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Familiarity of speaker accent on Irish children's performance on a sentence comprehension task

Claire O'Connor[1] and Fiona Gibbon[2]
[1]Enable Ireland, Cavan/Monaghan, [2]University College Cork, Ireland

Abstract
Objectives: This study sought to determine whether children's performance on a sentence comprehension task is affected when sentences are spoken in an unfamiliar native accent.
Method: Fifty typically developing school-aged children living in Southern Ireland (Cork) participated; 25 in a younger group (mean 7;08 years) and 25 in an older group (mean 9;09 years). The children completed a computer-based comprehension task during which 20 sentences were spoken in a Cork accent (familiar) and 20 were in a Tyrone accent (unfamiliar). The sentences were matched for syllable length and syntactic complexity.
Main results: The younger children made significantly more errors when sentences were spoken in an unfamiliar accent. The older children made a similar number of incorrect responses to both familiar and unfamiliar accents.

Conclusion: Younger children's performance on comprehension tasks may be reduced when sentences are spoken in an unfamiliar accent. Possible explanations and the clinical implications are discussed.

Key words: accent, receptive language, sentence comprehension, children

Introduction

Standardized tests are used routinely to measure receptive abilities in children. These tests are basic, fundamental tools used in research and clinical contexts to assess comprehension in both typically developing children and those with communication disorders (Bishop, 1997). The assessment set-up is purposely structured to remove context or situational cues in order to evaluate children's comprehension of specific aspects of language, such as grammatical structure, morphology, complex sentences, or vocabulary. In a typical test, the items (e.g., words, sentences) are selected in order to make increasing demands on children's receptive language processing skills. For example, test sentences usually increase progressively in length, syntactic complexity, or both, in order to identify the upper threshold of children's comprehension.

By definition, assessing spoken language comprehension entails a verbal presentation of items to the child, who is then required to demonstrate understanding in some way. A multiple choice format is the usual mode of response. For example, a child may be asked to choose from an array the picture that best corresponds to a word or sentence spoken by the tester. Many tests use this format, such as the British Picture Vocabulary Scales (Dunn, Dunn, Whetton, & Burley, 1997) and the Test for Reception of Grammar (Bishop, 2003). An alternative presentation is where the examiner asks the child to act out with three-dimensional objects, such as toys or colored shapes, in response to utterances spoken by the tester. Examples of tests using this format are the Reynell Developmental Language Scales (Edwards et al., 1997), the Token Test (de Renzi & Vignolo, 1962; DiSimoni, 1978) and the Token Test for Children (McGhee, Ehrler, & DiSimoni, 2007).

Although language comprehension tests vary in their construction, materials, response requirements and general administration, a feature that almost all have in common is that the tester speaks the instructions "live" at the time of testing. Most assessment manuals provide general guidelines about how the examiner should speak the test items and the best testing

environment in which to conduct it. For example, the guidance in the manual for the Test for Reception of Grammar (Bishop, 2003) is that the tester should "speak slowly and clearly, giving stress to any words shown in bold on the form" (p. 15) and that the test should be administered by a tester who is a "clear speaker of English" (p. 14). Overall speech qualities that could contribute to "clear" delivery include the use of appropriate speech rate, loudness, and carefulness (versus casualness). The obvious point is that to gain an accurate assessment of children's receptive language competence requires that test artifacts that might affect performance, such as a tester with unclear speech, are ruled out. However, a clinical difficulty arises in recognizing when a tester's speech is inappropriate in terms of rate or other factors and is thus "unclear" to the extent that a child underperforms on the test.

One aspect of testers' speech that could potentially diminish the clarity of spoken commands occurs when a tester has an accent that is unfamiliar to the child. The term accent refers to a combination of segmental (e.g., consonants and vowels) and nonsegmental (e.g., intonation, stress) aspects of speech, and is distinct from other levels of language (e.g., vocabulary, grammar, semantics, pragmatics). Native (regional) accents of English show great variation across the world where English is spoken as a first language. Native accents are distinguished from nonnative accents. For nonnative speakers, the accent arises from an interaction between segmental and nonsegmental characteristics of earlier learned language (or languages), which then influences the later learned English language. In a testing situation, it is perhaps surprising that examiner accent, when it is different from the child's, is not considered as an important factor when assessing comprehension. In reality, the chances of a tester speaking with an accent that is unfamiliar to the child are high given the multicultural makeup of healthcare services, combined with increasing immigration and mobility of the modern workforce.

As described above, most assessments of receptive language currently in routine clinical and research use rely on a "live" presentation of words or sentences at the time of test administration. This type of presentation has the advantage of the child being able to watch the tester's face as he or she speaks the instruction, which may facilitate comprehension. One assessment that does not use a live voice presentation of instructions is the Profiling Expressive Prosody in Children (PEPS-C, Peppé & McCann, 2003). PEPS-C is an assessment of prosody and it has a number of receptive subtests, which are presented to the child using prerecorded audio files stored on a computer. Using prerecorded audio files in this way has the advantage of presenting sentences in a standard form and also of making it possible to present the speech in an accent familiar to the child being assessed. The authors of PEPS-C have tailor-made the speech material for different populations because of the important role that accent plays in receptive prosody (Peppé et al., 2010). Most tests of receptive language do not use prerecorded speech stimuli, however, and it remains unclear whether or not such accent-specific speech stimuli is necessary, or even desirable, when testing other aspects of language, such as receptive vocabulary or sentence comprehension.

Regardless of whether the mode of instruction delivery is live or prerecorded, there are several reasons why accent differences between a tester and child should be considered before conducting a test of language comprehension. For example, phonological-phonetic variations provide much room for word misidentifications to arise between a tester and a child if they have different accents. In a real example (observed by the second author), a tester with a Scottish accent asked a 6-year old boy with a Southern British accent during the Test of Receptive Grammar (Bishop, 2003) to point to "the girl [□□□□] pushes the box" and the boy replied "I don't know where the *griddle* is". In this example, the child could have failed this test item, not

because he did not understand the syntax of the sentence, but because he did not recognize the tester's Scottish realization of the vocabulary item "girl".

The above example demonstrates how an unfamiliar speaker accent might reduce children's performance on testing, and there is now substantial research to suggest that an unfamiliar accent does indeed have an adverse effect on comprehension. For example, a number of studies have found that familiarity of accent can affect speed and accuracy of comprehension in adults (Anderson-Hsieh & Koehler, 1988; Cutler, Smits, & Cooper, 2005; Floccia, Goslin, Girard, & Konopczynski, 2006; Gupta, 2005). Floccia et al. found that adults had slower response times to sentences spoken in an unfamiliar (French) accent compared to a familiar (English) accent. Gupta (2005) used adult speakers and listeners in Singapore and Britain to investigate inter-accent speech intelligibility. This study found that the familiarity of the speaker's accent aided listener comprehension. After testing, Gupta concluded that listeners "found it harder to understand an accent with which they were unfamiliar" (p. 147).

Some studies have investigated the effect of an unfamiliar speaker accent on single word comprehension in typically developing children. Nathan, Wells and Donlan (1998) investigated the effect in children and stated that "age-related differences in processing accent variation can be predicted from the research on children's speech perception" (p. 347). The results of their study showed that the children had significantly more difficulties recognizing words spoken in an unfamiliar compared to a familiar accent. Nathan et al. also noted a developmental trend; the older children showed fewer difficulties understanding an unfamiliar accent compared to the younger children.

In a later study, Nathan and Wells (2001) investigated whether children with speech difficulties understood words spoken in their own accent better than those spoken in an unfamiliar accent. This study compared 18 children with speech disorders with 18 typically developing children on an auditory lexical decision task with two accent conditions; their own accent (Southern English, London) versus an unfamiliar accent (Scottish, Glaswegian). Nathan and Wells concluded that "the children with speech output difficulties had a specific deficit on the unfamiliar accent task compared to the familiar accent task" (p. 354). These researchers suggested that the children's difficulty lay in processing the unfamiliar phonetic features of the Glaswegian accent and an inability to map these unfamiliar features onto their own store of phonological representations. This study focused on comprehension of single words, and the authors highlighted the need for further research into the effect of accent familiarity on sentence comprehension in children.

Although there is currently a lack of studies investigating the effect of accent on sentence comprehension in children, a recent study by Dunton, Bruce and Newton (2010) investigated its effect in adults. They investigated the impact of two different accents on accuracy and response time for adults with aphasia and healthy controls. The stimulus items used were taken from a standardized test (the Comprehension Aphasia Test, Swinburn, Porter, & Howard, 2005) of language skills. Their results showed that those with aphasia made significantly more errors of accuracy, but not increased response time, in comprehension of sentences spoken in an unfamiliar accent compared to a familiar accent. This finding was not observed in the healthy group.

The aim of the current study was to find out whether familiarity of a tester's accent affected typically developing children's performance on a sentence comprehension task. The task was structured to resemble tasks that speech and language therapists and other professionals use routinely to measure children's receptive language in a clinical context. To this end, the study

included a younger and an older group so as to determine whether there was a developmental trajectory similar to the one identified by Nathan et al. (1998).

Method

Participants

Fifty children from two primary schools in the county of Cork, Southern Ireland, participated in the study. Twenty-five children in the first primary class formed the younger group. They were aged 7-8 years (mean 7;08 years; 15 boys; 10 girls). Twenty-five children in the fourth primary class formed the older group. They were aged 9-10 years (mean 9;09 years; 11 boys; 14 girls). The children lived within commuting distance of the schools they attended. Children were included in the study if, by teacher report, they were typically developing, native speakers of Southern Irish English, with no known cognitive, speech, language or hearing difficulties. Ethics approval was granted by the Research Ethics Committee of Queen Margaret University (Edinburgh) and written consent was obtained from parents and participants before data collection.

Speech stimuli

The comprehension task used prerecorded sentences that were spoken by two females aged 20-22 years. One speaker had a self-reported native Cork (Southern Ireland) accent and one had a self-reported native Tyrone (Northern Ireland) accent. The two speakers were selected on the basis of similar voice quality and fundamental frequency (f0). The two speakers were final year speech and language therapy undergraduates who were (a) trained to graduate entry level in phonetics and (b) experienced in the spoken requirements for administering a variety of standardized tools to assess communication skills in children.

Two accents of Irish English, Cork and Tyrone, were selected on the basis that, on presentation to the children, one would be familiar (Cork) and one would be unfamiliar (Tyrone, Ulster). Furthermore, the two accents were identifiably different in origin and phonetic characteristics. In terms of phonetic characteristics, the two accents of Cork and Tyrone differ in their vowel system, consonantal features and intonation. The vowel system in the South corresponds closely to the range of phonetic qualities spoken in the vowel system of the Irish language. For example, the short vowels /□□□□□□□□/ and the long vowels /□□, u□, □□/ all correspond to vowels used in words of the Irish language (Prigge, 2004; Wells, 1982). There are many differences between the vowel systems of Cork and Tyrone accents. The vowel system of this Ulster accent is derived mainly from the Scots traditional dialect. Vowel length and quality vary regionally and socially in Ulster and are dissimilar to that used in the south of Ireland (Wells, 1982). Southern Irish English consonants are quite striking in many parts of the country, especially in the areas of the fricatives /□/ and /□/ and liquids /r/ and /l/. The stereotypical Irish accent includes the use of dental /t/ and /d/ for the above fricatives, however in reality, dentals used in place of fricatives are heard but they are not always as frequent or obvious as is generally thought. The liquid /l/ is noticeably clear in all environments and the typical /r/ is dark in Irish English (Wells, 1982). In contrast, the dental fricatives of Ulster are pronounced as such and there are no strikingly unusual characteristics of the consonants of the North.

The current study used speech stimuli that were modeled on the sentences used in the Token Test (de Renzi & Vignolo, 1962) and the Token Test for Children (DiSimoni, 1978; McGhee et al., 2007). The Token Test is an assessment that measures receptive language and was designed for use with children aged 3-12 years. During the Token Test, the examiner gives spoken instructions, which the child carries out by manipulating real objects of different colors and shapes. For example, the child might be asked to “touch the green circle” and “put the blue

circle on the yellow square". Thus, sentences increase in length as the task progresses but at the same time the sentence syntax is kept relatively simple and predictable.

In the current study, the paradigm used in the Token Test was adapted by use of a Microsoft® power-point slide-show presentation with the spoken commands played via audio files stored on the computer. Instead of real objects, 2 dimensional images of objects were displayed on the computer screen. The procedure included 40 test sentences plus 4 practice items. The vocabulary used in the instructions was restricted, and included 9 colours, 4 shapes and 2 sizes. The vocabulary was selected on the basis that they would be familiar to typical children aged 7-9-years-old; the protocol did not ascertain whether the children knew the vocabulary items prior to testing, however. All the sentences began with the phrase "point to the x", for example, "point to the black circle". The choice of objects presented on the screen meant that children had to understand every colour, shape and size word in the sentence in order to score correctly. So, in the instruction "point to the black circle" the screen contained distracters, such as a red circle and a black rectangle. The number of distracters on the screen increased from 2 to 7 as the test progressed. The sentences therefore had a predictable grammatical structure, similar to the Token Test, and gradually increased in length as testing progressed. Length of sentences was measured by number of syllables, for example an early occurring sentence "point to the black circle" had 6 syllables while a later occurring sentence "point to the small yellow triangle and the big purple circle" had 16 syllables (see Appendix). The sentences presented in each accent were matched for the number of syllables.

The sentences used in the experimental task were recorded by the two speakers in a sound-proof room within a University Phonetics Speech laboratory at Queen Margaret University in Edinburgh. The recorded sentences were saved as audio files and in the experimental task were played at the same volume as each slide was presented to the child. Once recorded, accent typicality (i.e., typical of Cork and Tyrone) was externally verified by asking three phoneticians with expertise and knowledge of Irish accents to listen to three test sentences produced in each accent and to judge whether the accents were typical of these regional areas. These three experts agreed that speaker from Tyrone had an accent that was typical of the northwest of Ireland and the speaker from Cork had an accent that was typical of the southwest of Ireland. The two accents were alternated in the task, with odd-numbered sentences spoken in the familiar accent, and even-numbered sentences spoken in the unfamiliar accent (see Appendix). This choice of alternate presentation was selected on the basis of results from a study by Clarke and Garrett (2004) who found that familiarization can occur after listeners hear as few as two successive sentences from one speaker.

Experimental Procedure

The children completed the sentence comprehension task individually in a quiet, small room within their school in Cork. The researcher (the first author) who conducted the task was experienced in administering language assessments to young children. The task was relatively short, lasting approximately 10 minutes for each child. Before beginning, the examiner ensured that the children understood what the task involved and how they were expected to respond. There were two practice sentences at the start and two half way through the task. In responding, the children were required to wait until the prerecorded audio file had finished playing the sentence, to ensure they heard the full sentence, before they could point to the objects displayed on the computer screen. Throughout testing, the examiner gave prompts and encouragement to the children but gave no feedback about whether their responses were correct or incorrect.

Scoring and Analysis

The scoring was binary, with the children receiving a 1 for a correct response and a 0 for an incorrect response. A correct response entailed the child carrying out every element of the instruction appropriately, otherwise it was judged as an incorrect response. The score sheet was marked by the examiner without the children knowing if they were correct or incorrect. The maximum each child could score was 40 (20 in each accent). The statistical analysis used in this study was a two-way between-groups analysis of variance (ANOVA) carried out using SPSS software.

Rate of Speech

It was not possible for the speakers to control their speech rate precisely during their production of the sentences. However, rate was measured in terms of average syllables per second for each sentence. Syllables per second were calculated as follows. The waveform for each sentence was displayed using Cool Edit Pro 2®. A cursor was placed at the beginning and one at the end of each sentence. The time between the cursors in milliseconds (ms) was used to calculate syllables per second (1000/sentence duration, multiplied by the number of syllables in the sentence).

Results

A between group ANOVA was carried out with accent (familiar and unfamiliar) as the within factor and age (younger and older) as the between factor (Figure 1). The results show that the older children made significantly fewer errors than the younger children with a statistically significant main effect for age, $F(1, 96) = 75.5$, $p < 0.05$, with a large effect size (partial eta squared = 0.44). There was also a main effect of accent, $F(1, 96) = 63.43$, $p < 0.05$, which also had a large effect size (partial eta squared = 0.4). Although the older children scored about equally well in their responses to the familiar and unfamiliar accented sentences, the younger children made considerably more errors when responding to the unfamiliar accented sentences. Figure 1 shows mean incorrect responses in each age group, for both the familiar and unfamiliar accents. The figure shows that the mean number of errors for younger group was 2.36 (*SD* = 0.81) in the familiar accent condition and 4.32 (*SD* = 0.69) in the unfamiliar accent. The mean errors for the older group was 1.56 (*SD* = 0.92) in the familiar accent and 2.24 (*SD* = 0.88) for the unfamiliar speaker accent.

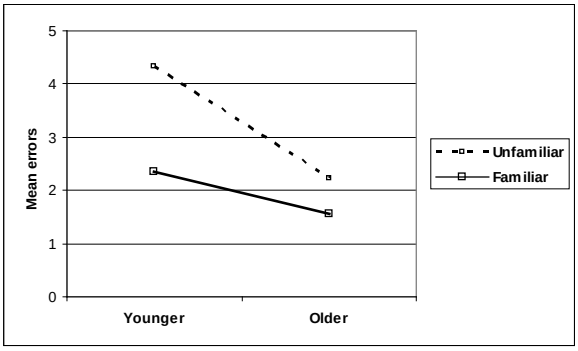


Figure 1. Mean errors produced by younger and older groups of children for sentences spoken in the unfamiliar and familiar accent.

The analysis showed a statistically significant interaction effect, $F(1, 96) = 14.91$, $p = 0.0002$, and the effect size was large (partial eta squared = 0.13). Regarding the one-degree-of-freedom contrasts of influence, the interaction was below the specified 0.05 significance level. This means that the effect of accent on the performance in the task occurred only in the younger children.

In terms of rate of speech, the average number of syllables per second for the Cork and Tyrone accented sentences was similar; Cork sentences averaged overall at 3.9 syllables per second, and Tyrone sentences averaged at 4.4 syllables per second. Overall, the rate of speech for the Tyrone accented sentences was approximately 10% faster than the Cork accented sentences. In relation to syllable length, the total number of errors increased as the sentences became longer in terms of number of syllables. As illustration, just one error occurred in response to the shortest instructions of 6 syllables, whereas a total of 75 errors occurred in response to the longest instructions of 16 syllables.

Discussion

The results showed that although the older children scored equally well in the familiar and unfamiliar accented conditions, the younger children had significantly more incorrect responses to the sentences spoken in the unfamiliar accent. In other words, for the younger children, accent unfamiliarity adversely affected receptive language performance in this test setting. This overall result supports the general finding in the literature that unfamiliar regional and non-native accents can have a detrimental effect on the speed and accuracy of listeners' comprehension (Adank & McQueen, 2007; Dineen, 2010; Dunton et al., 2010).

There are a number of possible reasons why the younger children had greater difficulty with understanding sentences produced in an unfamiliar compared to a familiar accent. The first is that younger children have reduced processing capacity for speech produced in an unfamiliar accent. Compared to the younger children, the older group may have benefited by allocating more processing resources, such as attention, to understanding sentences spoken in the unfamiliar accent. A similar explanation was put forward by Dunton et al. (2010), who suggested that understanding speech in an unfamiliar accent requires increased processing effort in order to extract the full meaning from it. They found that an unfamiliar accent had a significantly detrimental effect on comprehension in adults with acquired language disorder associated with aphasia (Dunton et al., 2010). Dunton et al. reported one of the unimpaired adult controls as commenting that they had to "attend more to the unfamiliar accented stimuli than to the familiar accented stimuli" (p. 9). These authors speculated that typical adults were able to give heightened attention, or enhanced processing facilities, to the listening process. These strategies helped them to understand speech in an unfamiliar accent. One adult control in the Dunton et al. study observed that he or she "had to think harder about the [unfamiliar] accent, and even more with longer sentences" (p. 9). Certainly the current study used sentences that increased in length, as measured by the number of syllables, as the task progressed. This increase in length would have made gradually heavier demands on the children's memory and attention as the test progressed. It could be that individuals with compromised or developing language systems, such as adults with aphasia or young children, find accented speech more difficult to understand than language spoken in a familiar accent because these individuals have more limited processing resources to allocate to the task.

A second possible explanation for the younger children experiencing greater difficulties than the older children with understanding an unfamiliar accent is that the younger ones may have been affected by rate of speech. Anderson-Hsieh and Koehler (1988) investigated the effect

of foreign accent and speaking rate on comprehension. They found that comprehension scores for all speakers were significantly lower at a fast rate than at a regular rate of speech. Although in the current study, all the sentence stimuli in both familiar and unfamiliar accents were all spoken at a natural rate, nevertheless the sentences in the unfamiliar accent condition were on average slightly (10%) faster than those in the familiar accent. It is therefore possible that the slightly faster rate of speech affected the younger children's comprehension, causing them to have a higher number of errors in their responses to the unfamiliar accent. Future investigations need to establish the effects of speech rate, as well as accent familiarity, on comprehension in children of different ages.

Nathan et al. (1998) in their study of typically developing 4- and 7-year-old children from London found that the younger children's comprehension was significantly reduced for words spoken in an unfamiliar regional accent. They suggested that the younger children failed "to map the unfamiliar accent onto their own phonological representations" (p. 343). In other words, that accented speech impeded the younger children's lexical access. Although this is a possible explanation in tasks where vocabulary was not predictable from the context, it is unlikely that failure to access the lexical item is a plausible explanation in the current study. The current study used a limited set of vocabulary items (i.e., colour, shape and size), which were repeated in different combinations throughout the instructions. As a result, the same lexical items were accessed repeatedly throughout the experiment and lexical misidentification on the part of the children was unlikely. Consequently, it is unlikely that the unfamiliar accent blocked lexical access.

A final explanation is that the younger children have had less exposure to language compared to the older children. As children get older they have longer exposure to different accents through the language they hear in their everyday lives, particularly through socializing and through the media. A number of authors have found that length of exposure to a particular accent improves listeners' comprehension (Adank et al., 2009; Nathan et al., 1998). There was an average two year difference between the younger and older group of children in the current study, so it is possible that the number of years of exposure to language could explain the accent effect. Nathan et al. view amount of exposure as one, but not the only factor in older children's superior ability to understand an unfamiliar accent.

The finding of an accent effect in younger children in the current study should be treated as preliminary because of some experimental design limitations and further studies are needed. Although the two speakers used in this study had similar rates of speech, the sentences produced in the Tyrone accent were on average about 10% faster than the sentences produced in the Cork accent. It is possible that rate of speech has an adverse effect on young children's comprehension of sentences. Furthermore, the experimental design had no period of familiarization to the unfamiliar accent. An appropriate adaptation period, for example a few minutes listening to a short story told by a speaker with an unfamiliar accent, may allow children to "tune-in" to the phonological-phonetic variations of that accent. In real life, it is usual to have a period of familiarization, so it would be relevant to establish the effect of accent familiarization on children's performance on a sentence comprehension task.

Although the current study controlled syllable length across accents, it did not vary sentence length in a systematic way. It is likely that any accent effects will be greater in situations that push the upper limits of children's comprehension. Such situations would include long, syntactically complex sentences, for example, or sentences spoken with added background noise. It is also important to investigate the effect of the strength, or degree, of accent unfamiliarity on

children's receptive language. A recent study by Dineen (2010) employed a non-native Polish accent, which was rated by listeners as "strong", as the unfamiliar accent. She found that children made many more incorrect responses than children in the current study when the sentences were spoken in the unfamiliar Polish accent compared to the familiar Cork accent.

Future studies need to investigate the effect of an unfamiliar accent on language comprehension in children younger than those used in this study, particularly preschool children and individuals with receptive language impairment. Establishing the effect of tester speech characteristics (e.g., accent, rate, prosody, and voice quality) on children's performance during receptive language tasks has high clinical relevance. If it is shown that young children's comprehension is affected adversely by such tester factors, test results administered under certain conditions may prove to be inaccurate or misleading.

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References

Adank, P., Evans, B., Stuart-Smith, J., & Scott, S. (2009). Comprehension of familiar and unfamiliar native accents under adverse listening conditions. *Journal of Experimental Psychology: Human Perception and Performance*, *35*, 520–529.

Adank, P., & McQueen, J. M. (2007). The effect of an unfamiliar regional accent on spoken-word comprehension. In J. Trouvain, & W. J. Barry (Eds.), *Proceedings of the 16th International Congress of Phonetic Sciences (ICPhS 2007)* (pp. 1925-1928). Dudweiler: Pirrot.

Anderson-Hsieh, J., & Koehler, K. (1988). The effect of foreign accent and speaking rate on native speaker comprehension. *Language Learning*, *38*, 561–613.

Bishop, D. V. M. (1997). *Uncommon Understanding.* Hove: Psychology Press.

Bishop, D. V. M. (2003). *Test for Reception of Grammar, Version 2 (TROG-2 Manual).* London: Pearson Assessment.

Clarke, C. M., & Garrett, M. F. (2004). Rapid adaptation to foreign accented speech. *Journal of the Acoustical Society of America*, *116*, 3647–3658.

Cutler, A., Smits, R., & Cooper, N. (2005). Vowel perception: Effects of non-native language vs. non-native dialect. *Speech Communication*, *47*, 32–42.

de Renzi, E., & Vignolo, L. A. (1962). The token test: A sensitive test to detect receptive disturbances in aphasics. *Brain*, *85*, 665–78.

Dineen, N. (2010). *The effect of accent on typically developing children's comprehension.* Unpublished bachelor's dissertation, University College Cork, Ireland.

DiSimoni, F. (1978). *Manual for the Token Test for Children.* Chicago: Riverside Publishing.

Dunn, L., Dunn, L., Whetton, C., & Burley, J. (1997). *The British Picture Vocabulary Scale.* Windsor: NFER-Nelson.

Dunton, J., Bruce, C., & Newton, C. (2010). Investigating the impact of unfamiliar speaker accent on auditory comprehension in adults with aphasia. *International Journal of Language and Communication Disorders*, *46*, 63–73.

Edwards, S., Fletcher, P., Garman, M., Hughes, A., Letts, C., & Sinka, L. (1997). *Manual for the Reynell Developmental Language Scales III.* Windsor: NFER-Nelson.

Floccia, C., Goslin, J., Girard, F., & Konopczynski, G. (2006). Does a regional accent perturb speech processing? *Journal of Experimental Psychology: Human Perception and Performance, 32*, 1276–1293.

Gupta, A. F. (2005). Inter-accent and inter-cultural intelligibility: A study of listeners in Singapore and Britain. In D. Deterding, A. Brown & E. L. Low (Eds.) *English in Singapore: Phonetic Research on a Corpus*. Singapore: McGraw-Hill Education.

McGhee, R. L., Ehrler, D. J., & DiSimoni, F. (2007). *Token Test for Children - 2nd Edition (TTFC-2)*. Texas: PRO-ED Inc.

Nathan, L., Wells, B., & Donlan, C. (1998). Children's comprehension of unfamiliar regional accents: A preliminary investigation. *Journal of Child Language, 25*, 343–365.

Nathan, L., & Wells, B. (2001). Can children with speech difficulties process an unfamiliar accent? *Applied Psycholinguistics, 22*, 343–361.

Peppé, S. J., Martinez-Castilla, P., Coene, M., Hesling, I., Moen, I., & Gibbon, F. E. (2010). Assessing prosodic skills in five European languages: Cross-linguistic differences in typical and atypical populations. *International Journal of Speech Language Pathology, 12*, 1–7.

Peppé, S., & McCann, J. (2003). Assessing intonation and prosody in children with atypical language development: The PEPS-C test and the revised version. *Clinical Linguistics and Phonetics, 17*, 345–354.

Prigge, S. (2004). *The English Language in the South of Ireland.* Retrieved from http://www.grin.com/e-book/31653/the-english-language-in-the-south-of-ireland

Swinburn, K., Porter, G., & Howard, D. (2005). *The Comprehensive Aphasia Test.* Hove: Psychology Press.

Wells, J. C. (1982). *Accents of English 2: The British Isles*. Cambridge: Cambridge University Press.

Appendix. A list of the 40 test sentences and 4 practice sentences (listed as P1-4 below) used in the comprehension task. Sentences to the left of the table were spoken in an accent that was familiar to the children (Cork) and those to the right were spoken in an accent that was unfamiliar (Tyrone). All sentences used in the comprehension task were prefixed by the words "Point to the …".

	Familiar (Cork) Accent		Unfamiliar (Tyrone) Accent
P1	blue square	P2	pink square
1	blue circle	2	black circle
3	purple rectangle	4	orange triangle
5	green circle	6	pink circle
7	yellow circle	8	blue triangle
9	orange rectangle	10	yellow rectangle
11	big yellow square	12	small blue circle
13	small red triangle	14	big purple circle
15	big orange rectangle	16	small purple triangle
P3	yellow square and the red circle	P4	green circle and the purple triangle
17	green square and the blue circle	18	red square and the orange square
19	purple circle and the brown square	20	red triangle and the pink square
21	green rectangle and the blue circle	22	orange square and the yellow circle
23	green rectangle and the red triangle	24	yellow circle and the pink triangle
25	small yellow square and the brown circle	26	small green triangle and the pink square

27	big red rectangle and the black circle	28	small purple circle and the green circle
29	small black rectangle and the pink triangle	30	big orange circle and the blue triangle
31	big purple rectangle and the yellow circle	32	small black triangle and the yellow rectangle
33	small yellow circle and the small brown square	34	small black square and the big orange circle
35	big yellow circle and the small green circle	36	small pink triangle and the big orange square
37	big purple rectangle and the small orange circle	38	small yellow triangle and the big purple circle
39	big orange triangle and the small green rectangle	40	small black triangle and the small yellow rectangle