual variance summarise the goodness of fit of the model. As outlined for vocabulary development, there was only one data point collected for participants ICDI 2, 6, 9, 11, and 19, so a model of their growth could not be estimated. This left 16 participants in the analysis.

Table 8:6 Results of fitting separate within-person exploratory OLS regression models for M3L as a function of linear time

	Initial Status		***Rate of Change***				
Participant	**Estimate**	**SE**	**Estimate**	**SE**	**Residual Variance**	**R^2**	**Gender**
ICDI 1	.172	2.63	1.84	.85	1.43	.825	F
ICDI 3	1	1.87	.5	.87	1.5	.250	M
ICDI 4	-3.3	3.3	2.84	1.05	2.25	.877	M
ICDI 5	-3.9	2.9	2.5	.87	2.09	.810	M
ICDI 7	4.3	.85	.499	.287	.384	.751	F
ICDI 8	11.14	0	-1.2	0	0	1	M
ICDI 10	-.335	0	1.34	0	0	1	M
ICDI 12	-8.7	0	6.7	0	-	1	F
ICDI 13	-8.7	0	5.4	0	-	1	F
ICDI 14	-1	.935	1.75	.433	.375	.942	F
ICDI 15	-.83	1.25	2.5	.577	.677	.949	F
ICDI 16	-1	1.87	1.5	.87	1.5	.750	F
ICDI 17	-.36	.106	2.34	.05	.005	1	F
ICDI 18	-.830	.105	1.78	.05	.007	1	M
ICDI 20	-3	0	4	0	-	1	F
ICDI 21	-4.66	0	5.33	0	1	1	F

The analysis above demonstrates that linear regression fitted the data quite well for most of the participants (R^2 values are over .75 in most cases), although it did result in a negative starting value for some participants. However, for ICDI 3 the fit was very poor, which was also evident from the visual inspection of his individual growth profile. The growth was in a positive direction for most children, apart from ICDI 8 whose longest utterance decreased by 1.2 words at the second time point. As was noted for his vocabulary development, this finding reflects that this child was already at ceiling at the first time point, and did not make observable gains in MLU over the six-monthly period. It is important to highlight however that MLU was captured in words, and so any morphological or morphophonological development would not be reflected in this score. All other children appeared to make steady progress in their maximum sentence length. Following this exploratory analysis, the individual results were summarised for the group by calculating the average estimated intercept and slope values for the 16 individuals above. These results are contained in Table 8.7 below.

Table 8:7 Descriptive statistics for the individual growth parameters obtained by fitting separate within-person OLD regression models for reported three longest utterances as a function of linear age (n=16)

	Initial Status (intercept)	**Rate of Change (slope)**
Mean	-1.25	2.5
Standard deviation	4.7	2.0
Bivariate correlation		-.91 ($p<.001$)

As can be seen, there was once again great variation in the starting MLU value with the standard deviation being much larger then the initial starting rate (again which is negative due to fitting a linear growth curve). The rate of change is more stable, with each member increasing MLU by an average of 2.5 words over the six-month period. There is also a strong, but negative correlation between the initial starting point and growth rate - in other words the higher a child's MLU at the starting point, the slower the child's MLU grows and vice-versa as might be expected with MLU (Rice et al., 2004).

As the values above are based on estimates as opposed to the true scores achieved, the next step was to formally model the growth over time using the MPlus software

(Múthen & Múthen, 1998-2007) as described in Chapter 6 on vocabulary development. Once again, conventional growth modelling was used, which meant holding residual variances equal due to the huge variability in the data and the small sample size, while re-scaling the variance to be on a similar level (dividing it by 200 in this case). However, unlike that reported for vocabulary development, the slope did not have to be fixed for the group, probably because a linear model fitted the growth in maximum sentence length data for all children, with minimum variance. As the fit statistics were good for this model (i.e., the chi-square result was non-significant, λ^2 (8) = 0 p=1; CFI=1 and RMSEA was less than .06 at a value of 0), the output parameters could then be explored, which indicate what can be expected in terms of M3L starting values and growth over the six-monthly periods. These are presented in numerical format in Table 8.8 and graphical output in Figure 8.9 below. The output parameters were re-scaled up (x 200) in order to provide meaningful output for maximum sentence length.

Table 8:8 Parameter details relating to growth curve modelling of M3L

Parameter	**Coefficient**
Intercept (mean)	.007 (x200) = 1.4
Intercept (variance)	.28 (x200) = 56
Slope (mean)	.012 (x200)= 2.4
Slope (variance)	0 (linear)
Slope change values	
Time 1	0
Time 2	1
Time 3	2
Time 4	3
Estimated Means	**Sample Means**
Time 1 = .007 + .012(0) x 200 = **1.4**	2
Time 2 = .007 + .012(1) x 200 = **3.8**	3.4
Time 3 = .007 + .012(2) x 200 = **6.2**	6.4
Time 4 = .007 + .012(3) x 200 = **8.6**	9.2

The table demonstrates that based on the growth model, children should have an average M3L of 1.4 at time 1 (16- 21 months), and that over subsequent 6-monthly periods, it should grow by an average of 2.4 words. A similar profile is captured by the graphic output below.

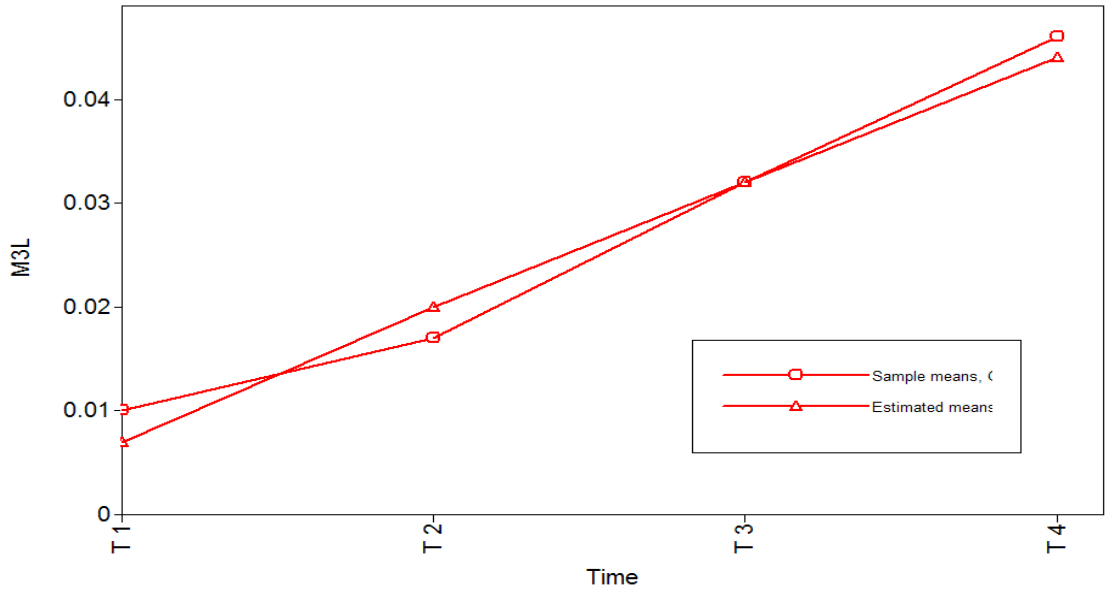


Figure 8.9 Growth in M3L over time (scaled)

The graphic output demonstrates that the estimated linear model describes the growth in M3L well. The findings are largely in line with previous research on the longitudinal development and growth curve analysis of MLU. For example, Rice et al. (2006) observed linear growth in steady acceleration for MLU in both children with SLI and typically developing controls. Moreover, they also observed that the trajectory of the younger group showed a slight tilt in growth as they started somewhat lower and ended slightly higher than the others. This fits with the pattern observed in the current study where those who started off lower made more rapid acceleration. However, Rice et al. (2006) did observe nonlinear points of acceleration when they compared the relationship between growth in MLU and vocabulary scores over time, and suggested that multivariate analyses of growth might be a better way of capturing this development. Much like the current study however, because of a lack of variance in linear growth for the vocabulary scores, multivariate analysis was not possible. Nonetheless, the advantage of using statistical modelling is that the results can be used as a reference of typical development against which other children's scores can be compared, thus providing more reliable normative data than using means and standard deviations alone.

8.9.2 Complexity

The other aspect of grammatical development over time to be captured by the ICDI was overall growth in grammatical complexity. Similar to the analysis of M3L, descriptive investigation of grammatical complexity was first carried out on an individual basis by plotting individual smoothed trajectories of the growth patterns of each child over time, as captured in Figure 8.10 below.

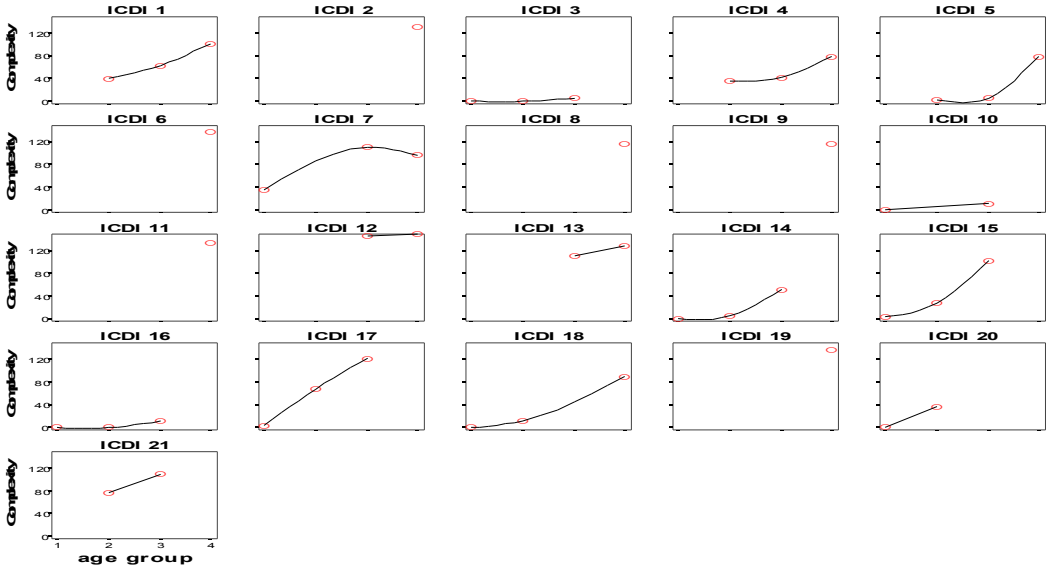


Figure 8.10 Smooth nonparametric trajectories superimposed on empirical growth plots for growth in grammatical complexity

As can be seen, the growth in grammatical complexity from T1 to T2 was very slow for some children (ICDI 3, 10, 14, 16 and18) whereas others grew more sharply over this period (ICDI 15, 17, and 20). From T2 (22- 27 months), to T3 (28-33 months), growth was larger for most children (apart from ICDI 3, 5, 10 and 16 where growth remained low). Finally, over the last time period, the growth trajectory was once again steep for most children apart from ICDI 7, whose grammatical complexity scores reduced over this time period. This was a similar profile to her growth in M3L over time, and although this could have been because she was already reaching ceiling at the previous time point, it may also be linked to the increase in the amount of English in the home over this period. For three children (ICDI 3, 10 and 16) grammatical complexity scores

remained low at all three occasions, and for two of these children, was linked to their slow vocabulary development. The next step was to summarise each child's growth trajectory by applying an Ordinary Least Square linear regression (OLS) model for each individual. Table 8.9 below contains the summary statistics from all within-person linear regression models with each participant's estimated intercept (initial status) and slope (rate of change).

Table 8:9 Results of fitting separate within-person exploratory OLS regression models for grammatical complexity as a function of linear time

	Initial Status		***Rate of Change***				
Participant	**Estimate**	**SE**	**Estimate**	**SE**	**Residual Variance**	**R^2**	**Gender**
ICDI 1	-23.4	13.5	30.5	4.33	37.5	.980	F
ICDI 3	-3.3	3.1	2.5	1.4	4.17	.750	M
ICDI 4	-14	26.9	22	8.7	150.0	.866	M
ICDI 5	-75	134.6	33.7	40.1	4430.3	.746	M
ICDI 7	20.9	37.1	22.4	12.6	743.14	.760	F
ICDI 8	172	0	-14	0	-	1	M
ICDI 10	-6	0	6	0	0	1	M
ICDI 12	133.0	0	4	0	-	1	F
ICDI 13	63	0	16	0	-	1	F
ICDI 14	-33	26.2	26	12.1	294.0	.821	F
ICDI 15	-55.3	31	50	14.4	416.7	.923	F
ICDI 16	-7.3	6.9	5.5	3.2	20.17	.750	F
ICDI 17	-54.7	6.9	59.5	3.18	20.17	.997	F
ICDI 18	-39	17.68	31.28	6.68	208.29	.956	M
ICDI 20	-37	0	37	0	-	1	F
ICDI 21	15	0	31	0	-	1	F

As can be seen, the linear model once again describes the profile of most of the participants, as the R^2 value explains over 75% of the variance in all cases, although it did result in a negative starting value for most of the participants. The rate of change was in a positive direction for most children, apart from ICDI 8, which was in line with the previous discussion of this child's M3L and vocabulary development. The final step before more formal modelling was to calculate the mean estimated intercept and slope values, the sample variance of these as well as the correlation between them using SPSS. These results are contained in Table 8.10 below.

Table 8:10 Descriptive statistics for the individual growth parameters obtained by fitting separate within-person OLD regression models for complexity as a function of linear age (n=16)

	Initial Status (intercept)	**Rate of Change (slope)**
Mean	3.49	21.86
Standard deviation	21.86	18.94
Bivariate correlation		-.722 ($p<.001$)

As is evident, the children started at a relatively low average point for complexity (at a score of just 3.5) although the rate of change was quite rapid (by 21.86 at the 2nd time point). There was also a strongly negative correlation between these aspects- thus the lower the starting point, the steeper the growth. Finally, an attempt was made to capture a statistical model that described the data using true values as opposed to estimates with the MPlus programme. However, despite attempting a variety of model types, the fit statistics for growth in grammatical complexity remained poor. This was most likely due to the huge variability observed and the small numbers involved, and so it was not possible to state that the growth curve produced by the model description was statistically significant (see Figure 8.11 below). It is worth noting that the estimated slope and the sample means had very similar growth trajectories, and seemed to indicate that the growth for the group was slower over the first two time points, and then rose sharply from 30 months. However because of the poor fit statistics, we cannot claim that the model identified is statistically similar to what is observed in the data. Dixon and Marchman (2001) raise concerns about using such complex statistical procedures with small data sets, and hold that for some factors to be identified, a large sample size (of almost 300 data points) is required.

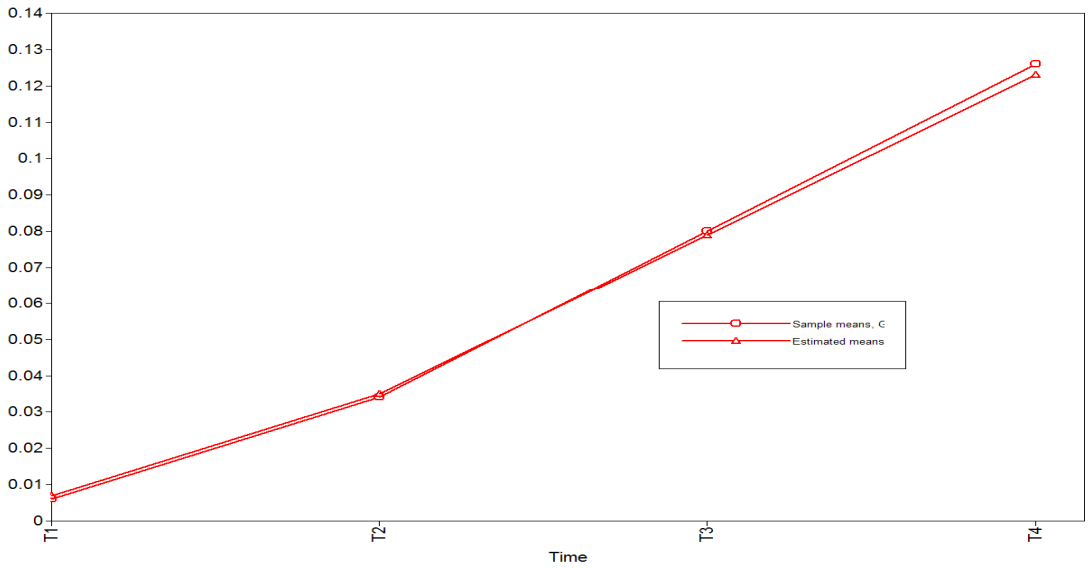


Figure 8.11 Growth in grammatical complexity over time (scaled)

Although we cannot make strong conclusions as to the nature of the growth in grammatical complexity scores, it is worth noting that previous related research on the growth trajectories of grammatical morphemes have observed that the growth is non-linear. For example, other versions of the CDI noted that the growth in all grammatical skills grew in a quadratic fashion, rising sharply after 2 years (Dale, 1991). In addition, a slow acceleration rate at the onset of grammatical acquisition, followed by sharper growth has been noted once certain language-related environmental events and innate individual differences emerge (Rice et al., 1998). However, this growth profile depended on the particular morpheme being observed. For example, plural marking and third person singular marking in English-speaking children have different growth trajectories and do not develop in synchrony with other grammatical tense marking such as past tense and irregular auxiliary verbs (Rice, 2004). Plural marking has been found to follow a pattern of slow initial growth followed by rapid acceleration and a final period of levelling off, in a typical S-shaped curve, as was described for vocabulary development. Third person singular marking on the other hand shows a strong quadratic growth trajectory, meaning that it increases steadily and sharply (almost by four-fold) over each time point. Although there were too few numbers in the current data set with too large individual differences to estimate such a model, this may be considered for future research.

8.10 Late Talkers

As discussed in the introduction, the aim of developing an early language assessment is that it can be used as a screening tool to identify children who are late talking in relation to their peers. Although many late talkers go on to develop language in line with their age-matched peers, even among these 'late bloomers', scores on measures of grammar as well as narration, reading, and language-based academics are statistically if not clinically, lower than those of matched peers. Furthermore, these differences persist into adolescence (Rescorla, 2000) and many go on to have a diagnosis of specific language impairment, thus the earlier they can be identified and provided with appropriate intervention the better the outcome (Dale, 1991). Much like that observed in the vocabulary development, two children (ICDI 3 and 16) appeared to have a slower developmental trajectory in grammatical development when compared to others. Therefore it was decided that more detailed analysis of the grammatical profile of these children should be carried out. Table 8.11 below compares the mean grammatical scores achieved by these children at the various ages with the group averages (in brackets).

Table 8:11: Grammatical scores for potentially late-talking children

Child	Age (mths)	Regular Morpheme	Irregular words	OG	Combining	M3L	Complexity
ICDI 3.1	18	0 (0.4)	0 (0)	0 (0.1)	not yet	1 (1.6)	0 (4.2)
ICDI 16.1	16	0 (0.4)	0 (0)	0 (0.1)	not yet	1 (1.6)	0 (4.2)
ICDI 3.2	24	0 (1.4)	0 (1.7)	0 (.36)	sometimes	3 (3.3)	0 (27.6)
ICDI 16.2	22	0 (1.4)	0 (1.7)	0 (.36)	not yet	1 (3.3)	0 (27.6)
ICDI 3.3	30	0 (1.4)	0 (7.4)	0 (.77)	sometimes	2 (5.8)	5 (68.5)
ICDI 16.3	28	1 (1.4)	1 (7.4)	1 (.77)	sometimes	4 (5.8)	11 (68.5)

As can be seen, the grammar scores achieved by both children at 16 and 18 months are more or less in line with the group average. However, by about two years the delay is apparent, particularly in terms of grammatical complexity. It was interesting to note that at 24 months, the maximum sentences length of ICDI 3 was in line with the rest of the group. This may have been due to the use of the formulaic phrase 'tá sé te' *it is hot* which was the only long example given at that age, and it could be questionable how productive this sentence really was, particularly as his maximum sentence length was

reduced to an M3L of 2, six-months later. At this time point (T3) ICDI 3 was once again markedly delayed in relation to the group, as is evident in all of the grammatical measures, particularly the number of irregular words used, M3L and grammatical complexity. ICDI 16 on the other hand began to make gains in grammatical development at this time point, and for three of the six main grammar measures (regular morphemes, overgeneralisations and maximum sentence length) was largely in line with those in her age group. It was interesting to note that in the growth trajectory for M3L was steeper than growth in grammatical complexity for this child. As M3L was calculated in words, it may have been that this child was adding words together but not yet adding grammatical morphemes at this age. This may indicate that she was using a more expressive or holistic style of language learning (Bates et al., 1994) where children reproduce long but relatively unanalysed strings of words. Further analysis of the spontaneous language samples of these children may reveal more information about the grammatical development of these children and reveal potential markers of language impairment in Irish.

8.11 Summary and Conclusion

Crosslinguistic research on the acquisition of morphosyntax reveals that children differ not only in the age at which they acquire particular morphemes but also in the style in which they select and produce grammatical aspects depending on the language they are acquiring (Behrens, 2006). The data analysed here for Irish language acquisition, revealed that children acquire the morphosyntax of the language in a very similar way to those acquiring other languages (e.g., M3L). However, because of the rich inflectional system of Irish, some aspects are acquired relatively earlier (e.g., word combinations) and with apparent ease (verbal nouns). On the other hand, other aspects such as overgeneralisation do not occur frequently due to the highly irregular nature of inflectional morphemes in the language, which also results in a relative delay in this aspect in comparison to those children acquiring other languages. Why is it that some grammatical morphemes are acquired with ease in a language, while others are more difficult? According to Peters (1997; 181) “Grammatical morphemes are relatively easy

to acquire when they are frequent, easy to segment, have a fixed position relative to an open-class stem, have a clear function, and have an easily recognisable form". As was outlined in this chapter, many of the grammatical morphemes in Irish, including initial mutations, although frequent, are difficult to segment, have varying functions and do not have a consistently recognisable form, and so present Irish-speaking children with a challenge.

Furthermore, although acquired at different ages, there was a general developmental progression from the addition of bound morphemes, to inclusion of function words, to expansion of phrase-level aspect and addition of clausal elements in the development of syntactic complexity as seen in other languages. Caselli et al. (1995) noted that there is no 'universal telegraphic stage' and no single order in which grammatical structures of a particular type are acquired. Thus the data above revealed that although some grammatical morphemes developed in a similar order across Irish and English, they were at very different rates due to the different complexities involved. The reason for this phenomena was attributed to the finding that "wherever conceptual complexity fails to predict actually order of acquisition, we find some pocket of relative linguistic difficulty" (Johnston & Slobin, 1979, p. 541). These differences in rate of language development present serious problems for the idea that all children develop on a single maturational timetable. In addition, for a variety of reasons (maturational, environmental, temperamental or language-related) some children rely more on one style of language learning than another. This was captured very well by the individual growth plots of the children (Figures 8.9 and 8.11 above) which revealed that while some children increased their MLU or added grammatical complexity items in a steadily increasing linear fashion over age, other children had a trajectory that began slowly, and once a critical mass of grammatical skills were developed, grew sharply before finally reaching a plateau. In fact, variation in the acquisition of grammatical complexity skills was so great that a model to describe the trajectory for the group could not be identified, unlike that found for M3L which was reliably linear. For two children grammatical progress remained slow at all time points (much like their vocabulary development) although one of these children seemed to improve at the third time point. Furthermore,

sources of variability in the acquisition of grammar, including age, gender, and birth order also emerged for the Irish-speaking children, although gender and birth order only had a marginal effect early in development.

Taken holistically, the development of grammar captured by the ICDI and supporting elicitation tasks revealed that although the children produced creative errors early in their language development, their first sentences were tailored to and shaped by the structural properties of their native language, in line with the description of language acquisition by Caselli et al. (1995). For example, although the children did produce some overgeneralisation errors on noun plurals, noun bases (from initial mutations) and verb tenses, in general, the children always used the VSO word order of Irish, and placed the modifying adjective after the noun. Although it could be argued that based on age comparisons, the Irish-speaking children were slightly delayed in their acquisition of morphosyntax when compared to those acquiring other languages, age-based comparisons are notoriously unreliable (Lieven et al., 1992) and so it is more meaningful to compare across languages based on vocabulary levels – something which will be carried out in the next chapter.

9 The relationship between vocabulary and grammar

This final chapter will attempt to outline the nature of the relationship between achievements in vocabulary with those of grammar as captured by the ICDI, and how these may shed light on language acquisition theories. The main theoretical argument centres on the well-known nature-nurture debate, and the ontogeny of the language faculty. Marchman (1997) describes how on one side, the assumption is that language acquisition requires a considerable degree of direction from innate, domain-specific cognitive mechanisms that are triggered with minimal environmental input, such as 'Universal Grammar', (Chomsky, 1986). Proponents of this view argue that a language subsystem such as grammar is an autonomous module that is structurally and developmentally separate from the lexicon as well as the rest of non-linguistic cognition. The other side of the debate holds the view that language acquisition involves integration of cognitive-linguistic and communication information drawn from interaction with the physical and social world (Marchman, 1997). In contrast to the domain-specific view, this theory holds that the acquisition of vocabulary and grammar emerge through complex interactions between domain-general learning mechanisms and an intricately structured, multiply-faceted world of which the child becomes increasingly aware. The profile of vocabulary and grammatical development provided by the ICDI, in addition to the longitudinal aspect of the current study, allow us to investigate the developmental ordering of these features and the relationship between vocabulary categories and particular aspects of morphosyntax. According to Dixon and Marchman (2007), this type of investigation can address fundamental questions such as whether the development of the various aspects of the system are unrelated, develop along a common course or whether one aspect of the system is contingent upon the development of another.

If the modular theory is correct, then the data from the ICDI should reveal dissociations between the achievements in vocabulary and grammatical skills. Conversely, if grammar and vocabulary develop from domain-general processes, then we should observe interdependencies between these skills across the ICDI data. Although

this debate has been previously studied in other languages, the study of the Irish language can further add to the literature as it has structures which are considered in the minority among world languages (including a VSO word order and complex morphophonological rules). This chapter will begin by comparing the results from the Irish data with those of the crosslinguistic research, to confirm previous findings, as similar observations of the relationship between vocabulary and grammar should be observed across all natural languages (Bates & Goodman, 1997). Subsequently, the longitudinal nature of this relationship will be analyzed using statistical modelling, as it is more reliable than collapsing results from crosssectional data (Rice et al., 1998). Finally, the predictive validity of vocabulary for later grammatical measures will be explored, not only for its theoretical significance, but also to add to previous findings of validity and reliability of the ICDI, such as whether parents can reliably differentiate development of vocabulary from that of morphosyntax. All of these aspects will be considered in light of the theoretical links between grammar and the lexicon.

9.1 Intercorrelations among aspects of the language system

We begin our analysis with an examination of the intercorrelations among the main aspects of vocabulary (including total composite vocabulary and the various lexical categories targeted) with those of grammar (including M3L, grammatical complexity and irregular word forms) as captured by the ICDI. Table 9.1 below contains the results of these aspects using Pearson correlations, with the second value in each pair representing the correlations controlling for the effects of age. All values are significant at $p \leq .01$.

Table 9:1 Intercorrelations among components of the CDI: Words & Sentences

		Grammar			
		M3L	**Complexity**	**Word Forms** (irregular)	**Regular Morphemes**
Vocabulary	**Total vocabulary**	.87 (.71)	.94 (.82)	.90 (.73)	.90 (.75)
	Common Nouns	.82 (.59)	.88 (.67)	.81 (.53)	.83 (.60)
	Predicates	.87 (.72)	.93 (.82)	.91 (.79)	.89 (.75)
	Social Words	.82 (.59)	.91 (.75)	.84 (.58)	.89 (.72)
	Closed Class	.85 (.71)	.91 (.82)	.92 (.84)	.87 (.74)
	Verbs	.85 (.68)	.90 (.76)	.91 (.79)	.86 (.70)

As can be seen, all correlations between grammar and total vocabulary measures were strong, and were slightly higher for Irish than those reported in the original MCDI study, which reported Pearson correlations of .78, .82 and .83 between total vocabulary and M3L, grammatical complexity and irregular word forms, respectively (Fenson et al., 2007). The correlations found for Irish were also slightly higher than those reported for Hebrew, which reported correlations of .77 between total vocabulary and grammatical complexity and .52 between total vocabulary and M3L (Maital et al., 2000). However, the values were similar to those reported for other language-versions of the CDI, including the Finnish (Lyytinen & Lyytinen, in press) and Spanish (Mariscal et al., 2007) adaptations. The Spanish adaptation reported strong correlations between vocabulary and grammatical complexity (.91) and between vocabulary and the number of regular morphemes (.91), although lower vocabulary and M3L correlations (.70) and vocabulary-irregular morphology correlations (.79) than the current study. Overall, the findings of a strong association between the lexicon and grammar are in line with previous studies, including a large-scale study involving more than 5000 two-year old twins (Plomin, Colledge, & Dale, 2002) and for other populations such as early talkers (McGregor, Sheng, & Smith, 2005), late talkers, children with focal brain injuries and developmental disabilities (Bates et al., 1995).

Fenson et al. (1994) hold that it is unusual to find relations this strong in studies of behavioural development and as the correlations are so large, they appear to approach statistical identity. As noted following previous regression analysis, age is a significant

factor in the development of both vocabulary and grammar, therefore it was important to partial out this effect so that associations were not taken to be an artefact of age (Bates & Goodman, 1999). As can be seen, when age was partialled out, correlations remained significant and strong between total vocabulary and all grammatical measures, demonstrating that there was no evidence of any dissociations between early measures of vocabulary and grammatical development. This was also in line with findings from an earlier study using the CDI by Fenson et al. (1994) who noted that vocabulary is as highly correlated with M3L and grammatical complexity as the latter two are correlated with each other (.89). These findings play an important role in theoretical claims regarding the nature of language learning (Dale, Dionne, Eley, & Plomin, 2000; Marchman et al., 2004) as will be explored below.

Further exploration of the relationship between vocabulary and grammar was carried out by correlating results from the main lexical categories of nouns, predicates, social words, closed class and action words (as described in previous chapters) with the various measures of grammar. This analysis revealed that all aspects of the lexicon were strongly and significantly correlated with measures of grammar. However, once age was partialled out, it appeared that lexical items which are more central to the development of morphosyntax (such as verbs, predicates and closed class items) had higher correlations with the various measures of grammar than more general lexical categories (i.e., common nouns and social words). These associations were slightly different for vocabulary types and regular morpheme usage, which, although lower for common noun correlations, (r=.60) were strong, and similar for the other word types including social words (ranging from r=.72 to .78). This might indicate that for this item, parents were responding to children who could be considered to be chatty and sociable when assessing grammatical development, although we will return to this issue. McGregor et al., (2005) note that as predicates serve as a core of sentence building, their high representation in the lexicon signals emergence of grammar. Likewise function words carry a heavy grammatical load in Irish, such as marking case (pronouns and prepositional pronouns), modality (auxiliaries), and the linking of phrases and clauses (conjunctions) and so it is not surprising that we find a stronger link to grammar among these items.

It was interesting to note that Bates et al. (1994) did not find that early usage of closed-class words reflected the early emergence of productive grammar. Their study observed that children who had less than 400 words had a weak, negative correlation between lexicon and grammar, which they claim suggests that the first function words are learned as memorised routines that may bear little relationship to the emergence of productive grammar (Caselli et al., 2001). However, once the children reached the 400 word mark, there was a strong relationship observed between the proportional growth of function words and indices of grammatical production, including MLU and inflections. A similar analysis was carried out for the Irish data, by contrasting the various correlations between vocabulary size and grammar as reported above. Children were grouped into eight Irish-vocabulary categories (i.e., words children only knew in English were excluded): 1-50 words (n=7); 51-100 words (n= 4); 101-200 words (n= 6); 201-300 words (n= 3); 301-400 words (n= 6); 401-500 words (n= 7); 501-600 words (n= 8) and >600 words (n=8). In line with the findings of Bates et al. (1994) however, there was no reliable relationship between the number of grammatical function words (closed class) and measures of grammar until the children had a minimum of 400 words (Spearman r=.79 and .82 $p \leq .05$ for M3L and grammatical complexity respectively). As will be seen later, this analysis shows that it is not only the quantity of lexical development that is important, but also the nature of the underlying vocabulary, as particular lexical categories appear to be more likely to form the basis of grammaticalisation than others (Bassano, 2000).

Fenson et al. (1994) hold that correlational values actually underestimate the close relations between measures of vocabulary and grammar, as indices of grammar cannot rise above zero until multiword speech begins, thus further confirmation of the link between the development of grammar and vocabulary was carried out via regression analysis. Previous analysis indicated that age, gender and to a lesser extent birth order, accounted for some of the variability noted in grammatical development. However, when total vocabulary was entered into the regression alongside these factors (and parental education) it accounted for 88% of the variance in grammatical complexity and 75% of the variance in M3L. Moreover, age no longer accounted for any of the variance in M3L

and only accounted for a further 1% of the variance in grammatical complexity. This was much like the findings in Italian and English where vocabulary size was a much stronger predictor than age for all measures of grammar (Devescovi et al., 2005) and so total vocabulary size may provide a better basis for cross-language matching in comparative studies of grammatical development. Therefore, one final step before considering the findings in light of wider theoretical issues was to group the children based on their vocabulary size and explore the corresponding growth in their grammatical skills.

As before, it was the link between Irish vocabulary and Irish grammatical items that was of interest, and so if the child *only* knew a lexical item in English, this was removed from the analysis and children were grouped into eight vocabulary categories as described above. Figure 9.1 below outlines the growth in grammatical complexity as a function of vocabulary size for Irish, and compares it to scores achieved by children in other language-adaptations of the CDI where available. The maximum complexity scores have been re-calculated to be on a similar scale across the adaptations, as described in the previous chapter.

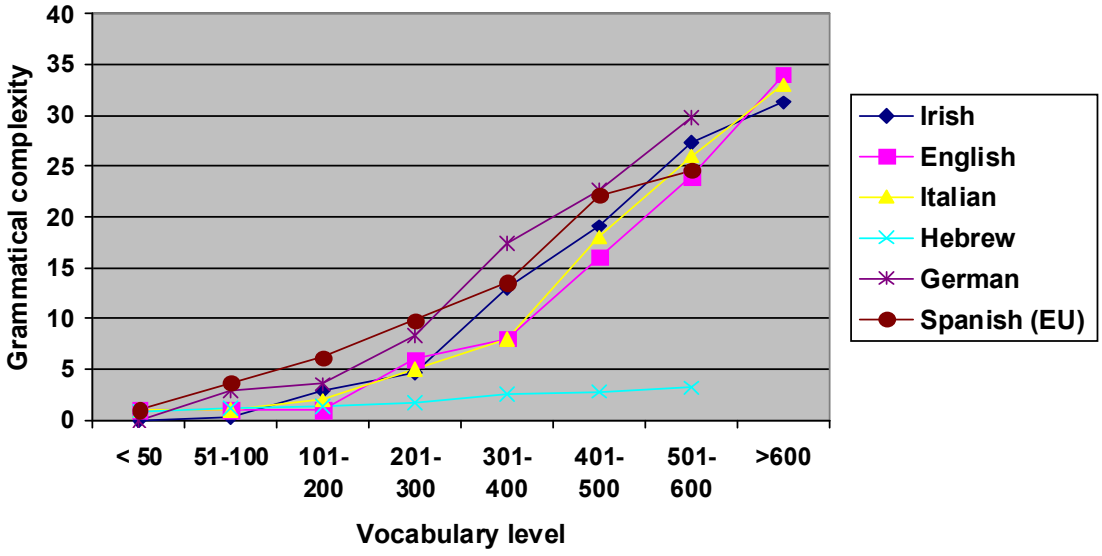


Figure 9.1 Grammatical complexity as a function of vocabulary size.

As can be seen, when the children had less than 200 words, their grammatical complexity scores were at or close to zero (although previous analysis revealed that they

did begin to combine words once they had vocabularies of between 50 and 200 words). This was also largely in line with that reported in other languages (e.g. Bassano et al., 2005; Bates et al., 1995; Caselli et al., 2001; Szagun et al., 2006 and Thordardottir et al., 2002). Once the children have between 200 and 300 words however, grammatical development increases rapidly for children acquiring Irish, Spanish and German, and increases once they have more than 400 words for those acquiring English and Italian, (Bates & Goodman, 1997). This substantial growth rate appears to continue until the children have reached over 600 words in their productive vocabulary. The growth trajectory could be described as being non-linear, as at low vocabulary levels there is no corresponding grammatical growth, whereas at high vocabulary levels, grammatical knowledge increases as an increasing function of vocabulary (Szagun et al., 2006). This trajectory suggests that the more words the child knows, the more opportunities the child has to demonstrate inflection (McGregor et al., 2005). However, it should be noted that the data for the children acquiring Hebrew demonstrate a slow trajectory and linear relationship between grammatical and vocabulary development. This may have been because grammatical complexity in the Hebrew CDI is measured in a different way to other languages, and involves parents responding to eight possible sentence types, ranging from single words to complex sentences. Szagun et al. (2006) note that it is unclear whether this finding reflects a difference in the Hebrew language, but as considerable crosslinguistic evidence exists, there is a strong argument for the interdependence of early lexical and grammatical learning in line with the view of an early and non-modularised organisation of linguistic knowledge.

It is possible that the similarities in the vocabulary-grammar growth curves in Irish, English, Italian, Spanish and German are an artefact of the way the sentence complexity task is designed and measured across these languages (Szagun et al., 2006), and so further analysis was carried out using an alternative measure of grammar, that of the relationship between vocabulary size and the development of maximum sentence length, as measured by MLU in words. The results are demonstrated in Figure 9.2 below.

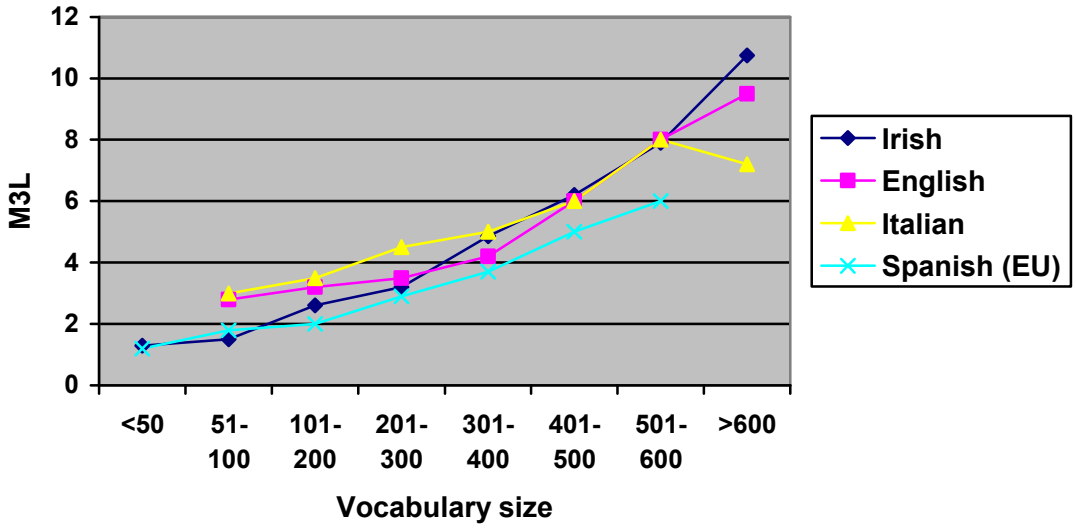


Figure 9.2 Maximum sentence length as a function of vocabulary size.

As was found in the previous chapter in age-based comparisons, it appears that the Irish-speaking children were also slightly delayed in their M3L based on vocabulary size until the 200-word level. Once again, it should be considered however that MLU was measured in words in the current study, but in morphemes in English and Italian, which could explain the difference. It is also interesting to note that at the lower vocabulary levels, the Italian children had marginally higher M3L scores in comparison to those acquiring Irish, English and Spanish, and M3L grew in a more steadily increasing linear fashion (although this was not observed in their grammatical complexity scores). This was interpreted as being due to the 'relatively rich, regular and consistently marked grammatical systems in Italian (which) may provide an easier target, requiring few exemplars (and smaller vocabularies) to support extraction of strong generalisations' (Devescovi et al., 2005, p. 783). Thus, grammatical development 'gets off the ground' earlier in that language. On the contrary, Thordardottir et al. (2002) found that due to the complexity and irregularity of morphological marking in Icelandic (as outlined in the previous chapter), these children required a larger critical mass than English-speaking children before grammatical regularity was found. In addition, Blesses et al. (2008b) hold that differences in grammatical developmental trends in various CDI-studies have been linked to minor language-specific variations in lexical content and in the early

composition of the lexicon across morphologically diverse languages. They note that these differences reflect the phonological complexity between sound and meaning across languages and cultural differences. For Irish, its morphological complexity may result in a similar delay, as Irish includes the system of initial mutations which are arguably less perceptually salient and applied irregularly, thus difficult to segment. In addition, the fact that irregular verbs not only have irregular inflections, but also have dependent and independent forms when used after negatives and question particles contributes to the complexity. Mutations force the Irish children to focus on the beginning of words (as opposed to Slobin's operating principle of 'the end of words') and might be linked to a slower acquisition profile.

Overall, as was noted for grammatical complexity, M3L in Irish increases as a nonlinear accelerating function of vocabulary size, and the growth becomes steeper once children have reached a minimum of 200-300 words in their expressive vocabulary. However, the sharp growth at the 200 word level is not as marked for M3L as that found for grammatical complexity, and may be linked to the fact that grammatical complexity is a much more detailed measure of grammatical achievement than M3L. Non linearity between early lexical and grammatical development has been reported across other languages (Bassano, 2000; Bates et al., 1988; Bates & Goodman, 1997; Caselli et al., 1999; Fenson et al., 1994; Stumper et al., 2008; Thordardottir, 2005), which suggests a developmental interaction between these domains, although does not infer causality (McGregor et al., 2005). Overall, the conclusion is that a minimum threshold of vocabulary development is required before grammatical development emerges, which supports the non-modular view of language organisation (Bates et al., 1995; Dale et al., 2000; Fenson et al., 1994).

The findings of a consistent relationship between lexical and grammatical growth across a variety of language types supports the claim that differences in the grammatical structure of the target language have little effect during the early emergence of grammatical structures. Thus, despite crosslinguistic differences in morphological marking and permissible word order variation, there is a powerful link between lexical

development and the emergence of grammar in this fundamental period of language development (Caselli et al., 1999). Further support for the association between grammar and the lexicon comes from a study by Marchman and Martinez-Sussman (2002) who had the parents of bilingual Spanish-English children fill out the CDI in both languages. Subsequent analysis demonstrated that within-language correlations were moderate to strong whereas cross-language correlations were weaker and non-significant. Although the correlations were slightly lower than those reported for monolingual children (Dale, 1991; Thal et al., 2000), they concluded that the results demonstrate that the association between lexical and grammatical learning does not result from a general cognitive ability but is specifically linked to the vocabulary and grammar within a specific language. Subsequent studies confirmed that lexical and grammatical skills are more closely linked within-languages than across languages (Conboy & Thal, 2006; Marchman et al., 2004), even considering the amount of exposure, general language skills and varying methodologies. All of these studies concluded that the ability to learn particular grammatical constructions in each language was constrained by how much language-specific vocabulary the child had attained and claimed to support the theoretical perspective that learning in the lexical and grammatical domains of language is continuous and based on a common mechanism.

9.2 Growth curve analysis of lexical-grammatical links

Rice et al. (1998) argue that because many of the previous studies are cross-sectional, the relationship between vocabulary and grammar is determined by collapsing evidence across the children's ages. They therefore hold that in order for this relationship to be reliably determined, it is essential to observe development using longitudinal studies. Furthermore, some researchers claim that behavioural measures of language may not accurately reflect the actual form of the underlying relationship (Dixon & Marchman, 2007) and so investigating this relationship using more reliable statistical techniques may further strengthen conclusions drawn from such studies. The next step in the analysis of the current study therefore was to capture the individual profiles for each child's grammatical development as vocabulary size increased. In order to reliably capture the growth trajectory for the group, growth curve modelling was carried out as in previous

chapters, except that instead of age being used as a metric of time, grammatical development was described in terms of growth in vocabulary size (ranging from <50 words to >600 words).

9.2.1 Growth in Grammatical Complexity over vocabulary size

Starting with exploratory analysis for the grammatical complexity, Figure 9.3 below demonstrates the smoothed non-parametric growth trajectories for all 21 children.

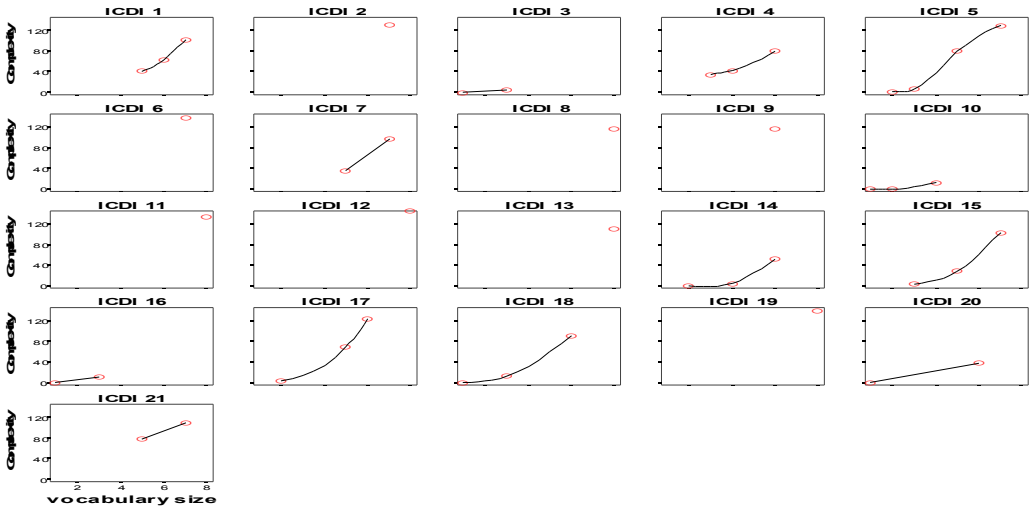


Figure 9.3 Smooth nonparametric trajectories superimposed on empirical growth plots for growth in grammatical complexity as a function of vocabulary size

The profile observed above is different to that noted in the previous chapter when grammatical complexity was profiled over age, in that all children demonstrate an upward, concave growth trajectory, although three children (ICDI 3, 10 and 16) had a slower rate of achievement in grammatical complexity over vocabulary size. After the initial exploration, formal modeling of the growth in grammatical complexity over vocabulary size was carried out using the MPlus software (Múthen & Múthen, 1998-2007) as before. Attempts were made to fit various exploratory models to the longitudinal data, including those with random slopes and intercepts, those looking for quadratic effects and those examining linearity. The model presented is the one that provided the

best fit to the data and as for previous data, involved conventional growth modeling, which meant fixing the slope so that a single trajectory was used to describe the profile for the entire group. In addition, the specified model involved holding residual variances equal and re-scaling the variance to be on a similar level (dividing it by 800 in this case) due to the considerable variability in the data and the small sample size. As the chi-square fit statistic returned a non-significant result (λ^2 (20) = 28.58 p=0.1), it was concluded that the specified model was accurate, and so the output parameters could then be explored. These are presented in graphical output in Figure 9.4 and numerical format in Table 9.2 below. The output parameters were re-scaled up (x 800) in order to provide meaningful output for maximum sentence length. As the variance was 0 at the first time point (i.e., all children with less than 50 words in their vocabulary had a grammatical complexity score of 0) this vocabulary size was removed from the model.

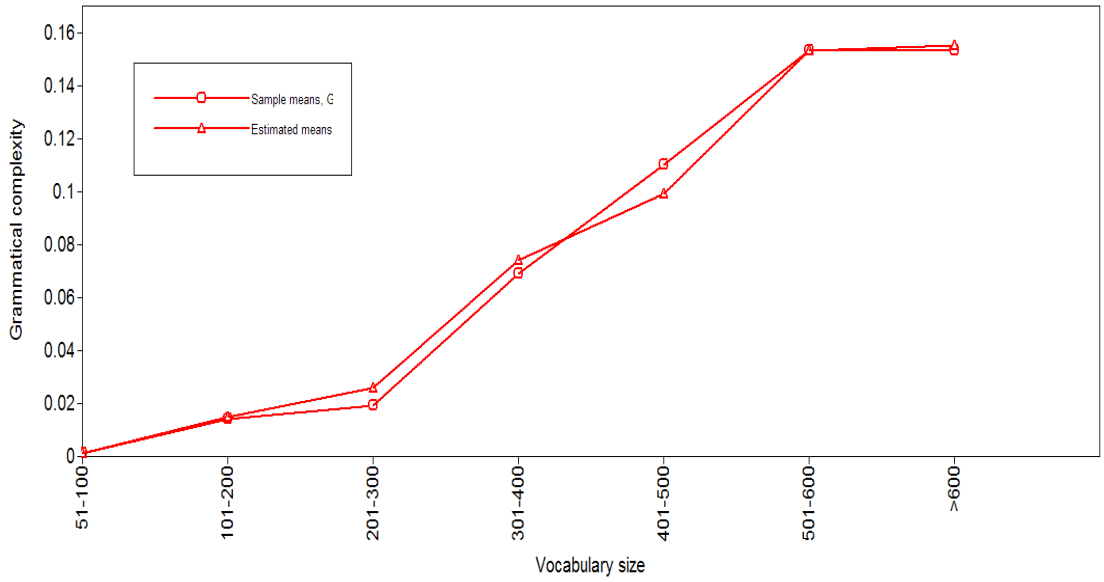


Figure 9.4 Growth in grammatical complexity as a function of vocabulary size (scaled)

As growth curve modeling of longitudinal data is claimed to be more reliable than merely plotting the information crosssectionally (Dale & Goodman, 2005), we can be more confident that the trajectory above confirms the nonlinear relationship between vocabulary and grammatical development observed in Figure 9.1 and 9.2 above. As before, we see little grammatical achievement until the 200-300 word mark, after which

there is steep acceleration in the development of grammatical complexity as a function of vocabulary. Unlike the previous analysis however, there is a plateau effect after the 600 word level, which as will be later outlined, might indicate a change in the relationship between these measures of language after a certain vocabulary size. The model parameters are outlined below and provide more reliable information regarding the growth in grammatical complexity that can be expected as a function of vocabulary in Irish, should the data be used to provide normative information.

Table 9:2 Parameter details relating to growth curve model for vocabulary development

Parameter		**Coefficient**
Intercept (mean)		.001
Intercept (variance)		0
Slope (mean)		.014
Slope (variance)		0
Slope change values		
51-100 words		0
101- 200 words		1
201-300 words		1.8
301-400 words		5.28
401-500 words		7.12
501-600 words		10.97
>600 words		11.17
Estimated Means		**Sample Means**
51-100 words = .001 + .014(0) x 800 =	**0.8**	1.25
101-200 words = .001 + .014(1) x 800 =	**12**	12
201-300 words = .001 + .014(1.8) x 800 =	**20.96**	19.67
301-400 words = .001 + .014(5.28) x 800 =	**59.94**	54.67
401-500 words = .001 + .014(7.12) x 800 =	**80.54**	79.86
501-600 words = .001 + .014(10.97) x 800 =	**123.66**	114.38
>600 words = .001 + .014(11.17) x 800 =	**125.9**	131

The estimates from the growth model in the table demonstrate that, when children have a vocabulary size of 51-100 words, their grammatical complexity scores should be approximately 1 (.08) on the ICDI, and once they have 300-400 words, should have a corresponding grammatical complexity score of 60 (59.94). Comparisons between grammatical complexity scores of children with 200-300 words with those who have 300-400 words, shows that the grammar scores increase three-fold (from about 21 to 60),

confirming the marked acceleration at this vocabulary level observed in other longitudinal studies (Moyle, Ellis Weismer, Evans, & Lindstrom, 2007; Tomblin & Zhang, 2006). The plateau in complexity scores once the children have over 600 words is also confirmed by the slow increase in scores from about 124 at 500-600 words to 126 at over 600 words. Szagun et al. (2006) carried out a similar analysis on the German CDI data and noted that for each grammatical measure, initially children had very slow growth (characterised by linear growth) and it was not until they reached vocabulary sizes of between 201 and 300 words that substantial growth occurred (as viewed by a quadratic trend). Although there were insufficient observations at each vocabulary size in the current study to identify a quadratic trend, further data collection may identify a more complex growth trajectory as observed in the German data.

9.2.2 Growth in Maximum Sentence Length over vocabulary size

The next step was to attempt to obtain a similar growth curve model for the M3L data. As above, initially the growth trajectories for individual children were plotted and smoothed in order to provide an estimate of the growth in the data, and are contained in Figure 9.5 below.

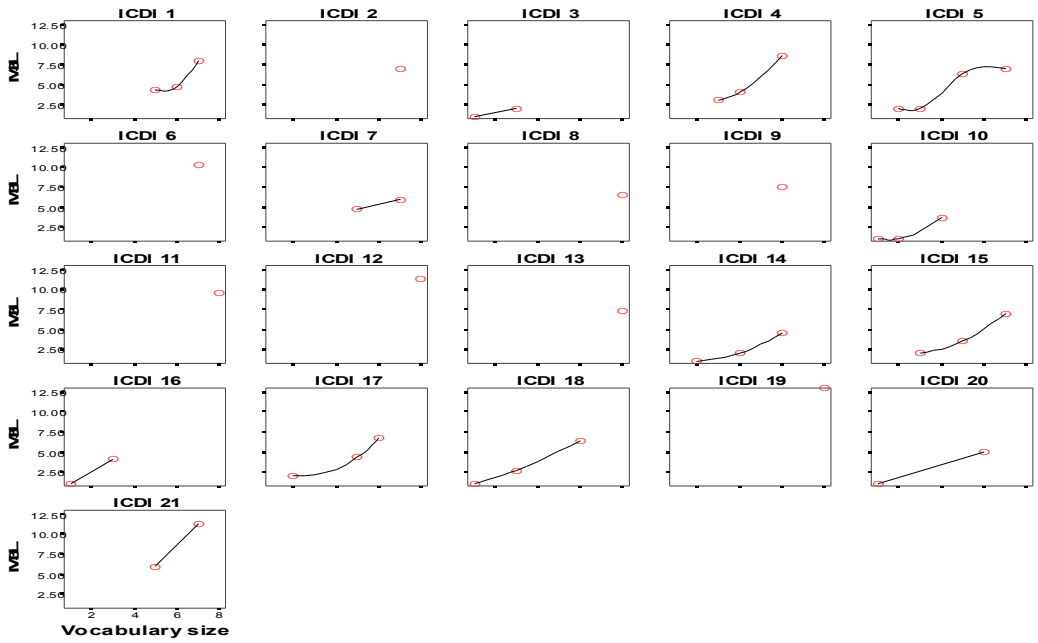


Figure 9.5 Smooth nonparametric trajectories superimposed on empirical growth plots for growth in M3L as a function of vocabulary size

Once again the growth trajectories in M3L for all children increased in line with vocabulary size, although there was a plateau effect for ICDI 5. Some children (e.g., ICDI 18) demonstrated linear growth for M3L, unlike the curvilinear profile for their growth in grammatical complexity (although some studies have noted a linear link between vocabulary and M3L, see McGregor et al., 2005). The growth in MLU for ICDI 16 was much steeper than that observed for her grammatical complexity, and as she was potentially a late talker, will be further analysed below. Although an attempt was made to capture a statistical model that describes the data using the MPlus programme, the fit statistics were poor. This was most likely due to the huge variability in terms of the growth profiles observed, and the finding of a negative acceleration at the 3rd time point, and so it was not possible to state that the growth curve produced by the model description was statistically significant (see Figure 9.6 below). According to Moyle et al., (2007) estimated parameters and p-values are misleading if the assumptions of the model are not satisfied. Nonetheless, the graph does indicate that overall, there is nonlinear growth in the development of M3L as a function of vocabulary size, much like that noted in the crosssectional profile of M3L noted in Figure 9.2 earlier in this chapter.

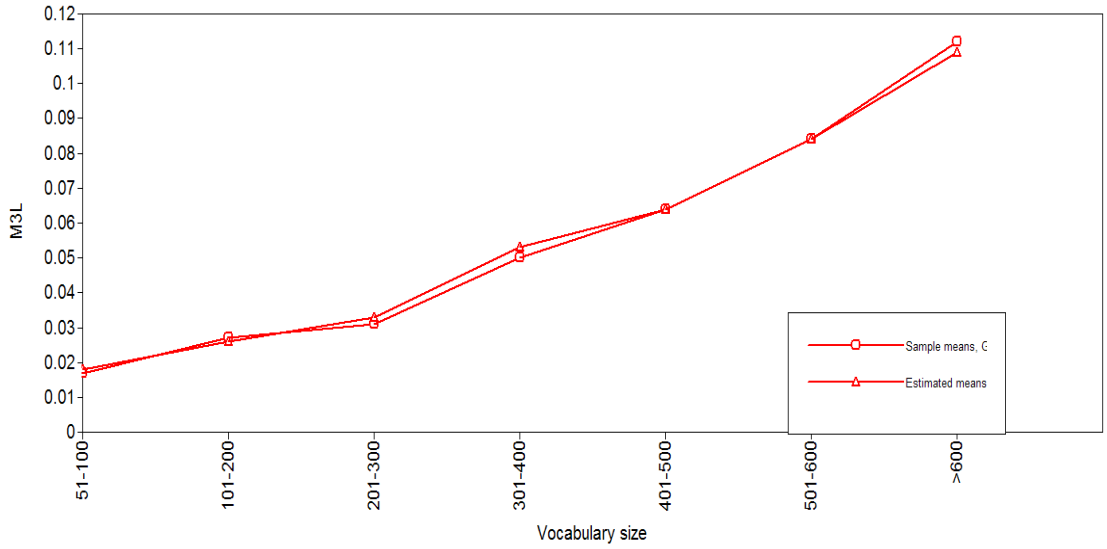


Figure 9.6 Growth in M3L as a function of vocabulary size (scaled)

9.3 Lexical- grammar relations

Bates and Goodman (1997) maintain that it is possible for various grammatical structures to need a critical number of lexical items within a specific class before they emerge. Therefore, as recommended by Dixon and Marchman (2007), investigations of the lexical-grammatical link should go beyond global measures of progress, and begin to map which particular features of children's lexical knowledge do and do not serve as the precursors for the child's abstraction of specific grammatical regularities in a more precise way. The final analysis was therefore carried out to investigate the lexical-grammatical development in greater detail. Previous research has identified that abstract grammatical abilities (e.g., producing rule-like use of inflectional morphemes, like 'daddy goed') emerge over the course of building a lexical system (e.g. Bates & Goodman, 1999; Dixon & Marchman, 2007). Dale et al. (2000) and Marchman and Bates (1994) also noted that verb vocabulary size is highly predictive of the onset of verb morphological forms, such as past tense marking, irregular word forms and overgeneralisations. The association between lexical and grammatical development is further illustrated in the lexical specificity of early use of tense, case, determiners and word order (Tomasello 1992; Pine & Lieven, 1997) and across languages as diverse as

English and Icelandic (Thordardottir, Ellis-Weismer, & Evans, 2002). Moreover, Chapter 7 on vocabulary development highlighted the relative advantage in closed-class vocabulary for those acquiring Irish as a first language and so it was worth investigating the relationship between size of verb and closed class vocabulary, and the onset of morphosyntax.

For this analysis, the children were divided into six categories based on their verb vocabulary sizes (ranging from 0 to 109) and eight categories based on their closed class total vocabulary sizes (ranging from 0 to 152). Figure 9.7 demonstrates the developmental profile of growth in maximum sentence length and irregular and regular word forms as a function of verb and closed class vocabulary size, respectively. As these measures were on a different scale, a second graph (Figure 9.8) compares both of these vocabulary measures with the achievements in grammatical complexity.

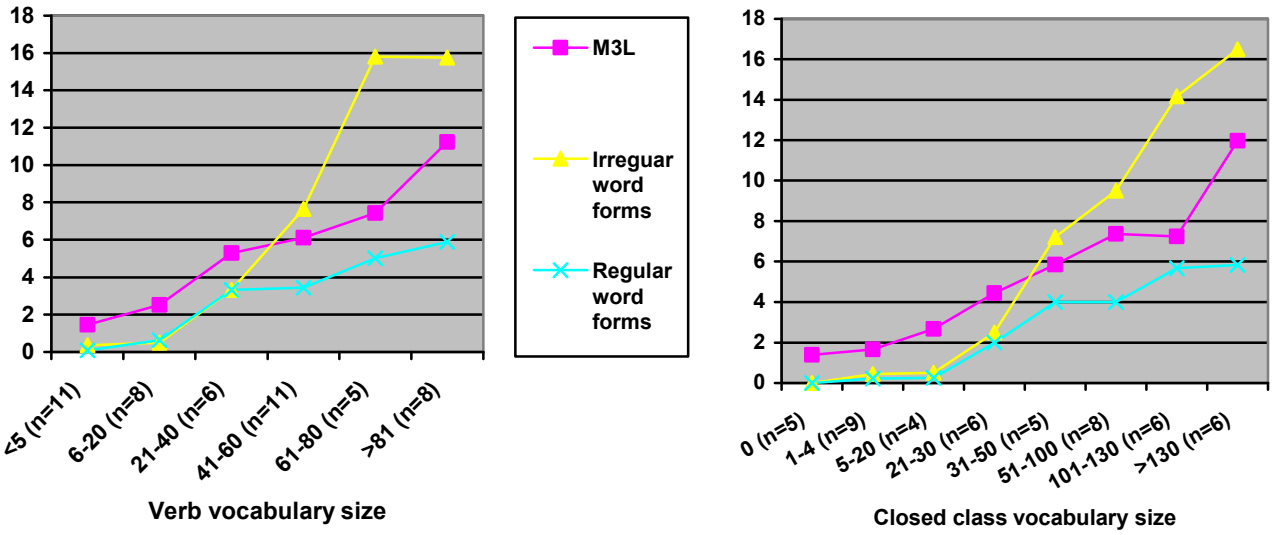


Figure 9.7 Growth in grammatical measures as a function of verb (left) and closed class (right) vocabulary size

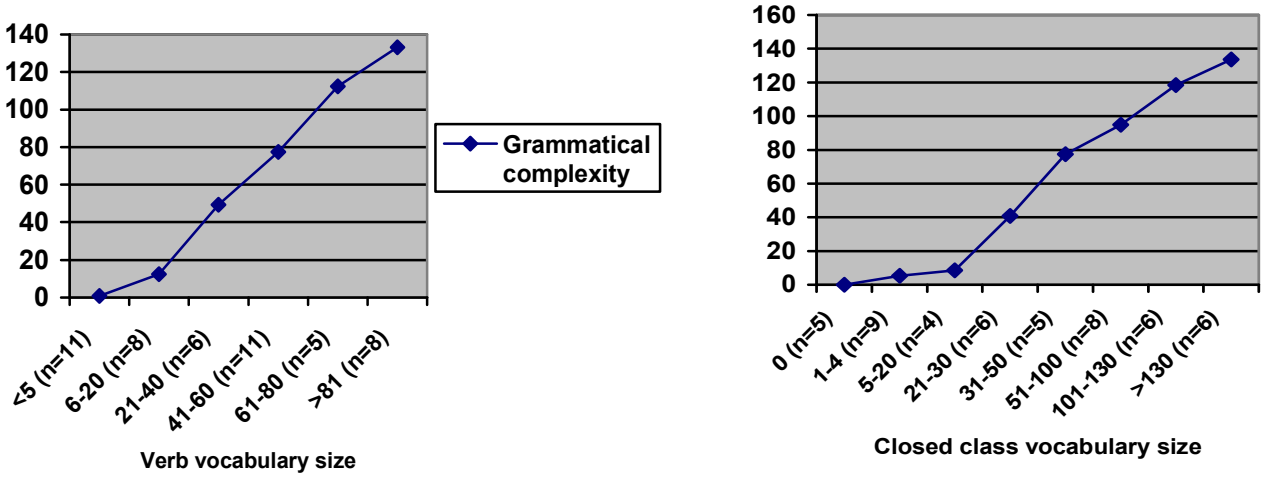


Figure 9.8 Growth in grammatical complexity as a function of verb (left) and closed class (right) vocabulary size

The graphs demonstrate that once the children had a verb and closed class vocabulary size of more than 20 words, growth in all aspects of grammar increased more markedly. The nonlinear relationship between vocabulary and grammar, as previously described, therefore also holds for this analysis. However the sharp increase in grammatical items appears to occur more markedly for irregular words forms, than M3L or the use of regular words. Growth in grammatical complexity items increased in a fairly similar trajectory as a function of verb and closed class vocabulary, as would be expected given that MLU and the use of regular morphemes are both addressed in this section. It is interesting to note that even when children have no closed class items, some of them were still reported to be joining words together (as indicated by their M3L scores) demonstrating that early combinations do not necessarily involve grammatical function words.

Further analysis was carried out looking at verb and noun morphology separately, as research on languages such as Finnish (Lyytinen & Lyytinen, in press) noted that acquisition of case form types occurred when the nominal lexicon size was roughly between 50 and 250 words, whereas verb inflectional types were acquired actively right from the beginning of the verb lexicon acquisition. Furthermore, analysis of Spanish CDI data also found that a larger critical mass of nouns (61) was needed for noun morphology to emerge, whereas less than two verb tokens were needed before verb morphology

emerged. In order to observe the pattern in Irish, the children were divided into vocabulary sizes based on their total noun and verb vocabulary size, and noun and verb morphology (as measured by the number of irregular forms selected by parents) were plotted as a function of the verb and closed class vocabulary sizes. These results are shown in Figure 9.9 below. In line with results from the Spanish study, only the irregular nouns and verbs were selected, as the actual productivity of morphemes as captured by parental report is questionable and may be misleading. This is because for most aspects of morphological development, parents are only asked to indicate how often (not yet, sometimes or often) their children produced certain grammatical items, and so it can give the false impression of an earlier beginning of grammar acquisition (Mariscal et al., 2007). This is unlike irregular morphemes which are listed individually.

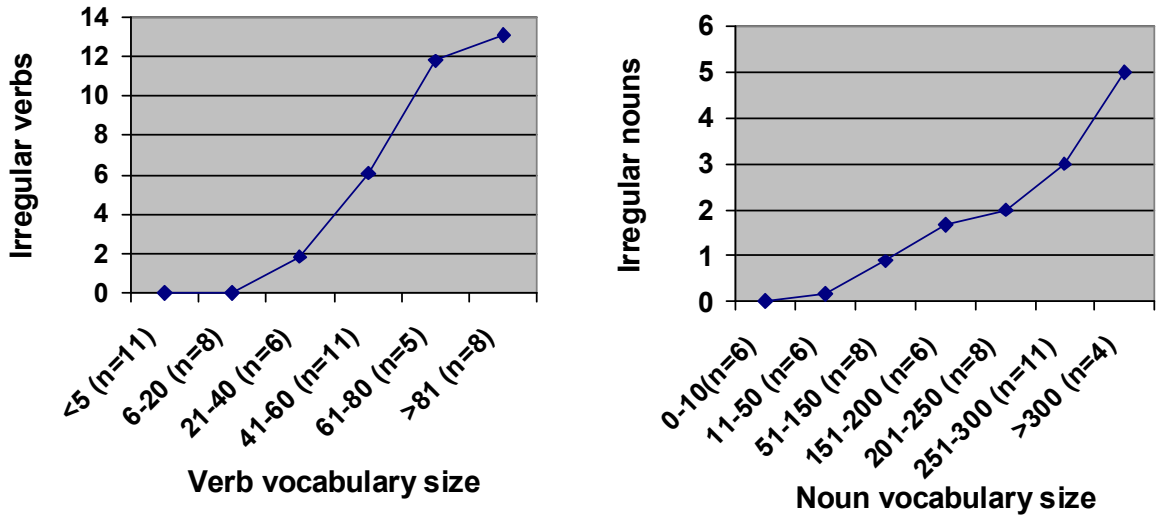


Figure 9.9 Growth in verb morphology as a function of verb vocabulary (left) and noun morphology as a function of noun vocabulary size (left)

As can be seen, it also appears as if verb inflectional morphology emerges relatively early in Irish, as children in this study only needed between 21-40 lexical verbs in their vocabulary before parents reported verb morphology, although they needed between 51 and 150 nouns before there was any example of noun morphology. A similar finding for the Finnish children was explained as being due to the fact that Finnish also has rich verb inflectional morphology and so children start to pay attention to verb endings 'earlier' or with a smaller verb lexicon size, compared to those children acquiring languages with less intensive verb inflectional morphology (Lyytinen &

Lyytinen, in press). According to Peters (1997), Finnish is a synthetic language, with words composed of stems plus long strings of affixal morphemes, which might indicate that grammatical morphemes may be difficult to extract. However, she goes on to state that as Finnish has vowel harmony, the morphological suffixes are phonologically conditioned by the vowels of the stem to which they attach, which could help to avoid problems in early segmentation. Unlike the study of Finnish which noted that verb morphology increases in a more linear pattern as a function of vocabulary size (Lyytinen & Lyytinen, in press), we see the typical non-linear pattern in the Irish data. Thus for the Irish children, it seems as if once they start paying attention to verb forms, they acquire them more rapidly than morphological markers on nouns. This occurs for both nouns and verbs despite the fact that they both have irregular morphemes and involve initial mutational rules. However, as noted in the previous chapter, initial mutations also occurred earlier on verbs than nouns, which might indicate that the critical values for the emergence of verb morphology are lower than the ones needed for the emergence of nouns. All of the findings reported above will now be explored in line with the literature on the nature of lexical-grammatical relations.

9.4 Theoretical Explorations of the Lexicon-Grammar Relationship

Bates et al., (1995), in their comprehensive outline of early language acquisition based on CDI data, noted that there are massive variations in the rate of language development for typically developing children in every area of early communication and language. In addition, significant temporal dissociations between major components of early language are also observed, including the relatively earlier development of vocabulary over grammatical skills. Although some theorists argue that these dissociations provide evidence for the view that the lexicon and grammar are distinct domains (see Moyle et al., 2007), others argue that these dissociations are only in relation to timing, with little evidence for dissociations in rate of development across individual children (Bates et al., 1995). Furthermore, Marchman and Bates (1994) outline the evidence for continuous association in rate and style of development across phonological, lexical and grammatical milestones, such as the link of early babble to the organisation of the lexicon and first words.

McGregor et al. (2005) outline how the premise that grammatical development depends upon and emerges from the lexicon is key in several theories of early language development, including the critical mass hypothesis (Marchman & Bates, 1994), the verb island hypothesis (Tomasello, 1992) and usage-based accounts of early grammatical constructions (Lieven, Behrens, Spears, & Tomasello, 2003). For example, explanations for the temporal delay between vocabulary and grammar acquisition in English include the fact that grammatical morphemes are generally short, unstressed and phonologically reduced, thus harder to perceive (Fenson et al., 1994). This is also relevant for grammatical morphemes in Irish, particularly as many involve subtle morphophonological changes in word-initial position. According to Szagun et al. (2006), this means that grammatical items will not be acquired until children have built up a sufficient number of content words to perceptually 'bootstrap' unstressed grammatical forms or combine words into sentences, and is consistent with proposals of a 'critical mass' account (Marchman & Bates, 1994). Thus, as increasing numbers of lexical items are learned, they become organised in such a fashion as to facilitate the abstraction and productive use of grammatical patterns. This seems to be consistent with the findings for Irish reported above as demonstrated by the graphs on the relationship between size and composition of vocabulary. Moreover, it seems to happen at a relatively lower critical mass of verb items to extract verb morphology, than that observed for noun morphology.

A related reason for the dissociation in timing between grammar and vocabulary acquisition is the fact that inflections and grammatical function words depend on the nouns, verbs and adjectives that they modify. Bates et al. (1995) argue that because the purpose of grammatical function words is to set up a relationship between other items in the sentence, their relative delay may be an inevitable by-product of phonetic and semantic differences among these linguistic types. As before, it may be that children cannot understand the purpose of closed class items until they have a good-sized vocabulary of content words and have had sufficient input of these words (Bassano, 2000; Bates et al., 1994), in line with the lexical bootstrapping account of vocabulary development (Bates & Goodman, 1997; Dale et al., 200l; Marchman & Bates, 1994). It is possible that word knowledge is stored together with detailed information about the morphological and syntactic contexts in which that word can participate. Therefore, in theory, all the grammar acquired by three-years of age is contained within the lexicon and

hence a natural extension of by-product of lexical learning (Fenson et al., 1994). Children then use the conceptual information of the different types of words (nouns are for people, things etc) to understand how words are used, in line with the *semantic bootstrapping* account (Lyytinen & Lyytinen, in press). In principle however, the systematic mapping between syntax and semantics could be one of the presuppositions that learners bring into the learning situation, that is part of the innate processing system that makes it possible to learn language (Gleitman & Gleitman, 1992).

On the other hand, *syntactic bootstrapping* predicts that the emergent sensitivity to the syntactic structure of phrases and sentences will facilitate the learning of new vocabulary. It has been shown that grammatical knowledge and parsing of input provides important cues for semantic learning (e.g., identifying a novel form as a count noun or transitive verb provides the basis for a hypothesis concerning its meaning; Dale et al., 2000). This indicates that it is not only vocabulary that influences grammatical development, but from 20 and 25 months children use their grammatical content to infer the meaning of novel words (Moyle et al., 2007). Thus the language-learning process is described as 'bidirectional bootstrapping' in that although grammatical patterns are abstracted from a developing lexicon, grammatical knowledge (particularly from 30-36 months) facilitates lexical acquisition, and this has also been noted in longitudinal studies of early language development (Moyle et al., 2007). It seems that language learning starts out based on general processing mechanisms, and as development proceeds (particularly after 40 months), becomes more modular and autonomous (Karmiloff-Smith, 1992). Therefore, although it is possible that some minimum number of words is necessary for grammatical development to begin (as is demonstrated in the curvilinear relationship between vocabulary and grammar), beyond this the relationship could be negligible, and in fact grammar and the lexicon may not be strongly related over the complete span of their respective developmental courses (Dixon & Marchman, 2007).

Marchman (1997) holds that the relationship between lexical and morphological abilities described above, confirm that the emergence of productive language is a natural consequence of the dynamics inherent in a connectionist learning mechanism. Instead of a divide between nature and nurture or domain-specific and domain general processing, she supports an 'emergentist' alternative which argues that "language acquisition gets off

the ground due to a set of general capacities for perceiving and processing speech information in the context of a powerful learning mechanism which abstracts and simultaneously stores information about the regularities inherent in the input at a variety of levels" (Marchman, 1997; 295). There is also converging evidence for the interdependence of lexical and grammatical learning from neurophysiological and crosslinguistic behavioural data. For example Neville and Bavelier (2000) (as cited in Szagun et al., 2006) demonstrated that Event-Related Potentials (ERPs) to open-class and closed-class words did not differ in 20-months-olds and the increasing specialisation of left-hemispheric brain systems for grammar was related to children's vocabulary size. Bates and Goodman (1999) examined several possible methodological artefacts that could account for these effects and demonstrated that the relationship held even if words that are related to grammatical complexity (i.e., grammatical function words such as preposition and conjunctions) were omitted for the vocabulary count.

Although these strong correlations indicate that vocabulary and grammar emerge from an underlying link between these two aspects of language, they fail to tell us about the factors causing this link, such as whether internal, genetic factors are involved or there is a link to the environment (Dionne et al., 2003). For example, it is a possibility that the empirical correlation between aspects of language development might just be a reflection of the fact that environments which facilitate one aspect of growth also facilitate the other. Research on the effects of child directed speech suggests that the total amount of speech, degree of semantic contingency, and frequency of joint attention, could all operate to provide better 'data' to functionally distinct lexical and grammatical development processes (Dale et al., 2000). A large study involving over 5000 twins attempted to disentangle these factors and concluded that there is a substantial genetic influence on the relationship between vocabulary and grammar, and that general abilities lacking a strong verbal component are not likely to be responsible for pacing the developments in both domains (Dale et al., 2000). A follow up study by Dionne et al., (2003) attempted to address the directionality of the effects and concluded that lexical knowledge was related to grammatical level and that grammatical level facilitated lexical learning (i.e., syntactic bootstrapping), in line with the previous explanation of bidirectional bootstrapping.

9.5 Predicting grammar from vocabulary scores

Due to the longitudinal nature of the current study, it was possible to investigate predictive validity in terms of the relationship between vocabulary and grammar measures taken at one time to those measured at a later time. These aspects have previously been discussed in the Chapter 5 addressing validity and reliability. However, predictive validity will be further explored here in terms of how the first measures of vocabulary taken when the children in the current study were aged between 16 and 20 months (n=9), relate to grammatical scores achieved six-months later (at 22-26 months), and twelve months later (at 28-32 months) for seven of these children. Results are contained in Table 9.3 below. Due to the reduced number in each age group, nonparametric Spearman correlations were carried out.

Table 9:3 Predictive correlations for children age 16-20 (n=9); 22-26 months (n=9) and 28-32 months (n=7)

	T2 Vocabulary	**T3 Vocabulary**	**T2 Complexity**	**T3 Complexity**	**T2 M3L**	**T3 M3L**
T1 Vocabulary	.83**	1***	.76*	.82*	.70*	.79*
T1 Complexity	.68*	.90**	.77*	.78*	.68*	.78*
T1 M3L	.68*	.90**	.77*	.78*	.68*	.78*
T2 Vocabulary		.96***		.86**		.75 (p=.052)
T2 Complexity		.93**		.85*		.82*
T2 M3L		.83*		.67 ns		.63 ns

***= p≤.001; **= p≤.01; *= p≤.05

The analysis revealed that total vocabulary at 16-20 months was significantly and positively correlated with vocabulary measures taken six-months (T2) and twelve-months later (T3). However it was also interesting to note that vocabulary measures at 16-20 months also strongly predicted grammatical complexity and M3L six and twelve months later. Likewise, grammatical complexity and M3L measures predicted later vocabulary measures, again demonstrating the two-way interdependence or bidirectional bootstrapping outlined above. As was found in the previous analysis of predictive validity, it does appear that parental predictive power is stronger from T2 (22-26 months) to T3 (28-32 months) than that observed over the earlier period from T1 to T2. This is in

keeping with previous findings by Bates et al. (1988); Fenson, et al. (2000); Bauer, Goldfield and Reznick (2002) and Feldman et al. (2005) who all reported stronger predictive correlations across the 2nd year of life with relatively weaker correlations at younger ages. Overall, these studies have concluded that these findings suggest that the best estimate of grammatical status at 28 months, right in the heart of the grammatical burst, is total vocabulary size at 20 months, measured right in the middle of the 'vocabulary burst', (Bates & Goodman, 1997). This also points out that children who are delayed in their acquisition of vocabulary, can also be expected to be delayed in their acquisition of grammar when measured at a later time, as will be explored in the analysis of late-talking children below. It was also interesting to note that M3L measured at 22-26 months only predicted vocabulary measures taken six-months later, but did not relate to later grammatical measures. This may be related to the fact that at 22-26 months, the mean vocabulary level is about 240 words, which has been noted to be the vocabulary size at which a sharp rise in the development of grammatical complexity and MLU occurs, and so would reduce any correlations.

Finally, although there were strong cross-domain correlations between vocabulary and grammar, the within-domain predicative correlations were stronger, (e.g., T1 vocabulary to T2 vocabulary were higher than T1 vocabulary to T2 complexity correlations etc), particularly when comparing vocabulary and grammatical complexity scores as opposed to M3L scores. This highlights the fact that parents can differentiate vocabulary development from grammar, and that what is being measured is a true reflection of these skills and not just parents responding to a general notion of language ability (Dale, 1991). This was in contrast to a study of preschool children with SLI as described by Thal et al. (1999) where cross-domain correlations were as high or higher than within-domain correlations and suggests that parents of language delayed toddlers cannot differentiate vocabulary and grammar in their children. It may be that the children are using fewer grammatical forms to provide parents with opportunities to observe grammar and because of delayed vocabulary acquisition, parental attention is still focused on this (Thal et al., 1999). These aspects were investigated with the two children in the current study who had relatively delayed language development in comparison to the rest of the group.

9.6 Late Talkers

There is conflicting evidence as to the link between vocabulary and grammar in late-talking children. An early study by Bates et al. (1995) found that vocabulary and grammar appear to be strongly associated in later talkers, particularly in the early stages of language acquisition. However more recent research such as that carried out by Moyle et al. (2007) and Ellis-Weismer, Marchman and Evans (2001) found that late talking children had the same proportion of verbs in their lexicon as vocabulary matched children, yet exhibited a weaker relationship between vocabulary size and MLU as compared with typically developing toddlers. Thus, although they had the same lexical foundation, they demonstrated delayed syntactic development. It may be that early grammatical learning is inextricably tied to the lexicon, but dissociations emerge at the point where normal children develop a more fluent and automatised ability to use grammar in real time (Bates et al., 1995). Moreover, it is well known that language impaired children with normal expressive vocabulary have particular difficulty with grammatical morphology (Bates et al., 1995) and have been observed to use more lexical bootstrapping and less syntactic bootstrapping compared to typically developing children.

There were two children identified in the current study as being potentially late-talking when applying the criteria of 'less than 50 words at two years' (Rescorla, 2000), and as previously discussed were participants ICDI 3 and ICDI 16. When their grammatical development as measured by grammatical complexity and M3L, were plotted as a function of their vocabulary size (see Figures 9.3 & 9.5 above), it was clear that they demonstrated relatively slower development than other children at similar vocabulary levels. These trajectories are re-created below comparing them to the group average, which for both children, involved two samples at vocabulary sizes of less than 50 words at the first two data points.

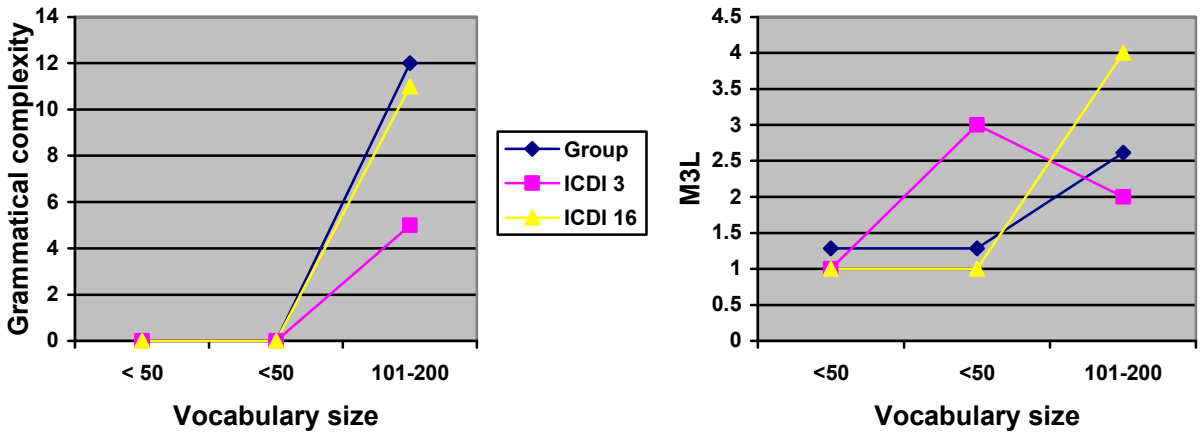


Figure 9.10 : Grammatical complexity (left) and M3L (right) scores for late-talking children as a function of vocabulary size

It appears that when the children had less than 50 words, their grammatical complexity scores were largely in line with that of the group average (i.e., 0). However, once they had vocabulary scores of between 100 and 200 words, the grammatical complexity scores of ICDI 16 were largely in line with that of the group, whereas ICDI 3 continued to demonstrate a relatively delay. For M3L, a slightly different picture emerged, in that ICDI 16 continued to have M3L scores in line with the group average and even higher than the group average once she had between 100-200 words. This was also similar to her profile in the previous chapter based on age-comparisons of grammatical skills. However, ICDI 3 demonstrated a rather different profile in that at the 2nd time point, with an expressive vocabulary of less than 50 words, his M3L was far above the group average. Then at the next vocabulary level, his M3L reduced again to being below the group average. As discussed in the previous chapter, analysis of the longest sentence reported by the parent in this case ('tá sé te' *it is hot*) revealed the possibility that this child was using formulaic phrases, and so his M3L was not likely to be productive at the second time point with less than 50 words. It seems that when vocabulary size is used as a comparative index as opposed to age, ICDI 16 was not in fact late talking in terms of her grammar scores (or may 'catch up' with her age peers), although ICDI 3 continued to demonstrate a delayed and different growth trajectory.

Some of the possible reasons as to why late talking children demonstrate a delay in the acquisition of morphosyntax, even at comparable vocabulary size has been

investigated in previous studies. For example, Conti-Ramsden and Jones (1997) found that children with SLI require more exposure to language in order to learn new lexical items and that they require a larger critical mass of verbs in order to abstract or generalise the grammatical regularities of the input. Rescorla et al. (2000) also found that late talkers make more progress in lexical skills as compared with grammatical skills and Paul (1993) concluded that expressive syntax is the area of greatest concern for children with a history of late talking. Moyle et al. (2007) hold that late talking children therefore exhibit a predominance of lexical bootstrapping and less evidence of syntactic bootstrapping (a weakness in expressive syntax). As stated by Rice (1998; 455) "The end results would be the opposite of bootstrapping. Instead of using one area of language to build other […] children would be left without a solid strap to hang onto". The grammatical delay of late-talking children therefore needs to be also considered as a potential marker of language delay in Irish-speaking children.

9.7 Summary and Conclusion

To summarise, it seems that there is robust evidence for a strong interdependence between grammar and the lexicon in early Irish language acquisition, reflected in the strong nonlinear relations. It also seems to be the case that different grammatical events may each depend up on a different lexical base, thus word combinations appear once the child has a minimum of 50 words, and morphosyntactic complexity emerges from 400-600 words. Moreover, the emergence of verb morphology seems to occur with a lower critical mass of lexical verbs than noun morphology for nouns. In addition, after 3 years there seems to be a growing dissociation between vocabulary and grammar, as demonstrated by the plateau effect once children have vocabularies of more than 600 words. This was also observed in children with Down syndrome (Bates et al., 1995). Tomblin and Zhang (2006) outline how this is not only due to the fact that sentence tasks involve the use of lexical items (Bates & Goodman, 1999), but the possibility that a grammatical system that is at least partially independent of lexical abilities would only become apparent as the language user approached maturity.

Overall, the links observed between vocabulary and grammar can be explained in terms of theories that link perceptual and/or semantic and syntactic bootstrapping with critical mass effects to the acquisition of language. Although the findings reported above are in line with previous studies, as the association is found in a typologically different language, it extends these findings. It is also important to consider the fact that as vocabulary size appears to give predictability to early grammatical acquisition, its clinical significance is that it can be used to help identify children at risk for later problems with grammar, including those with SLI. As demonstrated in the different profile of grammatical and lexical development in those children who were relatively slower to talk, the ability to identify late talkers at an early age is essential in the study of child language as even among late talkers showing 'recovery', scores on measures of grammar, narration, reading, and language-based academics are statistically, if not clinically, lower than those of matched peers and these differences persist into adolescence (Rescorla, 2000). The findings above, in line with those from previous chapters are summarised in the following final chapter.

10 Summary and Conclusions from the Study

10.1 Background

The main aims of this study were twofold: to profile and measure early language acquisition in Irish, and to consider this data in the context of crosslinguistic language-acquisition research. Profiling a minority language like Irish is complicated as although it generally has a favourable attitude as a symbol of ethnicity in Ireland, the actual use or opportunities to put competence to use, are quite low (Ó' Murchú, 2001). The number of first language speakers continues to decline, making it even more pressing to profile its early language acquisition while it is still possible. For example, Hickey (1999) showed that only 20% of children attending naíonraí (Irish-language preschools) in the Gaeltacht had Irish as a first language, with the majority (40%) learning Irish as a second language. In addition, the influence of the majority language must be considered, as well as the fact that, much like the situation in Wales, although there are few non-fluent speakers of English in the Gaeltacht, there are second language learners of Irish who could in principle provide non-native models for children (Gathercole, 2007). These issues meant that not only was subject recruitment difficult, resulting in a fairly limited sample of participating families, it was also difficult to decipher developmental errors from interference with the majority language.

The research tool used in the study – the Irish Communicative Development Inventory (ICDI) - was adapted from the MacArthur-Bates Communicative Development Inventory (MCDI), which has a strong research background and can be applied across all languages given adaptation and culture assimilation to the target language. Despite the limited sample size, the checklist enables the collection of very detailed language data, and as the current research was longitudinal, this meant that interesting paths to development could be observed. These findings are briefly summarised below, and considered in light of crosslinguistic findings, as such comparisons can reveal universal patterns of language development while allowing for language-specific predictions of ease or difficulty of acquisition of certain aspects (Slobin, 1985). After this the application of the research, including both theoretical and clinical uses are outlined, and

the limitations of the study are considered before outlining future research possibilities based on the outcomes.

10.2 Summary of the Main Findings

10.2.1 Reliability and Validity of the ICDI

Following initial adaptation and early piloting of the ICDI, the parent report checklist was used longitudinally to investigate early vocabulary and grammatical development in Irish. A key feature of this process was the initial validation of the new form. This was important as at the outset it was unclear whether the adapted form would capture all the key features of early language development in Irish. For example, although the adaptation was based on previous research on the acquisition of Irish as a first language, these studies are very limited and involved extremely small sample sizes, meaning that the language targets included in the form were drawn from limited literature. This meant that many targets had to be based on some of the so-called universals of language acquisition, such as the development from single words to early two-word combinations before more complex sentence structure, and the developmental errors of overgeneralisations in the acquisition of grammatical morphemes. However, it was unclear as to whether these would occur in Irish or whether the ICDI would profile the salient features of early Irish acquisition when compared to spontaneous and elicited language assessment methods.

The reliability of the form was primarily established by examining the internal consistency of the various subcomponents of the form using Cronbach's coefficient alpha. The findings revealed that both the vocabulary and grammatical scales (as measured by sentence complexity) demonstrated high internal consistency, and were in line with the outcomes of other language adaptations of the CDI. Consideration was also given to aspects of validity, including face and content validity. Analysis of these aspects revealed that on appearance, the test assessed the target language skills for Irish, and this was confirmed by comparing the outcomes with those of previous studies and with an Irish-language corpus (Guilfoyle, 1992), as well as an Irish assessment of grammar

(ILARSP, Hickey, 1990b). The ICDI data also converged with developmental patterns in language acquisition reported in the wider literature, so that the children were found to produce single words from about 12 months and began combining words from 18-24 months. Finally, criterion-related validity was investigated by comparing the outcome on the ICDI with spontaneous language samples, an elicitation task for grammatical morphemes and a standardised test of symbolic play taken over the various time-periods. For example, concurrent validity of the vocabulary measures for the entire groups and for children grouped into age 18-, 24-, 30- and 36-month olds, revealed strong and significant correlations. The same findings were observed for grammar, although the results highlighted that neither direct elicitation of inflectional morphemes, nor spontaneous language sampling, profiled the abilities of children in this age range as well as parental report. In addition, there was strong predictive validity of the form in that results on the ICDI at Time 1 (16-21 months) revealed strong and significant associations both six- and twelve- months later. Overall, these results demonstrate that the ICDI is developmentally sensitive to lexical and grammatical growth in this age group.

10.2.2 Vocabulary Acquisition in Irish

One of the more interesting outcomes of the study was the profile that emerged as to how children with Irish as a first language acquire vocabulary items. Looking at individual lexical items, it appeared that people names and names for objects commonly encountered by young children were among the first 20 words, in line with findings for other languages (Bates et al., 1994). In addition, the initial hypothesis was that Irish speaking children would not demonstrate a 'noun bias', as has been reported across other languages, but in fact have a higher number of verbs in their early language, due to the verb-highlighting features of Irish previously outlined. However this result did not actually materialise, and although a weaker version of the noun bias was observed, it seemed that at comparable vocabulary sizes, Irish-speaking children have more grammatical function words in their early vocabulary compared to children acquiring a variety of other languages. The reasons for this were explored and included features of the input language, such as the morphological, semantic and pragmatic characteristics, as

well as extralinguistic features related to the frequency and saliency of grammatical function words in Irish.

Findings that did correspond with other adaptations of the CDI included the wide variability in vocabulary size at similar ages, as well as a small advantage for girls and first-born children early in development. Although the children were acquiring Irish in the context of the majority language English, this did not seem to affect their vocabulary development to a great extent until they reached approximately 3 years. Finally, the analysis of the longitudinal data revealed that vocabulary acquisition is acquired in a linear trajectory, suggesting that vocabulary increased as a steadily rising function of age, with no points of acceleration or significant change. This profile was different to that observed in other languages (where language development is typically in an 'S'-shaped, non-linear trajectory, with slow initial increase followed by a sharp rise before levelling off), and may have been related to the bilingual aspect of language acquisition, which was obscured by the measures of total conceptual vocabulary used to profile vocabulary growth.

10.2.3 Grammatical Development in Irish

The next aspect of early language development captured by the ICDI was the acquisition of morphosyntax. Once again the results revealed many similarities in overall grammatical development between children acquiring Irish and children acquiring other languages, including the progression from early two-word combinations, to the increase in sentence length through to the addition of clausal elements and the expansion of phrases. Moreover, language-specific aspects of grammatical development were acquired relatively early and easily by the children, including the VSO sentence structure and the placement of modifying adjectives after the noun. However, other language-specific variations emerged relatively late, including the comparative delay in the acquisition of grammatical morphemes. Potential explanations for this outcome were explored by looking at crosslinguistic research and theories as to what makes certain morphemes easier to acquire then others. When applied to Irish, it appears that initial mutations, as they occur at the beginning of words (as opposed to the more perceptually salient

sentence-final positions), are difficult to segment (as they are shorter than a syllable) and cause relatively irregular mutation of the initial phoneme could all be linked to this relative delay. The longitudinal analysis revealed that growth in MLU over age was also linear for the group, which matched results for other languages reported in the literature, however individual growth profiles also revealed significant variations to this profile. Some of this variance was marginally attributed to age and gender, as with vocabulary acquisition.

10.2.4 The Relationship between Vocabulary and Grammar in Irish

Given the large variation in age-based comparisons observed within and across languages, a more reliable metric for comparison is based on vocabulary size. This was carried out when investigating the final theoretical question as to the relationship between vocabulary and grammar. The outcome revealed a strong nonlinear relationship between early vocabulary and grammatical acquisition skills in Irish, in that morphosyntactic skills grew slowly until the child had a critical mass of 300-400 words in their vocabulary, after which these aspects grew sharply as a proportion of overall vocabulary size. In addition, the children appeared to need fewer verbs before they began attaching morphemes to them, although a larger number of nouns were needed for noun morphology. The findings appear to support the emergentist theory of language development or the notion that language acquisition involves complex interactions between domain-general learning mechanisms and the social environment in which the child functions (Marchman, 1997). After three years of age however, grammar and vocabulary began disassociating, in line with the change in the relationship between language aspects with growing maturity (Karmillof-Smith, 1992).

Finally, although the study aimed to capture language acquisition from typically-developing children, two children appeared to be relatively delayed in comparison to the study group as they failed to produce a minimum of 50 words when assessed at two-years, and had lower scores on grammatical complexity measures when compared to age-matched peers. Although they both demonstrated progress at a later time point, one child continued to demonstrate a delay. Analysis of his language revealed that he used

significantly more social words in his early development and may have had formulaic production of word combinations. In terms of stylistic acquisition of language, this child appeared more 'expressive' which has been noted to result in a slower path to language development (Bates et al., 1994; Bates et al., 1995). Although it was beyond the scope of the current study, it would also be worth investigating the spontaneous language samples of these two children to determine, if like children with SLI speaking many languages, they resemble poor speakers of the language to which they are exposed (Leonard, 1998).

10.3 Implications of the Current Study

The findings of the current study have both theoretical and clinical implications. Firstly, it seems as if the acquisition of Irish on the surface is very like the acquisition of other languages with both SVO and SOV structures in terms of the number of early words in children's vocabularies, and the ages at which they begin to join words together and link them into sentences. There also seems to be a marginal advantage for girls in language acquisition, as well as those who are first born, although as previously mentioned this is only at younger ages. However, there are also subtle differences in the types of words they acquire at certain ages and vocabulary sizes, as well as the age at which they acquire certain grammatical morphemes when compared to children acquiring other languages. Overall, they adhere to the word order and syntactic structure of Irish, and show little influence from the majority language, apart from certain lexical items. This finding, taken together with the huge variations in the onset and growth of vocabulary production and the appearance of grammar as noted in other studies, challenges the idea that there is a universal maturational timetable for the emergence of early language development (Bates et al., 1995). Finally, the strong correlations noted between vocabulary and grammar at all vocabulary sizes and ages reveal that there is no modular distinction between lexical and grammatical learning, and contradict theories which state that these are distinct.

Clinically, the ICDI can be used as an early language assessment tool for Irish and to guide intervention in the language. As mentioned in the introduction, both assessment and intervention in Irish are now legal requirements for speech and language therapists

working with the Irish-speaking population, based on the Official Languages Act (2003). In addition, clinical guidelines for best practice also recommend that assessment and intervention be carried out on all the languages to which the person is exposed (RCSLT, 2006). Traditionally, children with language delay have been treated with therapy techniques based on the developmental patterns of English language acquisition. However, patterns of acquisition for other languages are not as well researched and therefore assumptions based on English may not be valid (Quinn, 2001). For example, the findings above indicate that Irish-speaking children with language delay would benefit from language intervention focusing on prepositions and prepositional pronouns, as these emerge relatively earlier than in other languages, and are a key component of the morphosyntactic system. Expectations as to the emergence of certain morphemes, such as the relative delay in plurals, but the ease of acquisition of verbal nouns, would also be relevant. It is interesting to note that the language development of first language Irish-speakers is often neglected when compared to those who learn it as a second language. For example Hickey, (2002) noted that in naíonraí (Irish-speaking preschools) overall, children from Irish-only homes only speak Irish in about 50% of their utterances and so she recommends that specific language plans, syllabi and methodology be in place in these preschools to continue to foster these children's knowledge of Irish. She holds that young native speakers of a minority language need the kind of language enrichment that is thought necessary for majority language children from disadvantaged homes. Otherwise, she warns that children will have incomplete competence in their mother-tongue, particularly as they are vulnerable to the influence and social status of English, which reaches them through TV, cinema and community (Baker & Jones, 1998 as cited in Hickey, 2002).

In order to use the ICDI for such purposes, however, it would benefit from further adaptation (as outlined below), including consideration of the two other major dialects of Irish, Connacht and Donegal Irish. In addition, further piloting and validation measures should be carried out.

10.4 Further Adaptation to the ICDI

The suggestions for further adaptations to the form are briefly outlined here. Beginning with the vocabulary scale, items which had a low frequency (i.e., were produced by less than 10% of the sample) should be removed. This would result in approximately 100 items being removed from the current data set (although for some of these items the English equivalent was more likely used). In addition, if later-acquired vocabulary targets are removed (i.e. those items not acquired until 36-40 months), this would reduce the targets by a further 40 items and bring the total vocabulary size to about 700 items, which is in line with other versions of the CDI. Although consideration should be given to more complex vocabulary items which might help distinguish children with more advanced vocabulary. Another adaptation might be to list 'action words' in terms of their verbal noun counterparts instead of the imperative, as was used as the base form in the current study. This is because parents did not recognise certain verb forms when presented in the imperative, particularly for regular verbs in the habitual sense (e.g., 'caoin' *cry* is typically used in the verbal noun construction 'ag caoineadh/', *crying* or 'caintigh' *talk* is more transparent when listed as 'ag caint' *talking*). This might have resulted in under-reporting of verb forms and so it would be worth investigating whether verbs listed as verbal nouns would increase accuracy of reporting. Confirmation of this profile would also come through closer scrutiny of the verb forms used in the spontaneous language samples. Other additions should be the inclusion of 'yea' (yes) as a loan word from English (and as 'neó' *no* is already listed), as well as the inclusion/exclusion of other individual lexical items based on parental feedback. Frequency analysis of vocabulary items would also help with the construction of a short form, which for Fenson et al. (2000) involved reducing the vocabulary checklist to 100 and the grammatical assessment to questions regarding the ability to combine words only. However, further validity and reliability measures would have to be carried out based on any adaptations.

The main changes recommended for grammatical items include more detail on plural marking. For example, instead of dividing plurals into 'regular' and irregular' there should be one section where in addition to questions on the use of certain 'irregular

plurals', parents are asked whether children are using the main plural markers (including slendering or palatalisation of the final consonant, vowel addition and vowel plus consonant addition). A similar section should be included for the development of initial mutations, as in the current format there are only two questions on contexts where lenition could be used and there were no questions on the emergence of eclipsis, as it was considered to be too difficult for the age, although in hindsight may distinguish those with superior grammatical skills. Another addition to the use of bound morphemes should be to remove the question regarding synthetic verb and person marking, as these items are less likely to be selected by parents (possible due to reduced saliency) and appeared to be initially acquired lexically (Hickey 1992). Instead they should be replaced with a question on whether the chid is using past participle (verbal adjective) marking to indicate recent past as was frequently noted in the spontaneous language samples. This bound morpheme was also targeted in the Icelandic version of the CDI (Thordardottir & Ellis-Weismer, 1996). Moreover, as many of the children seemed to learn certain vocabulary items in stock phrases (or formulas as described by Hickey, 1993) another aspect of a language assessment in Irish should also ask how the child is using words and phrases, in what contexts and whether these are in imitation only. Pine et al. (1996) also recommend adding this feature to parental assessments, as they found that there was a higher proportion of nouns reported in checklists, whereas observational methods found a high proportion of frozen phrases which is a defining feature of the 'non-referential style' of language acquisition.

Adaptation to the section on grammatical complexity might firstly involve the inclusion of a vignette as to the context surrounding the use of sentences to aid parental completion. It was noted in the testing that parents often reported that the child could use certain sentence types, although perhaps not the exact lexical items involved in the sentence examples in this section. Although it was explained repeatedly that children did not have to use those exact words, but the general sentence structure in the example, the recently adapted European-Spanish CDI included such contextual information and anecdotally it appears that it improves parental accuracy in reporting (Mariscal, personal communication). Other additions to this section would include sentences targeting subordinate clauses involving verbal noun complements, due to the word-order reversal required, which did cause some difficulty for children. In addition, there was no example

of a relative clause in the sentences, which might have identified those with higher language levels, particularly given that 40-month olds were included in the sample. The sentence examples also currently have some single words listed which should be removed given that this section is only to be completed for children who have begun combining words. Finally, there should also be a sentence example targeting adjectival agreement with plural nouns (i.e., 'bróga deas**a**' *nice shoes*) where the adjective is also marked for plurality.

As the children reached approximately three-years of age, about one-quarter of their total vocabulary was in English-only. Therefore, it is almost certain that they had some knowledge of English grammar also, which was displayed by early codeswitching in the spontaneous language samples. It is therefore important that further adaptations of the current form provide a format to measure the child's knowledge of English grammar as well as codeswitching. Similar studies which have attempted to develop language and culturally-specific expressive language assessments for minority language acquisitions have noted the need to allow for code-switching and lexical borrowing in child language assessments (Pert & Letts, 2003).

10.5 Limitations of the Current Study

A strength of the Irish adaptation was that each questionnaire was validated against extensive spontaneous speech data so we could be sure that the ICDI is representative of children's language at the relevant period of time. On the other hand, a number of shortfalls in the reliability of the form emerged. For example, there was no measure of inter-rater reliability from an external caregiver, which was noted to increase accuracy in the Dutch version of the CDI (DeHouwer et al., 2005). This study argued that most children in Western society do not only spend time with mothers, and so relying on a single reporter may underestimate a child's communicative behaviours. Different adults use diverse topics with the same child and so they will have different knowledge of what the child can and cannot say. Therefore, they propose having multiple reporters complete the checklist resulting in a cumulative CDI score that credits the child with the best score for any item on the CDI as checked by a single reporter. They hold that this may

ultimately increase the reliability and inter-individual comparisons of the instrument and lead to more accurate insight into the structure and nature of early vocabulary. Moreover, as caregivers are less emotionally involved with children than parents they may provide a more accurate assessment of a child's language (Bornstein & Haynes, 1998), potentially resulting in a more valid estimation of the child's language.

This approach was also evaluated in a bilingual Spanish-English situation by Marchman and Martinez-Sussmann (2002) and analysis indicated that the use of multiple reporters had little impact and in some cases improved the accuracy of the reports of both lexical and grammatical abilities. This is particularly relevant for the current study as some children were only exposed to English outside of the home and so the English-speaking caregiver may have had a different view of the child's language. Moreover, as Irish is a minority language, reporting parents may not be a first-language user and have limited proficiency in the language. Anecdotally it was noted in the current study that one non-native speaking mother failed to notice some grammatical skills in her child that were evident in the spontaneous language sample, and likewise used certain grammatical markers with varying accuracy in her own language. Having a second parent complete the form, as found in the Dutch study above, might give a more accurate and representative profile of the child's language skills and should also be considered for future studies. Finally, as the ICDI form and background questionnaire was presented to the parent in Irish-only, they could have been influenced to be in 'monolingual mode' (Grosjean, 2004, p. 40) for Irish and so reduced their reporting on the level and amount of English used.

Another clear limitation of the current study was the size of the sample, particularly when attempting complex statistical modelling of growth over time, and predictors of language acquisition, given the relative homogeneity of the group. 'Small sample studies are extremely useful in showing us what is *possible*. They cannot tell us whether the same patterns are general or reliable' (Bates et al. 1988; p35). It is difficult to see how this can be overcome, given that the number of first-language speakers of Irish is continuing to decline, and those that are left are generally from rural, middle class backgrounds. Moreover, in order to assess concurrent validity, each child had to be visited by the researcher on each data-collection to gather a spontaneous language

sample, further limiting the size sample feasible. However, now that a more valid and reliable form has been developed, the checklist can be posted to families in future studies and so lead to a larger number of children being included. Finally, another limitation was the fact that the language background questionnaire was not complete on each visit. Anecdotally, the families reported that an increase in the use of English came into the home as older siblings attended preschool and schools where they had increasing exposure to English. This would also have affected the vocabulary to which the younger children in the study were exposed to and so might have accounted for differences in vocabulary scores noted.

10.6 Future Research

As spontaneous language samples were gathered in the current study, but only analysed in terms of their contribution to validity measures of the ICDI, they provide a wealth of data that can be used to confirm some of the main findings in the current study. For example, Bornstein et al. (1999) describe how language development involves both the innate and biological abilities of the child and variation in language exposure in the environment, or put another way, both nature and nurture. A study by Pine (1994) reported that the volume of child-directed speech is significantly and positively related to measures of child language and so mothers of children who use a higher proportion of nouns have also been found to use more nominals in their own language. This was linked to a 'noun bias' in children acquiring English, whereas a higher level of verb-types and tokens in the input of Korean mothers resulted in a 'verb bias' in these children (Choi, 1997). Thus it would be worth investigating whether Irish-speaking mothers have a 'closed class' bias in their child –directed speech, or a 'prepositional bias' in particular.

In addition to investigating the input, the spontaneous language samples could also be used to validate the observation that the children are in fact using more closed class items. For example Tardif et al. (1999) found a moderate-strong correlation between the number of common nouns and verbs reported on the Mandarin CDI with that observed in spontaneous samples. They also reported that English-speaking mothers in particular were unreliable at reporting verbs and more attuned to their child's use of

nouns at the early stage of vocabulary acquisition. These factors were held to lead to a possible confounding variable in the reporting of a noun bias on the CDI. This could be explored in the current study by re-coding the spontaneous samples into the various parts-of-speech.

As well as the link between lexical and grammatical abilities outlined above, other researchers have looked at the relationship between phonetic and lexical abilities. Many researchers have noted that as children's vocabulary increases, it tends to contain more phonologically similar words. For example, Storkel (2004) found that early produced words were higher in density (made up of sounds that were very similar but with minimal contrasts, to those appearing in many other words) than words produced later. This suggested that acquiring a larger vocabulary may drive infants to represent words by their phonological segments as opposed to semantics in order to distinguish between words in the lexicon. It may be that children focus on words which contain phonetic segments that they can produce, avoiding words that contain segments they cannot produce, which is known as 'phonological selectivity and avoidance' (Ferguson and Farwell, 1975, as cited in Fletcher et al., 2004). Stoel-Gammon (1988) confirmed the relationship between phonological abilities and word learning using CDI measures, as did Fletcher et al. (2004) for Cantonese, and both noted a preference for initial consonant of words children can already say, with the phonology of the input language. Likewise in Danish, monosyllabic words and those beginning with bilabial consonants made up most of the first words, and words beginning with /b/ also made up to 24% of the first 100 words in English (Dale & Goodman, 2005). This would warrant further investigation in the current study by looking at the phonotactic probability of the words children learned longitudinally. Such a study could also investigate another predictor of language outcome noted in a recent study on the influence of vocabulary development in two-year olds, that of phonological working memory through a non-word repetition task(Stokes & Klee, 2009).

Finally, the ICDI should be administered to children with language delay to investigate the sensitivity and specificity of the tool. Sensitivity is a measure of the incidence of true-positive screens obtained in a sample of cases known to be positive, and specificity is a measure of the incidence of true-negative screens obtained in a sample of

cases known to be negative (Klee et al., 1998). Although there is some evidence that parents of children with developmental disabilities can provide valid information regarding their children's language development (Thal et al., 1999; Thal et al., 2007) it cannot be assumed that parent reports are valid methods of assessment for these children. Miller et al. (1995) describe how parents of those with language delay may not report in the same manner as parents of typically developing children. For example, they may have lower expectations, causing them to underestimate their child's abilities or they may also attempt to compensate for their children's abilities, and so overestimate the children's performance. On the other hand, one study did find the CDI to be an effective tool for sorting toddlers into lower (delayed) and higher language level groups (Heilmann et al., 2005). However, it was less effective at classifying children in the intermediate range (mid to low levels of language performance). A study by Klee et al. (1998) using a parent report of language development (The LDS, Rescorla, 1989) found that this screening tool demonstrated excellent sensitivity and specificity for identifying language delay at two-years but lower levels for predicting developmental status one year later. These aspects should also be investigated using the current tool.

10.7 Final Remarks

The ICDI is an excellent way of getting parents involved in the assessment process, and is particularly important given that family participation and active collaboration in the assessment and intervention of children from birth to three-years is a core aspect of family-centred practice (Rescorla, 2002). The form can also be used to help target goals for therapy and to monitor progress and it offers a much broader representation of a child's vocabulary than can be obtained from direct assessments. Moreover, as it has been adapted to over 40 languages, it enables relatively straightforward crosslinguistic comparative research. However, it must be remembered that this type of investigation is inevitably cross-cultural, and lexical and grammatical acquisition cannot be separated from the interplay of system of values and interpersonal relations in the world around the child (Slobin, 2002).

For a minority language like Irish, a key aspect is the acquisition of the majority English language, which happens early in language development and can result in negative changes in the first language (Kan & Kohnert, 2005). However, findings on these issues are conflicting and are influenced by a number of factors, not least the level and quality of the input the children receive in each language, as well as the status of both languages and the social and cultural contexts in which the language learning occurs (Kan & Kohnert, 2005). Nonetheless, a recent study by Hickey (2002) noted that grouping native speakers of a minority language in preschool or school with L2 learners of the language is beneficial for the second language learners but impacts negatively on young L1 speakers of the target language. Having an assessment like the ICDI can therefore be used to design the language plans that are needed to ensure that language loss does not occur.

11 References

Acarlar, F., Aksu-Koc, A., Kuntay, A. C., Topbas, S., Mavis, I., Sofu, H., et al. (2008). *Adapting MB-CDI to Turkish: Pilot data.* Paper presented at the 12th Congress of the International Clinical Phonetics and Linguistics Association, Istanbul, Turkey.

Acquaviva, P. (1996). Negation in Irish and the representation of monotone decreasing quantifiers. In R. Borsley & I. Roberts (Eds.), *The Syntax of Celtic Languages* (pp. 284-313). Cambridge: Cambridge University Press.

Akoyunoglou- Blackwell, A. (2005). Acquiring the English adjective lexicon: Relationships with input properties and adjectival semantic typology. *Journal of Child Language, 32*, 535-562.

Alexander Pan, B., Rowe, M., Singer, J., & Snow, C. (2005). Maternal correlates of growth in toddler vocabulary production in low-income families. *Child Development, 76*(4), 763-782.

Amery, J., Cartwright, S., & Uí Chearbhaill, A. (2003). *Céad Focal: The first hundred words*. Baile Átha Cliath: Gill and Macmillan.

Amery, J., Cartwright, S., & Uí Chearbhaill, A. (2004). *Buntús Foclóra*. Baile Átha Cliath: Gill and Macmillan.

Anderson, R. C., & Freebody, P. (1983). Reading comprehension and the assessment and acquisition of word knowledge. *Advances in Reading/Language Research, 2*, 231-256.

Au, T. K. F., Dapretto, M., & Song, Y. K. (1994). Input vs. constraints: Early word acquisition in Korean and English. *Journal of Memory and Language, 33*(5), 567-582.

Baldwin, D. A., & Markman, E. M. (1989). Establishing word-object relations: A first step. *Child Development, 60*(381-389).

Bassano, D. (2000). Early development of nouns and verbs in French: Exploring the interface between lexicon and grammar. *Journal of Child Language, 27* 521-559.

Bassano, D., Eme, P.-E., & Champaud, C. (2005). A naturalistic study of early lexical development: General processes and inter-individual variation in French children. *First Language, 25*, 67-101.

Bates, E., Bretherton, I., & Snyder, L. (1988). *From first words to grammar*. New York: Cambridge University Press.

Bates, E., & Carnevale, G. F. (1993). New directions in research on language development. *Developmental Review, 13*, 436-470.

Bates, E., Dale, P., & Thal, D. (1995). Individual differences and their implications for theories of language development. In P. Fletcher & B. MacWhinney (Eds.), *The handbook of child language* (pp. 96-151). London: Blackwell.

Bates, E., & Goodman, J. C. (1997). On the inseparability of grammar and the lexicon: Evidence from acquisition, aphasia and real time processing. *Language and Cognitive Processes, 12*(5/6), 507-586.

Bates, E., Marchman, V. A., Thal, D. J., Fenson, L., Dale, P. S., Reznick, S., et al. (1994). Development and stylistic variation in the composition of early vocabulary. *Journal of Child Language, 21*, 85-123.

Bauer, D. J., Goldfield, B. A., & Reznick , S. J. (2002). Alternative approaches to analysing individual differences in the rate of early vocabulary development. *Applied Psycholinguistics, 23*, 313-355.

Behrens, H. (2006). Language development: Morphology. In K. Brown (Ed.), *Encyclopaedia of Language and Linguistics* (2nd ed., pp. 373-376). London: Elsevier.

Bennet-Kastor, T. (2002). The 'frog story' narratives of Irish-English bilinguals. *Bilinguals: Language and Cognition, 4*(2), 131-146.

Berglund, E., & Eriksson, M. (2000). Communicative development in Swedish children 16-28 months old: The Swedish early communicative development inventory- words and sentences. *Scandinavian Journal of Psychology, 41*, 133-144.

Bleses, D., Vach, W., Slott, M., Wehberg, S., Thomsen, P., Madsen, T., et al. (2008). The Danish communicative developmental Inventories: Validity and main developmental trends *Journal of Child Language, 35*, 651-669.

Bleses, D., Vach, W., Slott, M., Wehberg, S., Thomsen, P., Madsen, T., et al. (2008). Early vocabulary in Danish and other languages: A CDI-based comparison. *Journal of Child Language, 35*, 619-650.

Bondaruk, A. (2006). The licensing of subjects and objects in Irish non-finite clauses. *Lingua, 116*, 874-894.

Bornstein, M., Cote, L., Maital, S., Painter, K., Park, S. Y., Pascual, L., et al. (2004). Cross-linguistic analysis of vocabulary in young children: Spanish, Dutch, French, Hebrew, Italian, Korean and American English. *Child Development, 75*, 1115-1139.

Bornstein, M., Hahn, C.-S., & Haynes, M. (2004). Specific and general language performance across early childhood: Stability and gender considerations. *First Language, 24*(3), 267-304.

Bornstein, M., & Haynes, M. (1998). Vocabulary competence in early childhood: Measurement, latent construct and predictive validity. *Child Development, 69*(3), 654-671.

Bornstein, M., Haynes, M., & Painter, K. (1998). Sources of child vocabulary competence: A multivariate model. *Journal of Child Language, 25*, 367-393.

Bornstein, M., Putnick, D., & De Houwer, A. (2005). Child vocabulary across the second year: Stability and continuity for reporter comparisons and a cumulative score. *First Language, 26*, 299-316.

Bornstein, M., Tamis-LeMonda, C., & Haynes, M. (1999). First words in the second year: Continuity, stability and models of concurrent and predictive correspondence in vocabulary and verbal responsiveness across age and context. *Infant Behaviour and Development, 22*(1), 65-85.

Brennan, S. (2004). *First steps: Early development of Irish as a primary language*. Baile Átha Cliath: Comhdháil Náisiúnta na Gaeilge/Western Health Board.

Brown, P. (1998). Children's first verbs in Tzeltal: Evidence of an early verb category. *Linguistics, 36*, 713-755.

Bryk, A. S., & Raudenbush, S. W. (2002). *Hierarchical linear models: Application and data analysis methods* (2nd ed.). Thousand Oaks CA: Sage.

Bryman, A., & Duncan, C. (2001). *Quantitative data analysis with SPSS Release 10 for Windows: A guide for social scientists*. London: Routledge.

Burchinal, M., & Appelbaum, M. (1991). Estimating individual developmental functions: Methods and their assumptions. *Child Development, 62*, 23-43.

Caldera, Y., Huston, A., & O'Brien, M. (1989). Social Interactions and Play Patterns of Parents and Toddlers with Feminine, Masculine, and Neutral Toys *Child Development, 60* (1), 70-76

Camaioni, L., Caselli, M. C., Longobardi, E., & Volterra, V. (1990). *Construction and validation of a parent report instrument for assessing communicative and linguistic development in the second year of life.* Paper presented at the Fifth International Congress for the Study of Child Language, Budapest, Hungary.

Camaioni, L., & Longobardi, E. (2001). Noun versus verb emphasis in Italian mother-to-child speech. *Journal of Child Language, 28*, 773-785.

Cameron-Faulkner, T., & Hickey, T. (2008, July). *The functional basis of children's early multiword utterances: Evidence from Irish and English child-directed speech.* Paper presented at the International Association for the Study of Child Language, Edinburgh, UK.

Carnie, A. (2008). *Irish nouns: A reference guide*. Oxford: Oxford University Press.

Caselli, C., Casadio, P., & Bates, E. (1999). A comparison of the transition from first words to grammar in English and Italian. *Journal of Child Language, 26*, 69-111.
Caselli, M., Bates, E., Casadio, P., Fenson, J., Fenson, L., Sanderl, L., et al. (1995). A cross-linguistic study of early lexical development. *Cognitive Development, 10*, 159-199.
Caselli, M. C., Casadio, P., & Bates, E. (2001). Lexical Development in English and Italian. In M. Tomasello (Ed.), *Language Development: Essential readings in developmental psychology*. London: Blackwell Publishers.
Central Statistics Office. (2007). Census 2006 Results. Retrieved 10th September 2008, from http://www.cso.ie/census/Census2006Results.htm
Central Statistics Office. (nd). *Surveys and Methodology*. Retrieved 15th March 2006. from http://www.cso.ie/surveysandmethodologies/.
Chaffee, C. A., Cunningham, C. E., Secord-Gilbert, M., Elbard, H., & Richards, J. (1990). Screening effectiveness of the Minnesota Child Development Inventory Expressive and Receptive Language Scales: Sensitivity, specificity and predictive value. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 2*, 80-85.
Chall, J. S., Jacobs, V. A., & Baldwin, L. E. (1990). *The reading crisis: Why poor children fall behind*. Cambridge, MA: Harvard University Press.
Chiat, S. (1986). Personal pronouns. In P. Fletcher & M. Garman (Eds.), *Language Acquisition* (pp. 339-354). Cambridge: Cambridge University Press.
Choi, S. (1997). Language specific input an early semantic development: Evidence from children learning Korean. In D. Slobin (Ed.), *The crosslinguistic study of language acquisition. Volume 5: Expanding the context* (pp. 41-134). New Jersey: Lawrence Erlbaum.
Choi, S. (2000). Caregiver input in English and Korean: Use of nouns and verbs in book-reading and toy-play contexts. *Journal of Child Language, 27*(69-96).
Chomsky, N. (1986). *Knowledge of Language: Its Nature, Origin, and Use*. New York: Greenwood Publishing Group.
Clift, Stagnitti, & DeMello. (1998). A validational study of the test of pretend play using correlational and classificational analyses. *Child Language Teaching and Therapy, 14*, 199-209.
Conboy, B. T., & Thal, D. (2006). Ties between the lexicon and grammar: Cross-sectional and longitudinal studies of bilingual toddlers. *Child Development, 77*(3), 712-735.
Corkum, V., & Dunham, P. (1996). The Communicative Development Inventory- words: Short Form as an index of language production. *Journal of Child Language, 23*, 515-528.
Cress, C. J., & Herzog, M. (2002, April). *Growth curves for receptive vocabulary inventories in non-speaking toddlers with developmental disabilities.* Paper presented at the International Conference on Infant Studies, Toronto, Canada.
Crystal, D. (2002). *A dictionary of linguistics and phonetics*. London: Blackwell
Crystal, D., Fletcher, P., & Garman, M. (1989). *The grammatical analysis of language disability: A procedure for assessment and remediation* (2nd ed.). London: Whurr.
D'Odorico, L., Carubbi, S., Salerni, N., & Calvo, V. (2001). Vocabulary development in Italian children: A longitudinal study. *Journal of Child Language, 28*, 351-372.
D'Odorico, L., & Fasolo, M. (2007). Nouns and verbs in vocabulary acquisition of Italian children. *Journal of Child Language, 34*, 891-907.
Dale, P. (1991). The validity of a parent report measures of vocabulary and syntax at 24 months. *Journal of Speech and Hearing Research, 34*, 565-571.
Dale, P. (2008, July). *Screening for language delay in preschool children: Experiences and methodological challenges.* Paper presented at the IASCL, Edinburgh, UK.
Dale, P., Dionne, G., Eley, T., & Plomin, R. (2000). Lexical and grammatical development: A behavioural genetic perspective. *Journal of Child Language, 27*, 619-642.

Dale, P., & Fenson, L. (1996). Lexical development norms for young children. *Behaviour research methods, instruments and computers, 28*, 125-127.
Dale, P., Fenson, L., & Thal, D. (1993). Some suggestions for the adaptation of the MacArthur Communicative Development Inventories to additional languages: University of Washington.
Dale, P., & Goodman, J. C. (2005). Commonality and individual differences in vocabulary growth. In M. Tomasello & D. Slobin (Eds.), *Beyond nature-nurture: Essays in honour of Elizabeth Bates* (pp. 41-81). Mahway, NJ: Lawrence Erlbaum Associates
Dale, P., Price, T., Bishop, D. M. V., & Plomin, R. (2003). Outcomes of Early Language Delays: 1 Predicting Persistent and Transient Language Difficulties at 3 and 4 years. *Journal of Speech, Language and Hearing Research, 46*, 544- 560.
Dale , P. S., Bates , E., Reznick , S., & Morrisset, C. (1989). The validity of a parent report instrument of child language at twenty months. *Journal of Child Language, 16*, 239-249.
de Grauwe, S., & Bol, G. W. (2007, June). *A study of Dutch children with SLI and normally developing children using various measures of morphosyntactic complexity and lexical diversity.* Paper presented at the European Child Language Disorders Group, Cork, Ireland.
De Houwer, A. (1995). Bilingual language acquisition. In P. Fletcher & B. MacWhinney (Eds.), *The handbook of child language* (pp. 220-250). Oxford: Blackwell.
De Houwer, A., Bornstein, M., & Leach, D. (2005). Assessing early communicative ability: A cross-reporter cumulative score for the MacArthur CDI. *Journal of Child Language, 32*, 735-758.
De Houwer, A., & Gillis, S. (1998). Dutch child language: An overview. In S. Gillis & A. De Houwer (Eds.), *The acquisition of Dutch* (pp. 1-100). Amsterdam: John Benjamins.
Department of Community Rural and Gaeltacht Affairs. (2003). *The Official Languages Act*. Retrieved 23rd June 2005. from http://www.pobail.ie/en/IrishLanguage/OfficialLanguagesAct2003/.
Department of Community Rural and Gaeltacht Affairs. (2007). *Comprehensive Linguistic Study of the Use of Irish in the Gaeltacht: Principal Findings and Recommendations*. Dublin: National University of Ireland, Galway.
Department of Community Rural and Gaeltacht Affairs. (nd). *Scéim Labhairt na Gaeilge*. Retrieved 29th July 2008. from http://www.pobail.ie/en/AnGhaeltacht/GaeltachtSchemes/SceimLabhairtnaGaeilge/.
Deuchar, M. (2008, 24th -26th October). *Evaluating competing models of code-switching.* Paper presented at the Models of Interaction in Bilinguals, Bangor, Wales
Devescovi, A., Caselli, M. C., Marchione, D., Pasqualetti, P., Reilly, J., & Bates, E. (2005). A crosslinguistic study of the relationship between grammar and lexical development. *Journal of Child Language, 32*, 759-786.
Dionne, G., Dale, P. S., Boivin, M., & Plomin, R. (2003). Genetic evidence for bidirectional effects of early lexical and grammatical development. *Child Development, 74*, 394-412.
Dixon, J. A., & Marchman, V. A. (2007). Grammar and the lexicon: Developmental ordering in language acquisition *Child Development, 78*(1), 190-212
Down Syndrome Educational Trust. (2000). *The first 120 words*. Portsmouth: Down Syndrome Educational Trust.
Doyle, A. (1996). Nominal Borrowings and Word-Formation in Irish. In a. B. S. H. Kardels (Ed.), *A Festschrift for Edmund Gussmann from his friends and colleagues* (pp. 32-46). Lublin: University Press of the Catholic University of Lublin.
Doyle, A. (2000). *Prepositions and reflexivity in Irish and English.* Paper presented at the 8th Annual Conference of the Polish Association for the study of English, Lublin, Poland.
Doyle, A. (2001). Verb-particle combinations in Irish and English. In J. M. Kirk & D. Ó' Baoill (Eds.), *Language Links: The Languages of Scotland and Ireland* (pp. 145-187). Belfast: Cló Ollscoil na Banríona.

Doyle, A. (2002). Covert and Overt Pronominals in Irish. *Lublin studies in Celtic languages, 7*.
Edwards, J. (2004). Foundations of Bilingualism. In T. K. Bhatia & W. C. Richie (Eds.), *The Handbook of Bilingualism* (pp. 7-31). Oxford: Blackwell.
Eriksson, M. (2001). Narratives validate communicative development inventories. *Applied Psycholinguistics, 22*, 45-60.
Eriksson, M., Westerlund, M., & Berglund, E. (2002). A screening version of the Swedish communicative development inventories designed for use with 18-month-old children. *Journal of Speech, Language and Hearing Research, 45*, 948-960.
Feldman, H., Dollaghan, C., Cambell, T., Kurs-Lasky, M., Janosky, J., & Paradise, J. (2000). Measurement properties of the MacArthur Communicative Development Inventories at ages one and two years. *Child Development, 71*(2), 310-322.
Feldman, H. M., Dale , P. S., Cambell, T. F., Colborn, D. K., Kurs-Lasky, M., Rockette, H. E., et al. (2005). Concurrent and predictive validity of parent reports of child language at ages 2 and 3 years. *Child Development, 76*(4), 856-868.
Fenson , L., Bates , E., Dale , P. S., Goodman, J. C., Reznick , S., & Thal , D. J. (2000). Measuring variability in early child language: Don't shoot the messenger. *Child Development, 71*(323-328).
Fenson, L., Dale, P. S., Reznick, J., Thal, D. J., Bates, E., Hartung, J., et al. (1993). *The MacArthur-Bates, Communication Development Inventories: Technical Manual & User Guide*. Baltimore: Paul H. Brooks.
Fenson, L., Dale, P. S., Reznick , S., Bates , E., Thal, D. J., Pethnick, S., et al. (1994). Variability in Early Communicative Development. *Monographs of the Society in Research in Child Development 59*, 1-185.
Fenson, L., Marchman, V. A., Thal, D. J., Dale, P. S., Reznick, J. S., & Bates, E. (2007). *MacArthur-Bates Communicative Development Inventories (CDIs), User's guide and technical manual* (2nd ed.). Baltimore: Brooks Publishing.
Fenson, L., Pethnick, S., Rendal, C., Cox, J., Dale, P., & Reznick, J. (2000). Short-form versions of the MacArthur Communicative Development Inventories *Applied Psycholinguistics, 21*, 95-116.
Fernald, A., & Morikawa, H. (1993). Common themes and cultural variations in Japanese and American mothers' speech to infants. *Child Development, 64*, 637-656.
Fey, M., & Gillam, R. (2003, June). *Measuring language development and language disorders: Documenting treatment outcomes.* Paper presented at the Symposium for Research in Child Language Disorders, Madison, Wisconsin, USA.
Fletcher, P., Chan, C., Wong, P., Stokes, S., Tardif, T., & Leung, S. (2004). The interface between phonetic and lexical development in early Cantonese language development. *Clinical Linguistics and Phonetics, 18* 535- 545.
Foras na Gaeilge. (nd). The Irish Language. Retrieved 13th June, 2006 from http://www.gaeilge.ie/language/default.asp?catid=16
Frankenberg, W., Dodds, J., Archer, P., Bresnick, B., Mashka, P., Edelman, N., et al. (1990). Denver Developmental Screening Test (Denver II). Denver: Denver Developmental Materials, Inc.
Gaelport. (November, 2007). An ghloine leathán- go fóill.
Gathercole, V. (2007). Miami and North Wales, so far and yet so near: A constructivist account of morphosyntactic development in bilingual children. *The International Journal of Bilingual Education and Bilingualism, 19*(3), 224-247.
Genesee, F. (2006). Bilingual first language acquisition in perspective. In P. McCardle & E. Hoff (Eds.), *Childhood bilingualism: Research on infancy through school age* (pp. 45-68). Toronto: Multilingual Matters.

Gentner, D. (1982). Why nouns are learned before verbs: Linguistic relativity versus natural partitioning In S. Kuczaj (Ed.), *Language development*. Hillsdale: Erlbaum

Gentner, D., & Boroditsky, L. (2001). Individuation, relativity and early word learning. In M. Bowerman & S. Leivenson (Eds.), *Language acquisition and conceptual development* (pp. 215-256). Cambridge: Cambridge University Press.

Gleitman, L. R., & Gleitman, H. (1992). A picture is worth a thousand words, but that's the problem: The role of syntax in vocabulary acquisition. *Current Directions in Psychological Science, 1*(1), 31-35.

Golinkoff, R., & Hirsh-Pasek, K. (1999). *How Babies Talk*. New York: Dutton/Penguin.

Goodluck, H., Guilfoyle, E., & Harrington, S. (2001). Acquiring subject and object relatives: Evidence from Irish. *Journal of Celtic Language Learning, 6*, 21-33.

Goodman, J. C., Bates, E., John-Samilo, J., Applebaum, M., G, C., & Elman, J. (1999, July). *Early lexical development and the dynamics of change.* Paper presented at the VIIIth Congress of the International Association for the Study of Child Language, San Sebastian, Spain.

Goodman, J. C., Dale , P. S., & Li, P. (2008). Does frequency count? Parental input and the acquisition of vocabulary. *Journal of Child Language, 35*, 515-531.

Gopnik, A., & Choi, S. (1990). Do linguistic differences lead to cognitive differences? A cross-linguistic study of semantic and cognitive development. *First Language, 10*, 199-215.

Gopnik, A., & Choi, S. (1995). Names, relational words and cognitive development in English and Korean speakers: Nouns are not always learned before verbs. In M. Tomasello & W. E. Merriman (Eds.), *Beyond names for things: Young children's acquisition of verbs* (pp. 63-80). Hillsdale: Erlbaum.

Gopnik, A., & Meltzoff, A. (1987). Language and thought in the young child: Early semantic developments and their relationship to object permanence, means-ends understanding and categorization. In K. Nelson & A. Van Kleeck (Eds.), *Children's language, Vol.6* (pp. 231-253). New Jersey: Lawrence Erlbaum.

Grosjean, F. (2004). Studying Bilinguals: Methodological and conceptual issues. In T. K. Bhatia & W. C. Richie (Eds.), *The Handbook of Bilingualism* (pp. 32-63). Oxford: Blackwell.

Guilfoyle, E. (1992). CHILDES- Gaelic samples. In B. MacWhinney (Ed.): Child Language Data Exchange System.

Gutierrez-Clellen, V. (1996). Language diversity: Implications for assessment In K. N. Cole, P. S. Dale & D. J. Thal (Eds.), *Assessment of communication and language* (pp. 29-56). Baltimore: Paul H. Brooks.

Gutierrez-Clellen, V. (1999). Language choice in intervention with bilingual children. *American Journal of Speech-Language Pathology, 8*, 291-302.

Hamilton, A., Plunkett, K., & Schafer, G. (2000). Infant vocabulary development assessed with a British communicative development inventory. *Journal of Child Language, 27*, 689-705.

Hancock, G. R., & Lawrence, F. R. (2006). Using latent growth models to evaluate longitudinal change In G. R. Hancock & R. O. Mueller (Eds.), *Structural Equation Modeling: A Second Course.* (pp. 177-196). Greenwood, CT: Information Age Publishing.

Hayes, A. F. (2006). A primer on multilevel modelling. *Human Communication Research, 32*, 385-410.

Health Service Executive. (January, 2005). *Irish speaking speech and language therapists to be appointed*. Dublin: HSE.

Heilmann, J., Ellis Weismer, S., Evans, J., & Hollar, C. (2005). Utility of the MacArthur-Bates communicative development inventory in identifying language abilities of late-talking and typically developing toddlers. *American Journal of Speech-Language Pathology, 14*, 40-51.

Hickey, R. (1985). Reduction of allomorphy and the plural in Irish. *Ériu, 36*, 143-162.

Hickey, T. (1990a). The Acquisition of Irish: A Study of Word Order Development. *Journal of Child Language, 17*, 17-41.
Hickey, T. (1990b). ILARSP: a grammatical profile of Irish. *Clinical Linguistics and Phonetics 4* 363-376.
Hickey, T. (1991). Mean Length of Utterance and the Acquisition of Irish. *Journal of Child Language, 18*, 553-569.
Hickey, T. (1992). The Acquisition of Irish as First Language: What Do We Know? *Insealbhú na Gaeilge mar Chéad Teanga*, 1-25.
Hickey, T. (1993). Identifying formulas in first language acquisition *Journal of Child Language, 20*, 27-41.
Hickey, T. (2002). *Language contact in the minority language immersion preschool.* Paper presented at the 2nd International Symposium on Bilinguals, Vigo, Spain.
Hickey, T. (2007). Children's language networks and teachers' input in minority language immersion: What goes in may not come out. *Language and Education, 21*(1), 46-65.
Hirsh-Pasek, K., Golinkoff, R. M., & Hollich, G. (1999). Trends and transitions in language acquisition: Looking for the missing piece. *Developmental Neuropsychology, 16*, 139-162.
Holm, A., & Dodd, B. (2001). Comparison of cross-language generalisation following speech therapy. *Folia Phoniatricia et Logopaedica, 53*, 166-172.
Holm, A., Dodd, B., Stow, C., & Pert, S. (1999). Identification and differential diagnosis of phonological disorder in bilingual children *Language Testing, 16* 271-292.
Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55.
Huttenlocher, J. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology, 27*(2), 236-248.
Huttenlocher, J., Levine, S., & Vevea, J. (1998). Environmental input and cognitive growth: A study using time-period comparisons. *Child Development, 69*(4), 1012-1029.
Huttenlocher, J., Vasilyeva, M., Cymerman, E., & Levine, S. (2002). Language input at home and at school: Relation to child syntax. *Cognitive Psychology, 45*, 337-337.
Ingram, D., & Pinker, S. (1989). Book Review: The crosslinguistic study of language acquisition Volume 1 & 2. *Journal of Child Language, 16*, 456-466.
Jackson-Maldonado, D., Thal, D. J., Marchman, V. A., Bates, E., & Gutierrez-Clellen, V. (1993). Early lexical development in Spanish-speaking infants and toddlers. *Journal of Child Language, 20*, 523-549.
Jahn-Samilo, J., Goodman, J. C., Bates, E., & Sweet, M. (2000). *Vocabulary learning in children from 8 to 30 months of age: A comparison of parental reports and laboratory measures* (Technical Report No. CND-0006). San Diego: University of California.
Johnson, S., Wolke, F., & Marlow, N. (2008). Developmental assessment of preterm infants at 2 years: validity of parent reports. *Developmental Medicine and Child Neurology, 50*, 58-62.
Johnston, J., & Slobin, D. (1979). The development of locative expressions in English Italian,Serbo-Croatian & Turkish. *Journal of Child Language, 6*, 529-545.
Jung, T., & Wickrama, K. A. S. (2007). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass, 1*, 1-16.
Kallen, J. (2001). The Acquisition of Celtic languages. *Journal of Celtic Language Learning, 6*, 5-8.
Kallen, J., & Smith, M. (1992). Irish language acquisition and speech/language therapy: Principles and needs. *Insealbhú na Gaeilge mar Chéad Teanga*, 26-42.
Kan, P. F., & Kohnert, K. J. (2005). Preschoolers learning Hmong and English: Lexical-semantic skills in L1 and L2. *Journal of Speech, Language and Hearing Research, 48*, 372-382.

Kauschke, C., & Hofmeister, C. (2002). Early lexical development in German: A study on vocabulary growth and vocabulary composition during the second year of life *Journal of Child Language, 29*, 735-727.
Kern, S. (2007). Lexicon development in French-speaking infants. *First Language, 27*(3), 227-250.
Kim, M., McGregor, K., & Thompson, C. (2000). Early lexical development in English- and Korean-speaking children: Language- general and language-specific patterns. *Journal of Child Language, 27*, 225-254.
Klee, T., Carson, D., Gavin, W., Hall, L., Kent, A., & Reece, S. (1998). Concurrent and predictive validity of an early language screening program. *Journal of Speech, Language and Hearing Research, 41*, 627-641.
Klee, T., & Harrison, C. (2001). *CDI Words and Sentences: Validity and preliminary norms for British English.* Paper presented at the Child Language Seminar, University of Hertfordshire, England.
Klee, T., Robertson, E., Howard, D., & Gavin, W. (2000, July). *Effect of word list length on parent report measures* Paper presented at the International Clinical Linguistics and Phonetics Association, Edinburgh, Scotland
Kovacevic, M., Kuvac, J., & Cepanec, M. (2005, July). *Intertwining of lexical and grammatical development in a highly inflected language: the Croatian adaptation of MacArthur-Bates CDI.* Paper presented at the Poster presented at the 10th International Congress for the Study of Child Language, IASCL, Berlin, Germany.
Kurland, B., & Snow, C. (1997). Longitudinal measurement of growth in definitional skill. *Journal of Child Language, 24*, 603-625.
Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: MIT Press.
Lewis, V., & Boucher, J. (1997). The Test of Pretend Play. London: Harcourt Brace.
Lewis, V., Boucher, J., Lupton, L., & Watson, S. (2000). Relationships between symbolic play, functional play, verbal and non-verbal ability in young children. *International Journal of Language and Communication Disorders, 35*, 117-127.
Lieven, E., Behrens, H., Spears, J., & Tomasello, M. (2003). Early syntactic creativity: A usage-based approach. *Journal of Child Language, 30*, 333-370.
Lieven, E. V. M., Pine, J. M., & Dressner-Barnes, H. (1992). Individual differences in early vocabulary development: Redefining the referential-expressive distinction *Journal of Child Language, 19*, 287-310.
López Ornat, S., Gallego, C., Gallo, P., Karousou, A., & Mariscal, S. (2005, July). *The (European) Spanish CDIs: results on early vocal, gesture, vocabulary and grammar development from 8 to 30 months.* Paper presented at the Xth International Congress for the Study of Child Language, IASCL, Berlin, Germany.
Lyytinen, P., & Lyytinen, H. (in press). Associations between lexicon and grammar at the end of the second year in Finnish children. *Journal of Child Language*.
Mac Cóil, L. (2003). Irish: One of the languages of the world. In M. Cronin & C. Ó'Cuilleanáin (Eds.), *The language of Ireland* (pp. 127- 148). Dublin: Four Courts Press.
Mac Fhlannchadha, P. (1999). Codemixing and codeswitching among children in an Irish immersion school. *Teanga, 18*, 43-63.
Mac Murchaidh, C. (2004). *Cruinnscríobh na Gaeilge*. Baile Átha Cliath: Cois Life.
MacCana, P., & Ó'Baoill, D. (1996). On the extended use of ag before verbal nouns. *Ériu, 47*, 185-191.
MacMathúna, S. (1979). A prolegomena to a study of language acquisition in Irish. *Teanga, 1*, 72-90.
MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk* (3rd ed.). Mahway, NJ: Lawrence Erlbaum Associates.

MacWhinney, B. (2003). Child Language Analyses (CLAN) (Version 23).
Maital, S., Dromi, E., Sagi, A., & Bornstein, M. (2000). The Hebrew communicative development inventory: Language specific properties and cross-linguistic generalisations. *Journal of Child Language, 27*, 43-67.
Malvern, D., & Richards, B. (2000). Validation of a New Measure of Lexical Diversity. A Pilot Study. In M. Beers, B. v. d. Bogaerde, G. Bol, J. de Jong & C. Rooijmans (Eds.), *From sound to sentence: Studies on first language acquisition.* (pp. 81-96). Groningen: Centre for Language and Cognition, University of Groningen.
Maratos, M. (2000). More overregularizations after all: New data and discussion on Marcus, Pinker, Ullman, Hollander, Rosen & Xu. *Journal of Child Language, 27*, 183-212.
Marchman, V. A. (1997). Models of language development: An emergentist perspective. *Mental Retardation and Developmental Disabilities Research Review, 2*, 293-299.
Marchman, V. A., & Bates, E. (1994). Continuity in lexical and morphological development: A test of the critical mass hypothesis. *Journal of Child Language, 21*, 339-366.
Marchman, V. A., & Martínez-Sussmann, C. (2002). Concurrent validity of caregiver/parent report measures of language for children who are learning both English and Spanish. *Journal of Speech, Language and Hearing Research, 45*, 983-997.
Marchman, V. A., Martínez-Sussmann, C., & Dale, P. S. (2004). The language-specific nature of grammatical development: Evidence from bilingual language learners. *Developmental Sciences, 7*(2), 212-224.
Marcus, Pinker, S., Ullman, M., Hollander, M., Rosen, T., & Xu, F. (1993). Overregularisations in language acquisition. *Monographs of the society for research in child development, 57*(228).
Mariscal, S., Gallego, C., & López Ornat, S. (2007, July). *The emergence of grammar from lexicon: Evidence from Spanish children under 2;06.* Paper presented at the Child Language Seminar, Reading, UK.
McCloskey, J. (1980). Is there raising in modern Irish? *Ériu, 31*(59-99).
McCloskey, J. (1996). Subjects and subject position in Irish. In R. Borsley & I. Roberts (Eds.), *Syntax of Celtic Languages* (pp. 241-281). Cambridge: Cambridge University Press.
McCloskey, J. (2008). Irish as a World Language. In B. Ó Conchubhar & B. Ó Buachalla (Eds.), *Why Irish? Irish language and literature in Academia*. Galway: Arlen House and Syracuse University Press.
McGregor, K., Sheng, L., & Smith, B. (2005). The precocious two-year-old: status of the lexicon and links to grammar. *Journal of Child Language, 32*, 563-585.
McKenna, A., & Wall, E. (1986). *Our first language: Acquisition of Irish*. Dublin: The Greendale Press Ltd.
Mercure, A. M. (1999). *The quality of parent-child bookreading interaction: Parental attitudes and child engagements.* Unpublished PhD, University of Washington, Seattle.
Miller, J. F., Sedey, A. L., & Miolo, G. (1995). Validity of parent report measures of vocabulary development for children with Down syndrome. *Journal of Speech and Hearing Research, 38*, 1037-1044.
Mon Thomas, E., & Gathercole, V. (2007). Children's productive command of grammatical gender and mutation in Welsh: An alternative to rule-based learning. *First Language, 27*(3), 251-278.
Moyle, M., Ellis Weismer, S., Evans, J. L., & Lindstrom, M. J. (2007). Longitudinal relationships between lexical and grammatical development in typical and late-talking children *Journal of Speech, Language and Hearing Research, 50*, 508-528.
Muthén, L. K., & Muthén, B. (1998-2007). *Mplus User's Guide* (4th ed.). Los Angeles, CA: Muthén & Muthén.

Naigles, L. R., & Hoff-Ginsberg, E. (1998). Why are some verbs learning before other verbs? Effects of input frequency and structure on children's early verb use. *Journal of Child Language, 25*, 95-120.
Nazzi, T., & Bertoncini, J. (2003). Before and after the vocabulary spurt: Two modes of word acquisition? *Developmental Science, 6*(2), 136-142.
Nelson, K. (1973). Structure and strategy in learning to talk. *Monographs for the society for research in child development, 38*, 1-2.
Ní Chartúir, D. (2002). *The Irish language: An overview and guide*. New York: Avena Press
Nic Eoin, M. (2001). Idir dhá theanga: Irish-language culture and the challenges of hybridity In C. Mac Murchaidh (Ed.), *Who needs Irish: Reflections on the importance of the Irish language today* (pp. 123-139). Dublin: Veritas Publications.
Nic Fhionnlaoich, A. (1984). *The acquisition of Irish as a first language by children aged between 2.1 -2.11 years.* Unpublished MA, Trinity College Dublin
Ó' Baoill, D. (1987). Phonological borrowing in Irish and problems of orthographical representation. In G. M. Eoin, A. Ahlqvist & D. Ó. hAodha (Eds.), *Proceedings of the Third International Conference on Minority Language: Celtic Papers* (pp. 89-103). Clevedon: Multilingual Matters.
Ó' Baoill, D., & Ó' Tuathail, E. (1992). *Úrchúrsa Gaeilge*. Baile Átha Cliath: Institiúid Teangeolaíochta Éireann.
Ó' Baoill, D. P. (1992). Developmental Stages in the Acquisition of Irish Phonology and Initial Mutations. *Insealbhú na Gaeilge mar Chéad Teanga*, 26-40.
Ó' Dochartaigh, C. (2006). Ireland, Republic of: Language Situation. In K. Brown (Ed.), *Encyclopaedia of Language and Linguistics* (2nd ed., pp. 24). London: Elsevier.
Ó' Donall, N. (2005). *Foclóir Gaelige-Béarla*. Baile Átha Cliath: An Gúm.
Ó' Donnchadha, D. (1992). Lán Béil. *Insealbhú na Gaeilge mar Chéad Teanga*, 74-96.
Ó' Laoire, L. (2004). Níl sí doiligh a iompar! No load to carry. In C. Mac Murchaidh (Ed.), *Who needs Irish? Reflections on the importance of the Irish language today* (pp. 46-63). Dublin: Veritas Publications.
Ó' Murchú, H. (2001). The needs of Irish-speaking bilinguals. *Journal of Clinical Speech and Language Studies, 11*(40-68).
Ó' Riagáin, P. (1997). *Language Policy and Social Reproduction: Ireland 1893-1993*. Oxford: Clarendon Press.
Ó' Sé, D. (1991). Verb Inflection in Modern Irish. *Ériu, 42*, 61-81.
Ó' Sé, D. (1992). The perfect in modern Irish. *Ériu, 43*, 39-67.
Ó' Siadhail, M. (1983). The erosion of the copula in modern Irish dialects. *Celtica, 15*, 117-127.
Ó' Siadhail, M. (1989). *Modern Irish: Grammatical Structure and dialectal variation*. Cambridge: Cambridge University Press.
Ó' Siadhail, M. (1995). *Learning Irish* (2nd Ed. ed.). London: Yale University Press.
O'Malley-Madec, M. (2001). English Discourse Markers in the Speech of Native Speakers of Irish. In B. Ó. Catháin & R. Ó. hUiginn (Eds.), *Béarla: Aisti ar Theangeolaíocht na Gaeilge* (pp. 34-46). Maigh Nuad: An Sagart
O'Malley-Madec, M. (2007). How one word borrows another: The process of language-contact in two Irish-speaking communities. *Bilingual Education and Bilingualism, 10*(4), 494-509.
O'Toole, C., & Chiat, S. (2007). Symbolic functioning and language development in children with Down syndrome *International Journal of Language and Communication Disorders, 41*, 55-171.
Oetting, J. B., & Hadley, P. A. (2008). Morphosyntax in child language disorders. In R. G. Schwartz (Ed.), *The Handbook of Child Language Disorders* (pp. 341-364). New York: Psychology Press.

Owen, A., & Leonard, L. (2002). Lexical diversity in the spontaneous speech of children with Specific Language Impairment: Application of D. *Journal of Speech, Language and Hearing Research, 45*, 927-937.
Owens, M. (1985). Two years on: A sample of mother child interaction in a second language. *Teanga, 5*, 29-46.
Owens, M. (1992). *The Acquisition of Irish: A case study* Clevedon: Multilingual Matters
Pae, S. (1993). *Early vocabulary in Korean: Are nouns easier to learn than verbs?* Unpublished PhD, Univ. Kansas, Lawrence.
Parisse, C., & Le Normand, M. (2000). How children build their morphosyntax: The case of French. *Journal of Child Language, 27*, 267-292.
Patterson, J. L. (1998). Expressive vocabulary development and word combinations of Spanish-English bilingual toddlers. *American Journal of Speech-Language Pathology, 7*(1), 23-32.
Patterson, J. L. (2000). Observed and reported vocabulary and word combinations in bilingual toddlers. *Journal of Speech, Language and Hearing Research, 43*, 121-128.
Pearson, B. Z., Fernández, S. C., & Oller, D. K. (1993). Lexical development in bilingual infants and toddlers: Comparison to monolingual norms. *Language Learning, 43*(1), 93-120.
Pert, S., & Letts, C. (2001). Developing an expressive language assessment for children in Rochdale with a Pakistani heritage background. *Child Language Teaching and Therapy, 19*, 268-289.
Peters, A. M. (1997). Language typology, prosody, and the acquisition of grammatical morphemes. In D. Slobin (Ed.), *The Crosslinguistic Study of Language Acquisition Volume 5: Expanding the Contexts* (pp. 136-197). New Jersey: Lawrence Erlbaum.
Pine, J. M. (1992). How referential are 'referential' children? Relationships between maternal-report and observational measures of vocabulary composition and usage. *Journal of Child Language, 17*, 75-86.
Pine, J. M., & Lieven, E. V. M. (1990). Referential style at thirteen months: Why age-defined cross-sectional measure are inappropriate for the study of strategy differences in early language development. *Journal of Child Language, 17*, 625-631.
Pine, J. M., Lieven, E. V. M., & Rowland, C. (1996). Observational and checklist measures of vocabulary composition: What do they mean? *Journal of Child Language, 23*, 573-589.
Pinker, S. (1989). *Learnability and Cognition: The acquisition of Argument Structure*. Cambridge, Mass: MIT Press.
Pinker, S. (1994). *The Language Instinct: How the Mind Creates Language* New York: HarperCollins.
Plomin, R., Colledge, E., & Dale, P. (2002). Genetics and the development of language disabilities and abilities. *Current Paediatrics 12*, 419-424.
Plunkett, K. (1993). Lexical segmentation and vocabulary growth in early language acquisition. *Journal of Child Language, 20*, 43-60.
Poulin- Dubois, D., Graham, S., & Sippola, L. (1995). Early lexical development: The contribution of parental labelling and infant's categorization abilities. *Journal of Child Language, 22*, 32-343. .
Prescott, C. A. (2004). Using the MPlus computer program to estimate models for continuous and categorical data from twins. *Behavior Genetics, 34*(1), 17-40.
Price, T. S., Eley, T. C., Dale , P. S., Stevenson, J., Saudino, K., & Plomin, R. (2000). Genetic and environmental covariation between verbal and nonverbal cognitive development in infancy. *Child Development, 71*, 948-959.
Purdon, E. (1990). *The story of the Irish language*. Cork: Mercier Press
Quinn, C. (2001). The developmental acquisition of English grammar as an additional language *International Journal of Language and Communication Disorders, 36* (Supplement), 310-313.

Rees, R., & Munro, S. (2005, July). A busy year on the Welsh language front. *Bulletin,* 14-15.
Reese, E., & Read, S. (2000). Predictive validity of the New Zealand MacArthur communicative development inventory: Words and sentences. *Journal of Child Language, 27*, 255-266.
Reid, L. (2005, June 22nd). Language Act may translate into more expense. *The Irish Times*.
Reilly, J. (1992). *American Sign Language version of MacArthur CDI.* Unpublished Manuscript San Diego State University.
Rescorla, L. (1989). The language development survey: A screening tool for delayed language in toddlers. *Journal of Speech and Hearing Disorders, 54*, 587-599.
Rescorla, L., & Achenback, T. M. (2002). Use of the Language Development Survey (LDS) in a national probability sample of children 18 to 35 months old. *Journal of Speech, Language and Hearing Research, 45*, 733-743.
Rescorla, L., & Alley, A. (2001). Validation of the Language Development Survey (LDS): A parent report tool for identifying language delay in toddlers. *Journal of Speech, Language and Hearing Research, 44*, 434-445.
Rescorla, L., & Bernstein Ratner, N. (1996). Phonetic profiles of typically developing and language-delayed toddlers. *Journal of Speech and Hearing Research, 39*, 153-165.
Rescorla, L., Mirak, J., & Singh, L. (2000). Vocabulary growth in late talkers: Lexical development from 2;0 to 3:0. *Journal of Child Language, 27*, 293-311.
Reznick, J. S., & Goldfield, B. A. (1992). Rapid changes in lexical development in comprehension and production. *Developmental Psychology, 28*, 406-412.
Reznick, J. S., & Goldsmith, L. (1989). A multiple form word production checklist for assessing early language. *Journal of Child Language, 16*, 91-100.
Reznick, S. (1990). Visual preference as a measure of infant word comprehension *Applied Psycholinguistics, 11*, 145-166.
Reznick, S., & Goldfield, B. A. (1994). Diary versus representative checklist assessment of productive vocabulary. *Journal of Child Language, 21*, 465-472.
Rice, M. L. (2004). Growth models of developmental disorders. In M. L. Rice (Ed.), *Developmental language disorders: From phenotypes to etiologies* (pp. 207-240). Mahway, NJ: Lawrence Erlbaum Associated.
Rice, M. L., Redmond, S. M., & Hoffman, L. (2006). Mean length of utterance in children with specific language impairment and in young control children shows concurrent validity and stable and parallel growth trajectories *Journal of Speech, Language and Hearing Research, 49*, 793-808.
Rice, M. L., Wexler, K., & Hershberger, S. (1998). Tense over time: The longitudinal course of tense acquisition in children with Specific Language Impairment. *Journal of Speech, Language and Hearing Research, 41*, 1412-1431.
Richards, B. J., & Malvern, D. D. (1997). *Quantifying lexical diversity in the study of language development.* Reading: University of Reading, The New Bulmershe Papers.
Robinson, B., & Mervis, C. (1999). Comparing productive vocabulary measures from the CDI and a systematic diary study. *Journal of Child Language, 26*, 177-185.
Royal College of Speech and Language Therapists. (2006). *Communicating Quality 3* London: RCSLT.
Saudino, K., Dale, P. S., Oliver, B., Petril, S., Richardson, V., Rutter, M., et al. (1998). The validity of parent-based assessment of the cognitive abilities of 2-year-olds. *British Journal of Developmental Psychology, 16*, 349-363.
Shaywitz, B. A., Shaywitz, S. E., Pugh, K. R., Constable, R. T., Skudlarski, P., Fulbright, R. K., et al. (1995). Sex differences in the functional organization of the brain for language. *Nature, 373*, 607-609.

Singer, J., & Willett, B. (2003). *Applied longitudinal data analysis: Modelling change and event occurrence*. New York: Oxford University Press.
Slobin, D. (1985). *The crosslinguistic study of language acquisition. Volume 1:The data* New Jersey: Lawrence Erlbaum Associates.
Slobin, D. (1985). Why study acquisition crosslinguistically? In D. Slobin (Ed.), *The crosslinguistic study of language acquisition. Volume 1: The data* (pp. 3-24). New Jersey: Lawrence Erlbaum.
Slobin, D. (2002). Cross-Linguistic Comparative Approaches to Language Acquisition. In K. Brown (Ed.), *Encyclopaedia of Language and Linguistics.* (pp. 299-301). London: Elsevier.
Smiley, P., & Huttenlocher, J. (1995). Conceptual development and the child's early words for events, objects and persons. In W. E. Merriman & M. Tomasello (Eds.), *Beyond names for things: Young children's acquisition of verbs* (pp. 22- 61). Hillsdale: Erlbaum.
Stenson, N. (1988). *Code-Switching vs. Borrowing in Modern Irish.* Paper presented at the Procedures of the 8th International symposium on language contact in Europe, Douglas, Isle of Man.
Stenson, N. (1993). English influence on Irish: The last 100 years *Journal of Celtic Linguistics, 2*, 107- 128.
Stenson, N. (1997). Language Contact and the development of Irish directional phrase idioms. In A. Ahlquist & V. Capková (Eds.), *Dán do Oide: Essays in memory of R. O' Cléirigh* (pp. 559-577). Dublin: Institiúid Teangeolaíochta Éireann.
Stenson, N. (2008). *Intermediate Irish: A grammar and workbook*. New York: Routledge.
Stoel-Gammon, C. (1988). Sounds and words in early language acquisition: The relationship between lexical and phonological development. In R. Paul (Ed.), *Exploring the Speech-Language Connection* (pp. 25-52). Baltimore: Paul H. Brookes Publishing Co.
Stoel, R. D., Roeleveld, J., Peetsma, T., van den Wittenboer, G., & Hox, J. (2006). Issues in longitudinal research on motivation. *Learning and Individual differences, 16*, 159-174.
Stokes, S. F., & Klee, T. (2008). Factors that influence vocabulary development in two-year-old children. *Journal of Child Psychology and Psychiatry, 49*(11), 1228-1226.
Stokes, S. F., & Klee, T. (2009). Factors that influence vocabulary development in two-year-old children. *Journal of Child Psychology and Psychiatry, 50* (4), 498-505.
Stumper, B., Schramm, S. A., & Szagun, G. (2008, July). *A normative study of the development of vocabulary and grammar in young German-speaking children assessed with a German language development inventory.* Paper presented at the International Association of the Study of Child Language, Edinburgh, UK.
Szagun, G., Steinbrink, C., Franik, M., & Stumper, B. (2006). Development of vocabulary and grammar in young German-speaking children assessed with a German language development inventory. *First Language, 26*, 259-280.
Tabors, P. (1997). *One child, two languages*. London: Paul H Brooks.
Tamis-LeMonda, C. S., & Bornstein, M. (1994). Specificity in mother-toddler language-play relations across the second year. *Developmental Psychology, 30*, 283-292.
Tardif, T. (1996). Nouns are no always learned before verbs: Evidence from Mandarin speakers' early vocabularies. *Developmental Psychology, 32*(3), 492-504.
Tardif, T. (2006). But are they really verbs? Chinese words for action. In K. Hirsh-Pasek & R. M. Golinkoff (Eds.), *When action meets word: How children learn verbs* (pp. 3-28). Oxford: Oxford University Press.
Tardif, T., Fletcher, P., Liang, W., & Kaciroti, N. (in press). Early Vocabulary Development in Mandarin (Putonghua) and Cantonese. *Journal of Child Language*.
Tardif, T., Geltman, S., & Xu, F. (1999). Putting the noun bias in context: A comparison of English and Mandarin. *Child Development, 70*, 620-635.

Tardif, T., Shatz, M., & Naigles, L. (1997). Caregiver speech and children's use of nouns versus verbs: A comparison of English, Italian and Mandarin. *Journal of Child Language, 24*, 535-635.

Thal, D., Jackson-Maldonado, D., & Acosta, D. (2000). Validity of parent report measuring vocabulary and grammar for Spanish speaking children. *Journal of Speech, Language and Hearing Research, 43*, 1087-1100.

Thal, D., O'Hanlon, L., Clemmons, M., & Fralin, L. (1999). Validity of Parent Report measure of vocabulary and syntax for preschool children with language impairment. *Journal of Speech, Language and Hearing Research, 42*, 482-496.

Thal, D. J., DesJardin, J. L., & Eisenberg, L. S. (2007). Validity of the MacArthur-Bates communicative development inventories for measuring language abilities in children with cochlear implants. *American Journal of Speech-Language Pathology, 16*, 54-64.

Thordardottir, E. (2005). Early Lexical and Syntactic Development in Quebec French and English: Implications for Cross-linguistic and Bilingual Assessment. *International Journal of Language and Communication Disorders, 40*, 242-278.

Thordardottir, E., Ellis-Weismer, S., & Evans, J. (2002). Continuity in lexical and morphological development in Icelandic and English-speaking 2 years-old *First Language, 22*, 3-28.

Thordardottir, E., & Ellis Weismer, S. (1996). Language assessment via parent report: Development of a screening instrument for Icelandic children. *First Language, 16*, 265-285.

Thordardottir, E., & Ellis Weismer, S. (1998). Mean length of utterance and other language sample measures in early Icelandic. *First Language, 18*, 1-32.

Titley, A. (2004). How did we get here from there. In C. Mac Murchaidh (Ed.), *Who needs Irish? Reflections on the importance of the Irish language today* (pp. 13-24). Dublin: Veritas Publications

Tomasello, M. (1992). *First verbs: A case study in early grammatical development*. Cambridge: Cambridge University Press.

Tomasello , M. (1995). Pragmatic contexts for early verb learning. In W. E. Merriman & M. Tomasello (Eds.), *Beyond names for things: Young children's acquisition of verbs* (pp. 115-146). Hillsdale: Erlbaum.

Tomasello, M. (2000). Acquiring syntax is not what you think. In D. Bishop (Ed.), *Speech and Language Impairments in children: Causes, characteristics, intervention and outcome* (pp. 1-15). New York Psychology Press.

Tomblin, J. B., & Zhang, X. (2006). The dimensionality of language ability in school-age children. *Journal of Speech, Language and Hearing Research, 49*, 1193-1208.

Tsao, F.-M., Liu, H.-M., & Kuhl, P. K. (2004). Speech perception in infancy predict language development in the second year of life: A longitudinal study. *Child Development, 74*(4), 1067-1084.

Ureland, P. S. (1988). *Bilingualism and Writing in the Irish Gaeltacht and the Grisons (Switzerland) with reference to Irish and English.* Paper presented at the Procedures of the 8th International symposium on language contact in Europe, Douglas Isle of Man, UK.

van Agt, H. M. E., van der Stege, H. A., de Ridder-Sluiter, H., Verhoeven, L. T. W., & de Koning, J. K. (2007). A cluster randomised trail of screening for language delay in toddlers: Effects on school performance and language development at age 8. *Pediatrics, 120*, 1317-1325.

Vasilyeva, M., Waterfall, J., & Huttenlocher, J. (2008). Emergence of syntax: Commonalities and differences across children. *Developmental Science, 11*(1), 84-97.

Verlinden, A., & Gillis, S. (1998). Nouns and verbs in the input: Gentner (1982) reconsidered. In V. Besien (Ed.), *First language acquisition* (pp. 163-187). Antwerp: ABLA.

Wehberg, S., Vach, W., Bleses, D., Madsen, T., & Basboll, H. (2007). Danish children's first words: Analysing longitudinal data based on monthly CDI parental reports. . *First Language, 27*(4), 361-383.

Wigger, A. (1972). Preliminaries to a generative morphology. *Ériu, 23*.

Wigger, A. (1998, September). *Language contact, language awareness and the history of Hiberno-English.* Paper presented at the Proceedings on the 2nd Conference on the Celtic Englishes, Podstam, Germany.

Yoder, P. J., Warren, S. F., & Biggar, H. A. (1997). Stability of maternal reports of lexical comprehension in very young children with developmental delays. *American Journal of Speech-Language Pathology, 6*, 59-64.

Zink, I., & Lejaegere, M. (2005, July). *Language acquisition in Dutch children reflected by the Mac-Arthur-Bates communicative development inventories.* Paper presented at the Poster presented at the Xth International Congress for the Study of Child Language, IASCL, Berlin, Germany.

12 Appendices