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The Development of an Idiographic Method of Measurement for Use in Dynamic Assessment.

Thesis presented by

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for the degree of

Doctor of Philosophy

University College Cork

School of Applied Psychology.

Head of School: Professor John McCarthy

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December 2019

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

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Epigraph.

Men must keep thinking; and the data assumed by psychology, just like those assumed by physics and other natural sciences, must some time be overhauled.
William James.[1]

As a rule, science regards the individual as a mere bothersome accident. Psychology too ordinarily treats him as something to be brushed aside so the main business of accounting for the uniformity of events can get underway.

Gordon Allport. [2]

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[1] James, W. (1890). *The Principles of Psychology.* Volume 1. New York. Holt. p. vi.

[2] Allport, G. W. (1937). *Personality: A psychological interpretation.* New York: Holt. .p. vii.

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This work is dedicated to my children Méabh and Ciara.

Peer Reviewed Publications Resulting from This Research to Date.

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Hurley, E. & Murphy, R. (2019) Integrated Social Learning Theory and the Mediated Learning Experience. In Tan Oon-Seng & Chua Bee Leng (Eds.), *Advances in mediated learning experience: technology, neuroscience and socio-pedagogic perspectives* (pp.97-118). Singapore: Cengage Learning.

Murphy, R. & Hurley, E. (2019). Measuring individual change using open card sort data. In F. McSweeney & D. Williams (Eds.), *Designing and conducting research in social science, health and social care* (pp. 104-120). London: Routledge.

Chapter1. Introduction.

The primary purpose of this thesis is the development of a psychometric approach to individual evaluation and assessment in Dynamic assessment (DA). Dynamic assessment is a process-based, psychoeducational approach to learning (Delclos, Vye, Burns, Bransford, & Hasselbring, 1992; Feuerstein, 2003; Haywood & Tzuriel, 2002; Verenikina, 2008). The works of Vygotsky (1962a, 1962b, 1978), Luria (1976) and Haeussermann (1958) upon which DA practice and research is based has been further developed by Feuerstein (1990, 2003). His theory of Structural Cognitive Modifiability and the Mediated Learning Experience (MLE), in conjunction with Vygotsky's socio-cultural learning theory, provide the foundation for an approach to learning intervention and dynamic assessment that continues to be advocated for and investigated by a number of psychologists and practitioners worldwide.

At the heart of DA intervention lies the interaction between the expert and learner, or in DA terminology the mediator and novice. The mediator guides and brings attention to and amplifies opportunities for learning for the novice. The learning experience is a *dynamic* co-created *process.* This process can occur both within learning and therapeutic contexts, such as between a teacher and student or psychologist and client, or without such as between a parent and child or expert peer and novice peer.

Dynamic assessment has been critiqued for several reasons. Issues with methods of evaluation and measurement have been closely inspected by psychologists both

within and outside DA. DA has been critiqued for a lack of a firm theoretical paradigm occurring, some argue, as little more than a loose collection of learning intervention methodologies with weak theoretical foundations (Murphy, 2011). Nonetheless DA persists as an approach to learning intervention that has, perhaps ironically, not yet maximised its potential (Frisby & Braden, 1992; Grigorenko & Sternberg, 1998; Haywood & Tzuriel, 2004; Karpov & Tzuriel, 2009; Murphy, 2011; Tzuriel, 2001).

Psychologists within and without DA have identified two principle concerns with the progression of dynamic assessment as a psychoeducational approach to intervention. Grigorenko and Sternberg (1998) describe macro and micro level issues that must be addressed while Tzuriel describes the molar and microscopic levels (2001). Essentially the two describe similar concerns. Firstly, the overarching issue of a viable theoretical framework within which to situate DA. Secondly, regarding research and practice, concerns with measurement and evaluation of DA methodologies applied to people. To address issues concerning measurement, the primary aim of this thesis, it is imperative to have a comprehensive framework within which scientific research and evidence-based practice can be undertaken. The purpose of this research is therefore twofold; to situate DA in a wider theoretical framework than has previously been the case and to investigate the viability of an idiographic method of measurement of DA intervention. The consideration of where DA fits into the theoretical landscape in psychology is necessary to provide a firm footing for research and practice with DA. This thesis proposes such a framework, namely, Integrated Social Learning Theory (ISLT). The method of assessment of dynamic intervention developed over the course of this research is an individualised,

targeted evaluation of movement and change of a person's self-concept over the course of intervention.

There are several theories of self-concept. Broadly speaking these theories can be separated into the study of individual differences (trait theories)) and the study of the person as a whole (process theories) (Barenbaum & Winter, 2003). This thesis conceptualises the development of self-concept as a process, further this development is dynamic and occurs in interaction with environment (Demo, 1992; Snygg & Combes, 1949). Trait theories of self-concept classify self-concept as a relatively stable element and devise methods of measuring the latent variable self-concept using nomothetic approaches, that is by devising self-report scales for measuring self-concept (Catell, 1950; Costa & McCrae, 1998). This approach seeks to understand universal elements of personality. It is particularly useful in understanding how people are likely to behave generally. Like individual psychology, trait theory research suggests that there is movement, or maturation of personality over time (Costa & McCrae, 1994). Interestingly, initially, early studies of individual differences considered intelligence as an integral part of personality (Barratt, 1995).

The hypothesis being considered as the rationale for intervention is grounded within the ISLT theoretical framework and draws from DA, which asserts that change is possible and from Rogers, who asserts that, under the correct conditions self-concept will reorganise into a more positive construal system of the self. The first hypothesis that is being tested is that because the person is not flourishing within their learning context intervention is warranted and can induce positive change in self-concept. It draws on conceptualisations of self-concept expounded upon by Perls (1973), Kelly (1955) and Rogers (1959) and is grounded within the paradigm of individual

psychology described by Allport (1957). The client or novice comes to the process in a state of incongruence (or unrealised potential) and therefore positive change is possible and likely under the correct conditions (Baumeister, 1999, 2011; Feuerstein, 1990; Rogers, 1959). Secondly a positive movement in self-concept will result in a positive movement in self-esteem and academic self-concept since these two elements are sub-sets of self-concept. In a longitudinal study, Marsh (1990) found that students with more positive academic self-concept achieved greater academic success the following year. Later studies confirmed the relationship between the two but indicated that achievement affects self-concept more than self-concept inherently influences achievement success (Muijs, 2011). Further, mastery of cognitive processes improves self-concept resulting in improved life outcomes for the individual (Demo, 1992; Marsh, 1990; Muijs, 2011; Swann, Chang-Schneider & Larsen McClarty, 2007).

The method is data-rich and provides an evidence-base for practice. The method gives an indication of directions for future intervention.

DA focuses on the *processes* of learning and, at its core, seeks to maximise the learning potential of an individual (Feuerstein, 1990; Vygotsky, 1978). Although there are accounts of learning interventions which are process-driven prior to this period, it is only since the 1960s that the approach has become familiar in the West, having its origins in what was then the USSR and later in Israel. The separation of progression in the building of learning theories and approaches between the USSR and the West had resulted in parallel yet differing theories of human learning and development (Murphy, 2008).

At the core of DA is the premise that ability is a malleable, dynamic process. The learning trajectory of any individual therefore cannot be predicted by a single

observation alone. In order to assess the ability of a person, performance must be considered and experienced in context and over time. This reflects one of the philosophical tenets of DA, that environment has an impact on learning ability. The dynamic interaction of the person with environment results in learning. In environments which are less than optimal this impact can be ameliorated through intervention. DA is concerned with identifying elements that have impacted a person's propensity to learn such as poor self-concept, cultural differences in learning styles and meaning, underdevelopment of cognitive strategies, social and cultural deprivation, poor self-regulation, elements affecting motivation such as stigma and internal processes such as psychological and physical barriers to learning (Haywood & Tzuriel, 2004). By examining the person as a complex dynamic system intervention targeting seeming complex obstacles to effective learning can be devised.

There are few who would argue that intelligence is 100% heritable. At the crux of DA is the suggestion that environmental factors have an impact such that intervention is warranted and has value. IQ scores and test results in schools have a significant impact on life outcomes (Tzuriel, 2001). At the core of applied psychology is the aim of improving the quality of life or life outcomes for people. It makes sense to examine if it is possible to improve on those outcomes for individuals. A focus on improving learning outcomes for those learners who are not excelling in the education system is warranted.

This is the purview of DA. It seeks to examine how best to maximise the learning potential of individuals so that they can engage in formal education in such a way as to get the best out of the learning experience. Historically DA intervention has focused on marginalised or disenfranchised people for this reason.

The difficulty thus far has been establishing the efficacy of DA in achieving its goal – the maximisation or improvement in learning potential for people that has a lasting impact on learning outcomes. There have been examples of DA-type interventions that support the efficacy of DA for this purpose and examples of interventions that have failed to produce satisfactory outcomes (Grigorenko & Sternberg, 1998). The mixed results of research to date has elicited a close examination of any shortcomings of DA and what exactly DA is and is not. Grigorenko and Sternberg (1998) review the principles and practices of DA and identify what can only be described as a myriad of issues with both the fuzzy theoretical foundations of DA and the more pragmatic issue of reliability of findings regarding the efficacy of DA as a method of learning intervention. Their paper resulted in a number of responses from researchers and theorists within DA (Haywood, 2008; Haywood & Tzuriel, 2004.; Karpov & Tzuriel, 2009 ; Lidz & Haywood, 2014).

Few deny that there are certain shortcomings in research and practice in DA. There have been moves to address the issues both at the micro and macro level as Grigorenko and Sternberg (1998) describe. The macro refers to issues such as the lack of a coherent, viable, theoretical framework within which to situate DA; the latter refers to issues with measurement and practice.

There have been attempts to address the macro, notably, Murphy (2011) who proposed a comprehensive metatheoretical framework within which DA could be situated and Van Geert (1991, 1994, 1998, 2000, 2014) who proposes a dynamic systems framework for the consideration of individual psychology, particularly as it pertains to development and learning. Others have sought to address elements of the issues identified, particularly regarding measurement in a number of ways. The most notable examples of this are Van Geert's dynamic systems approach to the

evaluation of the mediator/novice interaction (Van Geert, Steenbeek & van Dijk, 2011), Nesselroade and Molenaar's idiographic filter (Molenaar, 2009, 2013; Nesselroade & Molenaar, 2016). and Jensen's MindLadder technique (2000).

Historically DA has relied on two methods of measurement: A split-half IQ test pre- and post-intervention test or measurement systems integrated into the intervention. The primary difficulty with an integrated measurement system is the lack of scientific rigour that the results from such methods affords. The lack of recognition of the efficacy of this approach in the wider academic community presents difficulties for the uptake of dynamic assessment methods.

The second method commonly used is that of a split-half test of cognitive ability. The use of such tests may establish the movement of the individual from a level of ability to a higher level of ability when referenced to a norm-based group. This method has had some use in that it has established that learning potential is modifiable and is open to improvement through intervention. The method compares the individual's progress with a norm-based reference group. Regarding intervention this is problematic for two reasons:

Firstly, DA is an idiographic method – the focus being the movement or change in learning potential (LP) in the individual. To be consistent, the correct measure of such movement should also be idiographic in nature. The second issue lies with comparing the individual with a norm-based group. Individuals who typically are of interest to DA researchers are compared with a control group of their peers. For example, in a study involving immigrants to a country, participants in a study would be compared with a control group of immigrants to that country. Often norm-based tests have not been developed for these specific populations. In Ireland, asylum seekers and refugees are not a homogenous group. Even within groups originating

from the same region there are considerable differences. Relatively small numbers of such populations make accurate evaluation using norm-referenced tests difficult if not impossible. From a statistical perspective error and inaccuracy of measurement at the tail ends of normal distributions (Cam, 1986; Hammond, 2012), where many of the scores for people undergoing learning intervention reside add to the inaccuracy of such findings (Tzuriel, 2001).

This thesis seeks provide an alternative psychometric method for the evaluation of individual change due to intervention. There are two principle criteria to be met. Firstly, that the method provides results that can be used to evaluate intervention which in-turn can provide an evidence-base for practice. In other words that analysis elicits a measurement of degree of change due to intervention. Secondly, that the method provides indications for further directions for future intervention, that is that the method provides data-rich outputs which indicate if and how much further intervention is needed.

The measurement critiques described by Grigorenko and Sternberg (1998) and Frisby and Braden (1992) are levelled not only at dynamic assessment but at the measurement of individual change across time in psychology in general (Borsboom, 2006; Borsboom & Mellenbergh, 2004; Meehl, 1978). There are a number of studies that reflect this gap between research and practice, the identified issue being a lack of suitable methods of evidence-based measurement which would suit the needs of practitioners and their clients.

The solution proposed is the development of a novel idiographic methodology for the measurement of individualised intervention which will be described in these pages. In order to situate the methodology within a framework which will enable practitioners and researchers to usefully engage in and evaluate their work and that

of others carrying out such work, it is necessary to conceptualise a coherent framework within which to situate the study of change at the level of the person. This thesis addresses these issues in tandem. Each must be addressed in order that DA continue as an approach worthy of serious consideration within the field of psycho-educational assessment and intervention. The macro in this instance is the lack of a coherent framework consisting of a clear theoretical basis upon which to carry out, build and conceive methods of measurement and practice. The micro issues described by Grigorenko & Sternberg (1998) constitute inconsistencies and, in some cases, lack of rigour, in measurement and evaluation in DA.

The critiques levelled at DA regarding measurement are contained within the larger debate regarding measurement in psychology as a scientific method of investigation of the human condition, A number of considered critiques seek to generate serious consideration of how we do psychology and what we can (or cannot) assert (Barrett, 2003, 2008, 2011; Borsboom, 2006; Grice, Barrett, Cota, Felix, Taylor, Garner, Vest et al, 2017; Lykken,1991; Meehl, 1978; Michell, 2011). Measurement of people is a tricky business and it is tempting to agree with Meehl's (1978) suggestion that we use the term 'evaluate' rather than 'measure' when we describe what we do in psychology. It is interesting, to me at least, that as a scientific discipline, we are held more accountable for the flaws in our approach to measurement than any other, despite the fact that we are concerned with the study of a very complex thing (Lykken,1991). We cannot extricate latent variables from the embodied self and inspect them. Stevens' paper on measurement in psychology sought to argue that extrapolating from studies observing measurable variables such as reaction time or heart-rate allows us to assert that the further step of attributing scores to a latent quality, such as intelligence or stress, allows us to call what we do in psychology

measurement (1946). In the mathematical sense of the word it is not, it is more accurately described by Barrett (2003, 2011) as applied numerics. In the scientific sense of the word however, this is a form of measurement. The extrapolation or inference of meaning from available data built upon over time with studies that support or refute previous findings is the scientific method (Popper, 1959). We do not need a 'pure' form of measurement to claim what we do is science. Nor do we need to directly observe the variable under consideration in order to produce worthwhile findings (Harré, 1998, 2002). While some of the critiques aimed at psychology have merit it is worth noting that awareness of the flaws and failings of any approach, any method of evaluation or measurement, regardless of discipline, is essential. From this position we can build and discover – which is the goal of scientific endeavour.

Chapter 2 gives a brief account of how formal education of young people as we know it today came into being. This provides a context for the beginnings of measurement in educational psychology. How a nomothetic approach to the evaluation of intelligence came to dominate psychometrics and, as a result, educational psychology is explained. This dominance had a lasting impact on the structures of educational institutions (streaming according to ability) and approaches to intervention, namely segregation of those deemed to be of lower ability and those with disability with little expectation or intention to improve performance. Conversely alternative hypotheses to learning, particularly those that argued for a dynamic nature of learning impacted by resources and exposure to stimuli necessary for learning not solely determined by pre-existing characteristics of the individual such as genetic make-up was underdeveloped, particularly regarding methods of measurement. There were a number of reasons for this, not least the co-option of

Alfred Binet's approach to measurement, the original intention of which was to measure performance over time, into static testing (Binet & Simon, 1904, 1905, 1916; Siegler, 1992; Sternberg & Jarvin, 2015). For nomothetic approaches, theory and methods of measurement developed simultaneously. Methods utilised by practitioners who supported a person-centred approach to evaluation often in the form of case studies, the purpose of which was to engender change for clients, were often grounded in psychoanalytic approaches. These approaches were considered distinct from psychology as a science. It would be some time before methods of measurement of the person over time -idiographic methods of measurement- would be developed.

The individual psychology defined in these pages, which argues for the plasticity of learning and subjectivity of experience impacted by a myriad of environmental factors, is often seen to be at odds with a more deterministic theory of learning. Given the persisting arguments from that school of thought that this is an 'either or' debate, an argument for the consideration of the impact of environment on learning and the implications for this on outcomes for learners is given.

The second half of this chapter looks at the situation regarding the changes in structure in primary and secondary educational institutions – namely a move from segregation to integration and inclusion; from considering intelligence and ability as fixed to malleable. This move to a more rights-based, person-centred approach has implications for how psychologists and educators intervene for the maximisation of quality of life for students, how we approach learning intervention and critically how we evaluate ability and progress.

Chapter 3 gives an overview of dynamic assessment, the overarching theories upon which DA is based and the key arguments of these theories regarding the dynamic

process of learning. In particular the chapter discusses the contribution of Lev Vygotsky (1962; 1978), Alexander Luria (1976) and Reuven Feuerstein (1990, 2003) to the theoretical foundations that have provided the basis for DA research and practice. The chapter highlights how the specific orientation resulting from the culmination of these premises contribute to our understanding of the learning and development of humans. In conclusion the chapter examines the critiques of DA which have given rise to the rationale for this thesis.

Chapter 4 presents a conceptual framework for the study of lives from an idiographic perspective in psychology, Integrated Social Learning Theory (Hurley & Murphy, 2019). ISLT considers and integrates the three elements of theory, measurement and practice. The philosophical assumptions that underpin DA and other social learning theories indicate methodologies which focus on the individual. The dynamic nature of the myriad elements within the system that is an individual are considered as inextricable as described by Luria (Luria, 1959, 1976; Luria & Yodovich, 1956: Luria & Yudovick, 1958) at least when higher order process such as complex learning and emotional development are to be considered. A return to holism is posited, particularly drawing from individual and developmental psychology. ISLT sits within the paradigm of the individual situated in, and in dynamic engagement with, their environment. ISLT builds on these theoretical foundations particularly regarding measurement.

Classical test theory forms the original basis for norm-based psychometrics – the focus of which is the situation of an individual in relation to others. ISLT in this sense has a narrower focus, this difference in scale and orientation has ramifications for approaches taken to measurement. The teleological nature of individual development and the impacts of numerous factors across lifespan indicate methods

of evaluation and measurement which examine progress over time. Barrett's taxonomy of measurement (2003) is useful here as it indicates which methodologies of measurement are suitable for this purpose, and what can or cannot be asserted when we use one method rather than another. In fact, what can be asserted to be measurement, and what cannot be, is clarified. Case studies, for example, cannot be generalised, while test scores from norm-based tests cannot be used for in-depth intervention for an individual (nor are they strictly measurement). It thus becomes clear at what level of scientific enquiry each method operates.

To capture detailed information at this level of enquiry the conceptualisation and mathematical modelling of the person as a dynamic system is used. Dynamic systems theory, drawing from principles expounded in physics (Beilin, 1994; Lewis, 2000), is indicated for a focus on the questions this thesis wants to answer namely; how can a person's progress over time be evaluated in a way that is indicative of their *own* progress, how can a method be developed which answers this question which satisfies the requirements for scientific endeavour and at the same time providing indications useful to practitioners to guide intervention? Once the correct methodology is designed, the laws of cause and effect apply, each of these elements follow from the previous. Specifically, we are comparing a person's self-concept (Rogers, 1955) over several time points. The person's construal of themselves over a series of values (constructs) form the basis of their identity (Kelly, 1959). It is not necessary, or warranted, to anchor measures to a normative structure. Self-concept is developmentally moderated and by the age of about eleven years a person's self-concept has coalesced. The person sees themselves as embodied, their identity separate from others. The person continues to test their idea of themselves against evidence and information in their environment so while self-concept is relatively

stable it is subject to change if the person's construal system is sufficiently challenged. In order to evaluate the person's construal of themselves they are asked to situate themselves along a continuum of positive to negative on a series of values they identify as being important to them (such as intelligence, sense of humour, loyalty or kindness). The size or length of each construct is therefore constructed by the person – not dictated by norm-referenced methods. This captures two elements – the person's own definition of each construct and their own definition of the gradations of that construct or value. For example, a person may see the world in 'black and white' and identify two levels for kindness – one is either kind or not kind, while another may see several levels of subtlety in this construct – some people are mostly kind or mostly unkind. The definition of kindness may also vary; one person may see kindness as being emotional support while other may see it as proffering primarily material support. The number of gradations across values may differ – kindness may be a black and white issue with only two levels while intelligence may have several levels. By examining how the person scores in relation to others in their lives an inference can be made regarding their self-concept. Taken together these datapoints form a matrix of partial-order measures. Data from each time point can be reduced to a two-dimensional space. In order to compare self-concept over time General Procrustes Analysis (GPA) is used, giving an indication of the degree of stability or change over time.

The theoretical and philosophical underpinnings of ISLT indicate methods of measurement and evaluation, likewise directions and approaches to practice are indicated. This chapter considers how ISLT shapes and indicates a broadening of methods of engagement in DA. The approaches of person-centred psychologists such as Kelly (1955, 1963), Rogers (1959), Ellis (1962) and Perls (1973) are considered.

Chapter 5 goes into more detail regarding the rationale for the measurement methodology designed within this paradigm – Individual Dynamic Evaluation and Assessment (IDEA). In this chapter some of the debates within constructivism are addressed. The use of personal construct theory as a basis for the data collection methodology is discussed, and the orientation of personal construct theory to constructivism and subjectivity is clarified (Wortham, 1996, 1997). This is important in order to understand why and how this thesis asserts that a person's subjective concept of themselves is a valid method of evaluation of intervention.

The chapter goes on to describe methods by which information on a person's construction of themselves and the people in their world are typically collected and represented. This is followed by a description of the intervention used – a series of cognitive reasoning exercises delivered in a dynamic fashion. An abridged account of the intervention is given in Appendix 1.

Chapter 6 gives a detailed account of the IDEA protocol used in the ensuing 14 studies and two pilot studies undertaken. An account of the analysis techniques used is given, in this case Multidimensional Scaling (MDS) (Guttman, 1968;Kruskal 1964; Kruskal & Wish, 1978; Lingoes, Roskam & Borg, 1979) of each set of data for one time point, this produces a life-space map representing the person's construal of themselves and others in their world. Two approaches to the subsequent comparison of maps across time using General Procrustes Analysis (Gower, 1975) are described. Eight initial studies use a non-weighted GPA approach and while this method is useful, subsequently weighted GPA analysis of two pilot studies and six further studies suggest that this latter approach is a more suitable method, particularly when using open card sort data where constructs are elicited at each

session. IDEA is grounded in the theories and philosophical foundations of ISLT, how data is interpreted within this paradigm is described.

IDEA uses an open-card sort. Given that the person's construal of their world is subjective and the result of their dynamic interaction with their world, the mediator cannot presume to know anything about their lived experience or the sensemaking that forms the schema upon which they test their own self-concept (Kelly, 1955). It is possible to enquire and understand through language. Within personal construct theory there is an assumption that meaning is shared and agreements are made to the extent that we can operate as a collective species. However, there may be subtle differences in personal meaning given to objects or constructs which are not apparent when the person is interacting with others. The card sort process is therefore an open inquiry, the objective of which is to reveal the constructs and values against which the individual tests their own self-concept and those of others in their lives (Fransella, Bell & Bannister, 2003). It is important that the mediator influence this process as little as possible. This open enquiry means that the open card sort process begins anew at each session and that the number of levels that the persons sort their cards is generated during the sorting process as the participant tests and compares people along their definition of a given construct.

Each session involves generating as many constructs as possible therefore the number of constructs generated from session to session may vary. This represents challenges in terms of how data of this type can be represented and analysed. There follows a discussion on types of multivariate representation of data, in particular types of MDS for the representation of data. The rationale for non-metric multi-dimensional scaling as indicated as a method of producing graphical representations

of a monotonic matrix for one person is described. The chapter then examines GPA and the attendant evaluations for stress and goodness of fit produced by this analysis. How the subsequent output from these analyses in conjunction with an examination of scores across constructs from the original matrices is interpreted, a reflexive process, is described. The importance of grounding an interpretation in the expert knowledge of the practitioner – drawn from the theories expounded in ISLT- is emphasised. This is important in order to avoid assertions that go beyond the evidence from the data analysis. In this sense the methodology is no more or less subjective than any psychometric approach that makes inferences regarding latent variables.

This thesis examines how this measurement methodology can be used in the context of dynamic assessment intervention. The chapter gives an account of the intervention delivered and the particular approach taken in order to satisfy the criteria necessary for the interaction to be *dynamic*. In particular this intervention is modelled on Feuerstein's description of the necessary conditions for mediation to be effective and dynamic (2003) and Lidz's Mediated Learning Experience checklist (Lidz, 1991, 2002; Haywood & Lidz, 2006; Haywood & Lidz, 2009) which ensures that the practitioner addresses the elements necessary for the maximisation of learning potential as described by Feuerstein (1990). ISLT recommends widening the tools of practice to embrace the approaches to interaction taken by other person-centred approaches such as that of Rogers (1959) Perls (1973) and Ellis (1962). This has implications for how the workspace is designed, the mediator working alongside the novice in order to co-create learning.

A summary graphic (Figure 4) of the study design is given as a roadmap to the sixteen studies carried out within the ISLT framework using the IDEA methodology.

The chapter closes with an account of ethical approval, information and consent procedures followed for all studies for this thesis

Chapter 7 describes a conservative approach to GPA analysis for the fitting of GPA maps produced at time three and four to a baseline, centroid, space. This is followed by a description of the cohort from which the first two tranches of study participants were drawn. The first study, Kevin, showcases the procedure followed in detail. The subsequent seven participants who underwent intervention are then presented. The depth of detail produced using this methodology becomes apparent and how this method indicates methods and approaches for moving forward with intervention in order to maximise a person's potential becomes clear.

The results produced using this initial methodology using non-weighted GPA identify change in all cases due to intervention. While engaging in the card sort process with participants, factors not previously accounted for emerged. The initial phase of the first card sort session generates a list of all of the people with which the person comes in contact, and they are then asked to sort those people along constructs – elements of that person's construal system. This results in the person thinking about their system, their values and how they apply to those people. This can result in the person refining the degree of discrimination in their system. In other words, the process itself results in an examination of their personal construal system. This examination is what Kelly (1955) would describe as hypothesis testing. Does the person's card sorting express their construal system? If it does not the person may reconfigure their sorting behaviour. While a person's construal system is robust what was observed across initial sorts was an increase in discrimination of levels of sorting of people within constructs. Another factor considered was the wholly open nature of construct elicitation across time-points. This means that constructs elicited

across time points differ. In order to account for these factors, it became clear a weighted approach to GPA would be more appropriate.

A non-weighted approach is better suited to data collection methods where the constructs are pre-determined prior to the card-sort session by the mediator, the number of levels similarly being fixed. This approach is common in marketing studies for example where the objective is to collect attitudes to elements, such as products from a group of people at one time-point. In this case it can be expected that the scale, or size, of the space will be consistent given that the constructs and number of levels in each construct are fixed prior to sorting . Expansion or contraction of the shape produced by a person's card sort is contrary to the objective where the researcher wants to compare perceptions of products across people.

The studies presented here do not have predetermined levels or constructs. Each time point is generated within a session therefore the scale or size of data configuration may vary over time (although it is hypothesised that the meaning of proximity or distance of data points within the space may not). Therefore, a weighted GPA may be better suited to this analysis to account for this possible variation in sizes of spaces over time.

Chapter 8 examines the viability of using weighted GPA. If weighted GPA gives an accurate representation of movement or change due to intervention, then we should see a high goodness of fit and low stress where no intervention takes place. It also suggests that the sampling of constructs which comprise a person's self-concept using open-card sort produce similar configurations, or shapes, across time. Differing constructs elicited across times produce a sampled representation of that person's life space which is consistent.

Two pilot studies were carried out to test this hypothesis, the results of which are presented here. The results from both indicate a high degree of fit of subsequent maps with the centroid (baseline) configuration. This suggests a high degree of stability of the methodology.

Chapter 9 presents the results from six studies using this methodology. It becomes clear that, given the high degree of fit seen in the pilot study data that two things can be established. Firstly, goodness of fit of time 1 with time 2, where no intervention takes place gives an indication of stability or change already existing within the system. Poor fit indicates pre-existing movement or instability. In each of the cases presented in this third tranche, fit is generally good but not as good as the pilot study data. This variance is to be expected as people from this cohort were identified by gatekeepers as being most in need of support for a number of reasons. Where fit is very poor, caution must be taken in interpreting change in subsequent maps. Secondly one can more clearly assert that movement or change that does occur is due to intervention as we have a clearer baseline for fit.

Finally, chapter 9 evaluates and discusses the findings of this thesis in light of the theoretical framework and studies presented.

Chapter 2. A Consideration of Measurement in Psychoeducational Contexts.

A Brief History.

The formal education of children has a long history. Early education was often culturally or religiously specific and took forms of apprenticeship or induction into religious training. The term ‘novice’, used to describe the learner in dynamic assessment, originates from around 1400. The Latin term, meaning ‘new’ or ‘newly arrived’ was used to refer to newly arrived slaves and later new trainees into religious orders (Webster, Harris, Torrey & Porter, 1907). The structured education of upper classes in societies dates to the first century CE. Religious instruction was often the purview of religious institutions and orders (Christian, Muslim, Hindu, Confucian and many others) and educational instruction was generally only provided to males (Mulhern, 1959). While timelines vary from country to country, classroom type instruction as we understand it today dates to the 1600s and earlier in some cases (countries under the purview of the Roman Empire for example). In Ireland, from this time, education was essentially religiously segregated, with Catholics setting up what were known as hedge schools in contravention of Penal Codes imposed by the colonising protestant British. From the 1800s Catholic schools set up by religious orders were recognised. This was closely followed by the setting up of the National school system (primary school education for, mostly, Catholics), overseen by Britain but run by Catholic orders. Elsewhere in Europe and North America the nature and intended goals of education began to shift with the onset of industrialisation in the 18th Century and revolutions which brought about separations of church and state (Dowling, 1961; Turmel, 2008). The workforce moved from the fields to mines and factories. Three things resulted; a recognition that such work was not suitable for younger children, family work became

compartmentalised as adults went to work and there was now a need for a trained workforce (Gray, 2013).

While accounts of public schooling of children dates back centuries, it was not until the turn of the 20th Century that the relative performance of children within education was considered. While others such as Galton and Spearman had developed tests of intelligence, the Binet-Simon test was the first to focus on what we consider to be cognitive functioning (Gray, 2013). Alfred Binet developed his first test of ability with a view to evaluating the performance of children in the French schooling system to identify what were then termed 'retarded' performers (Binet & Simon, 1904, 1905, 1916). The purpose of which was to provide remedial teaching for those students.

Binet had set up the first experimental laboratory for the assessment of ability in children. His studies, along with his assistant Théodore Simon, resulted in the development of a test of ability which could be objectively administered. Binet cited the subjectivity of teachers' evaluations of students' ability as a rationale for designing the test. The Binet-Simon test was therefore the first standardised test of cognitive ability. Binet also emphasised context, environment, and the cultural specificity of intelligence – intelligence could not be measured using a once-off test such as he had developed without taking qualitative data into account. This issue was somewhat ameliorated by the development of the test to take account for age, but it is important to note that Binet never intended the results from his test to be taken in isolation as a measure of intelligence (Binet & Simon, 1904, 1916).

Binet's test marked the beginning of the testing of cognitive ability. The test was administered one-to-one and took about an hour-and-a-half to complete. This test was translated into English in 1908 by Goddard (Zenderland, 1998), the purpose of

which was to identify the ‘feebleminded’ for institutionalisation. The test was further developed in the USA by Louis Terman. The purpose of Terman’s work was also to select into institutions (Minton, 1988; Minton, n.d.; Terman, 1916; Terman & Childs, 1912). Terman’s work was further developed by Yerkes for the purpose of selecting into the army. Terman’s test, the Stanford-Binet test is the most enduring of the tests developed in the USA based on Binet’s original test. Terman, as head of The National Education Association revised the army selection tests developed in conjunction with Yerkes for the assessment of school children. By the 1920s primary schools divided classrooms based on homogenous ability which in turn was based on mass delivered paper and pencil Stanford-Binet test scores, a practice that persisted until the 1960s (Minton, 1988).

The transfer of the development of standardised intelligence testing from France to the USA was critical. Binet had intended the test to be used to assess children with a view to providing separate instruction to children who performed poorly at initial testing. The objective of separate instruction was to improve their performance in such a way as to reintroduce them into mainstream education. Binet strongly believed that intelligence was malleable, and his test was intended to be used in a dynamic fashion with due consideration of other factors which he believed might influence performance on such tests (Michell, 2012).

In the USA, the predominant theories of intelligence differed. Psychometric research in psychology at the turn of the 20th Century was philosophically grounded in genetic predeterminism. The basis for this argument was Mendelian – intelligence was heritable and rested on a single gene, although the term gene was not coined until 1905 by Johannsen, a Danish botanist (Johannsen, 1905). Terman drew on the work of Galton, a cousin of Darwin. Galton coined the term eugenics which means ‘good

creation', a term probably based on Pluto's writings in Republic circa 380 BCE (Plato & Grube, 1974). Terman based his approach to intelligence measurement on the principles developed by Galton (1907) which were originally aimed at capturing individual differences in physical processes. Spearman consequently developed methods of measurement of the processes described by Galton, thus forming the beginnings of classical test theory. Galton (1907) advocated for the distribution of resources to those most likely groups to advance the species, 'the best-adapted races', that is the most intelligent. In this way negative traits would be repressed through selection. This would result in healthier, morally sound citizens.

Terman asserted that intelligence was highly heritable (in the region of 80% based on his own studies). He posited that intelligence was mediated by race and the number of children in a family (in his own view often a function of ethnic origin). Despite having fifteen siblings himself Terman wrote:

> 'High-grade or border-line deficiency... is very, very common among Spanish-Indian and Mexican families of the Southwest and also among negroes. Their dullness seems to be racial, or at least inherent in the family stocks from which they come... Children of this group should be segregated into separate classes... They cannot master abstractions, but they can often be made into efficient workers... from a eugenic point of view they constitute a grave problem because of their unusually prolific breeding.' (Terman, 1916, pp. 91-92).

Thus, the view that intelligence was largely fixed, shaped the education of those whose performance was considered retarded. Poverty was a *result* of dysgenic traits. Dysgenic traits could be bred out of a population either by using strategies that advanced procreation of eugenic or 'well bred' individuals or by repressing the procreation of people with dysgenic traits with each other or with eugenic

individuals. Given that intelligence was highly heritable, the solution for the preservation of fitness in the population from a Darwinian perspective, in Terman's view, was to prevent those with lower intelligence from procreating and possibly more importantly from procreating with those of higher intelligence.

In the USA The Eugenics Record Office (ERO), founded by Charles Davenport in 1910 used the Stanford Binet test to identify the 'feeble minded'. The ERO considered many solutions to the issue of preserving the fitness of the original Anglo-Saxon white settlers. One solution put forth was euthanasia and while this solution was officially rejected it permeated some medical practices. Racial segregation was a matter of law. Widespread sterilisation programmes were implemented in the USA (in a total of 33 states) and other regions such as Canada, Scandinavia, South America and the UK, these plans were to continue until the 1970s and later in some cases (Black, 1983; Okrent, 2019; Reed & McLaren, 2006; Theobald, 2019). The eugenics movement, particularly the eugenics movement in California directly influenced Nazi policy. The killing of people in Germany began with the T4 programme in 1939. The T4 programme targeted German people, adults and children, deemed to be unfit for various reasons – age, mental capacity, physical incapacities, economic burden. The programme officially ran between 1939 and 1941 it is estimated that 70,000 people were killed during this time. The practice of killing people deemed to be unsuited to be members of a master race continued unofficially until 1945. While Nazi programmes for the eradication of other 'undesirables' including Jews, homosexuals, Roma and others resulted in millions of deaths it is estimated that 200,000 German people were killed under the T4 programme from 1939-1945 (Kundnani, 2018; Okrent, 2019).

In a seeming contradictory position Terman argued that the potential of gifted people

was influenced by environment and his interest in ascertaining how and why outcomes for gifted people could be maximised was reflected in his longitudinal studies on gifted people (Minton, 1988; Karier & Minton, 2006).

In terms of measuring intelligence, the result of this dominant emphasis on genetic predetermination was to argue that a static measure of intelligence was an accurate reflection of a person's ability. This position was to be reiterated by more recent researchers such as Murray and Herrnstein (Herrnstein & Murray, 1994) who also attributed as much as 80% of intelligence to genetic factors. While there has been strong critique of their work (Harris, 2009; Sternberg, Callahan, Burns, Gubbins, Purcell, Reis et al, 1995) research supporting their position persists (Plomin, 2018). Earlier Galton had asserted that intelligence (and other psychological traits) was normally distributed among humans much like physical processes although his own studies did not establish that this was the case (Heron, Spenser & Paul, 1988). This was used to great effect to assert a significant difference in IQ between races in the USA. Plomin has carried out extensive twin studies focusing on IQ. He advocates for genetic testing of intelligence in order to tailor separate education programmes based on ability.

As Kelly succinctly, states:

"…a not too bright physiologically minded psychologist might go looking for the IQ with a microscope. Not that he wouldn't be successful; he might even win the Nobel Prize by pointing to something like a kink in a chromosome." (1955, p28.)

Kelly's position is echoed in Venter's paper on the sequencing of the human genome in 2001. In this paper Venter and colleagues warn against two fallacies to avoid subsequent to their research – determinism and reductionism (Venter, Adams, Myers, Li, Mural, Sutton... & Gocayne, 2001). Understanding of the complexity of

heritability has advanced considerably since the turn of the 20th century, even so isolating heritable factors which contribute to intelligence eludes us.

In the most recent discussion on intelligence advocating for a deterministic position Plomin avoids discussion of race, instead referring to class as a dividing line, although race and class were essentially synonymous at the time of Galton and Terman's studies. Current estimations attribute 40-50% of intelligence to genetic factors (Plomin, 2018).

Disagreement rests on directionality of causation – does material inequality beget differences in IQ or vice versa? Regardless the argument for the continued promotion of heritability as the sole focus for intelligence research has weakened as our understanding increases. The exact relationship between genetics and intelligence has yet to be determined but the influence of convenience on the trajectory of measurement of intelligence cannot be underestimated (Allport, 1960). The most attractive element of the development of the Stanford Binet test in psychology (Peterson & Terman, 2006) was the ability to deliver the test to many people simultaneously and, given the dominant paradigm at the time, it would only be necessary to deliver the test to any individual once.

The result of the staunchly deterministic position in the Western world in the first half of the 20th Century has been that psychometrics and theories of the fixed nature of intelligence have become seemingly inextricably bound (Robinson, 2011). The practice of using a static, once off measure (or measures) of IQ to quantify ability has become the dominant practice so much so that static psychometric testing grounded in classical test theory, and educational psychological assessment are often considered synonymous.

Research within the field has subsequently focused on ways of improving the accuracy of normative psychometric tests of intelligence (Tremblay & Gardner, 1996; Weiss, 1982). Proponents of this approach included Karl Pearson and Charles Spearman for example. This positivist assumption – that psychometrics is on the right track and that now only refinement to measurement methodologies is required - was based on the scientific 'truth' of predeterminism , a now outdated concept.

Moving from Segregation to Inclusion – The Necessity of a Paradigm Shift in Educational Psychology.

While there may recently be evidence of a paradigm shift in terms of a movement from segregation in education to inclusion, approaches to evaluation and measurement in developmental and educational psychology practice is still largely grounded in a static approach to assessment and intervention (Woods & Farrell, 2006). The purpose of this method is to place the individual along a continuum in relation to their peers. Any results from assessment based on this approach are necessarily relative to a given population and the results of these assessments are dependent on the theory that all constructs, when measured in a population, will fall along a normal distribution (Elliott, Grigorenko & Resing, 2010; Lidz & Elliott, 2000). This is a method of comparison of the individual with the relevant population, the purpose of which is to assign a number value representative of a persons' intelligence or academic ability. This methodology was not intended to be used as a method of providing an assessment for the purposes of individual intervention. Currently results from such assessments, usually consisting of a battery of norm-referencing psychometric tests, are used to assess an individual's suitability for resource teaching. Resource teaching is extra learning support given to a student often in a dedicated space separate from mainstream classes. Resource teaching in

turn assumes that the individual referred has a significantly lower-than-average academic ability or significantly lower scores on some subscales of academic ability. The assumption is that while resource teaching may enable the student to negotiate the school system more ably, their IQ set point will not significantly change. Any diagnosis of a specific learning difficulty will remain static due to the inherent nature of these phenomena.

The development of intelligence testing has largely been a function of the social, political and scientific zeitgeist of its time. Fluid intelligence is the capacity to focus, reason and retrieve already held information effectively (Cattell, 1963; Unsworth, Fukuda, Awh & Vogel, 2014). As scores on fluid intelligence tests are correlated with achievement (Sternberg, 2008), this has ramifications regarding how we approach learning support. More recently there has been a move towards inclusion in education strongly influenced by a rights-based model of education (Kozulin, 2011). This shift in focus to inclusion rather than segregation by ability has been accompanied by a gradual shift from the position that fluid intelligence is largely fixed due to inherent factors to the position that fluid intelligence is impacted by environmental factors. Environmental influences are impactful to the extent that a person's fluid intelligence scores may increase under certain conditions (Sternberg, 2008). Social and government policies both in Europe and the USA advocate for the integration and inclusion of children previously segregated or excluded from mainstream education; the cohorts DA originally sought to support.

The prevailing system of assessment for intervention purposes is ill-suited for this shift. Static, norm-referenced methods of measurement of fluid intelligence (Cattell, 1963) are being used to provide information for interventions, the purpose of which is to target the individual. IQ scores are reductive, and while they are useful in

contexts where comparison with others is warranted, they do not provide adequate information or discrimination for individualised intervention (Tzuriel, 2000). Furthermore, the assumption that IQ is immutable restricts the scope of that intervention. The assumption that fluid intelligence scores are unchangeable, or little changeable by default, excludes students who may have impaired academic performance due to reasons other than lower-than-average innate ability. Persons for whom English (or the official language of the current country of residence) is not their native or first language, or students who come from marginalised groups and students who live in disadvantaged areas (with very high levels of unemployment and poverty), students who are unfamiliar with structured educational environments, asylum seekers and refugees are not accommodated in this model (Tzuriel, 2001). Feuerstein (Feuerstein, 2003; Tzuriel, 2000a) also describes students who are culturally deprived, that is students who are indigenous to a culture but who have not been exposed to mediated learning. Such students can come from any social class. It is worth noting that those who score significantly higher than the norm in such tests (gifted students) are also often overlooked (Calero, Belen & Robles, 2011; Lidz & Macrine, 2001;Vogelaar, Bakker, Elliott & Resing, 2017).

In their critique of DA, Frisby and Braden, 1992 argue that psychometric tests of intelligence are not necessarily once-off tests; that ‘psychometric intelligence’ (their term) can move due to intervention but such gain scores rarely persist. They also critique DA ‘fuzzy’ concepts of learning potential and the zone of proximal development while leaving the fuzzy concept of intelligence unacknowledged. Their point that a person with an IQ of 90 is never going to become a doctor brings up an interesting point regarding how Vygotsky conceptualised the zone of proximal development. Sociocultural learning theory does not argue that the possibility of gain

scores due to mediation is infinite, rather that which has not been grasped due to lack of opportunity (as opposed to that element constituting fixed ability) might be. Intervention is concerned with maximisation of potential while recognising that this potential has constraints. Frisby and Braden (1992) bring to bear on their argument work from Jensen (1969), Plomin (2018) and others to refute the impact of environment on intelligence, as ever it is a circular discussion which does little to advance either position.

The assumption that learning potential is limited solely by phenotype and therefore restricted by genetics alone is problematic from a practical perspective. Resource teaching is restricted to those who score significantly lower on IQ tests (or portions of an IQ test) without accounting for other possible factors other than innate ability. Resource staff therefore are not equipped to target intervention to the differing and often specific needs of students, nor is there an expectation that students referred to resource support may significantly improve their academic performance.

The dualist, behaviourist trajectory of psychology in the West was ameliorated by the cognitive revolution (Neisser, 1967). Philosophically the separation of mind and body, or at least emotion and cognition has persisted in educational psychology (Swain, 2009). This has resulted in a separate consideration of learning difficulties and emotional disturbance in young people. In Ireland, for example, learning difficulties and mental health issues are diagnosed and intervened for by two separate bodies; the National Educational Psychology Service (NEPS) and the Child and Adolescent Mental Health Services (CAMHS) respectively (Tatlow-Golden, Gavin, McNamara, Singh, Ford, Paul,... & McNicholas, 2018). The resultant lack of consideration of the impact of emotional and mental health on cognitive performance or vice versa has resulted in a vacuum regarding a whole-person approach to support

for persons who have experienced developmental delays or gaps in learning due to displacement, long-term illness, socio-economic disadvantage, marginalisation and other forms of hardship impacting emotional and mental wellbeing; conversely learning support rarely addresses the impact on mental health of these experiences. The prevailing approach of evidence-based research, undertaken in laboratory-type conditions is ill suited to shifts towards inclusive designs for supporting clients and students. This shift has implications for the philosophical lens through which we develop and design useful research, a consideration of which will be given in the next chapter. As a person-centred approach which considers multiple possible aetiologies of expressed ability, DA is well placed to address these deficits.

Chapter 3. The Grand Theories of Dynamic Assessment.

The practice of dynamic assessment is primarily grounded in the theories of Vygotsky (1962, 1978), Luria (1976), Leont'iv (Leont'iv & Cole, 2009), Haeussermann (1958), Bruner (1956, 1960), Rey (1934) and Feuerstein (Feuerstein, 2003; Feuerstein, Rand & Hoffmann, 1979; Feuerstein, Feuerstein, Falik & Rand, 2002) in addition to numerous more recent contributors to the theory of DA (see Murphy, 2011).

At the turn of the 20th Century, Binet was the most notable psychologist to assert that cognitive ability was plastic and while there were others, their work went largely unnoticed (Siegler, 1992). The usurpation of Binet's test by Terman and others who argued for the fixed nature of intelligence resulted in the spirit of Binet's work being subsumed by a paradigm which was at odds with the philosophical assumptions upon which his test was originally based. Meanwhile in the USSR, Lev Vygotsky was developing his theory of sociocultural development (1962, 1978). His theories, like those of psychologists in the USA and the UK were shaped by the prevailing, yet distinct, social and political landscape in post-revolution USSR. Marxist philosophy argued that the ability of the person to maximise their potential had been impacted by an inflexible class structure which was no more. The mandate of educators was to make manifest that potential in an egalitarian context. The maximisation of learning potential was a function of exposure to and interaction with learning, not any predetermined quality and certainly not one determined by class (Joravsky, 1989 in Murphy, 2008; van der Veer and Valsiner, 1991).

Critically the Russian school did not negate the study of higher order processes. In the 1930s behaviourism was the dominant paradigm outside Russia. Although Pavlov's (1927) work on the digestion of dogs contributed to the understanding of observable reflexes his work was critiqued by Vygotsky and Luria as being limited in its application to human behaviour. Later in the USA Koch (1993) would similarly critique behaviourism as stifling progression of psychology as a discipline concerned with understanding the human condition. Vygotsky (1925) in Veresov (1999) discriminates between the study of lower order processes as described by Pavlov and more complex processes unique to humans and other higher order species. These higher order process, emergent through development in interaction with the environment are those phenomena which should most concern psychologists (Luria, 1976; Wells, 2007) rather than being rejected as the focus of research in psychology.

The useful examination of unobservable mental processes in the West may have further been hampered by theist considerations. The consideration that consciousness may have a seat in the physical self as opposed to being separate (a soul), the two-world story (dualism) as described by Ryle which was a contentious one (1949). Darwin himself is thought to have delayed his release of Origin of Species because of the possible theological implications of his theory (1859). However, this myth of dualism as described by Ryle persisted and psychology busied itself with that which could be observed, leaving mental processes out of the equation.

Russian psychologists were not hampered by such theist considerations, the Soviet State rejected religion and along with it any difficulty in examining higher order processes as being embodied (Luria & Yudovick, 1959). There was no political or religious implication to embracing a monist position and no conflict in arguing for

the examination of mental processes. While the works of Vygotsky did not proliferate into the West, Russian psychology did not operate in a vacuum. In Russia there was an awareness of, and engagement with, the Frankfurt school, Wundt, and other European psychologists such as Piaget (van der Veer & Valsiner, 1991; Wertsch, & Tulviste,1992). However notable Russian psychologists such as Luria, Vygotsky and Leont'iv eschewed the Wundtian approach to examination of more complex neurological and cognitive processes. Luria argued that the experimental method was not fit for this purpose, although he recognised its value in the examination of lower order processes- such as habituation and classical and operant conditioning. He argued that the reductive nature of the experimental method did not allow for useful examination of more complex learning such as the use of pre-existing information applied to current situations, for example as the use of analogy in problem solving and planning. Luria's book 'On making of Mind' outlines the position that, in order to usefully study humans (Luria, Cole & Cole, 2006), it was imperative that not just complexity be considered but that the breaking down of that complexity to a sum of its parts would not be a fruitful endeavour (Luria, 1976). According to Cole, who translated many of the works of the more notable Soviet psychologists, Vygotsky, Luria and Leont'iv formed a research team referred to as 'the Troika'. Their objective was to formulate a psychology of the whole person (Cole, 2005; Cole, Levitin & Luria, 2006). Certainly, this was Luria's objective and while there is some debate as to the formal nature of their collaboration, their work collectively forms the basis for a philosophy of individual psychology from which DA draws it rationale. The investigation of processes intimates a teleological aspect to investigation. Gordon Allport (1962) took a similar position advocating a morphogenic approach to investigation in psychology – that is an integration of the

nomothetic and the idiographic approaches. It is this conceptualisation of individual psychology that forms the basis for the Integrated Social Learning theory described in chapter 4.

Vygotsky (1978) disagreed with Piaget's (1936) assertion that development was unidirectional – the child acting on their environment, and that learning was dependent on fixed, inevitable and predictable stages. Rather, learning was predicted by the quality of exposure to and interaction with environmental experiences. Vygotsky emphasised the cultural situation of learning, the process based dynamic nature of learning and the importance of mediation of learning. The term learning is used in its broadest psychological sense and occurs as a result of the interaction of a person with their environment. The potential for learning is increased when an expert intervenes in the process, acting as a guide or conduit between the novice and their environment. The acquisition of ability or skills is facilitated using culturally specific tools such as language and traditions. Likewise, Rey (1934) emphasised process and developed tests to estimate the educability of learners; a precursor to Feuerstein's learning potential (Haywood, 2012).

Vygotsky's work was subsequently built upon by Reuven Feuerstein in Israel (Feuerstein, 1990; Feuerstein, 2003) where the focus was on the integration of immigrant populations into Israel towards the end of and after the second world war. For Feuerstein intelligence is defined as adaptability to environment (Feuerstein, 2003). This adaptability crosses a range of domains: academic, domestic, and social. Adaptability is a process-driven enterprise, and because DA does not solely rely on reductive IQ scores or semantic knowledge-based tests as a measure of intelligence, practitioners are not as restricted by that definition of what constitutes intelligence. Based on an understanding of learning as a dynamic process, practitioners and

researchers may consider that blocks to learning are due to a range of factors and are not simply due to an innate lack of ability to learn. Even if learning is restricted to a degree by innate characteristics that might impact learning there still exists a potential to unlock those aspects of adaptability which have not been optimised. Learning is therefore impacted by a myriad of influences both at the level of the individual and at the various levels of the society within which a person lives.

DA interventions today primarily focus on learning in a structured educational environment such as school and is a psychoeducational approach. However, learning as a process is universal and occurs everywhere. Adaptability is integrative and involves both top-down and bottom-up processing. Crucially learning is optimised through mediation. Learning is accelerated for the novice with the guidance of an expert. Examples of dyads of novice/expert are parent/child, student/teacher, child/expert peer. The meaning of the learning experience for the novice is not static or objective, and while the meaning of certain objects can be shared, meaning is ultimately individually subjective (Vygotsky, 1962).

Again, the reasons for the timing of development of DA research in Israel are historical. By the end of world war II Jewish people comprised approximately 30% of the population of Palestine (as it was then known) (Rabinovich & Reinharz, 2008). There had been several waves of immigration into Palestine, primarily as a result of people fleeing Germany and other German occupied territories. In Africa, Jewish populations were enslaved to colonising countries, including Germany and many fled to Palestine. Palestine, prior to the establishment of the Jewish state saw a massive influx of Jewish people from a myriad of backgrounds and circumstances. Between the world wars Palestine was controlled by the British (Mandate Palestine). The Jewish population, comprising a small proportion of the overall population, was

highly educated. Between 1948 and 1960 over one million Jewish people had immigrated into Israel (Rabinovich & Reinharz, 2008). Feuerstein, who was born in Romania, had left Romania in 1944 on foot of the German invasion of the region in 1941.

The first populations that Feuerstein and DA sought to support were holocaust survivors. His observations echoed that of Vygotsky, Luria and Haeussermann – performance improved with mediation. DA was subsequently utilised to support African immigrants into Palestine/Israel and more generally as a method and approach to support other marginalised and disadvantaged groups (people with intellectual disabilities for example). Feuerstein worked in Geneva under Piaget and Rey and secured his doctorate in the Sorbonne in 1970.

Currently there are a number of researchers and research hubs advocating for the use of DA worldwide (Haywood & Lidz, 2006; Haywood & Tzuriel, 2004; Ishman & Tzuriel, 2008; Jensen & Feuerstein, 1987; Tzuriel, 2013;Murphy, 2011; Murphy & Marée, 2006; Tzuriel, 2000a; van der Aalsvoort, 2011).

The Role of Environment.

The role of environment is a central focus of both DA and socio-cultural learning theories. Learning is largely mediated by the environment, the people and other elements (such as school) with which the learner comes in contact (Feuerstein, 1990; Vygotsky, 1978). Vygotsky further discriminates between the instrumental, the cultural and the historical (Luria, 1976; Vygotsky, 1930).

Feuerstein described how an individual's ability or adaptability is moderated by culture and environment:

> "We prefer to describe these individual differences in terms of the process or the dynamics of change: the rate and quality of change; the nature, frequency, and

> intensity of the stimuli required to produce the given change as a structural characteristic of an individual." (Feuerstein, 1990, p 71).

Environmental deprivation or conversely enrichment, impacts learning potential. DA assumes that adaptability in an environment is moderated by how skilled an individual becomes at navigating that environment, hence there is a focus on maximising learning potential (Feuerstein, 1990). Critically a person's experience of their environment is subjective (Chalmers, 1995; Searle, 1994) and meaning is shaped by their perceptions of the information they have absorbed (Vygotsky, 1978). The neural networks and pathways that come to dominate are the result of exposure and attention to stimuli. The attention and cognitive processing of a stimulus is affected by multiple factors such as the biological make-up and processes of the physical self of the individual, cultural situation, access to MLE, and quality of MLE, all of which results in learning (Presseisen & Kozulin,1992; Shay, 2014; Tzuriel, 2013, 2014). The ability of an individual to grasp a concept and learn is moderated by the zone of proximal development, a concept first posited by Vygotsky (1978). This recognises that the learning process is restricted to a degree by physiological factors of development and critical and sensitive periods of learning first described by Piaget (Piaget, 1936, 1977; Sutherland, 2014). Vygotsky maintained that, through mediation, children could grasp concepts prior to the expected critical period for those cognitive skills. Bruner's theory of scaffolding similarly describes how complex concepts can be taught at even very young ages with the aid of a mediator (Wood, Bruner & Ross, 1976). Bruner emphasises that teaching, or mediation should focus on 'learning how to learn' rather what to learn. Learning is scaffolded, that is, learning develops as simpler learning processes are

grasped allowing for movement to the mastery of more complex processes. This process is not linear but emergent.

Therefore, there are countless permutations to learning development which means that it is highly unlikely that any two people have the same learning experience.

Brain Plasticity.

The concept of plasticity advanced by both Vygotsky and Feuerstein supports the view that cognition is modifiable and that cognitive skills that have not been learned can potentially be taught through mediated learning (Feuerstein, 1990). In the West this perspective is relatively new. The school which dominated the first half of the 1900s led by Galton, Terman, Spearman and others, posited that while learning was a function of the organism acting on the environment the ability of that organism to learn was a function of essentially fixed ability constrained by heritability (Symonds & Spearman, 2006). This school of thought would eventually give rise to the theory of a single factor for intelligence (g) (Spearman, 1927; Spearman & Jones, 2006). Evidence supporting the view of brain development as plastic is building as fast as technology capable of observing brain physiology will allow. The work of Blakemore (Blakemore, 2012; Blakemore & Choudhury, 2006), Davey (Davey, Fornito, Pujol, Breakspear, Schmaal, & Harrison, 2019) Garlik (Garlik, 2002), Grice (Grice, Barrett, Schlimgen, & Abramson, 2012), Haier (Haier, Karama, Leyba & Jung, 2009) and Driemeyer (Driemeyer, Boyke,, Gaser, Büchel, & May, 2008) supports the argument that brain development, the movement from neural development and attrition to stability of physiology continues into a human's mid-twenties and beyond. Recent research into the function of glial cells (Barres, 2008) and the ability of the brain to develop new cells into late adulthood (Boldrini, Fulmore, Tartt, Simeon, Pavlova et. al., 2018) suggest that there is still much we do

not know about how the brain develops and the meaning of such developments; but develop and change it does.

The Subjective Nature of Experience.

From a practical standpoint, DA is concerned with maximizing the learning potential of a person so that person can successfully engage in education. Often, target populations for such intervention are people with specific learning difficulties, people with general learning difficulties, immigrant populations, refugees, marginalized indigenous populations and other disenfranchised groups (see Tzuriel, 1992 for several examples). These are the individuals initially identified as those who would benefit from MLE intervention (Feuerstein, Rand & Hoffman, 1979).

While all humans have common attributes, there are attributes or combinations of degrees of attributes that make each individual unique. Feuerstein (1990)'s theory of MLE recognises this uniqueness and is one of the few methodologies in psycho-pedagogical approaches to learning which has the potential to embrace these differences and integrate them into learning intervention. A person's schemata are formed as a result of interaction with the world around them. Intervention can bring about change in that schemata. Key components of MLE such as intentionality, transcendence and the mediation of meaning guide intervention (Feuerstein, 1990). This is evocative of Kelly's personal construct theory (1955), because lived experience is necessarily subjective so then is the development of each person's self-concept. Critically that self-concept is permeable and open to change.

This echoes Luria's earlier comments on the individuality of formation of the human psyche. This individuality has ramifications for intervention. Luria, on considering his studies with children, highlights the need to recognise that, while performance across people may be the same, the underlying mechanisms for that performance

may not. Luria once again highlights the necessity of considering multiple environmental, physiological and mental factors for each individual in order to understand the behaviour or performance of that individual. Therefore, the reasons for or origins of behaviours must be examined and cannot be assumed to be the same for similarly performing individuals (Luria, 1976). This has ramifications for intervention, aetiology of similar behaviours across individuals cannot be assumed to be the same.

Dynamic assessment typically seeks to engender change by improving a person's cognitive reasoning skills, focus and memory (Feuerstein, 2003; Feuerstein, Feuerstein, Falik, & Rand, 2002). A number of tools have been developed to maximise the cognitive reasoning of individuals (Elliott, 2003; Elliott, Grigorenko & Resing, 2010; Haywood & Lidz, 2006; Lidz & Elliott, 2000; Murphy, 2011), on the assumption that such improvement will enhance a person's chance of success and survival in their society (Feuerstein, 2003). In the DA setting, learning is mediated by an expert who guides the novice and seeks to do so with the tools with which the person interacts, such as language.

Critically, learning is not site-specific and can take place anywhere. Vygotsky (1978), for example, emphasised the importance of play for children's optimal development, while Feuerstein (2003) emphasised the quality of family interaction in the MLE, the role of culture, and the teleological nature of cognition.

Critiques of DA.

One of the core critiques of DA is that it is not situated clearly within a theoretical framework which allows for examination and evaluation of its component parts in a scientific manner (Grigorenko & Sternberg,1998). Luria and Vygotsky emphasised the importance of context and while Russian psychologists valued the experimental

method for the examination of lower-order processes, case studies remained the methodology for the examination of performance outside the laboratory. The case study, by their own admission, was more art than science. Dynamic assessment as it currently stands is essentially a collection of tools and measures which has a common purpose – to engender change and maximise learning potential. DA is essentially an umbrella term under which varying process driven approaches can be contained (Murphy, 2011). In this scenario classical test approaches, integrated scoring systems, case study and group interventions are considered. Currently DA is a subset, or addendum to, the dominant paradigm. Opinion within DA is split between those who argue that this suffices and those who support a defining and separate framework within which to situate DA (Lidz, 2014).

As discussed, the gap between theory and practice is the result of largely historic circumstances and perhaps the brevity of Vygotsky's contribution due to his untimely death, the truncation of Binet and Simon's work, coupled with the delay of Russian theories on learning permeating Western psychology (Lidz & Haywood, 2014; Murphy, 2008). The few projects in the USA that considered environment as a contributor to educational attainment such as the Iowa Child Research Station studies (Bradbury & Stoddard, 1933; Cravens, 2002; Minton, 1984) floundered without social and political support.

In DA theory building took second place to studies focusing on establishing that ability was malleable, generally using split-half standardised testing to bolster this assertion. While this may be considered tangential to the primary focus of DA, a response to the position that intelligence was largely predetermined was a worthwhile enterprise. The mixed results from such studies (Grigorenko & Sternberg, 1998) did little to bolster DA's position as a methodology for learning

support. Mixed results and the perceived failure of high-profile programmes such as the Head Start programme in the US weakened DA's position as the methodology of choice for learning intervention (Morris, Connors, Friedman-Krauss, McCoy, Weiland et al, 2018; Puma, Bell, Cook, Heid, Shapiro, Broene, Jenkins, Fletcher, Friedman, Clarico, Rohacek, Adams, & Spier, 2010). Morris attributes this perceived failure to the consideration of the Head Start programme as a single entity rather than an approach to early learning intervention delivered across a large number of sites with varying degrees of rigour. Studies which found no effect for Head Start also considered children participating in the programme as a homogenous group. Early evaluation of the Head Start programme considered the program from a norm-based perspective. The research design consisted of only two groups – those who participated in a Head Start programme as the experimental group and those who did not as the control. Closer examination of results from the Head Start programme by Morris and colleagues show that the Head Start programme is particularly effective for certain cohorts, for example second language students and children with learning disabilities – the cohorts of particular interest to DA. Outside factors such as compliance by deliverers of the programme, found to be a significant factor in the efficacy of the programme, was not considered. As a result of the findings from these original studies DA suffered from critiques that the approach simply did not work, DA was being evaluated according to a normative paradigm(te Nijenhuis, van Vianen & van der Flier, 2007). Issues such as the consideration of practice effects and the inability to establish the transference of learning from such studies (Grigorenko and Sternberg, 1998) are not unique to DA and apply to all such test designs in psychology. Nonetheless such issues impacted the perception of DA as a viable approach to maximising learning potential. Grigorenko and Sternberg's

(1998) critique of DA is singular in focus however many of the issues outlined in their paper apply to all experimental designs in psychology (Haywood, 2008;Haywood & Tzuriel, 2002). Addressing issues of measurement requires a broader examination of psychometrics. Particularly salient here is the discussion on classical test theory and whether psychometrics can be classified as measurement at all (Barrett, 2003; Grice, Barrett, Cota, Felix, Taylor, Garner et al, 2017; Grice, Barrett, Schlimgen, & Abramson, 2012; Borsboom, 2006; Borsboom & Dolan, 2007; Borsboom &Mellenbergh, 2007; Heron, Spencer & Paul, 1998; Lord, 1953; Lykken, 1991; Meehl, 1978; Michell, 2011; Nesselroade & Molenaar, 2016).

There have been a number of responses to the critiques levelled by Grigorenko and Sternberg (Haywood & Tzuriel, 2004) but more importantly there have been moves to resolve some of the pertinent issues identified by DA researchers (Murphy, 2011; Tiekstra, Minnaert, & Hessels, 2016). While Grigorenko & Sternberg (1998) identify both macro and micro issues regarding the advancement of DA, Tzuriel (2001) identifies the molar and the molecular issues regarding the veracity of DA. Grigorenko & Sternberg identify issues at the macro level with regard to the discipline of psychology in general and a suitable framework within which to usefully evaluate and study DA.

In their foreword to Luria's Making of Mind (1979), Cole and Cole describe how some aspects of Soviet psychology developed approximately a generation later than other centres of psychology. This, coupled with an effective embargo on the work of soviet psychologists being disseminated outside the USSR meant that the most persuasive arguments for the malleability of ability and the veracity of studying unobservable processes took place in a vacuum (Murphy, 2008). Elsewhere the use of the experimental method became the gold standard within psychology.

Engaging with this dominant paradigm as a method of asserting the usefulness of DA in learning contexts has given little credence for the veracity of DA. The use of split-half tests of intelligence is necessarily reductive and does not inform intervention adequately. Participants rarely originate from an adequately homogenous sample (Kozulin et al., 2010). The use of norm-based scores applied to an individual in order to inform individualised intervention is contrary to the purpose of nomothetic measurement. By applying inferences drawn from group level studies to individuals, we commit an ecological fallacy even if we are applying those results to individuals who we involved in the study from which the results we drawn (Slevin, 1958; Thorndike, 1939). Such measures place the person in the context of the performance of others assuming that this population is all the 'same'. DA theorists argue that this cannot be the case. The focus should therefore be the individual as the system rather than the individual in comparison with others. A possible exception to this is where a *skill* is the target of evaluation, rather than the person (Tiekstra, Minnaert, & Hessels, 2016).

Conversely integrated scorning systems have been largely dismissed as subjective (Grigorenko & Sternberg, 1998). Within DA integrated scoring systems have been critiqued as being too structured, thus losing the essential dynamic nature of the interaction (Lidz, 1987).

The notable exception to the otherwise mixed reception of DA in countries worldwide is Israel, which has a strong research and practice history predominantly based on the works of Feuerstein and the LAPD.

Grigorenko and Sternberg identify the need to develop a more robust theoretical framework within which to situate DA in order to move forward. The need for a more robust theoretical framework within which to situate DA has been examined by

researchers since then notably by Murphy (2011) and Van Geert (1991,1994,1998, 2000, 2014). This thesis argues that the issue with the development of a holistic paradigm (Kuhn, 1962) is not one of collating what we have in DA but rather taking a step back and building a theoretical framework based on the premises' expounded by the founding theorists. The provision of a clear 'worldview' as described by Kuhn is essential. This requires an examination of the founding principles suggested by Binet (Binet, 1904, 1905, 1916; Cousin, 2009) and expounded upon by Vygotsky (1978), Luria (Kozulin, 2004; Luria, 1959, 1976) and Leont'iv (Leont'iv & Cole, 2009) and subsequently Feuerstein (1990, 2003). An examination of the philosophical assumptions, once established, suggests logical methodologies of measurement and evaluation, approaches to research and practice. In this way DA is situated within a paradigm in keeping with its foundations and goals alongside similar person-centred approaches in psychology. This allows for both a clarity of position and purpose while suggesting new avenues from which to draw solutions to the issues for which DA is critiqued both within and without. This intimates taking a position on some of the debates within DA.

Current Approaches to Measurement and Evaluation in DA.

One of the advantages of the prevailing approach to the psychometric evaluation of ability, that is static testing of ability and IQ, is that general theory and measurement developed simultaneously. Galton (1907) proposed that ability was measurable, and Pearson (1900) and Spearman (1928) developed methodologies of measurement which matched the principles of those theories. Issues with the measurement of latent variables aside, how to evaluate ability was indicated by the philosophical underpinnings of the grand theories of evolution and genetic predeterminism of the time.

This was not the case with DA. The theories upon which DA is based such as Vygotsky's theories of development (1962, 1978) suggest that learning potential can be evaluated but not how to measure learning potential in a manner which satisfies the current evidence-based paradigm. Binet (1904) indicated that a holistic, dynamic approach to evaluation be taken and that evaluation should not be static. His original work is peppered with caveats regarding the assessment process, for example stressing that issues such as fatigue be considered during the testing session and emphasising caution in interpretation of behaviours. The dynamic between tester and testee forms an important part of evaluation of ability.

The use of case study as a method of evaluating individual performance endures but alternate methods of measurement seeking to address the deficit in DA from this perspective have only been developed relatively recently, beginning with Feuerstein, Rand and Hoffman (1979). In DA distinctions are made between approaches that are what Feuerstein terms clinical approaches and other approaches which focus on standardising the intervention procedure. In this sense clinical refers to the person-centred focus of the mediator as distinct from a focus on measuring the efficacy of an intervention. The approach used by Feuerstein et al is considered clinical in orientation, the focus being on the MLE and the dynamic between the mediator and novice. While Feuerstein has developed comprehensive tools for intervention, notably the learning potential assessment device (LPAD) the emphasis is on the quality and nature of the interaction rather than measurement of performance. This focus has proved challenging in terms of evaluating the efficacy of DA approaches. Lidz describes DA as a 'clinician's dream and a psychometrician's nightmare' (1997, p. 286). The difficulty lies in finding an effective method (or methods) of

evaluation of DA interventions, something DA researchers and practitioners have investigated in some detail (Caffrey, Fuchs & Fuchs, 2008).

Setting aside the use of split-half tests to establish the malleability of IQ scores there are now many approaches to assessment in DA. These approaches are delineated in the literature as falling along a continuum of wholly clinical in orientation consisting of individual case study, to wholly structured intervention protocols where each step of the intervention is delineated in advance and measured in a quantitative way (Grigorenko & Sternberg, 1998, Lidz & Elliott, 2000; Murphy, 2011). This taxonomy is grounded in the assumption that classical test theory methodologies (and more recent methods such as IRT and the Rasch model) are the gold standard for the evaluation of methods of assessment and intervention in psychology. These approaches are designed within an evidence-based practice framework, conversely Feuerstein's approach and those who advocate for his approach is practice-based evidence in orientation. This delineation between evidence-based practice and practice-based evidence is a useful one when considering the methodology presented here (Barkham & Mellor-Clark, 2003; Barkham & Margison, 2007; Holmqvist, Philips & Barkham, 2015). The methodology is designed to be used by practitioners to provide an evidence-base for their work which they can present to relevant stakeholders while at the same time usefully informing their own practice. In this way the methodology can be considered within the practice-based evidence paradigm as complementary to top-down evidence based practice tools for assessment and intervention.

In fact, there are many different methodologies developed within DA, nearly as many different methodologies as there are researchers. There are several texts that

outline the testing methods and methodologies of the MLE and DA (Campione, 1989; Lidz & Elliott, 2000; Murphy, 2011).

Aside from narrative case study in DA, generally two common approaches to measurement, namely integrated scoring methods and spilt-half tests of ability are highlighted as being the overarching approaches to evaluation. Grigorenko and Sternberg (1998) refer to these as cake and sandwich designs respectively while Poehner & Lantolf (2005) distinguish between the interactionist approach and the interventionist approach. There are further variations within the graduated prompts and testing the limits methodologies – differences in how tasks are presented in terms of difficultly and how learning potential is derived.

A number of integrated scoring systems have been developed within DA, such as the graduated prompts method developed by Campione and Brown (Brown & Ferrera, 1985; Budoff, 1987; Campione, Brown, Ferrera & Bryant, 1984; Poehner, 2009), testing the limits (Carlson & Wiedl, 1979; Carlson & Wiedl, 1992), stimulus enrichment (Haywood,1997) and coaching on task elements (Budoff, 1967; Hamers, Ruijssenaars & Sijtsma, 1992). These approaches seek to standardise the intervention phase of the process such that intervention is consistent across individuals. However, the integrated scoring method is critiqued for lacking rigour, for the arbitrary nature of the scoring system used and for a lack of clarity regarding operationalisation of learning potential (Murphy, 2011). Within DA, critiques focus on how the scoring during the intervention process detracts from the dynamic quality of the MLE itself and is more akin to static approaches (Haywood, 1997).

Clinical approaches, in DA referred to as interactionist or mediational approaches, (Tzuriel, 2000a) with or without being sandwiched between cognitive measures (Feuerstein, Rand & Hoffman, 1979; Haywood, 1997; Jensen,2000; Lidz, 1991;

Tzuriel, 2001). These systems evaluate the success of an individual in grasping an array of cognitive skills based on the number of steps they took to complete a task successfully during the MLE (Feuerstein, 2003). The ability to transfer this learning to proximate and distal situations is also evaluated (Campione & Brown, 1987). The resultant gain score (if used) gives an indication of learning potential. Measures used often include the Ravens Progressive Matrices (RPM) (Raven, 2003) and Feuerstein's Learning Assessment Propensity Device (LAPD) (Feuerstein, Feuerstein & Gross, 1997). The Learning Potential (or Propensity) Assessment Device developed by Feuerstein (Feuerstein, Falik, & Feuerstein, 1987; Feuerstein, Falik, & Feuerstein, 1998) evaluates the performance of a novice over several tasks targeting cognitive reasoning skills. It consists of a battery of exercises delivered in a dynamic manner and results in several scores across exercises giving an indication of the novices learning potential and gaps in learning.

Typically split-half design studies have an experimental (or quasi-experimental) design, are classical test theory-based and assess the progress of groups of people due to a specified intervention (Lidz, 1987). These scores are then analysed to give a statistical test of significance, thereby giving an indication of the efficacy of the intervention, which in turn may establish the general usefulness of the intervention for the population under consideration. Critiques of this method focus on the lack of standardisation of the intervention. In terms of directing further intervention, the results of such analysis are essentially reductive and provide little in terms of informing targeted intervention for the participants at an individual level (Grigorenko and Sternberg, 1998).

This method is useful as it indicates which specific aspects of cognitive skills require mediation. It shows what has and has not already been grasped by the learner, and it

provides an indication of how quickly the learner might grasp new concepts and transfer learning from the intervention to other domains. Critiques include the possibility that gain scores along these measures are a result of practice effects and that studies have inadequate sample sizes to assert efficacy (Grigorenko & Sternberg, 1998). Practice effects occur when participants engage in the same cognitive tests over time points where little time has elapsed between tests. It is an artefact of gaining skill on the test due to being familiar with the test and the test situation. Research suggests that such gain scores do not persist. A meta-analysis examining practice effects suggest that using split-half tests and lengthening the duration between test times can reduce practice effects (Calamia, Markon & Tranel , 2012). However, care must be taken where participants taking the test have never been familiar with taking such tests. Cultural factors must be considered. DA purports to measure or evaluate learning potential, a latent construct the equivalent of which in psychometrics usually refers to IQ. This, like debates concerning the nature of intelligence, has resulted in criticisms of DA as attempting to quantify a fuzzy concept and brings with it the circular debate concerning the 'measurement' of latent constructs in general.

One of the main advantages of the interactionist approach to mediation over the interventionist approach is that it allows the mediator to interact fully with the novice and the process of joint attention, an important aspect of dynamic assessment (Vygotsky, 1978; Feuerstein, 2003). The primary critique of this approach is that is lacks consistency across cases and may be subjective – therefore it is difficult to assert an evidence base for the method that has adequate reliability and validity (Grigorenko & Sternberg, 1998, Murphy, 2011). These critiques raise questions in terms of how practitioners and researchers might best assert the usefulness of DA

while maintaining the inherent qualities of the MLE interaction as described by Vygotsky and Feuerstein. Such questions are not new and have been raised several times in the dynamic assessment literature (Grigorenko & Sternberg, 1998; Kovalčíková, 2015; Lidz, & Elliott, 2000; Murphy, 2011). One of the long-standing critiques levelled at dynamic assessment measurements was the entrenchment of the measurement model in normative-based, large-scale type studies where the individual was often compared to their cohort or the individual's post-test score was assessed in tandem with his/her pre-test score. This manner of tracking movement or improvement across testing sessions had been used for many years as the standard methodology. Its usefulness in evaluating effectiveness of specific interventions with population samples endures. However, practice effects and the reductive nature of test scores were often cited as a main disadvantage of this method particularly in relation to guiding targeted intervention for individuals which is a primary goal of DA. The resultant vacuum regarding idiographic measurement research emphasises the need to move from a set of methodologies of practice to a theoretical framework for practice and intervention.

Exceptions to the continuum of structured to less structure intervention which do not rely on typical psychometric measures include the MindLadder technique developed by Moogens Jensen (Jensen, 2000) and the work of Paul Van Geert (Van Geert, 1991; Van Geert, Steenbeek & van Dijk, 2011). These methods focus on individual change and provide methods of measurement of change due to intervention suited to an idiographic focus.

Jensen's method (2000) uses the MLE as a blueprint for interaction between mediator and novice. The MindLadder method explicitly examines the construction of knowledge for the learner and identifies 45 intellective functions, 20 non-

intellective functions and 10 performance functions. Jensen explicitly examines the person as a dynamic system – intellective, non-intellective and performance functions are in interaction with each other see Jensen, 2003 for a good overview. Gaps in performance in one function impacts others. The change-based approach which is at central to DA means that the person is considered an open-system rather than a closed system resistant to change from external forces. The knowledge of the learner is built upon within the learning environment by constructing a shared understanding of the mechanisms which impact performance. Aspects of personal performance across functions are evaluated using a series of computer-based tasks. Functions which are identified as requiring mediation as a result of this process are then targeted in intervention. Performance is evaluated based on movement in scores on tasks targeting specific functions across assessment sessions.

Van Geert has developed a method of evaluating the quality of MLE interaction between novice and expert (teacher and child or parent and child dyads) in order to maximise the efficacy of mediation (van Geert, Steenbeek & van Dijk, 2011)

There are those in DA who are satisfied that DA does not need a coherent paradigm within which to situate the various approached and methods developed thus far, rather embracing the diversity of methods and approaches thus far produced as *dynamic* (Lidz, 2014*).* Others have argued that this seeming incoherence puts DA at risk of being rejected as a plausible methodology for assessment and intervention for marginalised and disenfranchised people (Murphy, 2011). This thesis argues for the latter. In order to preserve the qualities that make DA so appealing, a position must be taken on core philosophical tenets which provide the foundation for the study of individual lives. The development of the Integrated Social Learning Theory framework described in chapter 4 was designed for this purpose.

Chapter 4. Integrated Social Learning Theory.

Integrating Compatible Theories.

ISLT is designed to provide a framework for the scientific study of individual lives from a psychological perspective. Within this framework it is possible to examine thoughts, actions and behaviours of individuals without comparing them a norm reference group. Therefore, ISLT builds upon work of psychologists such as Allport (1937,1960) and more recently Molenaar (2004). Allport intended to develop an all-encompassing theory of psychology, embracing all elements within the one overarching theory. His primary focus however was on the individual. His 1960 paper, The Open System in Personality Theory, examined the conceptualisation of an individual's personality as an open system. In this paper Allport elegantly delineates the two overarching approaches to investigation in psychology – the nomothetic and the idiographic. Two very different conceptualisations of personality are inferred. The nomothetic approach is characterised by viewing the person as a closed or quasi-closed system. From this perspective the impact of culture, society and environment is considered to be negligible. The idiographic approach is characterised by viewing personality as an open system. From this perspective, the individual is a complex system potentially impacted and shaped by a myriad of factors. Context and environment shape experience and learning. Such a system seeks stability or order however people strive to enhance their lived experience and thus endeavour to enhance the order of their personality system (Allport, 1960). Molenaar (2004) argues that psychology should eschew the current dominant paradigm of interindividual approaches for examination at the intraindividual level. Thus far the development of a psychometrics of the individual has been limited by technological constraints, methods which measure or evaluate the person as an open

system have not appreciably advanced. One of the possible reasons for this is a seeming lack of coherence regarding the premises of intraindividual psychology. This thesis proposes the construction of a framework for the situation of this intraindividual paradigm.

Essentially ISLT proposes a reconfiguration of the current dominant taxonomy of methodologies considered in psychology, the emphasis in ISLT being the study of lives using an intraindividual focus. The prevailing pyramidal taxonomy of research methodologies taught at undergraduate level suggests that experimental methodologies are better than, say, case study (Runyan, 1983; Shaneyfelt, 2016). The argument here is that psychology strives to establish cause and effect – and only experiments can achieve this goal. As a result, many students and indeed researchers in psychology make the error of assuming that experimental psychology is better than other methods, ignoring the requirements of designing a study protocol to meet their requirements – that is what method best answers their question? This assumption in turn is based on the understanding that when we are theory building, we use qualitative methods, quantitative when testing. These are imaginary divides deemed useful for heuristic purposes. This delineation developed from the perspective of interindividual psychology grounded in the theoretical assumptions of objectivity of observation and a fixed level of various qualities within an individual (such as intelligence), a trajectory which occurred in parallel with the development and domination of the interindividual paradigm in psycho-educational psychology. This measurement of *things* as opposed to the examination of *processes* is further grounded in the assumption that heritability predetermines who we are (Okrent, 2019).

In order to usefully develop methods of evaluation and measurement at an intraindividual level, a framework that distinguishes itself as designed for the study of individual lives is necessary (Jensen, 2003).

Philosophically, individual psychology has a firm foundation, is grounded in holism and rejects the duality of mind and body. Allport (1937) distinguishes between the study of individual differences (the trait-based nomothetic approach to the study of personality) and the study of personality (as a holistic approach to understanding individuals). The latter echoes the paradigm proposed by Luria for the study of higher-order processes (1956, 1959, 1976). Japanese philosophy, similarly, conceptualises reality as field (the person, mind and environment being bound). The emphasis is on process- rather than object-based reductionism (Kasulis, 2012).

There have been debates within social psychology and personality psychology sparked by critiques of these sub-disciplines as being unscientific in their approaches which have further clarified the assumptions underlying the study of personality an account of which is described by Pettigrew and Cherry (2012). While some within these areas sought to ameliorate such critiques by embracing the experimental method to examine group dynamics such as Asch (1956) and Milgram (1963), others gravitated towards a holistic conceptualisation of human behaviour, affect and cognition. This divide is echoed in DA, some favouring the person-centred method while others strive to standardise the intervention process (Lidz, 1998). Interestingly developmental psychology is the one sub-discipline in psychology where the consideration of the person as more holistic than sum-of-parts dominates (Pettigrew & Cherry, 2012).

Advances of psychometric measurement when considering the person in comparison with others (nomothetic approaches), happened in tandem with theories expounding

the logic of these interindividual measurement approaches. While nomothetic science seeks to establish general laws, idiographic sciences seek to establish the uniqueness of a phenomenon (Windelband, 1904). The primary critique of the idiographic approach has been that it lacks scientific rigour in evaluation and measurement.

Evaluation of individuals over time began with the use of case study in psychology. The work of Freud (Freud, Strachey, Freud, Strachey & Tyson, 1957) is typically given as one of the first examples of this approach. The value of case study is often critiqued as being ungeneralizable. This oft cited critique of case study assumes that the objective is to generalise. This assumption is based on the tacit understanding that there is a hierarchy of measurement in psychology and at the pinnacle of that hierarchy lies nomothetic methods (Runyan, 1983). Within the ISLT paradigm the objective is not to formulate generalisable laws but to formulate hypotheses regarding one person.

The seeming lack of generalisability is often a rationale for *not* engaging in idiographic studies. This may be understandable given that such studies are rarely published (Pettigrew & Cherry, 2012). Clinical approaches in DA such as those developed by Feuerstein (Feuerstein, Feuerstein, Falik & Rand, 2002) are similarly critiqued. Allport strongly defended the use of case study for the study of personality. Properly used case study could be considered both a work of science and a work of art (Allport, 1937).

Allport stresses the importance of integrity and psychological expertise in the formulation of case study. It is through the reading of such studies that the consumer, be they practitioner, researcher or otherwise, makes a judgement on the veracity of the claims made by the evidence presented.

The long-standing position that nomothetic and idiographic perspectives are competing, rather than complementary, paradigms result in psychologists from one paradigm spending much time denigrating the other rather than bolstering their own research (Dar-Nimrod & Heine, 2011). Currently nomothetic and individual psychologies are different conceptualisations based on separate philosophical foundations and assumptions with different objectives (Allport, 1937; Koch, 1993). Jensen's conceptualisation of idiographic approaches as being a change-based model while nomothetic methods are stability-based models is useful here (Jensen, 2003). Both approaches are relatively nascent, and both have had difficulties in operationalising the philosophical into tangible methods of evaluation in a way that establishes either as being definitive in its assertions. Both schools of thought have produced copious quantities of research despite difficulties of evaluation and measurement and this represents scientific method, which is to test and refute through investigation (Popper, 1959). The kernel of this debate seems to be one of scientific endeavour however in practice what is of concern is the usefulness of one approach over the other depending on the requirements of the situation. For any given question a direction is indicated – to either compare with others or not; to examine the common or the unique. One method is not therefore more correct than the other, what renders the approach taken scientific is that it uses the correct methods to investigate the phenomenon under consideration, using sound philosophical and theoretical foundations.

Given clear foundations, examination of possible ways of building on current idiographic methodologies is possible. Many of the advances in measurement and understanding within psychology begin with thought experiments – 'what ifs'. For example, in the area of cognitive psychology (Neisser, 1967; Neisser, Boodoo,

Bouchard, Boykin, Brody, Ceci et al, 1996) postulated that brain structures and processes operate similarly to those of a computer; a thought experiment accepting that one can extrapolate conclusions from experiments; the assertion being that not all that is worthy of consideration is directly observable. This advancement in psychology was the result of an acknowledgement that the behaviourist school, while producing very useful research regarding learning, was limited in its understanding of higher order mental processes such as metacognition and executive functioning, an observation already made by Luria (Luria & Cole, 1976; Luria & Yudovick, 1959). It is on this basis that the area of cognitive psychology began, and yet it is only very recently that technology has made it possible to investigate such hypotheses further. The research undertaken under these assumptions has proven invaluable in terms of understanding cognitive processes. Recent advancements in the field particularly regarding the use of artificial intelligence networks from research such as the Blue Brian Project and the Human Brain project make clear that such processes are complex and that complex learning is an emergent *process* (Kanari, Ramaswamy, Shi, Morand, Meystre et. al., 2019; Markram, 2013). This gives weight to both Allport and Luria's assertion that, regarding the human species, certain processes are more usefully examined at this intraindividual level.

The Individual as a Dynamic System.

Lewin's (1936, 1942) work on field theory began in a manner like that of Neisser's – a thought experiment, asking what if the person was considered as a dynamic system? What if that system could be conceptualised as being subject to the laws of physics – how then might one make manifest the impact of outside forces (or internal psychological states) on that system? Lewin (1942) outlined how personality can be conceptualised in his work on Field Theory. Lewin died young and his work on

formulating a methodology grounded in physics and mathematics was incomplete. By his own admission, the technology to realise his work had not yet been developed. However, his work is the basis for dynamic systems theory in psychology today. His conceptualisations of 'tension' in a system (individual) as a precursor to movement are the basis for the conceptualisation of the self as *process.* Tension results when there is an incongruence between the person's construal system and their experience. This tension results in a move towards reorganisation of the system. In this paradigm the individual is made manifest as a dynamic interaction of the self with environment – one cannot be without the other. Lewin hypothesised that the constituent elements of individual self-concept, that is constructs which form a person's schemata both of themselves and others, could be represented in a space. Such a life space would reflect the relationship between constructs (or 'subparts') in terms of their proximity or distance from each other. Spaces on the life-space map hold meaning and represent classification of elements in the person's world (Lewin, Lippitt & Escalona, 1940).

Lewin formulated calculations of the probability of movement of the system (or subparts of the system) but was careful to state that although quantitative results were derived these were not physical in the mathematical sense but rather psychological, an acknowledgment of the measurement of latent rather than directly observable phenomena, in other words they are 'applied numerics' as described by Barrett (2003). Lewin coined the term 'life space' to describe this field, a dynamic interplay of person and context. His typographical approach emphasises the importance of meaning, specifically he stresses that areas in the life space are bounded by the subjective meaning given to them by the individual. In this way while we can utilise Euclidian geometry to analyse data matrices of constructs to

produce a graphical representation of the data it is this psychological space we are interpreting.

Dewey (1899) and James (1890) made similar arguments for the futility of extrication of elements of the person from the person in context. Mischel likewise examines the person in context as being process driven (Mischel, 1973; Mischel, & Shoda, 1995). Development and learning as a function of self then is a dynamic *process*.

The Dynamic Process of Learning – Environment and Culture.

DA is a processed based approach to assessment and intervention. This distinguishes DA from classical approaches to development which are strongly grounded in bottom-up orientations to learning. Central to DA and socio-cultural learning theories, learning is largely mediated by the environment, the people and other elements (such as school) with which the learner comes in contact (Feuerstein, 1990; Vygotsky, 1978). Feuerstein (1990) described how an individual's ability or adaptability is moderated by culture and environment. When examining or evaluating a person's learning ability, how they engage with learning, how quickly they grasp a concept and how well they internalise this learning and apply it to proximal and distal situations is key. Capturing change and understanding the nature and quality of that change, due to mediation, is therefore the primary goal of DA assessment.

Environmental deprivation therefore impacts learning potential. DA assumes that adaptability in an environment is moderated by how skilled an individual becomes at navigating that environment, hence a focus on maximising learning potential (Feuerstein, 1990). Critically a person's experience of their environment is subjective (Chalmers, 1995; Searle, 1994) and meaning (Vygotsky, 1978) is shaped

by their perceptions of the information they have absorbed. Lidz describes how cultural differences in learning can be shaped by the necessity or importance of learning certain skills or knowledge may not be prioritised (Lidz, 1995; Lidz & Macrine, 200; Lidz & Gindis, 2003). This has implications for refugee, asylum seeker and immigrant populations in terms of certain skills which may be valued by their host country but are simply irrelevant in their place of origin. Studies on folk taxonomies examine how different cultures organise and categorise the world around them and while taxonomic systems across cultures are similar (hierarchical) detail and emphasis vary depending on the importance of any given genus for that culture (Berlin, Breedlove & Raven, 1968). Emphasis is dependent on usefulness and importance (meaning). This variance in application of intelligent behaviour due to environment has further been examined by Sternberg and Grigorenko (2004) for example, who define intelligence as behaviour which moves towards the maximisation of wellbeing within a cultural context.

The neural networks and pathways that come to dominate are the result of exposure and attention to stimuli. The attention and cognitive processing of a stimulus is affected by multiple factors such as the biological make-up and processes of the physical self of the individual, cultural situation, access to MLE, and quality of MLE, all of which results in learning. Perception is the interaction of attention with top-down processing and is therefore shaped by a person's subjective experience (Feuerstein, 2003). There are countless permutations to this process which means that it is highly unlikely that any two people have the same learning experience. The person is considered a unique, open and dynamic system.

Integrated Social Learning Theory- Approaches to Measurement.

The second aim of this thesis is to develop an idiographic method of measurement

within ISLT. ISLT draws on explanations and methods from the natural sciences and applies them to psychological constructs – latent variables. There have been a handful of papers which have strongly advocated for an idiographic approach to research of measurement in psychology in general (Allport, 1937; Barratt, 2003; Bem,1983; Harré, 1998; Harré 2002 & Runyan, 1983).

Idiographic data collection methods range from ethnographic studies of observation of individuals in their environment to case study of individuals in clinical or educational settings. There are also studies which use self-report such as the experience sampling method (Larson & Csikszentmihalyi, 2014).

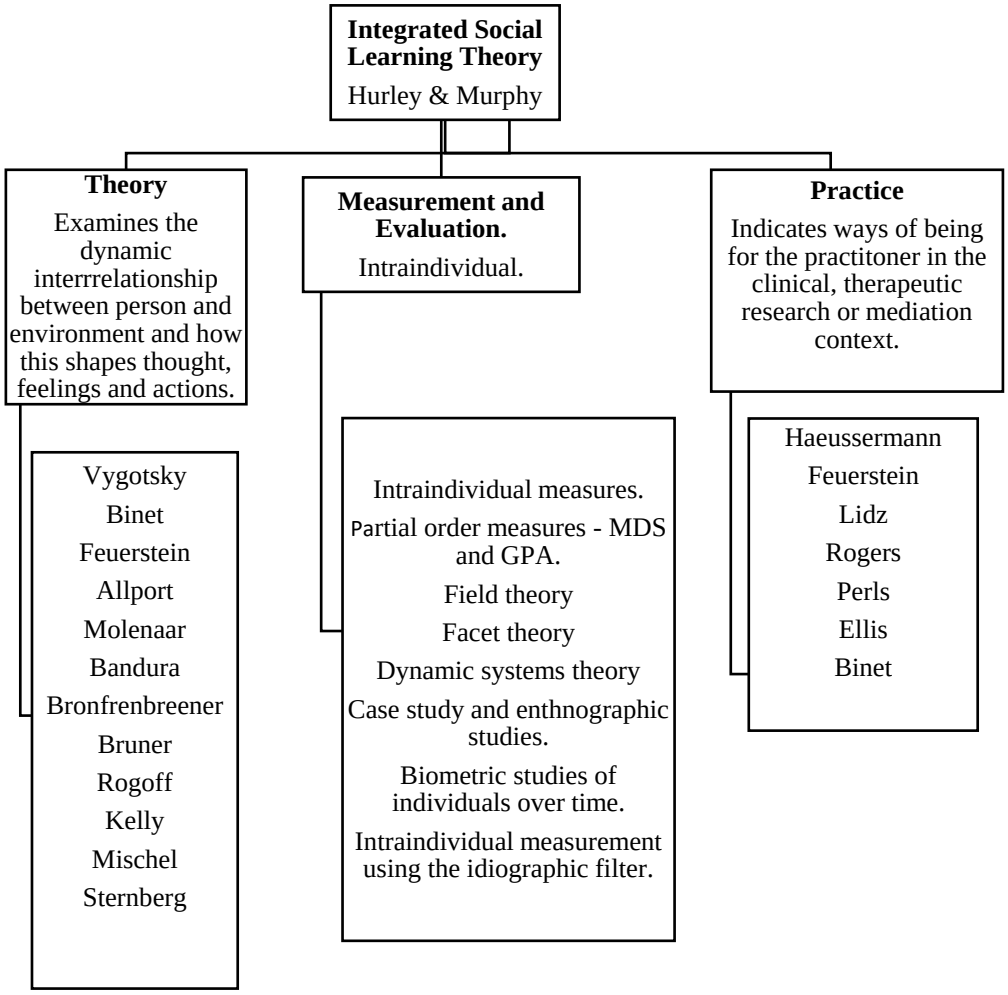
In clinical settings N=1 case study uses evaluations of progress of an individual with similar normative sample results which is very similar to methods of evaluation of individuals using norm references scales for IQ testing in educational settings (Jacobson & Truax, 1991). The purpose of these approaches is to determine if the person falls within (or without) what is considered to be a normal range of functioning with regard to a specific trait in comparison to an appropriate target population. This is problematic because it uses a norm-referenced measure to evaluate an individual; comorbidity or multiple specific learning difficulties (SLD) are not well accounted for in such models (Molenaar & Valsiner, 2009). The original purpose of such tests was to place a person along a continuum for a trait, not to prescribe for the individual. Therefore N=1 case studies are essentially mixed method studies in the same way that split-half tests using standardised intelligence tests in DA for informing individual cases are a mixture of methods. These methods investigate the individual using classical test theory designed instruments in an attempt to direct intervention – an unsatisfactory approach (Davies, Howells & Jones, 2007)

Levels of Measurement in ISLT.

ISLT considers three elements for the study of individual human lives: theory, measurement and practice. Figure 1describes how ISLT is organised according to these three elements. Examples of compatible grand theories, methodologies of data collection and evaluation and theories of practice are described.

Figure 1

ISLT - Theory, Practice and Measurement & Evaluation. Developed from Hurley, Murphy and Robinson (2017)



Barret's Argument for Levels of Scientific Measurement.

Clarity in form of reframing methods of investigation based on the focus of research allows for a structural shift away from a hierarchy of methodologies to a standpoint of assessing which approach is best suited to the phenomenon under investigation. Research methodologies are not considered value-laden per se. Evidence-based practice is the building of scientific knowledge the purpose of which is to apply that knowledge. Barrett argues that variables of interest do not have to be structured in the mathematical sense. Measures do not have to directly map onto quantities of latent variables in order to assert that what we do in psychology is a scientific (Barrett, 2003).

Barret identifies three categories within which psychometric methods fall – measurement, non-quantitative variable structures and applied numerics. Barrett's taxonomy outlines in detail the levels of analysis which have deeper discrimination that the more common qualitative/quantitative division of methodologies considered in psychology. With regards to the measurement of latent constructs Barrett rejects Stevens' assertion that this constitutes *measurement.* Within this taxonomy classical test theory falls within the category 'applied numerics' rather than measurement, consigning values as it does to some manifestation of an unobserved thing. This is a useful distinction. As Barrett (2003, 2011) states this does not detract from the scientific nature of investigation, rather this more accurate definition of what constitutes psychometrics as usual allows for more rigorous research. It also avoids an exaggeration of the claims that can made for results of such studies, thus placing psychometrics on a firmer, more scientific footing.

The qualitative/quantitative divide has been problematic in psychology as it often consigns qualitative research to the role of theory building rather than the possibility that individuals can be examined usefully in a way that is essentially separate from the goal of theory building. Barrett (2003) states that methods using partial order measures, such as the one presented here, are better suited to the examination if intraindividual change. These measures are not constrained by nomothetic concerns, they are not anchored to Likert-type scales (1932). The number of levels of a construct can emerge during the data collection process; being a function of the novice's (or clients) own construal of that quality.

Uncoupling methodologies from this conceptualisation allows for a more robust evaluation of methodologies across all levels of investigation. The inherent limitations and strengths of each level come into sharp relief. Constructive evaluation, criticism and indications for further development of any methodology within the taxonomy is built upon understanding the underlying theoretical and philosophical foundations of the method. For example, examination of classical test theory within the classification of normative methods of evaluation allows for a clear discussion of the strengths and shortcomings of the approach in a way that makes sense. Circular arguments comparing apples (normative methods) with oranges (idiographic methods) become redundant.

Debates regarding measurement in psychometrics in general focus on interindividual rather than intraindividual methodologies. Within the ISLT framework it is the intraindividual that is the focus of examination. The reframing suggested by Barrett (2003) also allows for the development of a taxonomy of idiographic methods of evaluation and assessment the correct use of which is indicated by the level of examination required by the research or clinical practice question.

Within Barrett's taxonomy methodologies such as split-half tests used to evaluate an individual's performance and N=1 single case study using norm-referenced or diagnostic measures (Kazdin, 2011), are seen as a hybrid of inter and intra-individual methodologies. These approaches are critiqued for this reason; while the focus of investigation is the individual, norm-referenced measures are used to evaluate change, often resulting in a lack of intricacy of evaluation such as is required for targeted intervention. The reductive nature of such measures necessarily factors-out qualities of the individual which may be important to account for when considering suitable avenues for intervention. From a psychometric perspective the application of norm-referenced instruments for the interpretation of individual cases is suspect. By applying meaning to scores of individual cases from group level data analysis we are committing the ecological fallacy (Robinson, 1950; Selvin, 1958; Thorndike, 1939). Barrett's position is clear – all methods of psychological measurement have their shortcomings. The application of the most appropriate type of evaluation or measurement for the level of analysis and an accurate portrayal of the abilities and constraints of each method are of primary concern.

For this thesis data was collected using an open card sort which resulted in a matrix of partial-order measures for a person at any one timepoint, in all data was collected across four timepoints. Drawing from field and facet theory in particular (Guttman & Greenbaum, 1998; Lewin,1935, 1942) non-quantitative variable structures are particularly suited to examining partial-order measures where the dataset is not compared or fit to a normative frame of reference (as would be the case in normative psychometrics). Data is represented and interpreted according to theories drawn from physics such as dynamic systems theory.

Systems Theory and Idiographic Measurement.

Like other psychometric approaches, this thesis draws from the natural sciences for a methodology to study the individual usefully. Bronfenbrenner's ecological theory conceptualises the multiple levels, both external and internal which impact human development (1976, 1979). In particular his more recent work (2006) recognises the importance of internal (neural and heritable) as well as external influences (such as language, culture and social structures) on development. It is this conceptualisation, of the person in dynamic interaction with both external and internal influences that describes the basis for systems theories of development. Each level has an influence on human development and sub-optimal conditions in any one can negatively impact development. The relationship between these levels and the facets of each level mean that strengths in one area, say a nurturing caregiver, can provide resilience against other potentially negative factors. Likewise, strengths in the system, such as high levels of ability, can be negatively impacted by institutional factors such as lack of access to education. These interactions enhance or hamper development. The interaction of multiple facets at multiple levels represent an open, complex, dynamic system.

In dynamic assessment the focus is on the progression of the individual, the objective of intervention is to maximise learning potential. An important aspect of the philosophical underpinnings of DA is that the trajectory of development is not necessarily linear (Vygotsky, 1962a, 1962b, 1978). Development relies on exposure, or lack of exposure, to enriching learning opportunities. Learning can occur both before and after the critical and sensitive periods where that learning is expected to be most effective (Vygotsky, 1978). The internalisation of learning is shaped by existing internal factors. Top-down processes such as the imposition of meaning on

learning moments mean that the self is shaped by the existing internal construction of reality. Learning is a subjective experience.

Higher-order processes such as those described by Luria emerge as a result of these interactions (Luria, 1959, 1976; Luria, & Yudovick, 1959; Smith & Thelen, 2003). Dynamic and open systems theory provides a blueprint (Thelen & Smith, 1994; Van Geert, 1991; Van Geert 1994; Van Geert 2000) for the examination of stability and change within that unique system and as a result the effect of introducing a new element into that system can be evaluated. Several authors have attributed the design of their approaches to the treatment of the person as a dynamic system, notably Jensen, 2000; Molenaar, 2004 and Van Geert 1994. Such a system is permeable and possesses characteristics of stability and change. The system is self-contained but open to outside influence. The system seeks or moves towards stability but as the system is never static, the interchange between elements within the system is characterised by movement, not stagnation (Thelen & Smith, 1994). What needs to be emphasised is that change will occur and that this change can be influenced from outside, which is the premise of any psychological intervention. The individual is viewed from a specific and dynamic perspective, in accordance with socio-cultural learning theory.

Dynamic systems theory posits that all elements in a system are inter-related and the movement of one element influences all other elements (Lewin, 1935; Lewin, Lippitt & Escalona, 1940). Crucially it is the movement of each element over time or that is of interest. By examining the movement of elements into and out of areas of classification delineated in life-space, we can predict the pattern of movement of a system and the elements within it.

Using this method to interpret life-space maps gives us the information we need to inform individualised intervention. It also suggests that constructs such as self-esteem will be impacted by movement in other areas of the map- for example the movement of the self towards feeling increased self-efficacy or intelligence, resilience and positive relationships with expert peers and mentors or mediators. This is the underlying foundation for the application of a holistic – ecologically based approach to evaluation of the individual regarding assessment. The positive movement of self-concept through improved performance on cognitive reasoning tasks resulting in overall improvement in engagement with, and success in, the sphere of formal education – an indicator of career success in the future.

Euclidian geometry can be used to produce such spaces from matrices, but one must be mindful that the interpretation of such measures is psychological rather than purely quantitative in the manner as described by Lewin (1938, 1942). The amounts themselves, other than in terms of comparison are not measures in the mathematical sense. Within this paradigm;

> Each person is initially conceived of as a unique system of inter-acting dynamic processes, the unfolding of which gives rise to an individual life trajectory in a high-dimensional psychological space (Molenaar, 2004, p. 2002).

Emergence, which is the development of the system into a different or more complex system, is a key component of this theory. Given the complexity of the system we are interested in here, individual humans, what will emerge when a system is subject to some energetic force (either from outside or inside the physical self) is not easily predicted (Thelen & Smith, 1994). What we can posit is that the system will reorganize and that we can capture that

reorganization in some way. It is possible to represent and quantify the change in that system.

Dynamic systems theory appears to be gaining traction within psychology and as a method of measurement in psychometrics, particularly in the past ten years.

Van Geert has already made progress in relation to scientific observation of dynamic systems in teaching (1991, 1994, 1998) and is the only researcher of DA thus far whose method of measurement satisfies the criteria necessary for scientific research in DA as described by Sternberg and Grigorenko (2002). Paul Van Geert's dynamic systems theory (1994) upon which the Groningen school of dynamic system theory is based (Witherington, 2007) describes the rationale for considering the person and the elements with which they come in contact as subject to the laws of systems theory as described in physics and hence is an open system. From this perspective the person is seen as a self-organising system and the emergence of qualities is the result of elements acting on the system rather than predetermined or predictable design. Development involves both top-down and bottom-up processes. The Groningen school of dynamic systems theory (Van Geert and Steenback, 2005) marries well with personal construct theory which also views a person's constructed identity as relatively stable unless subjected to extraordinary forces which result in a reconfiguring of identity and personal constructs.

There is some disagreement and debate within systems theory regarding how systems develop, some rejecting emergent properties as being partly the result of cognition and reject psychological phenomena as suitable foci of measurement. The

process of self-organization according to Thelen and Smith (1994) is a wholly bottom-up process; psychological processes are epiphenomena or irrelevant artefacts. This position is in contrast to the position taken by Van Geert, whose position is reflected in that of Kelly who states that psychological events are true phenomena rather than artefacts. In fact, Kelly goes one step further stating that it is this subjective reality that should be of primary interest to psychologists (Kelly, 1955).

Brunner (1956, 1960) describes the development of the self and cognitive structures in a similar way. Development is not linear and higher order, complex, cognitive processes are more than simply the sum of the parts upon which they are scaffolded. Bruner's position echoes Luria's assertion – that higher-order learning processes in humans are complex and should not be confused with lower-order learning processes such as classical and operant conditioning. In order to examine more complex higher order processes a holistic, idiographic lens must be used. This approach involves considering the person as a whole, the graphical representation of a person's psyche is then a sample of this whole. This sampling is elicited through the open card sort method described in more detail in Chapter 6.

Like Lewin, Shepard (1962) refers to 'life space maps' as 'psychological space', his argument being that such a space breaks the cycle of circulatory logic of measurement that has persisted in psychology thus far, ergo a psychometric instrument measures a definable, quantifiable thing (or variable) and that that measure is verifiable by comparing it against a measure developed from the data. Multidimensional scaling used in this way does not compare the system under consideration to anything else, rather it graphically represents the form of the data collected for that person (Shephard, 1962).

Multidimensional scaling therefore is a system of classification devoid of external constraints. There have been a number of studies that establish that the method renders accurate classification of objects. For example, Guttman (1985) carried out an MDS study for the classification of whales, porpoises and dolphins (cetaceans). This study was part of an investigation of the accuracy of several methods of data reduction techniques used in psychology, the results of which are reported in Marcotorchino, Proth, and Janssen (1985). Guttman found that the method was more accurate in representing the classification of cetaceans over and above cluster analysis for example. One of the reasons for this is the ability of the method to represent empty space or areas where there are no items, allowing for a more accurate classification of areas where there *are* cetaceans present. It is also possible to delineate areas on the maps which abut and extrapolate what separates one class from another by referring to the original data matrix. In fact it is these *areas* which have meaning rather than the clusterings of objects represented in these areas. Elements are classified according to their positioning in the space. When considering psychological space areas can be characterised as being positive, negative, or complex spaces (Guttman, 1985; Lewin, 1938). Positive spaces contain elements which have positive signature scores across all constructs, negative spaces can be characterised as containing elements which score poorly across all constructs, while complex spaces consist of elements with varying positive and negative scores across constructs.

The life space maps presented in this thesis therefore represent an expression of the taxonomy of the person regarding their own personal construal system.

Approaches to Intervention and Practice Within ISLT.

The most contentious debate within DA is what can be considered to be dynamic assessment and what cannot. The argument rests on an inspection of study (or intervention) designs which moves from purely clinical case-study approaches to integrated scoring systems such as testing the limits to split-half repeated measure designs and from mediated to standardised methods of delivery (Haywood & Lidz, 2009). Tiekstra, Minnaert and Hessels (2016) and Poehner (Poehner, 2008, 2009; Poehner & Lantolf, 2010), for example, discriminate between the more clinical approach favoured by Feuerstein, Lidz and others and a more structured approach favoured by Campione and Brown (Brown & Ferrera, 1985; Budoff, 1987; Campione, Brown, Ferrera & Bryant, 1984; Poehner, 2009), Carlson and Wiedl (Carlson & Wiedl, 1979; Carlson & Wiedl, 1992), Haywood (Haywood,1997) and Budoff (Budoff, 1967; Hamers, Ruijssenaars & Sijtsma, 1992). The split-half sandwich designs give scores similar to nomothetic approaches to testing using a test of IQ, often The Ravens Progressive Matrices (Raven, 2003) or Feuerstein's LAPD (Feuerstein, Falik & Feuerstein, 1987). Integrated scoring system designs (the cake design) consist of scoring the novice on the number of attempts it takes the novice to successfully complete a task. Scores across cognitive domains reflect the amount of mediation required for the novice to complete tasks across cognitive reasoning domains and give an indication of learning potential (Tzuriel, 2001). Tiekstra, Minnaert and Hessels (2016) recommend that we delineate these different approaches as being dynamic assessment and dynamic testing respectively. The difference between the two approaches is also one of focus – the clinical approach focusing on the individual whereas dynamic testing focuses on mastery of a specific skill or skills.

This thesis focuses on investigating how this clinical approach might be utilised in a way that provides an evidence base for the maximisation of cognitive reasoning skills for an individual. To date Feuerstein's LAPD is the most notable proprietary version of this however, as Lidz notes, the mediation of cognitive skills (or other skills for that matter) is not a patented exercise and the important aspect of the process is that it be dynamic, adhering to the parameters of the mediated learning experience as described by Feuerstein. In particular MLE emphasises *intentionality, transcendence and meaning* as three critical aspects of the process Feuerstein (2003). Within a psycho-therapeutic context Roger's (1957) core conditions set out the demeanour and environment which the practitioner must provide in order for movement in self-concept to take place. ISLT recommends the integration of this approach into the dynamic interaction to further clarify the person-centred orientation of DA intervention. Already in DA the mediated learning experience described by Feuerstein outlines the conditions of interaction necessary to achieve effective DA intervention. Like Roger's core conditions Lidz's checklist of the MLE (1991) drawn from Feuerstein (1990) ensures that the mediator works effectively with the novice in a dynamic manner. Like Rogers Feuerstein outlines three key elements which must be present –intentionality, transcendence and meaning. Intentionality of the mediator is characterised by evidence of the mediator being present and interested in the client. The relationship is one of shared experience, the mediator provides a dynamic interplay between the novice the learning activity in order to maximise the learning potential of the novice. Transcendence is the ability to apply the element learned in a novel situation. The mediator encourages transcendence of the learned skill by investigating and encouraging the novice to apply learned skills to novel situations. In the intervention battery, IDEA-1, used for

these studies participants are asked how they could use their learning in the real world and to develop novel puzzles from the materials provided to exhibit transcendence from the learning situation. Meaning is an essential element of the DA interaction. The learning experience must have value to the novice. Attention is brought to the learning experience and the value of the exercise is explained. Joint attention is core to the mediation of reasoning skills. For example, when mediating analogies, the mediator might explain that the use of analogy is a skill that is used frequently in everyday life. The discrimination of objects based on similarity or dissimilarity is a frequent and useful reasoning skill. The mediator can give suitable examples and encourage the novice to do the same.

To ensure that MLE intervention qualifies as dynamic, Lidz (1991) developed the MLE rating scale, an account of how the mediator should engage with the novice in the interaction, the checklist also evaluates the quality of MLE interaction. This checklist ensures the validity of the interaction as dynamic. Used in combination with Feuerstein's account of the necessary components of the MLE an approach to engaging with and intervening with clients akin to other clinical approaches in psychology is derived. While what happens in session may vary from person to person the attitude, approach, goals and outcomes of intervention are clear. For clarity Lidz's checklist is included here in Appendix B.

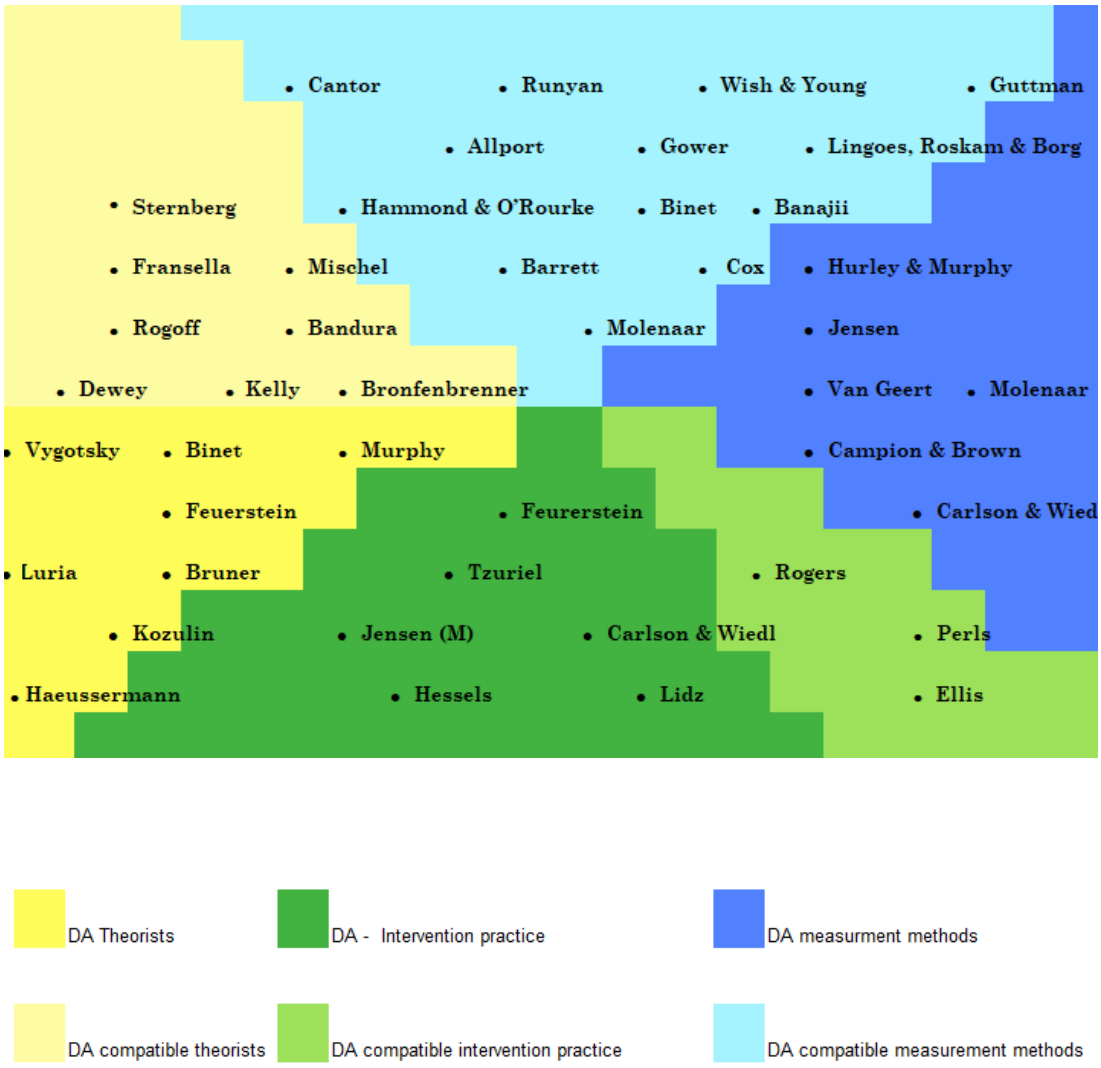
The ratings scale (or checklist as it sometimes known) can be used to assess the quality of MLE between a novice and expert which can be any of the dyads wherein mediation of learning occurs such as a parent and child dyad. It is also used by researchers and practitioners to ensure that they are engaging in *dynamic* intervention. The orientation of the mediator is to the person. Given that the focus of intervention is the person, this clinical approach is reminiscent of humanistic and

Gestalt approaches to intervention in therapeutic settings. Grounding DA practice with a framework of similarly person-centred approaches allows for the examination and refinement of MLE intervention. This also allows for a fuller consideration of aspects other than ability impacting the person in terms of performance, in particular aspects of the person such as affect and mental wellbeing can be accounted for within this model. While the content of the interaction varies across participants or clients *the process* is considered reliable and consistent when the conditions described by Feuerstein (2003) are met. How the interaction occurs is therefore valid in the same way that other therapeutic process-based approaches within psychology are considered to be valid. Reliability and validity are determined by a clear framework for engagement and, the effectiveness, expertise and training of the practitioner within their domain (Garb, 1998). In this case that domain is DA. Within the ISLT framework DA comes into its own as a uniquely psycho-educational approach to learning.

ISLT identifies three pillars; theories, levels of measurement and practice which broaden and support the philosophical foundations of dynamic assessment. Figure 2 below considers how these pillars can place DA within a paradigm the purpose of which is the investigation of individuals in the context of their environment.

Figure 2

ISLT - theory, measurement and practice



Each pillar considers complementary theories which inform DA. The philosophical foundations provided by Binet (1904, 1905, 1916), Vygotsky (1962, 1978), Luria (1976), Feuerstein (1990) and others are complemented by other social-learning theorists and researchers such as Allport (1937, 1960), Kelly (1955, 1963), Bandura (1971), Mischel (1973), Bronfenbrenner (1976, 1979, 2006) and Dewey (1899). The mediation relationship (practice) developed by Feuerstein (2003), Lidz (2002), Tzuriel (2014) and others within DA is further informed by the works of Rogers

(1955), Perls (1973) and Ellis (1962). This is particularly relevant as educational supports have moved to support the whole person using person-centred planning. This broadening of the elements of practice allows consideration of intellectual, behavioural and physical blocks to learning and the dynamic interaction of these factors in DA intervention. Finally, existing investigation into how to evaluate and measure in DA by Campion and Brown (1987) , Carlson and Wiedl (1979, 1992) , Hurley and Murphy (2015), Van Geert (van Geert, Steenbeek & Dijk, 2011) , Jensen (1992) and others is bolstered by researchers and theorists of psychometric measurement who have developed or advocate for individualised methods of evaluation of the person over time.

Chapter 5. Individualised Dynamic Evaluation and Assessment.

Having developed a framework for the development of a method of evaluation of individualised DA intervention a consideration of how to measure must now be considered. This is a holistic approach to intervention which indicates a whole person approach to evaluation. The following chapters are therefore a description of how research can usefully be conducted within ISLT. Primarily it is designed to address the micro concerns within DA – a methodology that can provide an evidence base for practice without detracting from the dynamic nature of intervention. This methodology – Individualised Dynamic Evaluation and Assessment (IDEA-1) is described hereunder.

The realist perspective has its uses in psychology. The behaviour, affect and cognition of humans, a complex species, is examined in order to identify general similarities and differences. In so doing we gain an understanding of general laws governing human functioning from a psychosocial perspective. This is very useful when developing frameworks for living designed to benefit most people or groups of people who fall into the central area of the bell curve (general educational settings for example).

In considering the individual a different perspective is needed. In controlling for idiosyncratic and other 'unknowable' aspects of individuals, (what some classically oriented psychologists would refer to as 'curiosities' in an experimental design) we are potentially factoring out those aspects of a person which require careful consideration for intervention at an individual level. This applies not just to those at the tail end of any given bell curve but to those within normal ranges of functioning. All individuals have their idiosyncrasies.

Personal Construct Theory.

"If we examine a person's philosophy closely, we find ourselves staring at the person himself." Kelly, 1955. p. 16.

Personal construct theory identifies core constructs as the central mechanism by which people make sense of their world (Fransella & Neimeyer, 2005; Kalekin-Fishman, 2005; Kelly, 1955; Thorman, 2007). The organisation of constructs is hierarchical and consists of core and peripheral constructs. Core constructs form the basis from which we regard the world and form our core identity. This array is stable unless some outside force challenges a construct to the extent that a reshaping of that construct results (Raskin & Debany, 2018). Peripheral constructs are more flexible in nature, are more open to reappraisal and do not have the same importance in terms of identity formation (Burr, Butt, & Epting, 1997). Challenges to peripheral constructs do not, therefore, disrupt identity to the same extent. Constructs have a range of convenience (Fransella & Neimeyer, 2005; Kelly, 1955). Constructs are applied where they are deemed to be useful and relevant to the individual. They are therefore often temporal and context specific.

Construct formation occurs when a person acts on their environment. The person is seen as an active agent, a scientist testing various hypotheses about the world (Kelly, 1955). Their experience involves both top-down and bottom-up processes. Information coming into the system is appraised and meaning is given to that information which then forms, updates or is rejected as the basis for formulating a view of identity or the world. The unique set of variables which exist for any one person at any one time in any given environment make it very difficult to argue that such a situation can be considered objectively. In this sense reality is subjective (Mancuso, 1996). No two people can have exactly the same experiences of their

world and no two people give the same meaning to their experiences of what might occur as a result of exposure to identical stimuli. That is not to say that a person is not constrained in *how* they construe their world. Humans are constrained in their physiology, their physical selves and by time and place. How we give meaning to occurrences is constrained by our neurology which is constrained, at least to a degree, by our genotype. How the human nervous system develops, limits the bounds of our understanding of and access to the world (Maturana & Varela, 1980). A good example of this is the development of language in childhood. New-borns do not have access to the language within which they will be raised, nor do they have the neural development necessary to give meaning to words and phrases. Language develops and becomes refined through interaction and exposure over time. These processes, in interaction with the environment, result in the development of a myriad of behaviours. In this sense an organism is restricted in their construal by their own physical structure; only when their structure is sufficiently disrupted to require alteration does their construal system change (Raskin & Debany, 2018). The distinction between personal construct theory's position on choice and the restrictions imposed on an individual in executing choice and other realist perspectives is important. Personal construct theory posits that subjectivity of experience is bound by shared meaning and collective agreements on what constitutes objective truth.

In contrast the nomothetic approach seeks to account for variation through standardising experiments as far as is possible using the experimental method. This approach within psychology has its foundations in the natural sciences, specifically physics. The philosophical foundations for this approach to knowledge-building have its roots in realism. The assertion realism makes is that reality is objective, that

all scientific endeavour moves towards truth and that that truth is universal. Constructivism is rejected as being poor science (at the very least) (Devitt, 1991). There is an ongoing philosophical debate regarding the veracity or viability of realism vs constructivism in psychological research. Realism is reductive and posits that all elements of the person can be identified and that these elements *make* the person. Constructivism posits that *process* is key (rather than constituent elements). While it may be possible in the future to identify all the elements that 'make' a person who they are, that there is only one objective reality is a position that is far from established.

Pragmatically the experimental methodology used within this realist perspective controls for environment (light, heat, location) and intrinsic variables such as age, sex and so on. Within this paradigm studies are subject to measurement error Rhemtulla ,van Bork and Borsboom (2019) and solutions to the issue of such errors are far from established Westfall and Yarkoni (2016). The error is the difference between the observed score and what we estimate to be the true score based on these calculations. Plomin estimates, that heritability accounts for 50% of IQ scores in adulthood (2018). The rest is due to idiosyncrasies not suited to observation from a realist perspective. From a constructivist perspective this position is untenable in the study of human lives. Idiosyncrasies are a considerable portion of what makes us who we are and are, by definition, unique to the individual.

The two positions discussed here are often considered to be philosophically in conflict. However, in psychology, it is not necessary to discount idiographic methods as unscientific in order to assert that nomothetic methods are; particularly as the applied function of each differs (Molenaar & Campbell, 2008).

Particularly strident critiques assert that constructivists take the position that as reality is subjective and essentially an internal state then 'anything goes' in terms of what reality is (Held, 1995, 1998). While this is more accurately an idealist perspective than a constructivist standpoint, the ramification is that that one can essentially make up, change and assert a reality that is entirely without recourse to the outside world. Reality is wholly unknowable (or non-existent outside the embodied identity). This position, many constructivists agree, is as untenable as the extreme position taken by some that, through the experimental method, we establish the truth, thus collapsing definitions of reality and truth. Personal construct theory is clear in terms of how reality is considered – and to what extent that reality is subjective. Kelly (1955) asserts that:

> "We presume that the universe is really existing...though the correspondence between what people really think exists and what really does exist is a continually changing one." p. 7.

While Kelly's monograph has an enduring relevance, more recently, Raskin and Denby (2018) address these critiques of constructivism clearly and concisely but perhaps more importantly make clear why taking a constructivist position is useful for the examination of the lived experiences of individuals. They clarify the unique position of personal construct theory, reiterating Kelly's definition of reality and the formation of constructs as consisting of both top-down and bottom-up processes.

Methods of Data Collection and Analyses in Personal Construct Theory.

The repertory grid technique.

The repertory grid was developed by Kelly (1955) for use in a psychotherapeutic context as a structured method for generating an understanding of a client's personal construal system. The method uses prescribed constructs and people. In the original

grid technique, the client/participant is asked to choose three people for a given construct and mark on the grid two of those people who are similar and one who is dissimilar. For example, for the construct ‘funny’ the person chooses three people, say their mother, father and brother. They might mark their father and brother as being ‘funny’ and their mother as being ‘not funny’. In this sense this data elicitation technique is dichotomous; there being only two levels along which the person sorts the three people chosen – funny or not funny. Subsequent variations of this technique have included ranking all elements (people) along the construct using a Likert type scale of (usually) 1-7, resulting in a symmetrical data matrix (Fransella, 2005; Fransella, Bell & Bannister, 2003). The resultant grid is then inspected for patterns in the person’s construal system, correlations between elements can be calculated.

A variation of this technique involves eliciting constructs using a triad of people (or elements). The client is asked how two of the people chosen are the same and how they might be different from a third. The client then ranks people according to the constructs elicited, once again along a prescribed scale. In this way constructs are generated during the session, rather than being imposed on the client.

Another way of collecting this data is by using the card sort method. There are several variations of this method (Fransella, 2005). A closed card sort is a sort using prescribed constructs provided by the mediator. Closed card sorts are commonly used in marketing to understand groups of people’s attitudes to a product and information architecture to direct design of websites for example. Closed card sorts are more commonly used when the objective of the research is to understand a person’s attitude to a specific phenomenon and is akin to Q sorts in this way (Brown, 1986). Often closed card sorts and Q sorts are delivered to specific *groups* of people

to understand their construal of a phenomenon (Absalom-Hornby, Hare, Gooding, & Tarrier, 2012; Adams & Savage, 2017; Canter, Sarangi & Youngs, 2014; James & Warner, 2005; Previte, Pini & Mckenzie, 2007). The objective of these studies is to cluster or sort the data in order to inform practice. Thus, data analysis techniques of closed sorts include factor analysis and cluster analysis.

An open card sort is a sort where constructs are elicited during the sorting session. 'Open' in this sense does not necessarily mean that the participant generates the items for the sorting procedure; often elements - be they people or chocolate bars or aspects of a website site map are prescribed by the researcher. The constructs or categories into which elements are sorted come from the novice. One advantage of this method is that the data from numerous people can be considered quasi-nomothetic (all categories are of the same magnitude) and can be subject to data analysis assuming a symmetrical dataset.

The objective here is to construct a representation of the person's psychological space. Since we cannot know how the person constructs that space unless we enquire (Kelly, 1955), the imposition of constructs by the practitioner would make assumptions contrary to the philosophical basis for research within this paradigm. This thesis therefore examines the viability of using an open card sort coupled with the elicitation of constructs within the session as the objective is to elicit a sense of the person's own construal system. Further there is no expectation as to how the person parses that system. The scale along which the person sorts the elements is not fixed by the mediator – rather is generated by the participant during the sorting process for each construct. Nor is there an expectation that the data collected be symmetrical or that we want to force the data into categories or clusters. The objective is to reduce a multidimensional dataset drawn from the results of several

sorts across constructs into a representation of that data in a two-dimensional space (or map). Analysis techniques such as factor analysis or cluster analysis are not suited to this analysis. Firstly, the size of the datasets is inadequate. It is also important to consider the 'meaning' of possible outliers rather than remove them from the analysis. Secondly, the spaces between and around groups of elements have meaning as described by Lewin (1942) we wish to conserve that structure.

The Intervention.

DA is interested in the expressed ability of the person. Vygotsky's Zone of Proximal Development posits that a person has the potential to increase their levels of ability with the aid of an expert. In DA ability is process based, demonstrated through successful reasoning required to problem solve. The reasoning exercises here are based on the cognitive reasoning skills identified by Feuerstein. Some of these skills are scaffolded. The dynamic assessment intervention consisted of a series of cognitive reasoning exercises. There were three levels to each domain targeted to allow for variations in ability. Skills targeted were: Patterns, sequences, analogy and antonyms, logic, mathematical deduction, attention (focus and memory) and metacognition.

In order to ensure the dynamic element of intervention permeated sessions, the Lidz MLE rating scale was used. Intentionality, meaning, transcendence, sharing (joint regard), sharing (of experiences), task regulation, praise/encouragement, challenge, psychological differentiation, contingent responsivity, affective involvement, change is monitored by the mediator (Lidz, 1991).

An evaluation sheet based on elements of Feuerstein (1979) MLE for effective dynamic intervention was developed and included; The capacity of the novice to grasp the principle underlying the initial problem and to solve it, the nature of

investment required in order to teach given principles, the extent to which the newly acquired principle was successfully applied in solving problems that were progressively difficult, examining the puzzles the participants have to make themselves and their ability to relate their reasoning for puzzle construction back to the previous exercises, the preference of the novice for one or another of the various modalities of presentation of a given problem (for example patterns are solved using shape manipulation and acetate transposition). The mediator observes and takes note of how the novice responds to different engagement strategies. When attempting to engage the novice different strategies can be more effective than others; for example, some clients respond more effectively to praise rather than competition. The effects of novelty and complexity during each section of tasks as the intervention progresses is noted (Feuerstein, 1979, Lidz, 1991).

The aim of the intervention design is that mediator and novice become immersed in the learning process.

Chapter 6. IDEA methodology.

The objective was to make available a practical method of measurement which could provide the basis for evidence-based research and practice, the focus of which is an examination of movements or change within the person in terms of self-concept over time.

Methodology.

The methodology devised is situated within the theoretical constraints of ISLT. The assumptions underlying ISLT allow for the consideration of a broad range of methodologies of which the individual is the primary focus. This includes, for example case studies and certain techniques within DA such as those that integrate evaluation into the intervention process and methods which make comparisons of individual performance over time. The strengths and weaknesses of these methods have been described in the previous pages.

The purpose of this research was to devise an individualised technique of evaluation of progress due to an intervention which would be compatible with both research and practice. Researchers require results which can evaluate an intervention in quantifiable terms thus providing practitioner with an evidence-base for practice. Practitioners and clinicians require intervention which inform them about their client and the degree of progress being made over the course of intervention in such a way as to direct future courses of action.

Data Collection.

Prior to data collection the author attended a workshop at the BPS headquarters on data collection, laddering, eliciting constructs and analysis using the repertory grid technique. The purpose of attending the workshop was to gain fluency in the administration of the card sort technique and the correct approach for the elicitation of constructs.

Card sorts are grounded in Kelly's personal construct theory (1955). The card sort technique was developed by Kelly and Fransella (2005) as a method of structuring idiographic data. The resultant grid giving a structured representation of the person's subjective world and their place in it relative to the people or institutions in that world. Typically, the method is used in a clinical or counselling setting as a tool for bringing into focus how the person experiences their own world, how they view themselves in in it and how they relate to the people in their world. This gives the practitioner an insight into the person's self-concept (Kelly, 1963). A multiple card sort provides a snapshot in time of the person's own subjective reality and how they position themselves within that reality.

Data from each card-sort session is collected and entered into a spreadsheet. Each sorting session produces a data matrix. Each data matrix can be further analysed to produce graphical representations of the data. These graphical representations known as life-space maps (Lippitt & Escalona, 1940) and represent the person's psychological space (Shephard, 1962).

These maps use scaling techniques to reduce a multi-dimensional space into a two-dimensional representation of that space.

Points on the map represent elements (or in this case people) in relation to the individual. Proximity, or conversely distance, indicate that the person sees people as 'like me' or 'not like me'.

Points on the resultant plane represent people in relation to their multiple positionings across a number of constructs elicited in a card-sorting session. Multiple maps produced using MDS analysis across time provide us with an overview of how a person construes their identity across time-points.

In the studies presented here MDS output from card-sort sessions 1 and 2 provide anchor data which acts a baseline, or control, for each study. These timepoints are subject to a general Procrustes analysis (GPA) resulting in a centroid configuration against which data from subsequent timepoints are compared (Gower, 1975). This configuration accounts, to some degree, for error or 'natural' movement in identity against which the researchers compare self-concept after intervention. MDS output from card-sort sessions 3 and 4 are overlaid onto the baseline data and analysed accordingly. GP comparison of times 3 and 4 with the centroid gives an evaluation of the degree of change across the card-sort sessions. Output of GP analysis elicits an index of fit and degree of difference (or uniqueness) across sessions.

The assumption underlying this approach is that any change across time exceeding the movement or change accounted for at baseline is due to intervention. However, caution in interpretation of results must be exercised when fit is poor as this indicates a degree of movement already inherent in the system. This may be due to developmental factors i.e. that a stable sense of self has not yet coalesced or outside factors impacting the system such as upheaval or lack of security or stability in the person's life, it may be also due to internal factors which may hamper the development of a stable self-concept.

The points for any one person consist of several coordinates across constructs and are multidimensional in nature. MDS collapses the multidimensional co-ordinates into a common space of two or three dimensions in much the same way that data is fitted in factor analysis. The data is not manipulated, rather, the clearest representation of the data is the goal of analysis. The multidimensional vector for each person (their position across constructs) is reduced to a two-point coordinate in the space. The advantage of this approach, over factor analysis, is that the space is constrained or defined by the points within the construct and hence distances of co-ordinates between clusters of data can be meaningfully interpreted.

In this study, two approaches to fitting the data across time points were considered. In groups 1 and 2 a rigid approach was taken. Data from multidimensional scaling at each time point was transposed and rotated. This orientates datasets in a way that allows them to be usefully compared. In MDS the pattern of datapoints produce a shape on the map. Each point is a vector or co-ordinate on this map. However, MDS analysis may produce a shape at one time which is the mirror of another – GPA orients and transposes shapes in a way that allows for comparison. The results from these studies indicate that greater change occurs after time one and two in all studies. The goodness of fit between time one and two gives an indication of the degree of stability of self-concept. Lower fit indices indicate that the person, or system is experiencing or undergoing change, there is flux in the system. This would be typical of a very young person, someone who has a high degree of chaos or uncertainty in their world or someone who has not internalised a strong sense of self. Higher fit indices suggest stability. This baseline element of each study provides a basis for asserting that greater change subsequent to intervention is due to that intervention.

However, in order to examine the stability of the method itself it was necessary to undertake pilot studies. Originally the rationale for the rigid approach applied for the first two studies was that; if a person's construal system is relatively stable then so too must be the magnitude of each construct, or element of self-concept be stable. Therefore, the size of the shape produced by this data should not vary appreciably. This does not take account of shifts in construal due to the card sort process itself, something that was observed during the studies carried out for this thesis. Weighting in GPA stretches spaces produced during MDS so that essentially the spaces and constructs contained therein can be compared on the same scale. This would allow for some of the movement in construal, or levels of construal, due to the assessment procedure to be accounted for. Each timepoint involves an open card sort – the constructs are generated anew with no reference to any previous sort. In this sense each card sort session is a sample of the constructs which make up the schema that are the building blocks of the person's self-concept and their theories about the world. It is likely then that there will be variance in scale for constructs from one time point to another. The initial rigid approach is better suited to sorts where constructs are consistent across time. To examine the hypothesis that this approach would maximise goodness-of-fit, two pilot studies were carried out. Data was collected for two people across three time-points. In each case time 3 was compared with a centroid baseline configuration produced from time one and two. Both studies produced perfect fits with baseline.

In order to compare the two methods, weighted and unweighted GPA, data from the first person from the weighted GPA cohort, Stephen, was subject to both approaches and is presented in chapter 8. His results coupled with the very good fit of both pilot studies suggest that weighted GPA gives a more precise indication of change.

How Data Collection Can Be Construed According to Dynamic Systems Theory.

The research design presented here is a repeated measured design for the analysis of idiographic data. This thesis hypothesises that a person's psychological space will be relatively stable unless a new force, such as an intervention, is introduced into that space. By taking a snapshot of that person's psychological space across times, or slices of time, prior to intervention we can examine these patterns and trajectories and estimate the stability or movement in the system where no intervention takes place. This provides us with a baseline or centroid life space map. This map can then be used as comparison with subsequent maps to examine how elements introduced, such as a DA intervention, impact a person's psychological space. Once again it is hypothesised that the person's construal system will reorganise due to intervention. Given that the degree of change occurring across times can be measured we can then evaluate the impact of an intervention on an individual's self-concept.

The constructs provided by the individual during the assessment phase give insight to the person's self-concept. Using a method of comparison, it is possible to extrapolate how the person views themselves in terms of self-esteem, self–efficacy, intelligence and other constructs of importance to them. By comparing their position on the map with other individuals who they have mentioned, it is possible to see those individuals on the map with which they most closely identify. The subsequent conclusions drawn by the mediator are subjective and rely on the expertise of the mediator. Lingoes in Chapter 5 of Lingoes, Roskam and Borg(1977) states that such interpretations be theory driven. Does the person identify with a positive or negative peer group? Does the person identify with the formal education with which they are engaged? Does the person have a positive view of teachers and if so, are they positioned closely on the map with such people or at a distance? Is the person's

position on the map relative to certain clusters (family or peers) developmentally appropriate? For example, in younger participants we would expect to see greater variation in self-concept over times as the system has not yet stabilised. The arrangement of people on the map suggest psychological ways of being that can be interpreted using psychological theory, such as developmental theories, attachment theory, theories of mind In this sense interpretation of the maps is constrained by the skills and knowledge base of the interpreter.

Certain groupings or patterns of distribution of people on the map may have meaning and it is useful for the practitioner to consider these patterns. For example, a simplex is an ordered pattern that forms a line in the space. More commonly in NMDS we would expect to see circumplexes, that is curves or arced patterns in the data given that the order relations are monotonic (Lingoes & Borg, 1979). This suggests that the elements on that line have commonalities yet differ in the degree to which they are scored along at least one construct. Such geometric patterns suggest a relationship between these elements and warrant closer inspection. It is possible to test if the observations are actually circumplexes, radixes and so on using further analyses of the spaces (Lingoes & Borg, 1979), however this is a more complex process and may not be of added benefit with regard to interpretation of the psychological space.

More commonly *regions* in the space are identified for closer inspection, interpretation of these spaces is grounded in psychological theories of development, attachment, self-concept and personal construct theory (Lingoes, 1979). These spaces, as stated previously are construed by examining the elements (people) that occupy that space and their signature scores along constructs. Empty spaces on the map also hold meaning – for example where we seem extreme cases the distance between the extreme case and others suggests that this person is seen as exceptional

(either in a positive or a negative sense). We can see a good example of this in Justyn's maps. This is useful in terms of understanding how the person construes their world and the people in it. In simple terms Justyn sees this extreme case as 'bad' and they score negatively across most constructs. However, he does not see the world in polarised terms, he discriminated well across constructs from other people in his world, including himself. Rather this extreme case represents something like the antonym to an idealised space the demarcation on spaces on the map is useful for explaining the regions and their meaning to other researchers, practitioners and the clients themselves. An example of demarcated maps is given in Kevin and Justyn's results.

Movement already occurring in the system due to factors other than the intervention are controlled for by using a baseline measure against which subsequent change is compared. This centroid configuration takes coordinates at times 1 and 2 prior to intervention and fits them into a centroid or common space. Subsequent timepoints are then fit to this centroid space to give an indication of the degree of change due to intervention. By examining the baseline and subsequent movement of the individual through their own universe or subjective world and by considering the subsequent positionings of themselves relative to other people or elements on the map we can assess the efficacy of the intervention.

Open card-sorts (Kelly, 1955) are used to generate a snapshot of how the person views their world and their place in it regarding constructs elicited. The technique used here is designed to allow the person to identify values they see as key to identity and arrange themselves and people in their world along a continuum they themselves develop through the sorting process. Core to Rogerian principles is that self-actualisation is the goal of the organism (person). People are inherently good

and are motivated to seek the good life (1951). The good life is a concept posited by Rogers – one may not 'achieve' self-actualisation but one can strive to maximise the move towards self-actualisation. An aspect of self-concept it the ideal-self. This is the bar against which a person measures their real or current self. Rogers argues that when there is a considerable gap between these two self-schemas, the person is in a state of incongruence and self-actualisation is harder to achieve. When there is overlap between the two schema – i.e. when the person identifies with aspects of their ideal there is congruence which is characterised by low levels of anxiety, engagement in the 'good life' and movement towards self-actualisations is possible. Therefore, in order for intervention to be warranted the client must be in a state of incongruence. Some data collection techniques include the ideal-self in the sorting procedure. The Q–sort self-assessment procedure for example asks participants to sort statements of being – one for real self and one for ideal self. The resultant grids indicate the degree of congruence or incongruence between selves. Consideration was given to the use of an ideal self in the sorting procedure used here. It was not included for several reasons – the objective is to elicit information from the person about their world from a place of 'not knowing'. The imposition of an ideal self-card suggests otherwise. The imposition of an ideal-self card on the participant suggest that their current or real self is not ideal and this is contrary to unconditional positive regard. The participants in the first two studies, by virtue of the participation in the project were 'at risk' from poverty and numerous other factors. The participants in the younger cohort had all been identified by gatekeepers as 'most challenging' and 'most at risk'. Self-concept is developmentally moderated, younger participants may not have a developed sense an ideal-self and may struggle with the concept. Rather

ideal spaces or conversely negative spaces are extrapolated by examining signature scores of people who inhabit those spaces.

The Protocol for Card-Sort Sessions.

The mediator begins with a pile of blank cards and a marker. The participant is invited to name the people currently interacting with them on a regular basis. The participant begins to name people. Typically, the person will name their immediate family and friends first. The mediator writes a name and their relationship to the participant on each card. When the process is exhausted the mediator prompts the participant to name anyone they may be forgetting. The purpose is to gather the names of all people the participant interacts with on a regular basis regardless of the opinion the participant may have of them.

Once this process is complete the participant is asked to name a construct. Constructs elicited must fall along a polarised continuum. In order to gain training in the elicitation of constructs I attended a workshop delivered by the BPS on construct elicitation and data analysis using Kelly's rep grid technique. It is important not to direct the participant. Prompts such as 'what is important to you?' and "What do you not like?" are acceptable. Once a theme is elicited it may be necessary to "ladder-up" (Kelly, 1955) in order to reach the kernel of the construct the participant is describing. For example, if a participant cites 'family' as something that is important to them in order to isolate the concept it is necessary to enquire further. "Why is family important to you?" Common responses such as "because I can depend on them", "because they love me no matter what" can be further laddered until clear constructs such as trust, love, dependability is reached. Another approach is to present the novice with two or three cards and ask the person how the people named are similar or different and from this starting point elicit a construct. The participant

is then invited to sort the cards they have generated into levels along the construct. The participant begins with the first card and considers how they would categorise that person. They then compare this with their second card, placing this card to the left or right (or with) the first depending on whether that person scores higher or lower on that construct. Using this method of comparison, the participants places all their cards on the table. This produces a sort based on the person's own definition of the construct and their own perception of the number of levels that construct can have based on their own experience. Each level is then given a rank score. Cards are rank scored on a continuum from negative to positive. The most positive = 1, followed by increasingly negative scores (2, 3, 4 and so on depending on the number of levels elicited). Scores for each sort are then recorded. This process is repeated until the participant can no longer generate constructs. For subsequent card-sort sessions the steps are the same. No reference is made to constructs elicited in previous sessions unless the participant expressly names them themselves. Sessions last an hour and half on average, and two hours for the initial session.

Therefore, the data collected consists of a number of open card-sorts based on a number of constructs in any one session. The purpose of this approach is to elicit how the participant views their world with a minimum of interference from the researcher.

The resultant data matrix generated is analysed using multiscalogram analysis, a type of MDS, producing a life-space map, a two-dimensional depiction of the person and how they view themselves in relation to other people in their world. How the person perceives themselves can be interpreted by the practitioner/researcher in terms of self-esteem, self-efficacy, intelligence, likability etc using existing psychological theories in keeping with person-centred research. This is a reflexive process.

Multi-dimensional Scaling.

MDS is a multivariate data reduction technique (Krishnaiah & Kanal, 1982; Kruskal & Wish, 1978). The term multidimensional scaling can refer to any statistical analysis technique which considers the simultaneous analysis of more than one variable (Borg & Groenen,1997; Cox & Cox, 2001). The narrower definition of the term refers to methods of analysis which produce a graphical representation of data points as a results of data analysis techniques grounded, largely, in the use of Euclidian geometry approaches of data reduction (representing multidimensional data on a plane). It is this definition that is used in this thesis (Cox & Cox, 2001). Within this narrower definition of MDS there are different approaches depending on the type of data under consideration (Cox & Cox, 2001; Lingoes, Roskam & Borg, 1979). Two-way MDS is suited to a data matrix collected from one person. Three-way MDS is suited to the analysis of multiple data matrices, for example data collected from more than one person. Metric MDS is suited to data which, as the name suggests, has a metric, linear quality; that is levels which are equidistant from neighbouring levels (Cox & Cox, 2001). In psychology an argument is made that Likert scales which have been developed in the usual manner fall into this category. Non-metric multidimensional scaling does not assume that levels are equidistant but rather there is a requirement that the relationship between levels be monotonic (de Leeuw, 1977; Roskam, 1979). Monotonicity refers to the preservation of the relationship between rank order of pairs undergoing data reduction. In this way the integrity of the relationship between ranks is preserved but linearity is not assumed. Given that the data collected during card-sort sessions is a subjective construal by an individual of several constructs not previously defined we cannot assume that the

data produced qualifies as having a metric quality or that the distances between ranks are 'metric'. The ranked data gathered during card sorts *is* however monotonic, and there is an ordinal relationship between ranks, and is thus suited to non-metric scaling.

MDS has a long history; see de Leeuw and Heiser (1982) for a brief but clear overview. Data points are categorical rankings which vary in terms of the number of levels for each construct. MDS allows for computations to be made in higher dimensions as well as placing fewer restrictive assumptions on the data. MDS can use ordinal data and produce metric solutions (Abdi, 2007; Cox & Cox, 2001; de Leeuw, 2000, 2016; de Leeuw, Mair & Groenen, 2016; Dunn-Rankin, Knezek, Wallace, & Zhang, 2014; Bruhn & Gigerenzer, 2017; Kruskal & Wish, 1978). Pairs closer to one another in this two-dimensional coordinate map space are more similar and pairs further apart are less similar. Multidimensional scaling is a broad term describing a family of multivariate analysis techniques where a representation of the data is produced (Cox, & Cox, 2001). Guttman's work on facet theory (Canter, 1985; Guttman & Greenbaum, 1998) also falls into this domain where the term scalogram analysis is used.

The usefulness of multidimensional scaling in the context of this thesis is that multiple variables which may have differing levels or number of ranks may be analysed to give meaningful results; these are the partial order measures referred to by Barrett (2003) as being suited to the consideration of idiographic data collection. The data does not have to be anchored to an external ranking system (a Likert scale for example). This is the nature of the data collected during card-sort sessions. That the method reveals a structure that has meaning, that is that the graphical representation of the data analysed is representative of the rank of each element

across variables or constructs has been considered by Guttman and Levy and Guttman in Marcotorchino, Proth and Janssen's edited volume (1985). Numerous examples of using MDS analyses to reproduce meaningful representations of data are also given by Andrecut, 2009, Asada and Ohgushi, (1991), Cox & Cox (2001), de Leeuw, (2016) and Meulman (1992). Cox and Cox (2001) consider the efficacy of multivariate methods of data reduction and classification across a number of questions. Their findings suggest that MDS offers a robust method for the representation of this type of data. Shepard refers to 'life space maps' as 'psychological space', his argument being that such a space breaks the cycle of circulatory logic of measurement that has persisted in psychology thus far (1962). The representation of elements in the space is not coupled to a measure developed using traditional psychometric measures, rather the elements and the space are a representation of the individuals own self-concept. Constructs are therefore not imposed on the person or space, rather the analysis and subsequent rendering of the life-space makes manifest the structure of the data (Guttmann, 1977).

de Leeuw and Heiser (1982) consider the efficacy of various types of scaling in terms of producing a viable representation of the data. They compare metric formulae with non-metric formulae and different approaches to stress and strain testing. Measurements of strain are typically used in three-way MDS calculations and so are not used here.

De Leeuw and Heiser (1982) findings suggest that non-metric MDS is a robust method which offers comparable representations to metric methods of MDS; while the two approaches differ primarily in terms of the loss function used for calculation of the position of elements within the space.

Stress and fit in NMDS.

Stress is a goodness of fit measure obtained through rotation and iteration (Xiong, Blot, Meullenet & Dessirier, 2008). Each iteration tests fit to a starting point, or central co-ordinate. Previous versions of MDS have used 0,0 as the axis upon which to rotate and transform the solution, often resulting in poor fit scores. The loss function in NMDS ensures best fit of the data to the space while preserving the monotonicity in the dissimilarity matrix. Non- metric MDS (generally) uses a least squares loss function (often referred to as stress). The data undergoes iteration in a smallest space, being rotated and transformed around random points of origin (vectors) until a best fit of the data to the space is achieved (Noma & Johnson, 1977; Roskam, 1979). The resultant stress figure for the solution is a goodness-of-fit measure of the data to the space, and an indication of the degree of error within the space in terms of the co-ordinates produced for each element. Stress gives an indication of the degree to which data fits a monotonic curvilinear best fit. The lower the stress the better the fit.

For the analysis of data collected for this thesis, mulitscalogram analysis uses a dissimilarity matrix (suited to ranked data) to produce a graphical representation of data in a two-dimensional space (although the representation may in fact be a solution in two or three dimensions). Current methods incorporate the use of various starting points in order to achieve best fit, therefore the data is iterated through various points of origin until goodness of fit is maximised in the smallest space. Various writers in particular Kruskal (1964) have solved the issue of reduction of dimensions necessary for a robust solution using distance measures such as City Block or Minkowski. In this sense MDS is a very robust method of representing

multivariate data in N dimensional space (usually 2 or 3 dimensions). Stress less than .2 is desirable (Cox & Cox, 2001).

The data from the card-sort sessions is subjected to multiscalogram analysis (Kruskal & Wish, 1978) using a software package developed by Hammond (Hammond & O'Rourke, 2007; Hammond, 2014). The purpose of this technique is to represent the position of multiple data points in Euclidian space (Young & Hamer, 1987). Multidimensional scaling (MDS) techniques transfer the data collected from card-sort sessions into visual representations of that data. Data from each sort is mapped onto a multidimensional space (Steyvers, 2002; Whaley & Longoria, 2009). MDS reduces this multi-dimensional space into a two-dimensional representation of that space (Borg & Groenen, 1997; Buja, Swayne, Littman, Dean & Hofmann & Chen, 2007; de Leeuw & Mair, 2015). Points on the map represent elements (or in this case people) and their relationship to the individual. Using Euclidian geometry, points on the resultant map represent a person's position in their subjective world in relation to other people in the world (Hammond & O'Rourke, 2007). Each construct's data points are then positioned into a common space. The MDS analysis uses a Euclidian distance measure which transposes an origin on the X and Y axis respectively of a two-dimensional coordinate map. If we conceptualise each construct's data points as a shape in two dimensions, then each shape is overlaid upon the next shape. Lingoes, Roskam and Borg (1979) describe this as imagining a set of transparencies overlaid and being rotated and manipulated to conjoin items' co-ordinates across constructs. The parameters of the map are dictated by the person's construal of the constructs that they produced during the card-sort process (the number of levels they identified for each construct) combined with the number of card sorts that were elicited during that session. Each map represents a slice of time in that person's existence. Over the

course of intervention subsequent ‘snapshots’ using this technique may be taken to evaluate change. The constructs provided by the individual during the assessment phase give insight to the person’s self-concept. Using a method of comparison, it is possible to extrapolate how the person views themselves in terms of self-esteem, self–efficacy, intelligence and other constructs of importance to the learning process. By comparing their position on the map with other individuals it is possible to see those individuals on the map with which they most closely identify. The subsequent conclusions drawn by the mediator are interpretive. Does the person identify with a positive or negative peer group? Does the person identify with the formal education with which they are engaged? Does the person have a positive view of teachers and if so, are they positioned closely on the map with such people or at a distance?

Interpretation of output from the MDS analysis is reflexive (Guttman, 1985). Meaning is extrapolated using psychological theory in much the same way that the results from factor analysis are interpreted. As the constraints of each map are delineated by the data, it is necessary to refer to the original data matrix to determine the significance of various zones on each map. This must be done separately for each map. Constructs are scored along a continuum from 1 to *k*, with 1 being the most positive level of the construct. By examining the pattern of scores for individuals and their subsequent placement on the map it is possible to determine which zones on the map are considered positive, which are negative, and which consist of a mix of the two depending on the pattern of scores for an individual.

Those who score most positively across constructs are those viewed as closest to the participant’s ‘ideal’ while those who score at the other end of the continuum across constructs are furthest from the participant’s ideal. Movement in this direction suggests an increase in self-esteem, mastery and self-efficacy. For example, where

five constructs have been elicited at the card sort phase, the optimal structuple or signature score would be 11111. As the participant is also represented on the map, we can observe the participant's proximity to those she views as ideal, identify clusters she perceives as negative, and observe differences in groups such as family in comparison with school friends or teachers. Differences amongst groupings are also observed (Lingoes, 1979).

General Procrustes Analysis (GPA).

Each life-space map produced using multi-dimensional scaling has its own parameters dictated by the combination of constructs elicited and the number of levels identified by the learner for each construct. In order to usefully compare maps across time it is necessary to subject maps to general procrustean analysis, which transposes the maps generated during the MDS onto a common space, rendering them measurably comparable (Bennani Dosse, Kiers & Ten Berge, 2011; Gower, 1975).

By taking a snapshot of that person's universe across >1 time prior to intervention we can examine these patterns and trajectories and estimate the likelihood of speed and direction of movement of the individual's elements across times. In order to establish a baseline, the first two sets of card-sort data (T1 and T2) are subjected to GPA. This provides us with a centroid map that takes account of error or change prior to intervention. This baseline map is then used for comparison with subsequent maps. Given that the distances between elements on these maps both within and across times can be measured in a meaningful way, we can then measure the impact of an intervention on an individual. By examining the baseline and subsequent movement of the individual through their own universe or subjective world and by considering the subsequent positioning of themselves relative to other people or

elements on the map we can assess the efficacy of the intervention. Output of GPA analysis elicits an index of fit and degree of difference (or uniqueness) across sessions. We collapse times one and two to generate a centroid configuration which accounts, to some degree, for error or 'natural' movement in identity against which we compare self-concept after intervention. We maintain that subsequent change is due to that intervention.

Interpretation of Results of MDS Analysis of Card-Sort Data.

Interpretation of output from the MDS analysis is reflexive. The NMDS software requires a fit of .9 or higher for the constrained space, which is delineated by the data itself (Sean Hammond, personal communication, December 11th, 2018). As the constraints of each map are delineated by the data, it is necessary to refer to the original data matrix to determine the significance of various zones on each map. This must be done separately for each map. Constructs are scored along a continuum from 1 to *k*, with 1 being the most positive level of the construct. By examining the pattern of scores for individuals and their subsequent placement on the map it is possible to determine which zones on the map are considered positive, which are negative, and which consist of a mix of the two depending on the pattern of scores for an individual. The *degree* of change across times can then be evaluated using the second step of the scaling analysis. General Procrustes analysis renders the data onto a common space. This allows a comparison of movement and change of the person across times. In this study Times 1 and 2 (T1 and T2) are taken before any intervention is delivered. The data for these two time-points are fit into a common space. Goodness-of-fit of T1 and T2 gives an indication of stability (or conversely movement) in the life-space. The matrix produced from this analysis provides a baseline for comparison with subsequent sessions gathered over the course of intervention and thus, to a

degree, controlling for movement or error not due to intervention. This is the control element of this idiographic study. GP analysis at T3 and T4 are compared with this centroid or baseline configuration.

For the first two groups examined here a conservative approach was taken to GPA analysis. MDS produces a representation of the data in two-dimensional space. This representation can best be conceived of as the shape of the data. Data was transposed and rotated so that the shapes of the data across times was comparable. If we assume that the scale or 'length' of a person's core constructs are rigid or fixed, then we would assume that this would not change appreciably over the course of intervention. The size of each individual data shape would remain consistent.

The subsequent studies three and four allow for expansion or contraction of construct length and therefore the size of the shape produced by the data. It was noted that, during the card sort phase, participants reassessed their conceptions of constructs and that the card-sort process itself shifted people's perceptions of 'how they see things' - their construal system (see study 3). Hence in studies 3 and 4 data is rotated, transposed and stretched or contracted to fit the shapes to each other, taking account, to a degree, for movement due to the sorting process itself. This was tested here with two pilot studies. Both pilot studies revealed a goodness of fit with the centroid of 1 (perfect fit).

Interpretation of tabular outputs from the analysis.

Stress.

Stress is a goodness of fit measure of the data to the space (De Leeuw & Stoop, 1984; Kruskal, 1964). Stress utilises a least squares loss function to preserve relations between ranked, non-metric data such as the data matrices produced during the card sorting procedure. There are a number of approaches in the literature to

fitting data to a smallest space (Roskam, 1979). In the studies presented here decisions regarding type of approach were taken based on the theories within which the work is situated – i.e. personal construct theory. The equations used are non-metric because we cannot assume that the relationship between levels of a construct is linear.

The algorithm for producing the coordinate data from the data matrix produces an initial configuration – arrangement of elements in a two dimensional space. In NMDS we seek to preserve the dissimilarities between data points. The second step of this analysis is the reduction in size of that space over a series of steps or iterations to arrive at a smallest space, while conserving the relationship of elements to each other in the space. This process is repeated using different starting points (in this case vectors) until best fit is achieved (Roskam, 1979).

When considering refinements to the algorithm utilising the algebraic functions developed by Kruskal (1964) used in the studies, theory must once again be the basis for choosing such refinements. Issues arise if the starting point, or initial configuration, when subject to reduction results in a local minima (finishing point in convergence) which is sub-optimal. In other disciplines where this method is used the objective is to arrive at a global, or true, minima. For example, in geography when mapping terrain, researchers may wish to know the lowest and highest altitude points of a terrain in order to faithfully represent the terrain on a map. It is important to know the true lowest point of altitude. In psychology we are presented with the challenge of representing latent constructs – we cannot know the global minima of the psychological space. Remember the objective of this approach is to as faithfully as possible reflect a sample graphic of the person's self-concept. Therefore, when solving for issues such as the result of the iteration process producing a local minima

which is sub-optimal care must be taken. The programs used for data reduction use a stepwise approach to reducing the space and therefore the magnitude of each step affects the final result.

Refinements to this process which conserve the structure of the data include multiple random starts (different initial configurations) and approaches to gradient boosting (using decreasing magnitudes of steps for example) (Cox and Cox, 2001). Any loss function must not contort the data to fit the space in a way that such fitting loses its meaning. The program utilised here uses a multiple random starts loop, using different starting configurations, to minimise stress to avoid a sub-optimal local minima solution. Where the initial configuration does not converge at stress of < 0.2 the program chooses another starting point (initial configuration) and begins the process anew. In the cases presented here 2 dimensions adequately accommodated the data in the space. The multiple-starts approach optimises goodness of fit for the final solution (Sean Hammond, personal communication, 20th June 2020). Stress of less than .2 is considered acceptable (Kruskal, 1964).

RV

R Vector (RV) is an indication of the strength of relationship of a set of variables in a matrix to another set of variables in another matrix. Values range from 0 to 1. 0 indicating that there is no relationship of variables between matrices. A higher goodness of fit suggests a correlation between the pattern of one set of variables with another, fit of .8 or higher being considered ‘good’ (Escoufier, 1970). Since the time of carrying out these studies there have been a number of refinements to RV as a measure of goodness of fit (Josse & Holmes, 2016). These refinements and the consideration of other measures of fit should be taken into consideration in future studies.

Table of fit of time3 and time 4 with the baseline centroid.

This table give two figures – fit and uniqueness of card sorts with baseline. Fit values range from 0 to 1. These fit indices give an indication of the degree of change or difference of the maps at time three and four from baseline. A high degree of fit indicates little change has occurred (there is not much difference between the baseline centroid and subsequent sorts) while uniqueness gives an indication of difference in the shape of the elements on the map. Higher degrees of uniqueness once again signify difference between sorts undertaken at baseline and those taken over the course of intervention.

Correlation of time 3 with time 4.

A correlation table of time 3 with time 4 gives a further indication of similarity or difference ergo stability across times.

The Intervention Used.

The intervention used was a series of cognitive reasoning exercise puzzles designed by the author addressing areas of cognitive modifiability identified by Feuerstein, Miller, Rand & Jensen (1981) and Feuerstein (1990). Sets, patterns, sequences, analogy and anonyms, logic, mathematical deduction, combined cognitive reasoning exercises, focus, memory and metacognition were targeted. Within each of these areas three exercises of increasing levels of difficulty were designed. All exercises consisted of shapes or blocks that the novice could manipulate in order to solve the puzzle.

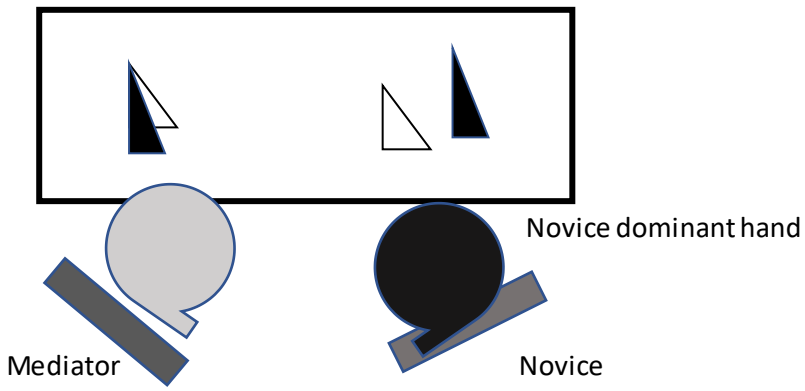
The intervention avoided the use of words or written exercises (except for the dot matrix exercise) to avoid cultural bias (Appendix A).

The Workspace.

The mediator sits at a double desk alongside the novice (Figure 3). It is preferable to sit on the non-dominant hand side of the novice as this gives the mediator a clear view of the novice's workings. This has an advantage over the usual sitting opposite teacher-learner interaction as it allows the novice to mimic the mediator without having to account for mirroring. The lack of a physical object between the mediator and novice may also reduce feelings of a power dynamic evocative of formal teaching environments. It is important that the novice feels that the mediator is 'working with' rather that teaching at them. In this way the mediation space is designed to reflect Rogers' person-centred concept of unconditional positive regard while also allowing for a workspace.

Figure 3

Aerial view of mediation workspace



For each level the novice was presented with a task and asked to complete it. For example, in an analogy exercise, novices were presented with a picture of a completed multicoloured shape and asked to recreate the picture using the shapes available to them (see appendix A for an account of exercises used for intervention).

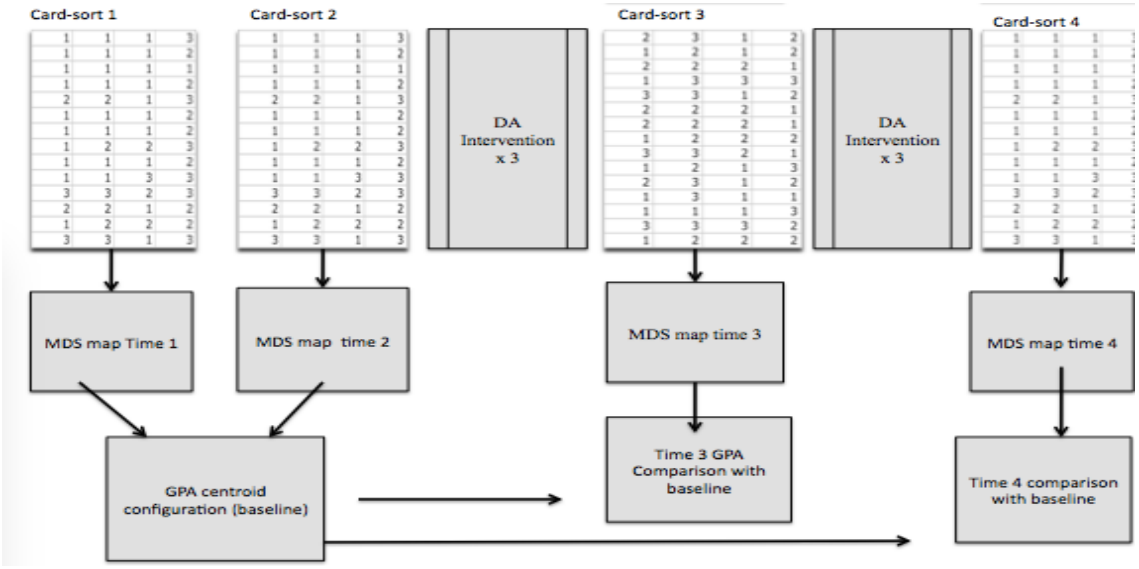
Using a graduated prompt approach, the student's level of ability was ascertained. Intervention was then targeted at increasing their level of ability in that domain. This was achieved by presenting exercises slightly above their level of ability. In this way the novice and mediator 'figure out' how to solve the puzzle. The novice is then asked to construct their own puzzle in the same domain to embed learning and demonstrate that they have grasped the concept.

Study Design.

The design protocol is outlined in Figure 4. Each study consisted of four card-sort sessions. The first and second card-sort session was used as a baseline and no intervention took place between sessions. There was a gap of three to four weeks between these sessions. Following the second card sort session, three follow-up DA sessions were carried out, one a week for three weeks. Each DA session lasted approximately one hour. This was followed by the third card sort session, after which another three sessions of intervention were undertaken. The fourth and final card sort session was carried out after the completion of six DA intervention sessions in total. Brief notes were taken after each session. Overall, each study consisted of between 10 and 12 contact hours.

Figure 4

Protocol for data collection and analysis



The top row of figure four describes the study protocol. Each card-sort session result was collected and recorded in Excel. The result was then subjected to multiscalogram analysis (MSA) (a form of Multidimensional Scaling). This analysis produces two sets of coordinate data, one representing a two-dimensional rendition of each multi-dimensional data point, in this case people in the participant's world, the other the results of MSA analysis. A fit of .9 or higher is required to produce a plot of the data.

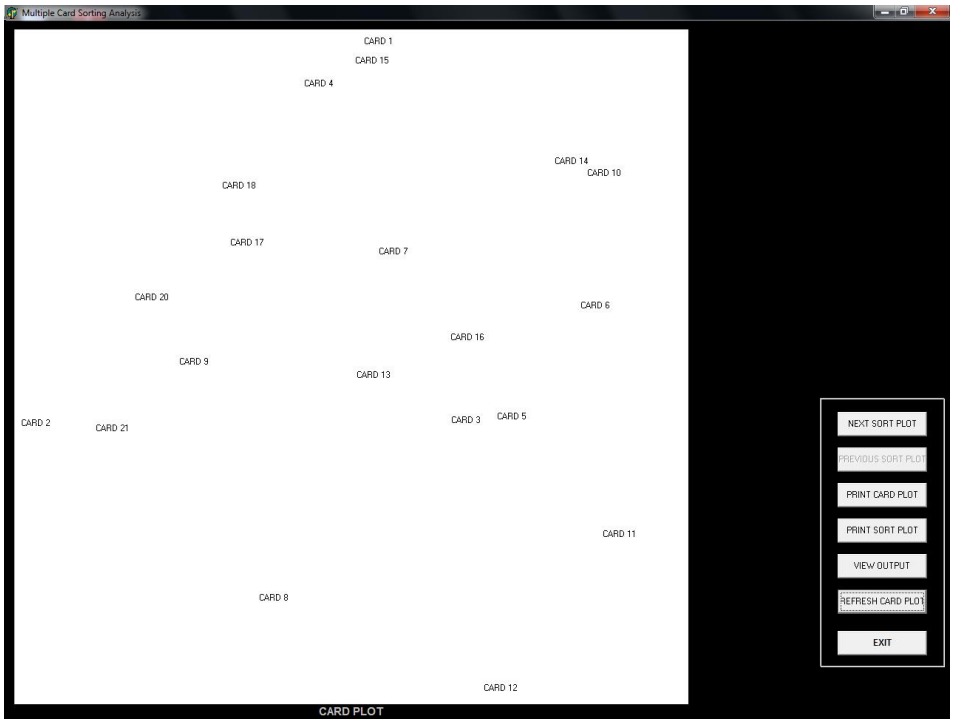
The analysis treats tied (identical) signature scores as one item of data, that is matching scores are excluded from analysis. Tom's output data at time 1 (Figure 5) will be used to illustrate the above:

This Sort Contains 21 Profiles.
Profile 19 Is Identical To Profile 2 And Has Been Deleted.
20 Profiles Will Be Analysed. These Are:-
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 20 21

This results in a plot of the data as follows:

Figure 5

Sample output for Tom time 1

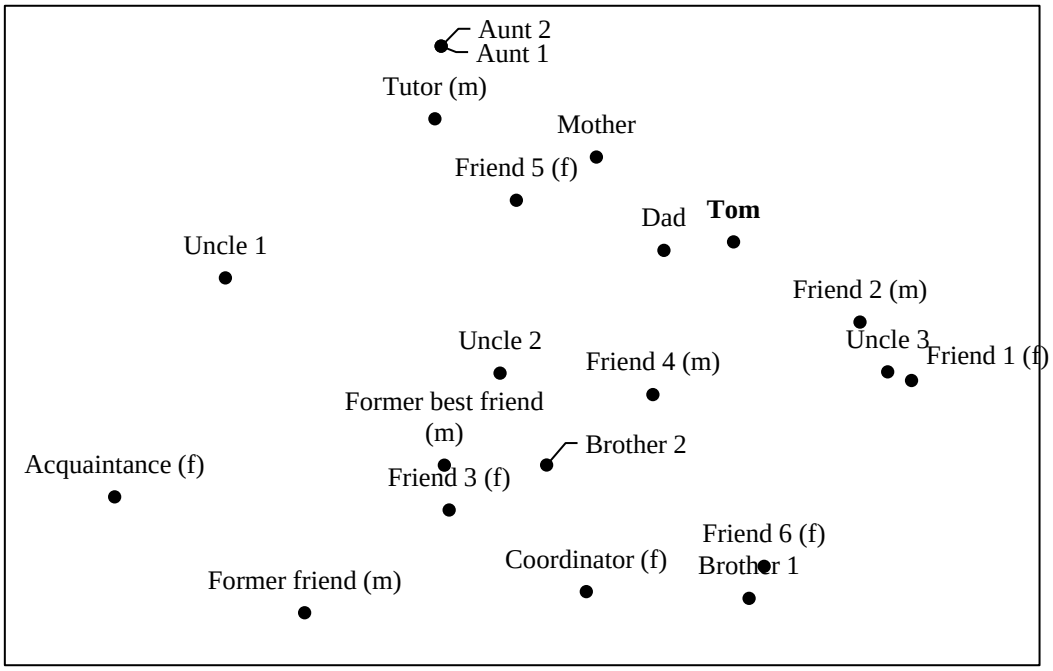


This can then be used to interpret Tom's self-concept at time 1, given that the practitioner would know who is represented on the map (and where ties occur).

However, for the purposes of this thesis data was charted in Excel for clarity throughout. All participants names were changed, and roles rather than names were used to describe the people in the participants lives for anonymity purposes (Figure 6). Future software development could integrate these steps into a more usable software package.

Figure 6

Example of a life-space map, Tom time 1



Coordinates were then input into a chart in Excel and XY Chart Labeller was utilised to label the data points, producing a life-space map of the participants data. Profiles 19 and 20 are clearly denoted as identical (aunt 1 and aunt 2).

Finally, MSA coordinate data were subjected to GPA analysis. In order to account for natural movement (or error) in the person's construal system, coordinate data from time 1 and 2 were collapsed to produce a centroid or baseline configuration

against which subsequent MSA coordinates were compared to give an indication of difference and change due to intervention.

Two approaches to GPA were considered and tested. Each MSA data set forms a shape in the delineated space. Essentially each shape is fitted to the next (as in the fitting of time one to time two). There are two approaches which can be taken to this GPA; a conservative approach where an assumption that constructs elicited would be stable in size. This was tested with the first two groups. A second approach allows for more flexibility when fitting the data to the centroid and this was tested in group 3. In the second instance the shape of the data is stretched or reduced in size (weighted) to achieve optimal goodness of fit. A pilot of the second method suggests that this method is more suited to a more accurate evaluation of the degree of change due to intervention. Two pilots of this method (described in the results section) where no intervention took place both produced near perfect or perfect fit of MSA at time 3 with the centroid. Stephen's data from group 3 is presented using both methods for illustration. This comparison also suggests that weighted GPA produces a more accurate evaluation of change or difference in self-concept due to intervention.

Ethics.

The PSI Code of Professional Ethics was strictly adhered to. Ethical approval was applied for and obtained from the UCC ethics committee. Garda vetting was obtained through UCC for this work as it involved working with children and vulnerable adults.

An information session on the study was presented to project participants during which questions were encouraged. Participants were then given an information sheet, the contents of which were verbally explained. A consent form was provided to all participants, which could be returned to the project co-ordinator. Participants under eighteen were also provided with parental consent forms. Of the eighteen participants who attended the information session twelve participants signed up to the study.

Notes and observations were recorded for all participants. Notes taken regarding progress during intervention (as per Lidz's MLE checklist) were used to inform future sessions. Participants often shared sensitive details of their lives, for the purposes of this thesis only salient information will be described, some details are also omitted to preserve the anonymity of participants. The individuals who participated in this study often have complex living situations, which, if fully described, would potentially identify them. Given the oft-sensitive nature of information given during sessions and the requirement for individual anonymity under GDPR regulations, sections of case-study write-ups have been omitted. This decision was made in order to be able to disseminate this thesis in the public domain. This presents challenges for the reader when making associations between participants movement over the course of intervention and the impact of that intervention and assertions of that change being positive. In order to address gaps in

narrative for some cases, where possible information regarding the disposition of the participant, their gaps in learning and the association between their movement in self-concept and intervention is given. Two detailed case-studies are included so that the reader can ascertain how the methodology works, observe the reflexive nature of interpretation, and patterns of data in the maps. Remaining case studies are truncated. This thesis tests the validity of the methodology for use in various educational settings. The focus of these truncated case studies is to test the ability of the methodology to consistently produce representative life-space maps.

Further requirements for data protection were also adhered to. The Data Protection Act (2018) enacts EU GDPR (2016) regulations in Ireland. This legislation has implications for the storage and sharing of personal data. As a result of these guidelines which refer to the entitlement to anonymity of participants accounts of personal identifiers have been curtailed in the case studies described here. In order to comply with GDPR guidelines identifiers and data were separated and notebooks detailing sessions were stored by codebook identifier. The codebook is stored separately. Only information complying with GDPR guidelines was stored in soft copy. Soft copy material is anonymous and stored securely on a password protected laptop. All files are password protected. Data will be stored for ten years post project.

Chapter 7. Results.

Results from Eight Studies Using First Methodology.

Recruitment of participants.

35 schools and projects were approached and invited to participate in these studies. Each principle/coordinator was sent an information pack. On follow up two centres – a primary school and an early school leavers project consented to participate. It was noted that there was considerable gatekeeping for many of these schools and centres. This may be because DA is generally unfamiliar to practitioners working with young people in Ireland. The final studies here represent a broad range of people in terms of socio-economic status, ethnicity, gender. Participants range in age from 8 to 23.

The First Two Cohorts.

The studies in this thesis were drawn from four groups. The first two groups were taken from the same alternative education project. The project was designed to facilitate early school leavers or marginalised young adults. The project delivered a series of level 4 and level 5 courses. All the participants in the group were drawing state benefits (were unemployed). This was a heterogenous group; for example, some were members of an indigenous ethnic minority, most were economically disadvantaged, some had substance misuse issues, some were in foster care and some had behavioural issues or mental health issues. The advantage with an idiographic approach to support in such settings is that heterogeneity is not an issue as support is targeted to the specific requirements of the individual. Issues particular to the needs of the individual can be clearly identified and, where possible, addressed. Particular to DA areas addressed are gaps in cognitive ability, attention and memory. However, in some instances, needs which are extraneous to usual learning intervention must be

met before any learning intervention might be considered. Regarding the below studies, these needs ranged from gaining access to mental health workers, addiction counsellors and state services which could provide accommodation. Tzuriel refers to non-intellectual factors impacting learning (2000a) such as locus of control, self-confidence, need for mastery and other psychological mechanisms. Extraneous, ongoing factors must also be considered. This highlights the need to provide a whole-person approach to learning interventions which is rarely addressed in the literature and perhaps makes stronger a case for learning interventions to be particularly psychoeducational in nature in the broader sense. Very recent policy changes in Europe and the USA (Kozulin, 2011; Utley, Haywood & Masters, 1992) and Ireland for example emphasise the need for a whole-person, individualised and team-based approach to support. In Ireland there has been several pieces of legislation enacting an inclusive education framework such as the Education for Persons with Special Educational Needs Act (2004) and the Education (Admission to Schools) Act (2018).

Some of the participants in the project had been previously assessed for learning difficulties and/or behavioural issues. While this information was recorded the approach taken here was non-diagnostic, issues addressed were those that presented in sessions with the mediator.

The studies ran in two tranches – one in the first semester and one in the second of the 2013 academic year. The project offers a one-year QQI level 4 course after which participants can pursue a second year, QQI level 5 course if they wish. Quality and Qualifications Ireland is a statutory body the purpose of which is to implement regulations as set out by the European Qualifications framework (Directorate-General for Employment, Social Affairs and Inclusion, 2018). Standards of

education can then be usefully compared across member states. Levels 4 and 5 of this framework generally correspond with the final two years of secondary level education, although guidelines are laid out separately for projects such as the project described here.

Of the twelve people who consented to the study for this cohort four did not complete. Of those four one no longer qualified to attend the project, one was not available within the timeframe to complete, one declined to complete, and one was referred to services for substance dependency and homelessness. Group one consists of four studies, group two of another four studies undertaken after completion of the first group.

Group 1.

Kevin – detailed procedure.

The same procedure for the generation of cards and constructs was followed for each of the studies. The first study – Kevin, will be used to describe the card sort and intervention procedure in detail.

Kevin has been suspended from school multiple times. He had a history of physical altercations, had been in contact with the law and causing damage to school property. By his own account, he engaged in risk-taking behaviours, including alcohol and drug misuse and getting into fights.

Like all participants in this study, Kevin had consented to take part and reiterated his verbal consent during our first session and all subsequent sessions. The mediator explains the boundaries, rights and responsibilities of both the mediator and the participant according to PSI ethical guidelines and relevant legislation. The session then begins.

Kevin was very reluctant to engage and there was little or no eye contact during this session. He was reluctantly cooperative throughout. One of the advantages of the card sort method which was observed throughout this series of studies is that even though a large amount of information is gathered the process generally occurs as unobtrusive to the client/participant. The process of card generation is first explained to the participant and the process begins.

'Can you tell me the names of the people you see regularly?' is the first step of this process. The mediator writes the names given by the participant on cards. The mediator then asks for clarification regarding the relationship of each person to the participant – 'and who is that?', the relationship of the person or their role is then also written on the card. Once names that come easily to the participant are complete the mediator asks 'Is there anyone else you can think of that you see regularly? It doesn't have to be friends or family?', 'How about people you maybe don't like so much but see?' and so on until the list is exhausted. The list of names is recorded in Excel in the order that the participant gives. Usually a participant will name immediate family first followed by friends. Sometimes the order in which the participant recounts people is worth noting. Enquiries can be made in terms of the participants living arrangements 'And do they live with you?' or 'And do you live with them?' People who are named as a result of asking who the participant doesn't like are labelled 'acquaintances'.

In this way the mediator learns about the participant without being obtrusive. The demeanour of the mediator is important and, in the case of this methodology follows person-centred approaches to interaction. Finally, the participant is asked to write their own name on a card.

Once the list of people is generated the construct-elicitation phase begins. Constructs are elicited using laddering (Botschen & Thelen, 2016; Hinkle, 1965; Walker & Crittenden, 2011). It is important to be as non-directive as possible. 'Tell me about what matters/ is important to you.'... 'why?' If the person has difficulty engaging various methods can be used to elicit constructs in a non-directive manner. For example, triarchic laddering involves presenting the client with two cards taken from their pack. They are asked to identify how two of the people are similar and how one might differ. 'Pick two people who are alike in some way, how are they alike? Can you think of someone who is not like them in this way? 'In this way a conversation begins about what the similarity and differences are across people and why. It may be necessary to 'ladder up' or 'ladder down' until a viable construct which the participant values is reached. Once a construct is developed the sorting process begins. Kevin places the first card on the table and the process of comparison is explained by the mediator.

'Ok, now take the next card ... is that person the same as the first? Or are they better/worse at listening (say) than the person you have already put down?'. At this point it is useful to remind the participant that they are only sorting the cards based on this quality and that no overall judgement is being made about the person (by either them or the mediator).

The number of levels is dictated by the levels of discrimination construed by the participant in that construct across the people described in their card pile. In this way the number of piles generated can vary across constructs elicited.

This process is followed until the participant can think of no other constructs.

In the first session Kevin generated the following five constructs:

Family

Fit

Drama

Hold a grudge

Personal Hygiene

It is not necessary to give constructs ‘psychological’ titles, it is important that each construct reflects a value held by the person and that they understand the meaning of their construct. Notes can be taken by the mediator for clarity after the session. Subjective meaning can be clarified by engaging in conversation with the participant. ‘What does “drama” look like to you? Can you give me an example?’. On occasion it is necessary to clarify which end of the continuum along the construct the participant values as being more positive. In short, the mediator, as far as possible, makes no assumptions or value judgements and has no expectations of the participant or the people described on the cards.

Constructs are scored along a continuum from 1 to k, with 1 being the most positive level of the construct. By examining the pattern of scores for individuals and their subsequent placement on the map it is possible to determine which areas on the map are considered positive, which are negative and which consist of a mix of the two depending on the pattern of scores for an individual. Table 1 shows Kevin’s data matrix at time 1 followed by the constructs elicited during the card sort session.

Card sort time 1.

Table 1

Kevin's data matrix time 1

Kevin	1	2	1	1	1
Mother	1	2	1	2	1
Younger brother	1	2	1	1	1
Cousin 1 (f)	1	2	1	1	1
Friend 1 (m)	2	2	1	2	2
Coordinator (f)	2	2	1	2	1
Grandfather 1	1	2	1	3	1
Father	1	2	1	2	1
Godfather	1	2	1	2	1
Older brother	1	2	2	2	1
Friend's brother	2	2	1	1	1
Friend 2 (m)	2	2	1	1	1
Cousin 2 (m)	1	2	1	1	1
Cousin 3 (f)	1	2	1	1	1
Grandfather 2	1	2	1	1	1
Tutor 1 (f)	2	2	1	2	1
Aunt 1	1	2	1	1	1
Aunt 2	1	2	1	2	1
Grandmother	1	2	1	1	1
Tutor 2 (f)	2	2	1	1	1
Cousin 4 (f)	1	2	1	1	1
Acquaintance 1 (m)	2	3	3	4	2
Friend 3 (f)	2	2	1	2	1
Friend 4 (m)	2	1	1	1	1
Tutor 3 (m)	2	2	1	1	1
Acquaintance 2 (m)	2	2	2	3	3

Constructs elicited.

Family

Fit

Drama

Hold a grudge

Personal Hygiene

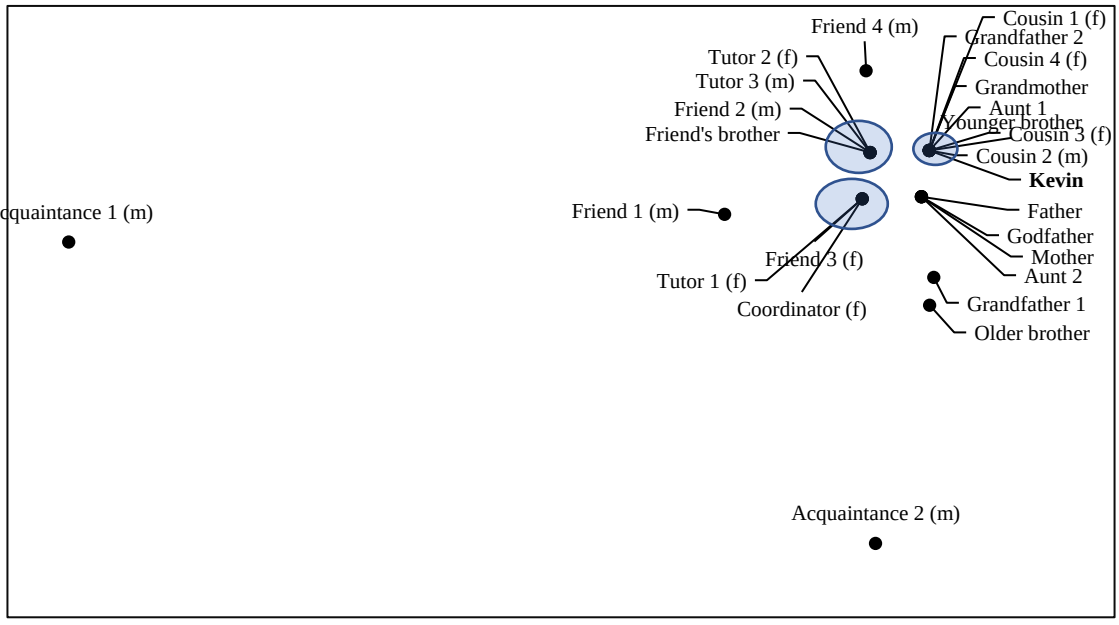
As can be seen from the table Kevin had two levels in the first construct generated, three in the second and third, four for 'hold a grudge' and three for personal hygiene. During the elicitation process for the first construct Kevin indicated that family was important to him. The mediator engaged in attempts to ladder up or down to find the

seeming kernel of this value for Kevin however it became apparent that ‘family or not family’ was a construct that had meaning and value for Kevin and so this was the first construct that was sorted.

At this juncture it is possible to inspect the matrix for extreme cases and patterns in the data. The combination of scores of any given individual is known as a structuple or signature score. In Kevin’s case there are no apparent extreme cases which would be represented by signature scores of either 1,1,1,1,1 or 2,3,3,4,3 although Acquaintance 1 has a score nearing a negative extreme signature score. Positive extreme signature scores suggest that the person is idealised by the participant. Nobody in Kevin’s map has perfect positive signature scores however, his aunt 1 and friend 4 are clearly considered in a positive light overall. The data from the matrix is then subject to MSA analysis which produces a life-space map (Figure 7).

Figure 7

Kevin life-space map time 1



The first map (Figure 7) indicates that Kevin identifies strongly with his immediate family. There is however some distance between him and his older brother and grandfather. Interestingly he sees himself as different from his peers, friends and some people he admires such as his tutor and his friend's brother (who is in the Navy). Kevin has expressed a desire to join the Navy.

There is also a distinct grouping of women he views in a positive light – his friend, the project coordinator and one of his tutors. These people are positioned away from him in a similar manner to the 'positive male' group. There is also a very clear division in the map between everyone and Acquaintance 1, Kevin's acquaintance. While it might be useful to exclude this person from the analysis, this extreme positioning of an individual Kevin dislikes indicates a positive orientation towards the other people in his world.

Table 2 shows Kevin's data matrix at time 2 followed by the constructs elicited during the card sort session.

Table 2

Kevin's data matrix time 2

Kevin	2	2	1	3
Mother	1	3	1	2
Younger brother	2	3	1	2
Cousin 1 (f)	2	3	1	3
Friend 1 (m)	2	3	2	2
Coordinator (f)	2	3	1	2
Grandfather 1	2	3	1	3
Father	1	3	1	2
Godfather	2	3	1	3
Older brother	2	2	2	2
Friend's brother	2	2	1	3
Friend 2 (m)	2	3	1	2
Cousin 2 (m)	2	3	1	3
Cousin 3 (f)	2	3	1	3
Grandfather 2	2	3	1	2
Tutor 1 (f)	2	3	1	2
Aunt 1	2	3	1	3
Aunt 2	2	3	1	3
Grandmother	2	3	1	3
Tutor 2 (f)	2	3	1	3
Cousin 4 (f)	1	3	1	3
Acquaintance 1 (m)	3	3	3	1
Friend 3 (f)	2	2	1	2
Friend 4 (m)	2	2	1	2
Tutor 3 (m)	1	3	1	3
Acquaintance 2 (m)	2	2	2	2

Constructs elicited.

Listening skills

Ability to follow instruction

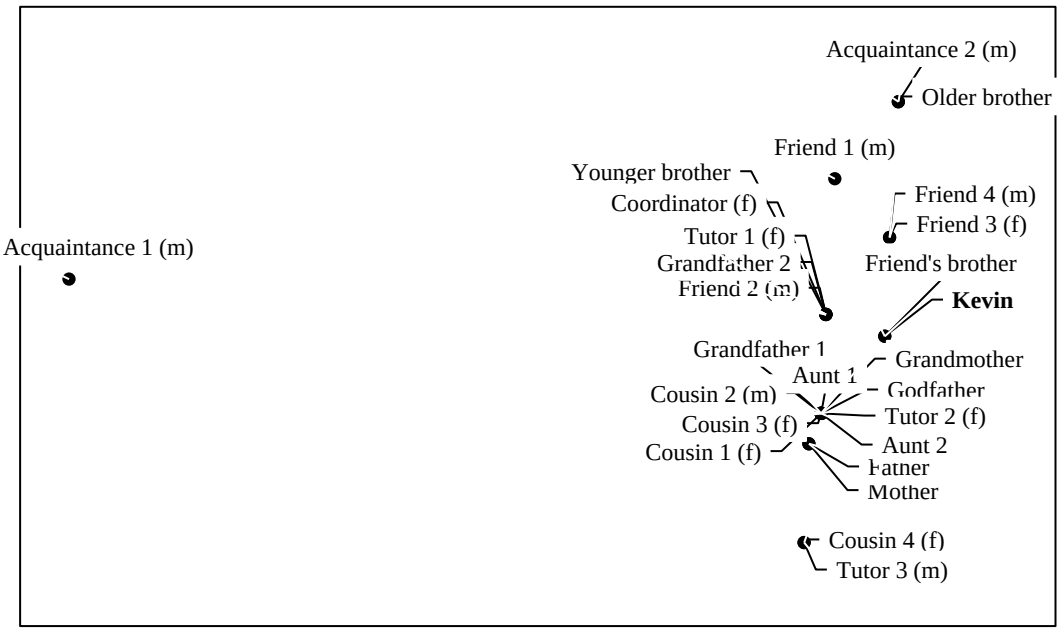
Sneaky

Drive me nuts

Figure 8 is the second map from Kevin. MSA analysis does not compare maps across times so this map is produced independently of the first.

Figure 8

Kevin life-space map time 2



While the map's orientation and scale appear to be similar to the first this is not always the case and cannot be assumed. What is interesting here is the similarity between the two maps in terms of how people are positioned in relation to Kevin.

The purpose of taking a number of card-sorts prior to intervention is to provide a centroid map or baseline for comparison.

Intervention exercises.

The dynamic assessment intervention used (Appendix A) was developed to target a range of cognitive domains. The intervention consisted of a series of exercises under the following categories: Sorting, sequences, patterns, analogy, logic, mathematical deduction, focus, memory and metacognition. Each category consisted of a series of puzzles devised by the author grounded in dynamic assessment which the participant and mediator could manipulate.

Each category also consisted of a number of levels of difficulty. For example, for the

category ‘sequences’ initial puzzles consisted of exercises based on sequence reasoning items similar to problems found in the Raven’s progressive matrices and other proprietary cognitive tests. Levels of difficulty consist of: one simple series (pattern) to be recognized, two series combined, visual series and mathematical series combined, one increasing series and one decreasing series and so on. The mediator lays down tiles with a progressive series and asks the participant to choose the next tile in the series from a number of ‘answer’ tiles.

For the logic a series of manipulatable ‘planets’, ‘landmasses’ and items were devised. For example, the participant is given a series of statements ‘Only Martians like chocolate, Bob likes chocolate. Where does Bob live?’ the participant places Bob on the correct planet. Increasing in level of difficulty (using logical deduction).

The Towers of Hanoi exercise was used to interrogate more complex problem solving – containing as it does at its lower levels of complexity logical steps – planning and metacognition is required (Unterrainer et al, 2004).

For the category mathematical deduction, a collection of images of animals were used (with varying numbers of legs). The ‘meaning’ of the image is first deducted through discussion and demonstration. ‘If I tell you that a duck and a duck equal a dog what can you tell me about what these images mean?’. For example, that the image of a duck represents the value 2, a dog 4 and so on. More complex levels consist of images representing minus numbers, multipliers and so on. At each level the participant is asked to devise their own equation using the images available to demonstrate proximal transference of learning as describes by Feuerstein.

Kevin showed resistance to this section, asserting that he was ‘crap at maths’. He recounted his negative experience of learning maths in secondary school (a common experience in this cohort). One of the primary advantages of dynamic assessment

intervention is that the intervention can be directly targeted to the individual. Teaching examples can be drawn from and applied to the lived experience of the participant. This was used here. The mediator asked Kevin what he had done that weekend (he had been drinking with friends). As his friend group couldn't afford to go to the pub, they had bought alcohol at an off-licence (a shop that sells alcohol). Kevin has limited resources. He had €20 to spend. I asked him how he spent it in the shop. He described how he had bought so much of one type of alcohol and so much of another to maximize his spending. He had very little change as a result. I asked him how he had calculated how much of each type to buy. He professed that this was easy and went on to explain that in order to spend most of his money and get the most out of his night, buying four cans of cider and a small bottle of liquor was the optimal spend.

Using this example, it was explained to Kevin that he had, in fact, found the solution to his problem using maths - algebra in fact. This had an impact on Kevin's engagement with this section of the exercises. Dynamic assessment allows for the mediator to identify barriers and find keys to learning which are not always possible in one-way teaching and static environments. Further, the non-judgmental disposition of the mediator allows engagement with the lived experience of the participant without censure, something which appeared to be a rare experience for many of the participants in this cohort. The change in Kevin's demeanor and orientation towards the session suggests a shift away from his perception of himself as being 'crap at maths'.

Each person's progression through the assessment battery is participant led. In Kevin's case patterns, sequences and analogies were grasped during the first tranche of sessions. mathematical deduction, logic and complex reasoning tasks were

undertaken in the second series of sessions. Table 3 shows Kevin's data matrix at time 3 followed by the constructs elicited during the card sort session.

Table 3

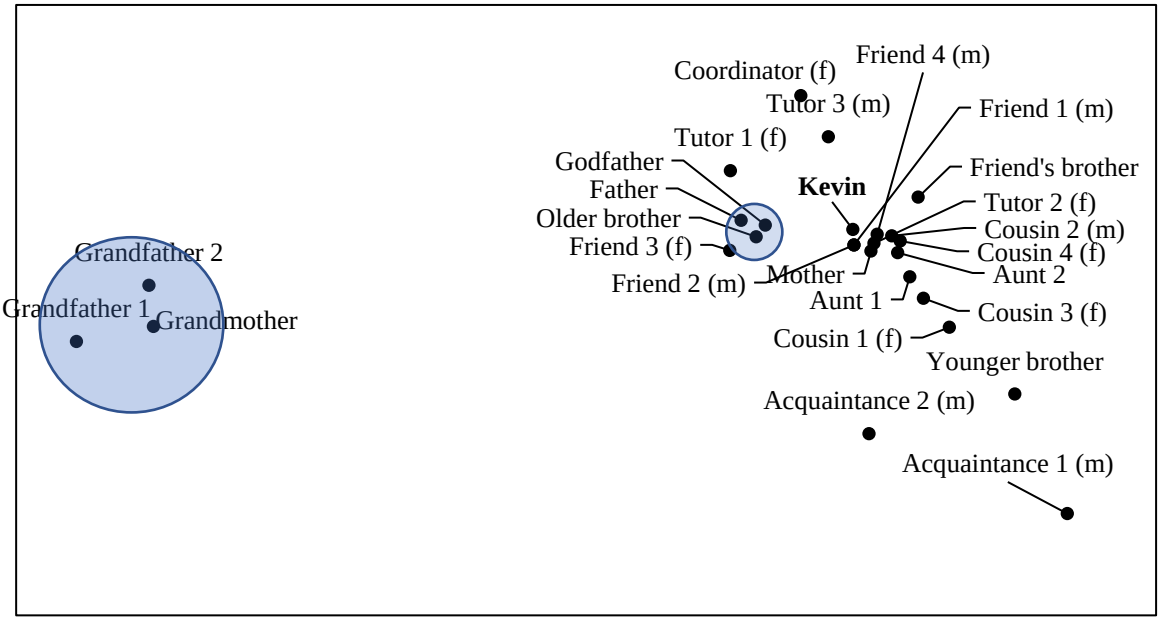
Kevin's data matrix time 3

Kevin	1	2	1	1	1	3
Mother	1	2	3	1	3	5
Younger brother	2	3	1	1	6	5
Cousin 1 (f)	1	3	1	1	6	5
Friend 1 (m)	1	2	1	1	7	3
Coordinator (f)	1	4	4	2	5	3
Grandfather 1	1	1	5	3	2	4
Father	1	2	3	1	2	3
Godfather	1	2	3	1	2	3
Older brother	1	2	1	1	2	3
Friend's brother	1	4	1	1	1	2
Friend 2 (m)	1	2	1	1	7	3
Cousin 2 (m)	1	3	2	1	1	3
Cousin 3 (f)	1	3	1	1	7	5
Grandfather 2	1	1	5	3	2	3
Tutor 1 (f)	1	2	4	2	5	5
Aunt 1	1	3	3	1	3	5
Aunt 2	1	3	3	1	5	5
Grandmother	1	1	5	3	4	5
Tutor 2 (f)	1	2	1	1	5	5
Cousin 4 (f)	1	4	1	1	3	5
Acquaintance 1 (m)	2	3	1	4	8	5
Friend 3 (f)	1	2	1	1	4	3
Friend 4 (m)	1	2	1	1	1	1
Tutor 3 (m)	1	4	4	1	5	3
Acquaintance 2 (m)	2	2	1	1	8	4
Motivated						
Travel						
Music tastes						
Ability to do what they do						
Occupation						
How they would act in a risky situation						

The map at time 3 (Figure 9) represents Kevin's perception of his social world and his place in it after three intervention sessions.

Figure 9

Kevin life-space map time 3



Classification of spaces on the map grounded in relevant psychological theory is possible at this juncture (Cox & Cox, 2001; Kruskal, 1977; Lewin, 1935). For example, it can be seen that Kevin now identifies more strongly with his peer group than his immediate family and he aligns himself with peers he sees to be mature indicating identification with a positive peer group.

Intervention phase 2. He has also distanced his grandparents from himself, seeing them as less capable of doing what they do, having bad taste in music and unlikely to cope with risky situations well. Again, this extreme positioning tells us something about Kevin – conversely, he *does* see himself as able to do what he does, an

indication of positive self-concept. Interestingly Kevin has used the same or very similar construct again in this sort – motivation. This suggests a stabilising of his construal system and this coupled with movement towards positive peer groups and adults suggests a positive movement in self-concept.

The phase of intervention consists of three sessions, one a week. The levels and areas of focus in sessions depend on progress made in the previous series of exercises. The levels reached are somewhat dependent on chronological age, although that is not a focus here because levels of cognitive ability are developmentally correlated. There is no expectation that a participant has mastered cognitive abilities which would be expected at a particular age. If the participant has grasped the separate domain puzzles in each section of phase one of the intervention, they are presented with puzzles using mixed cognitive skill puzzles. Focus and memory strategies are introduced. Metacognition – planning and problem solving are also generally introduced in phase two. The progress made through the programme is dependent on the progress of the participant. The role of the mediator is to best facilitate the progress of the participant in grasping and applying the cognitive skills worked on in sessions.

Table 4 shows Kevin's data matrix at time 4 followed by the constructs elicited during the card sort session.

Table 4

Kevin's data matrix time 4

Kevin	2	1	1	3	2	2
Mother	1	1	3	3	1	1
Younger brother	2	2	4	3	2	1
Cousin 1 (f)	2	1	4	3	2	1
Friend 1 (m)	2	2	3	3	2	1
Coordinator (f)	1	2	4	2	1	2
Grandfather 1	2	1	4	3	1	1
Father	1	1	3	3	1	2
Godfather	1	1	4	3	2	1
Older brother	1	2	3	3	1	2
Friend’s brother	1	1	5	2	1	1
Friend 2 (m)	2	1	3	3	1	1
Cousin 2 (m)	1	1	1	3	1	1
Cousin 3 (f)	2	1	4	3	1	1
Grandfather 2	1	1	4	3	2	2
Tutor 1 (f)	1	2	4	2	2	2
Aunt 1	1	1	3	3	1	2
Aunt 2	1	1	3	3	1	1
Grandmother	2	1	4	3	2	2
Tutor 2 (f)	1	1	4	2	1	2
Cousin 4 (f)	1	1	4	3	1	1
Acquaintance 1 (m)	3	3	5	3	3	3
Friend 3 (f)	2	1	3	3	2	2
Friend 4 (m)	1	1	2	3	1	1
Tutor 3 (m)	1	1	4	2	1	1
Acquaintance 2 (m)	2	2	4	2	2	2

Motivation

Honesty

Communication

Openness

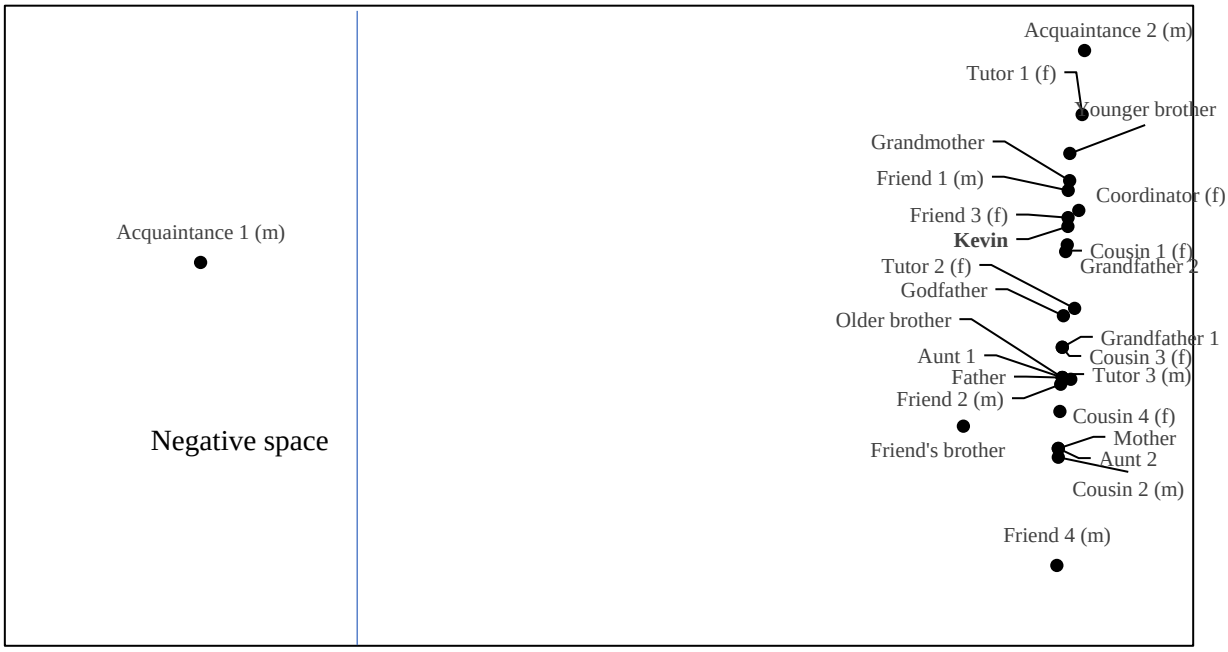
Care for friends & family

Skilled at job

Figure 10 showcases Kevin’s life-space map after six sessions of intervention.

Figure 10

Kevin life-space map time 4



The extreme positioning of Acquaintance 1 is still evident, however, clustering of the other people in his life and his relationship to those people has changed considerably. Kevin now identifies more strongly with his friends and positive role models such as the coordinator of the project and his second tutor. It is still interesting that he identifies with largely female cohorts, or that he identifies the female people in his life as being in possession of positive attributes more so than their male counterparts.

A debriefing interview was carried out with Kevin where he was shown his maps. He was very interested and engaged and volunteered that the process of card-sort and intervention has been of benefit to him. He went on to work placement with a mechanic.

The degree of change or movement can only be fully evaluated by referring to GPA output for goodness of fit, uniqueness and case comparisons.

GPA analysis.

Table 5

Kevin iteration history

Cycle	Stress	Mean RV
1	4.5642	0.2304
2	0.0229	0.8224
3	0.0028	0.8226
4	0.0004	0.8227

Note: Stress is very low and Mean RV at .83 is good.

A goodness of fit measure is indicated by Stress after N iterations (in this case 4 iterations) and Mean RV respectively. The consistent decrease in stress suggests that the initial starting point for reduction is adequate. Like other measures in psychology optimal results for these figures are somewhat arbitrary, however stress of below .2 for a two dimensional solution (de Leeuw & Stoop, 1984) and Mean RV above .8 are considered good.

Each subsequent card sort is then compared to the baseline centroid configuration (table 6). Each card sort session for a participant is denoted by 'case' in the output.

Degree of changes at times three and four.

Comparison of times 3 and 4 with centroid configuration (Table 6).

These are the fit of MSA coordinates for the time 3 and time 4 assessments after being rotated and reflected to the best fit with the centroid.

Table 6

Kevin fit of time 3 and 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.000	0.7440	0.4465
4	1.000	0.8052	0.3517

Note: These are the fit indices (correlations) of each subsequent assessment (times 3 and 4) to the centroid. A smaller fit indicates greater deviation (change) from the starting point. Uniqueness indicates how much of the variance is independent of the starting point.

The nature of that change needs to be determined by a qualitative interpretation of the configurations. Classification of spaces on the map are determined by the qualities possessed by the people represented in those spaces in the same manner that classification is determined using this method in the natural sciences.

These results indicate that the greatest change occurs at time 3, after three sessions of intervention; uniqueness = .45 with a lesser degree of uniqueness compared to the centroid configuration at time 4 after six sessions of intervention; uniqueness= .35.

Relationships between cases. The final analysis (Table 7) examines the correlation between time 3 and time 4. High correlation suggests that little change is occurring from one card-sort session to the next while low correlation suggests dissimilarity between cases. The figure above the diagonal is the correlation of the two assessments before they were optimised (raw MSA output). The figure below the diagonal is the correlation of the two assessments after they were rotated and reflected to fit the baseline centroid.

Table 7

Kevin correlation of time 3 with time 4

	3	4
Case 3	1.00	0.271
Case 4	0.397	1.00

Note: Relationships between Cases Before (below diagonal) and After (above diagonal). This suggests the relationship between configuration of time 3 with time 4 is low.

The figure above the diagonal is the correlation of the two assessments before they were optimised (raw MSA output). The figure below the diagonal is the correlation of the two assessments after they were rotated and reflected to fit the common starting point. This might be compared with the correlation between each assessment and the centroid to show that they are about as dissimilar from each other as they are from the start. A small value here indicates that the change between time 3 and 4 is substantial. The quality of that change is identified by an interpretation of the plots or life-space maps.

These results indicate that the intervention had a positive effect on Kevin's self-concept. Low correlations between times 3 and 4 suggest that that change is ongoing and further intervention is thus indicated.

The second half of Kevin's intervention targeted metacognition focus and memory and are more complex than more basic reasoning skills, each exercise takes longer to process. In cases where a novice has a learning difficulty which specifically impacts short term memory or ability to focus these exercises require more attention and time.

These results indicate the intervention effected change but after a number of sessions it was effective at a decreasing rate. The goal of intervention is to reach a saturation

point where the advantage of intervention has been maximised, the objective being to increase the learning potential of the novice to the point where they have the necessary level of ability to engage with education or work (or in Kevin's case with an apprenticeship). The results here suggest that stability between time 3 and 4 has not been reached and further intervention is indicated.

Results from card-sorts over the course of intervention can effectively direct and target intervention and give an indication of optimal number of sessions required per participant.

Kevin was shown his life space maps upon completion of the analysis. He was very interested, supported the interpretation of findings and rated the experience positively.

Sean.

Age 23. Lives at home with mother in a social housing estate in a remote rural village which he had described as unsafe. Sean was one of the older participants in the project at the time this study took place. Initially he presented as very cooperative but made little eye contact. This study took place in an area with a high rate of suicide. All the participants from this cohort had direct experience with suicide, having lost either a friend, family member or multiple people to suicide. Table 8 shows Sean's data matrix at time 1 and the constructs elicited. Figure 11 shows Sean's life space map at time 1.

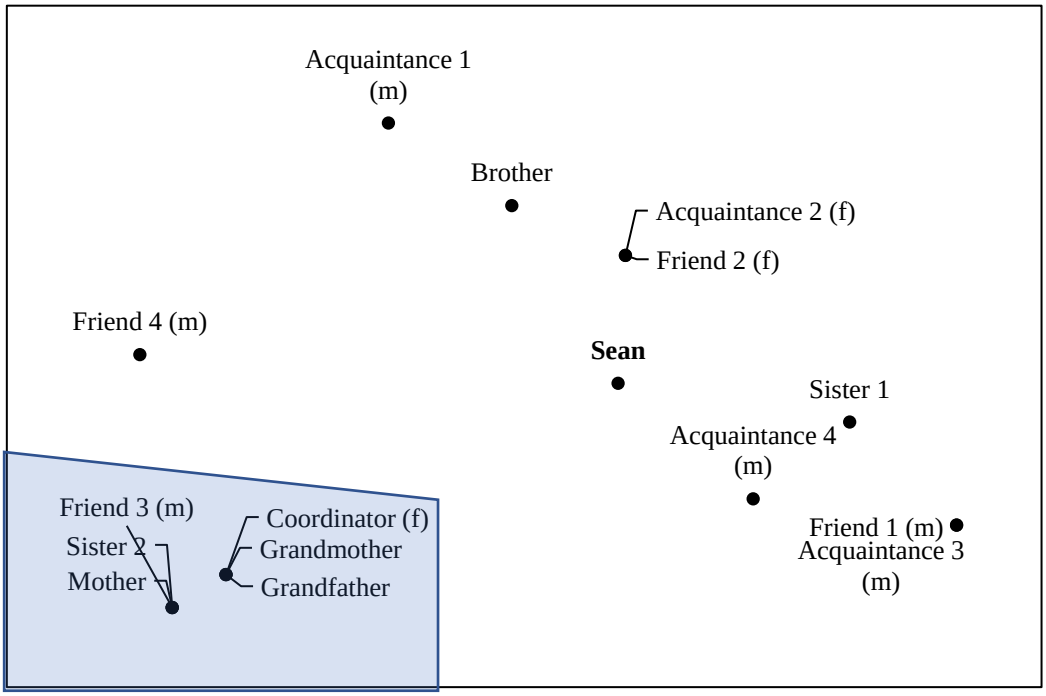
Table 8

Sean's data matrix time 1

Sean	1	1	3	1	1
Friend 1 (m)	2	1	2	1	1
Mother	1	2	2	1	2
Friend 2 (f)	2	1	2	1	1
Acquaintance 1(m)	3	3	3	3	2
Grandfather	1	2	2	1	2
Sister 1	1	2	1	2	2
Acquaintance 2 (f)	3	3	1	3	1
Brother	1	1	2	1	1
Grandmother	1	2	2	1	2
Sister 2	1	1	1	2	2
Acquaintance 3 (m)	3	3	1	3	1
Friend 3 (m)	3	3	3	3	2
Friend 4 (m)	2	1	2	1	1
Acquaintance 4 (m)	3	3	3	3	2
Coordinator (f)	3	2	1	3	2
Acquaintance 5 (f)	3	3	1	3	1
Mother's partner (m)	1	3	2	2	1
Family					
People I can talk to					
Dedication/lazy					
Sit and be silent with					
Socialise					

Figure 11

Sean life-space map time 1



Sean engaged in the card sort process in earnest. Generally, Sean sees himself in a positive light. It can be seen from the data matrix that he sees himself as lazy, along with his acquaintances and friend 3. The first map indicates that Sean is not identified strongly with anyone else in his world. There are no idealised people. Nor does he identify with adults who are older than him (his friends tending to be slightly younger than him). The bottom left corner of the map represents a cluster that Kevin sees in a somewhat negative light and includes one of his friends and his sister and mother (with whom he lives).

Table 9 shows Sean's data matrix at time 2 and the constructs elicited. Figure 12 shows Sean's life space map at time 2.

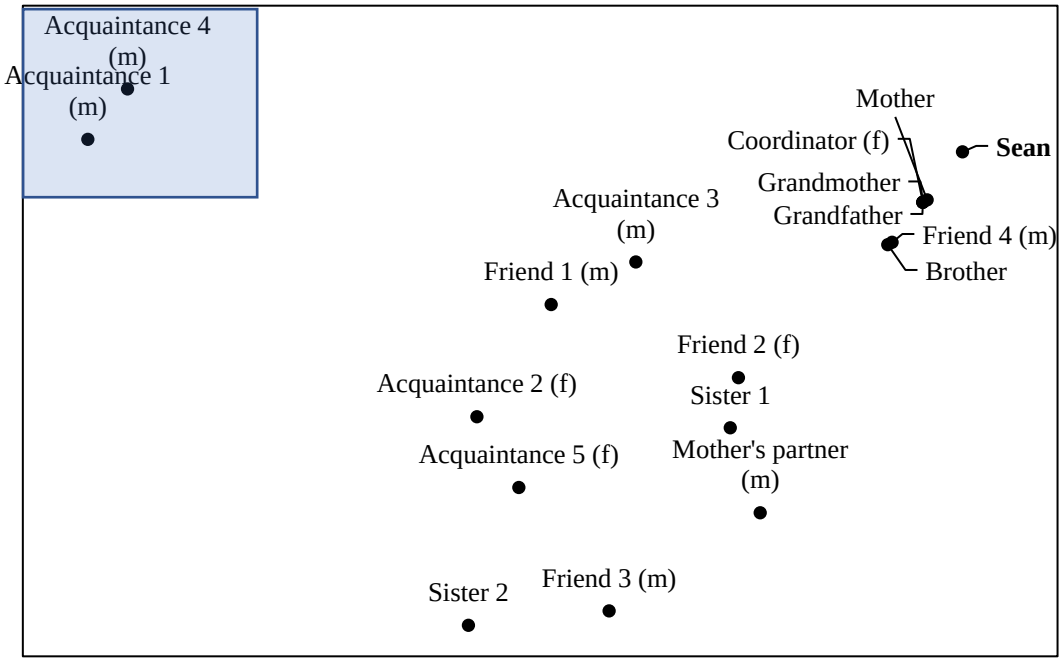
Table 9

Sean's data matrix time 2

Sean	1	1	1	1	1	1
Friend 1 (m)	1	2	3	1	2	2
Mother	1	1	1	2	2	1
Friend 2 (f)	1	1	2	2	2	2
Acquaintance 1	3	3	3	3	2	2
Grandfather	1	1	1	1	2	1
Sister 1	2	2	1	1	1	2
Acquaintance 2 (f)	3	2	2	3	2	1
Brother	1	2	1	1	1	1
Grandmother	1	1	1	1	2	1
Sister 2	2	2	2	3	2	2
Acquaintance 3 (m)	3	2	1	2	1	2
Friend 3 (m)	2	2	2	1	2	2
Friend 4 (m)	1	2	1	2	1	1
Acquaintance 4 (m)	3	3	3	3	1	2
Coordinator (f)	1	1	1	1	2	1
Acquaintance 5 (f)	1	2	2	3	2	2
Mother's partner (m)	2	2	2	2	1	1
Trust						
People that annoy me						
Generous/self-centred						
Academically driven						
Outdoor type						
Work ethic						

Figure 12

Sean life-space map time 2



In this session Sean's signature score is an idealised score, suggesting Sean has a positive self-image. He presents as quietly confident and engages easily, this is reflected in the number of constructs elicited in these sessions. The top left-hand corner is a negative space, while his sister 2 and friend 3 having middling signature scores.

Table 10 shows Sean's data matrix at time 3 and the constructs elicited. Figure 13 shows Sean's life space map at time 3.

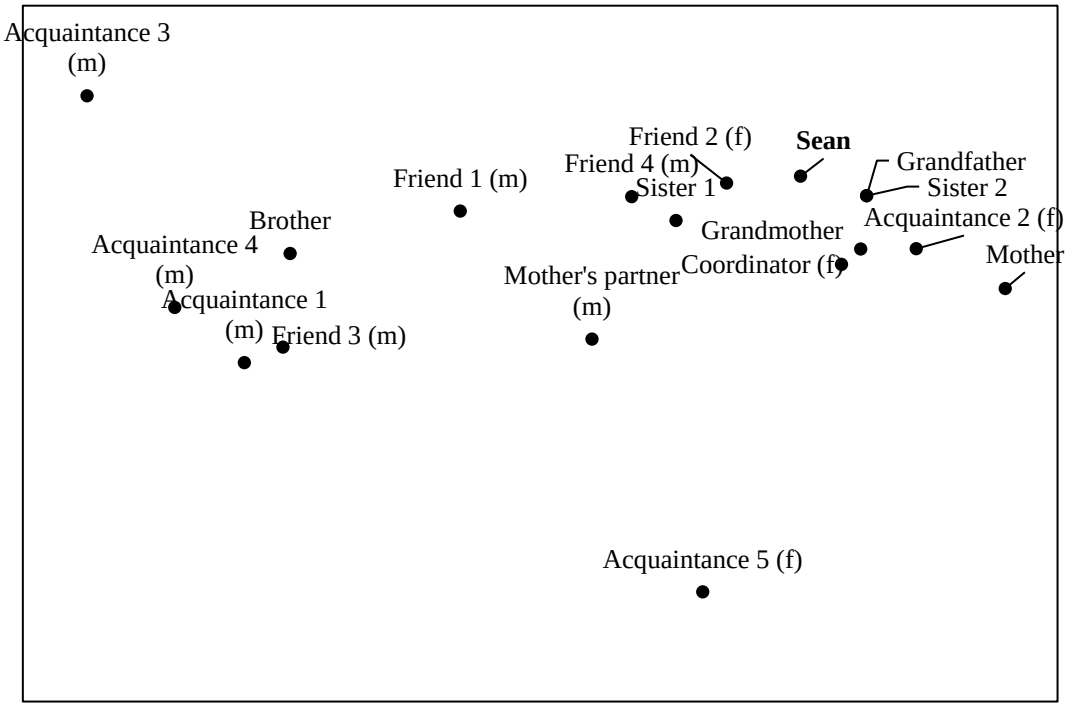
Table 10

Sean's data matrix time 3

Sean	2	1	2	1	1	2	1
Friend 1 (m)	1	1	1	1	1	3	1
Mother	2	1	3	2	1	2	2
Friend 2 (f)	2	1	2	3	1	3	1
Acquaintance 1 (m)	1	3	1	2	3	3	1
Grandfather	2	1	2	3	1	3	2
Sister 1	2	3	2	3	1	2	1
Acquaintance 2 (f)	2	1	1	2	1	2	2
Brother	1	3	3	1	1	1	1
Grandmother	2	1	3	3	1	3	2
Sister 2	2	1	2	3	1	3	2
Acquaintance 3 (m)	1	2	1	3	1	1	1
Friend 3 (m)	1	3	1	3	2	3	1
Friend 4 (m)	2	1	1	3	1	3	1
Acquaintance 4 (m)	1	3	1	3	3	3	1
Coordinator (f)	2	1	1	2	1	3	2
Acquaintance 5 (f)	2	3	3	2	2	3	3
Mother's partner (m)	1	3	2	1	2	2	2
Cockiness							
Showing respect							
Sociability							
Work on your own							
Compassion							
Physical fitness							
Competitiveness							

Figure 13

Sean life-space map time 3



Sean sees himself as somewhat introverted and perhaps lacking confidence. He engaged with the exercises well, his maturity was reflected in the way he dealt with tasks he found challenging or needed high levels of mediation to complete. His map at time three suggests an integration between adults and younger people – perhaps indicating a movement towards a more mature sense of self.

Table 11 shows Sean's data matrix at time 4 and the constructs elicited. Figure 14 shows Sean's life space map at time 4.

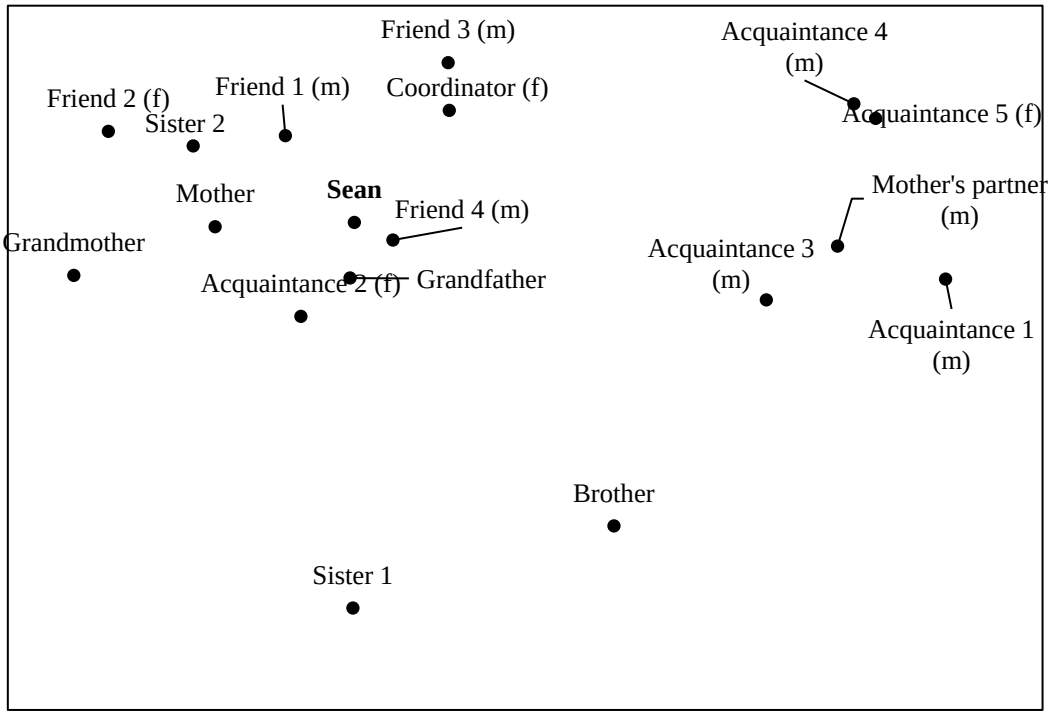
Table 11

Sean's data matrix time 4

Sean	1	1	1	1	2	2	3	3	3
Friend 1 (m)	1	2	1	1	1	2	2	3	1
Mother	1	1	1	1	1	2	2	2	2
Friend 2 (f)	1	1	1	1	2	2	2	1	2
Acquaintance 1 (m)	3	2	2	2	1	1	3	2	1
Grandfather	1	1	1	2	2	2	1	2	1
Sister 1	2	1	1	1	1	1	1	2	1
Acquaintance 2 (f)	1	1	1	2	1	2	1	3	2
Brother	2	1	1	2	2	1	3	3	3
Grandmother	1	1	1	1	1	2	1	1	2
Sister 2	1	2	1	1	2	2	1	1	3
Acquaintance 3 (m)	3	2	1	2	1	1	3	3	1
Friend 3 (m)	3	2	1	1	2	2	2	3	3
Friend 4 (m)	1	1	1	1	2	2	3	3	3
Acquaintance 4 (m)	3	2	2	2	2	2	3	3	3
Coordinator (f)	1	2	1	2	2	2	2	2	1
Acquaintance 5 (f)	3	2	2	2	2	2	3	2	3
Mother's partner (m)	1	2	2	2	2	1	3	2	3
respectful									
generosity									
hypocrites									
punctuality									
patience									
willpower									
sporting ability									
neatness									
motivated									

Figure 14

Sean life-space map time 4



There has been a shift in how Sean sees himself, from an almost idealised position at times one and two to perhaps a more accurate evaluation of himself in terms of willpower and motivation. Sean is clearly prepared to apply himself and has high degrees of focus in session. Further intervention should focus on building on existing cognitive skills, planning and goal setting.

GPA analysis.

Table 12

Sean iteration history

Cycle	Stress	Mean RV.
1	1.0392	0.1483
2	0.0168	0.7156
3	0.0308	0.7193
4	0.0261	0.7224
5	0.0214	0.725
6	0.0171	0.727
7	0.0134	0.7286
8	0.0102	0.7298
9	0.0077	0.7307
10	0.0058	0.7313
11	0.0043	0.7318
12	0.0031	0.7322

Note: Fit scores fall within acceptable parameters.

Table 13

Sean fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.000	0.7786	0.3937
4	1.000	0.6863	0.5290

Note: There is a higher degree of change of time 4 compared to time 3 suggesting increased movement in the system. This indicates intervention should continue.

Table 14

Sean correlation of time 3 with time 4

	3	4
Case 3	1.00	0.078
Case 4	0.018	1.00

Note. Relationships between Cases Before (below diagonal) and After (above diagonal).

Sally.

Sally was 18 at the time of the study. She had completed the applied leaving certificate which is a version of the final exam for secondary school for people who perform at a level deeming them unsuited to sitting the standard leaving certificate examinations (either at ordinary or higher levels). Sally was calm, cooperative and interested in the process. Table 15 shows Sally's data matrix at time 1 and the constructs elicited. Figure 15 shows Sally's life space map at time 1.

Table 15

Sally's data matrix time 1

Sally	2	1	3	2	1
Tutor 1 (f)	1	2	1	1	1
Friend 1 (f)	1	3	3	2	1
Niece	2	2	2	3	2
Friend 2 (m)	1	1	3	2	1
Friend 3 (f)	1	1	3	2	1
Tutor 2 (m)	1	2	1	1	1
Tutor 3 (f)	1	2	1	1	2
Sister 1	2	1	3	2	2
Mother	1	1	1	1	2
Cousin (m)	2	2	2	3	1
Tutor 4 (f)	1	2	1	1	2
Brother 1	1	1	1	1	1
Brother 2	1	1	1	1	2
Sister 2	2	1	1	1	2
Tutor 5 (f)	1	2	1	1	2
Acquaintance (f)	1	3	1	3	2
Uncle	1	1	1	1	1
Sister 3	1	1	3	2	1
Father	2	1	1	1	1
Tutor 6 (f)	1	2	1	1	2
Grandmother	1	1	1	1	2
Friend 4 (m)	2	3	3	3	1
Friend 5 (f)	1	3	1	1	2
Friend 6 (m)	1	1	3	2	1
Aunt	1	1	1	1	2
Friend 7(f)	1	3	1	2	2
Friend 8 (m)	1	3	3	3	2
Tutor 7 (m)	1	2	1	1	2
Friend 9 (f)	2	1	3	1	2

Shyness

Emotional/mental strength

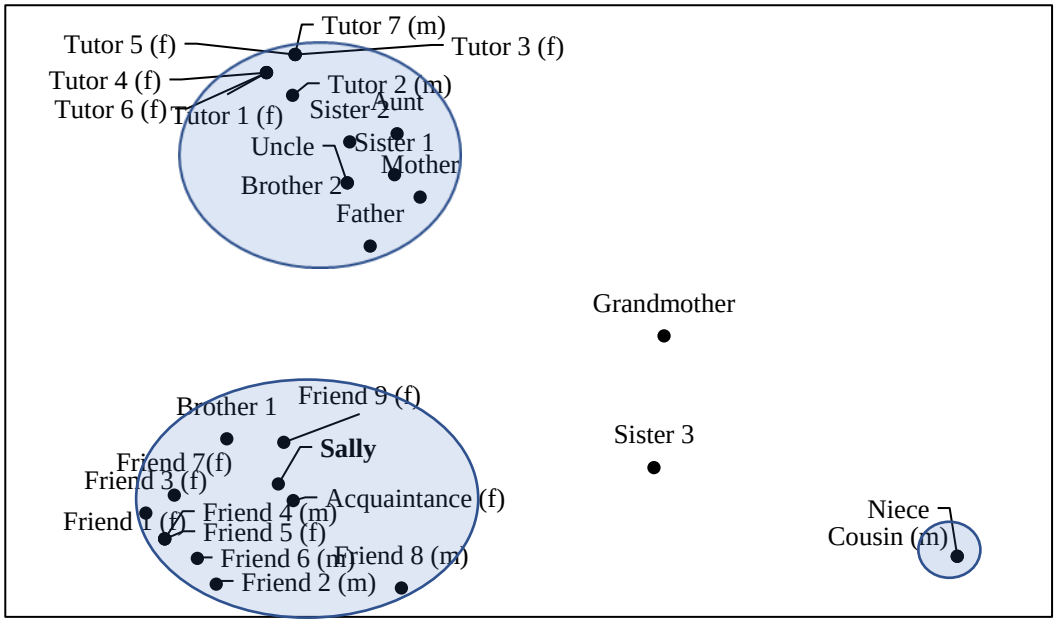
Confidence in public situations,

Intelligence general

High maintenance.

Figure 15

Sally life-space map time 1



There are noticeably clear clusters in Sally's first map. Adults in Sally's world form one large cluster. She sees most of the adults in her world as being intelligent and confident. The large clustering in which Sally also finds herself, is comprised mainly of her peers and they are seen as less intelligent and confident.

Table 16 shows Sally's data matrix at time 2 and the constructs elicited. Figure 16 shows Sally's life space map at time 2.

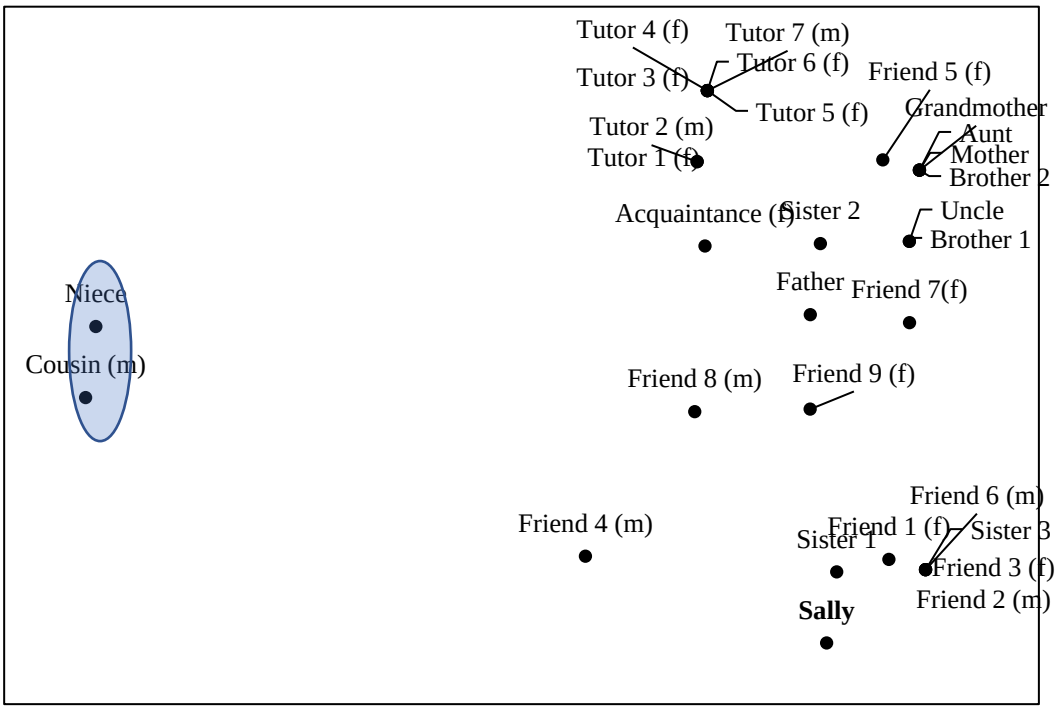
Table 16

Sally's data matrix time 2

Sally	1	1	1	1	2	2	2
Tutor 1 (f)	2	2	1	2	2	2	3
Friend 1 (f)	2	1	1	1	2	2	1
Niece	2	3	1	3	1	3	1
Friend 2 (m)	1	1	1	2	2	1	2
Friend 3 (f)	2	2	1	3	1	3	2
Tutor 2 (m)	2	1	1	1	2	1	1
Tutor 3 (f)	2	1	1	1	1	1	1
Sister 1	2	2	1	2	1	3	1
Mother	2	2	1	1	2	1	1
Cousin (m)	2	2	1	3	2	3	1
Tutor 4 (f)	2	1	1	1	2	2	3
Brother 1	2	2	1	2	1	2	3
Brother 2	1	1	1	2	1	2	2
Sister 2	2	1	1	1	2	3	2
Tutor 5 (f)	2	1	1	2	2	2	2
Acquaintance (f)	3	2	2	3	1	2	1
Uncle	1	1	1	3	2	2	2
Sister 3	1	2	1	3	2	1	1
Father	3	2	1	1	1	3	3
Tutor 6 (f)	2	2	1	1	2	2	3
Grandmother	3	1	1	2	1	1	3
Friend 4 (m)	2	3	1	2	2	3	3
Friend 5 (f)	1	1	1	3	1	2	1
Friend 6 (m)	2	1	1	3	1	3	1
Aunt	1	1	1	1	1	2	1
Friend 7(f)	2	2	1	3	1	3	1
Friend 8 (m)	2	2	1	3	2	2	1
Tutor 7 (m)	2	1	1	1	2	1	1
Friend 9 (f)	1	1	1	1	1	1	2
Athletic							
Outgoing							
Honest							
Calm under pressure							
High maintenance							
Patience							
A bit mad/boring							

Figure 16

Sally life-space map time 2



This map has similarities to the first. Sally's niece and cousin are at a distance from others on the map and have generally less positive signature scores although there are no extreme signature scores in Sally's maps. Interestingly Sally does not score acquaintances in the extreme, rather she is very balanced in her sorting of people. Sally, likewise, has a complex signature score. She sees herself as outgoing, athletic, honest and calm under pressure although the low scores she gives herself on mad/a bit boring and high maintenance suggest she has low self-esteem- seeing 'a bit mad people' as exciting and interesting.

Table 17 shows Sally's data matrix at time 3 and the constructs elicited. Figure 17 shows Sally's life space map at time 3.

Table 17

Sally's data matrix time 3

Sally	1	1	1	1	1	1	2	2
Tutor 1 (f)	1	2	2	1	2	2	2	1
Friend 1 (f)	1	1	2	1	2	1	2	3
Niece	1	2	1	1	2	1	1	2
Friend 2 (m)	1	1	1	1	1	1	2	2
Friend 3 (f)	1	1	2	1	2	1	2	3
Tutor 2 (m)	1	2	1	1	2	2	2	2
Tutor 3 (f)	1	2	1	1	2	1	1	1
Sister 1	1	1	2	1	2	1	1	2
Mother	1	1	2	1	2	1	2	2
Cousin (m)	1	2	1	1	2	1	1	2
Tutor 4 (f)	1	2	1	2	2	2	2	2
Brother 1	1	2	1	3	2	1	1	3
Brother 2	1	1	2	1	1	2	1	2
Sister 2	1	2	1	2	2	1	2	1
Tutor 5 (f)	1	2	1	1	2	2	2	1
Acquaintance (f)	2	3	2	3	3	2	1	3
Uncle	1	1	1	1	1	1	2	1
Sister 3	1	1	2	1	1	2	1	1
Father	1	1	1	2	2	1	1	1
Tutor 6 (f)	1	2	1	1	2	1	2	2
Grandmother	1	2	2	1	2	2	1	1
Friend 4 (m)	2	2	2	1	2	2	2	3
Friend 5 (f)	1	1	1	1	2	1	1	2
Friend 6 (m)	1	1	1	1	2	1	1	3
Aunt	1	1	1	1	1	1	2	1
Friend 7(f)	1	2	2	2	2	1	1	2
Friend 8 (m)	2	2	2	2	2	2	1	3
Tutor 7 (m)	1	2	1	1	2	1	2	2
Friend 9 (f)	1	1	2	1	2	2	1	1

Honesty

"Sound"

Ability to cope with a stressful situation

Sense of humour

Physical fitness

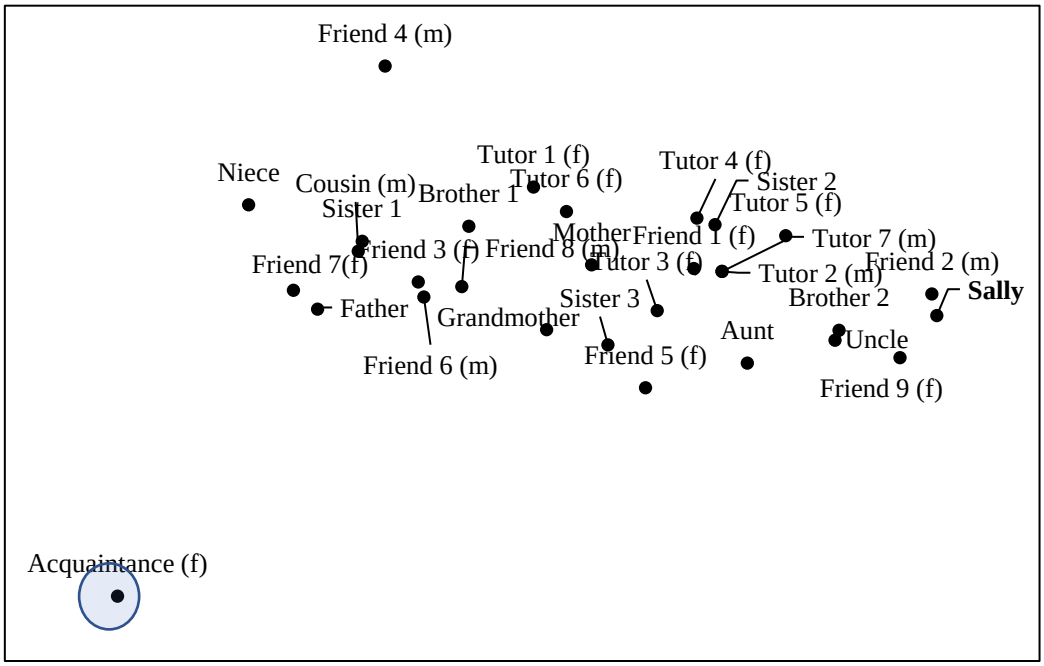
Competitive

High maintenance

Money management

Figure 17

Sally life-space map time 3



Sally engaged with the intervention excises well. She exhibited a competence and understanding of logic, mathematical deduction and problem solving (in The Towers of Hanoi exercise) which suggested an ability above that which had been expected of her in school. When asked about this Sally professed a love of maths but that her teacher had ignored her in class when she had shown interest. She described constantly raising her hand to either ask questions or answer them and not being called upon. She explained that she thought this was because the teacher dismissed everyone in Sally's peer group as being stupid. Sally had gone from studying honours maths at intermediary level in secondary school to finally doing the applied leaving cert course, a considerable drop in standard. In Ireland not having a pass standard of maths in the leaving certificate is problematic, most tertiary level educational institutions require maths for entry and as the applied leaving cert course

does not qualify, at the time it was not possible to retake the maths exam as a stand-alone subject.

Sally is involved in her local soccer team and is physically fit. The importance of this aspect of her identity is reflected in the constructs elicited.

This third map suggests a shift in Sally's perception of the people in her world, particularly the adults and reflects a shift in seeing herself and her peers as being separate from the adults with which she regularly comes in contact.

Of note here is the movement along the construct 'high maintenance' of friend 4 from positive to negative (from time 1). This swing from one extreme to another along a construct may be what Kelly describes as 'slot rattle' (1955) and can be the result of an attempt in shifting one's construal system to make sense of changing situations or the introduction of new phenomena (such as a mediator). The method described here creates new constructs at different timepoints and although there are other instances of participants using the same or very similar constructs over times (see Kevin for example) this is the first instance where this shift can be clearly observed. Case notes indicate that this shift in perception by Sally of friend 4 is due to a disagreement within her peer group. Further consideration of other evidence within the signature scores and maps are needed to ascertain if this is merely 'slot rattle' or an actual shift in her construal system. There is also a distancing of acquaintance (f) from the rest of the people in the map, this area represents a negative space. Information in the data, her signature scores and movement towards respected adults suggests that Sally's construal system is moving and her self-concept is moving in a positive direction.

Table 18 shows Sally's data matrix at time 4 and the constructs elicited. Figure 18 shows Sally's life space map at time 4.

Table 18

Sally's data matrix time 4

Sally	1	1	2	3	1	2
Tutor 1 (f)	4	1	1	1	2	4
Friend 1 (f)	3	1	2	3	2	4
Niece	1	1	4	4	3	1
Friend 2 (m)	3	1	2	3	1	2
Friend 3 (f)	2	1	2	3	2	4
Tutor 2 (m)	4	1	1	2	2	2
Tutor 3 (f)	4	1	1	1	2	2
Sister 1	1	1	1	2	2	3
Mother	1	1	1	1	1	3
Cousin (m)	1	1	4	4	3	1
Tutor 4 (f)	4	1	1	1	2	4
Brother 1	1	1	2	3	2	4
Brother 2	1	1	1	2	2	2
Sister 2	1	1	1	1	2	2
Tutor 5 (f)	4	1	1	1	2	2
Acquaintance (f)	5	1	3	3	2	3
Uncle	1	1	1	2	2	2
Sister 3	1	1	4	4	1	3
Father	1	1	1	2	1	2
Tutor 6 (f)	4	1	1	1	2	4
Grandmother	1	1	1	4	3	3
Friend 4 (m)	3	1	2	3	2	4
Friend 5 (f)	3	1	2	3	2	4
Friend 6 (m)	2	1	2	3	1	2
Aunt	1	1	1	1	2	3
Friend 7(f)	2	1	2	3	2	2
Friend 8 (m)	3	1	3	4	1	2
Tutor 7 (m)	4	1	1	1	2	2
Friend 9 (f)	2	1	2	2	1	3

Family

Loyalty

Responsibility

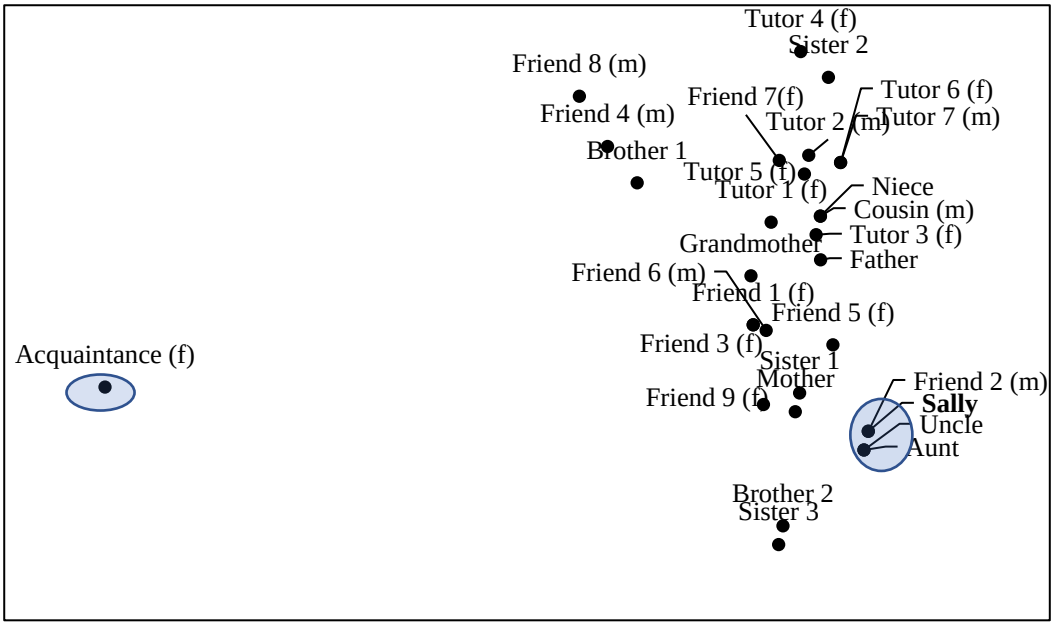
Independence

Intro/extrovert

Indoor/outdoor person

Figure 18

Sally life-space map time 4



The maps at times three and four suggest a shift in Sally's perception of herself in a positive direction, although it is worth noting that academic ability and intelligence are not constructs that were elicited during these sorts. Sally was particularly interested in sports and this is reflected in her constructs, being an avid soccer player. There is a movement away from peers who could be considered to have a negative influence. The extreme positioning of acquaintance (f) has persisted across time 3 and 4.

GPA analysis.

Table 19

Sally iteration history

GPA analysis.

Cycle	Stress	Mean RV
1	0.4785	0.0690
2	0.0176	0.7169
3	0.0203	0.7199
4	0.0174	0.7224
5	0.0145	0.7245
6	0.0118	0.7262
7	0.0094	0.7276
8	0.0074	0.7286
9	0.0057	0.7295
10	0.0044	0.7301

Note: Fit scores fall within acceptable parameters.

Fitting experimental configurations to the normative centroid

Table 20

Sally fit of time 3 with time 4 with baseline centroid

Time	Weights	Fit	Uniqueness
3	1.0000	0.3051	0.9069
4	1.0000	0.1142	0.9870

Note. Fit is very low, while conversely uniqueness is very high suggesting a high degree of movement in Sally's construal system.

Table 21

Sally correlation of time 3 with time 4

	3	4
Case 3	1.000	-0.219
Case 4	0.020	1.000

Note – Similarity between time 3 and time 4 is low suggesting movement in the system.

Discussion.

The results from GPA suggest considerable movement in Sally's construal system. This shift towards adults and peers she sees in a positive light suggest positive movement in her self-concept. The earlier stages of data collection, at times one and two suggested that Sally may struggle with self-esteem. Subsequent sorts suggest that self-esteem improved over the course of intervention. Further intervention would focus on further training on complex reasoning skills, training, and career support. Sally, Kevin and Harry were three participants whose progress was followed up post study. Sally gained employment after her year in the project and is currently a supervisor at a fast food outlet where she has considerable responsibility and manages stock and the day to day receipts. She is proud of her achievements. While this is generally considered to be an excellent outcome for projects such as these, her potential as suggested by intervention had not been maximised during her secondary school years.

Ashley.

The example given here is of a 19-year-old female who had dropped out of school at the age of fifteen. Ashley was a member of an ethnic minority group. At the time of the study she was in foster care as her parents were deemed by social services to be unfit. Her account of school was like several people in this cohort. “Don’t get me wrong I really did like school. You could be doing something interesting and they’d take you out of school.” She described being “Thrown out into the cabin all day” (resource teaching) where they did little. Table 22 shows Ashley’s data matrix at time 1 and the constructs elicited. Figure 19 shows Ashley’s life space map at time 1.

Table 22

Ashley's data matrix time 1

Ashley	1	1	2	1	1	1
Foster sister 1	2	3	3	3	2	2
Friend 1 (f)	4	1	1	1	1	1
Niece	1	3	3	4	3	3
Friend 2 (f)	4	4	2	4	1	1
Foster mother	2	1	1	1	1	1
Brother 1	1	3	2	2	2	1
Aunt	3	2	3	3	2	3
Brother 2	1	3	1	2	2	1
Mother	1	1	1	1	1	1
Acquaintance 1 (f)	5	5	4	5	3	3
Foster sister 2	2	3	2	3	1	2
Nephew 1	1	3	3	4	3	3
Social worker (f)	4	4	3	3	2	4
Brother 3	1	2	1	2	2	1
Nephew 2	1	3	3	4	3	3
Godson	3	3	3	4	3	3
Foster sister 3	2	3	3	3	2	2
Friend 3 (f)	4	4	1	2	1	1
Foster brother	2	2	2	2	2	1
Acquaintance 2 (m)	5	5	4	5	3	4
Extended family member (f)	3	3	2	3	2	3
Boyfriend	1	1	1	1	1	1
Sister	1	3	2	3	1	1
Foster father	2	3	2	2	2	2
Brother 4	1	2	1	2	1	3
Father	1	1	1	1	1	1

Listening

Family

Closeness

Sense of humour

Trust

Introvert/extrovert

How social a person is.

Figure 19

Ashley life-space map time 1

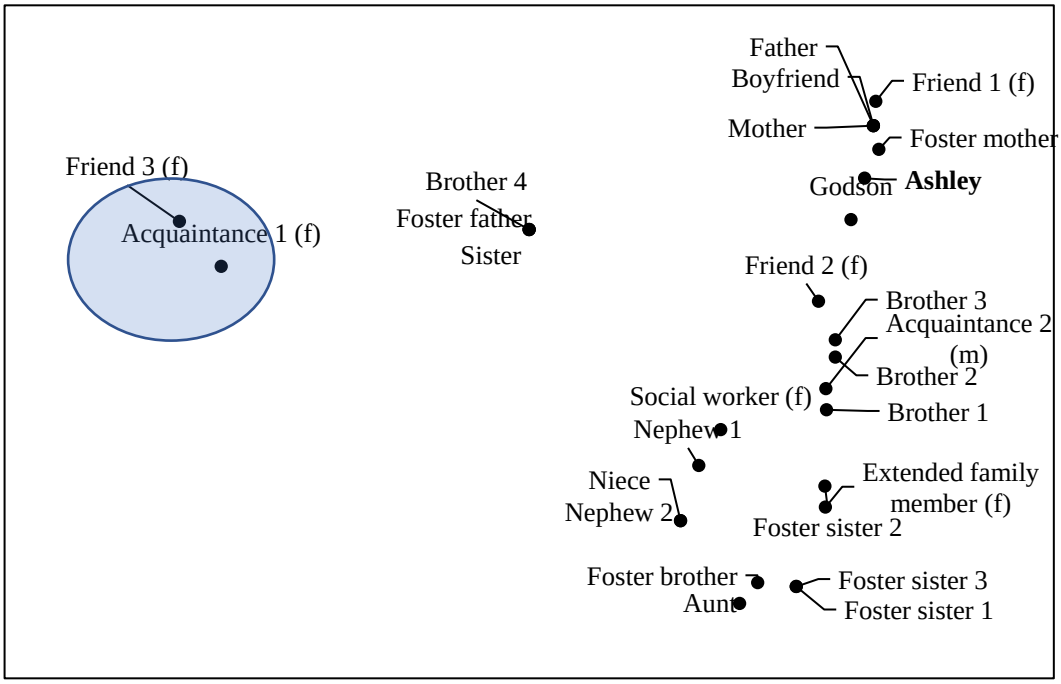


Table 23 shows Ashley's data matrix at time 2 and the constructs elicited. Figure 20 shows Ashley's life space map at time 2.

Table 23

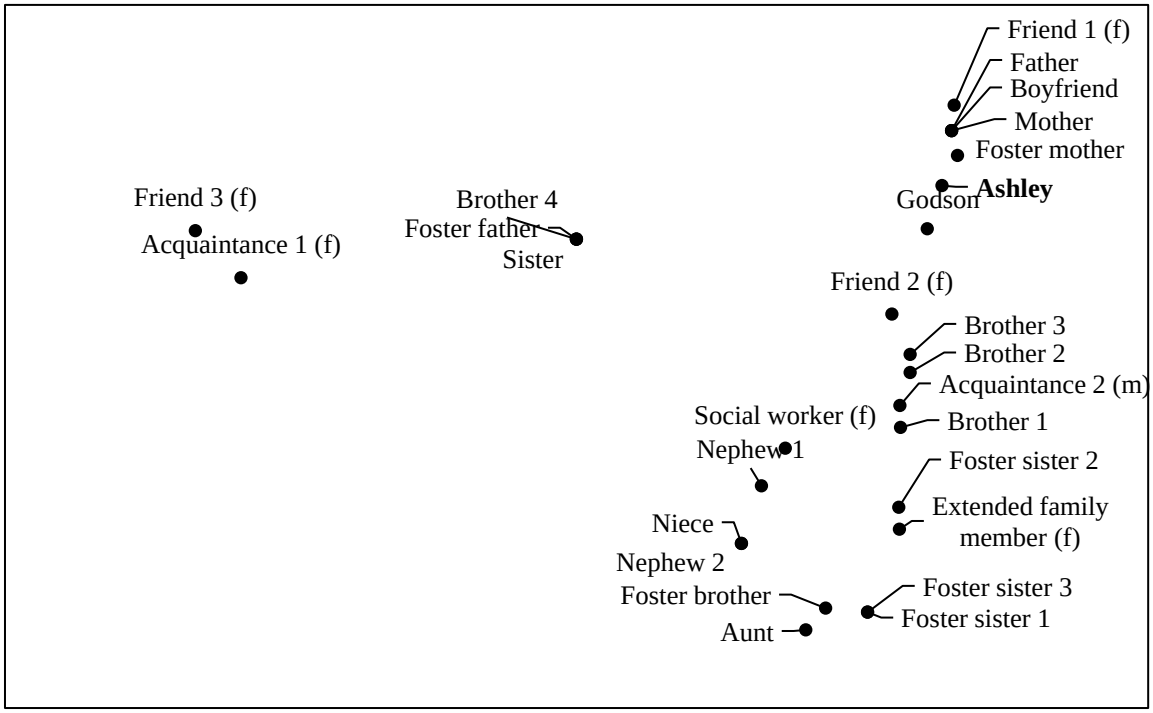
Ashley's data matrix time 2

Ashley	1	1	1	3	1	2
Foster sister 1	1	1	1	2	2	1
Friend 1 (f)	1	1	1	1	1	3
Niece	1	1	1	2	2	1
Friend 2 (f)	2	2	1	3	1	2
Foster mother	1	1	1	2	2	1
Brother 1	1	1	1	2	2	1
Aunt	1	2	2	3	2	2
Brother 2	1	1	1	2	2	1
Mother	1	1	3	3	3	2
Acquaintance 1 (f)	3	3	2	3	1	2
Foster sister 2	2	2	1	2	1	2
Nephew 1	1	2	2	2	2	1
Social worker (f)	3	3	1	3	3	3
Brother 3	1	1	3	3	1	2
Nephew 2	1	2	2	2	2	1
Godson	1	2	2	2	2	1
Foster sister 3	2	2	1	2	2	2
Friend 3 (f)	2	1	3	3	2	1
Foster brother	1	1	1	2	1	3
Acquaintance 2 (m)	3	3	2	3	1	2
Extended family member (f)	2	2	1	3	1	1
Boyfriend	1	1	1	1	1	3
Sister	1	1	3	3	3	2
Foster father	1	2	1	2	2	2
Brother 4	1	1	1	2	2	1
Father	1	1	3	3	3	2

Constructs elicited are: caring, happy, personal grooming, physical exercise, socialising, good decision making.

Figure 20

Ashley life-space map time 2



Constructs elicited at each session are different, as are the number of levels selected for the sorting process. What is striking here is the stability of the system or person and how Ashley construes her world. There is little change from one card-sort session to the next. Ashley most closely identifies with her family of origin, particularly her mother and father. Interestingly this section of the map is characterised by positive scores across constructs. Ashley has intimated that the people in this sector, including herself are close to her ideal. This is at odds with Ashley's description of her home life. As stated, Ashley is in foster care as her parents are engaged in serious drug misuse, as is her brother 3 who lives with her parents. Ashley has a negative view of this misuse and the very destructive effect it has had on her family. She speaks about being interested in being an addiction counsellor. Her brother 4, foster father and sister form a cluster. Examination of the

matrix coupled with constructs elicited and scores suggest she sees this group in a somewhat negative light. The cluster at the bottom of the map consists of her foster siblings and others all have negative scores across constructs, while her social worker and other brothers have mixed scores across constructs.

Table 24 shows Ashley's data matrix at time 3 and the constructs elicited. Figure 21 shows Ashley's life space map at time 3.

Table 24

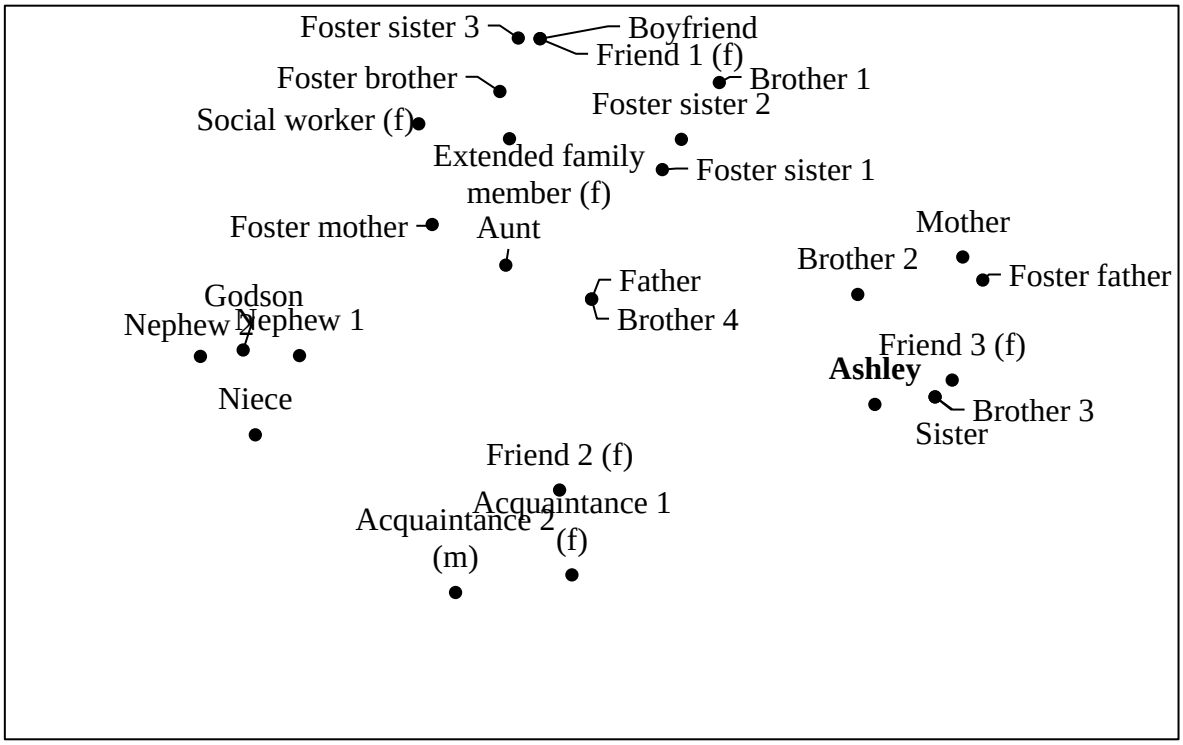
Ashley's data matrix time 3

Ashley	1	1	1	3	2	2	2
Foster sister 1	1	3	1	2	2	3	1
Friend 1 (f)	3	1	2	2	1	3	1
Niece	3	3	3	2	3	2	3
Friend 2 (f)	1	2	3	3	3	3	2
Foster mother	2	2	2	1	3	2	1
Brother 1	2	1	1	2	2	3	1
Aunt	2	1	2	1	3	1	2
Brother 2	1	1	1	2	1	1	3
Mother	2	1	1	3	1	1	2
Acquaintance 1 (f)	1	2	3	3	3	2	2
Foster sister 2	2	3	2	2	2	1	2
Nephew 1	3	1	3	1	3	3	3
Social worker (f)	3	3	2	1	2	3	2
Brother 3	1	1	1	3	2	1	3
Nephew 2	3	3	3	1	3	3	3
Godson	3	3	3	2	3	3	3
Foster sister 3	2	3	2	2	2	3	1
Friend 3 (f)	1	2	1	3	2	1	2
Foster brother	3	3	1	1	1	3	1
Acquaintance 2 (m)	1	3	3	3	3	2	3
Extended family member (f)	3	2	2	2	2	3	2
Boyfriend	3	1	2	2	1	3	1
Sister	1	1	1	3	2	1	3
Foster father	3	2	2	1	1	3	1
Brother 4	3	1	1	1	1	3	2
Father	1	1	1	3	1	1	1

Constructs elicited:
Social anxiety
Mentally strong
Openness
Confidence
Outgoing
Risk-taking
Kindness.

Figure 21

Ashley life-space map time 3



Clustering has changed considerably and there is less distinction between Ashley's ethnic group, such as some of her family members and friend 1 and others. The third map indicates a movement away from her parents. Interestingly Ashley continues to idealise her parents, however and scores them both low for the construct 'confidence.' Ashley now identifies more closely with her friend, sister, and brother 3. She now has a more positive view of her foster father and brother 4 who is also in foster care. The cluster at the top of this map is denoted by people who score in the mid-range across constructs except for kindness where they all score 1 (most positive).

Table 25 shows Ashley's data matrix at time 4 and the constructs elicited. Figure 22 shows Ashley's life space map at time 4.

Table 25

Ashley's data matrix time 4

Ashley	3	1	2	2	1	2	1	1	3
Foster sister 1	2	1	3	1	1	1	3	2	2
Friend 1 (f)	3	1	3	1	1	1	2	3	1
Niece	3	1	3	3	3	3	2	3	1
Friend 2 (f)	2	3	1	2	2	3	2	2	3
Foster mother	2	1	2	1	2	3	1	3	1
Brother 1	3	1	3	1	1	1	1	3	1
Aunt	3	1	2	2	3	2	2	3	2
Brother 2	1	3	2	1	1	2	2	3	2
Mother	3	1	1	2	1	2	2	3	2
Acquaintance 1 (f)	1	1	2	1	3	3	3	3	1
Foster sister 2	3	1	1	2	2	2	3	2	2
Nephew 1	3	2	3	3	3	3	3	2	2
Social worker (f)	1	2	3	2	1	1	3	3	2
Brother 3	1	2	2	1	1	1	2	3	3
Nephew 2	3	1	3	3	3	3	3	2	2
Godson	3	2	3	3	3	3	3	2	2
Foster sister 3	2	1	2	1	2	2	3	3	2
Friend 3 (f)	1	3	1	2	3	3	3	3	3
Foster brother	2	2	3	1	1	1	2	1	2
Acquaintance 2 (m)	1	3	2	2	3	3	3	2	3
Extended family member (f)	2	1	1	2	3	3	3	2	2
Boyfriend	3	1	2	1	1	1	2	1	2
Sister	1	3	1	1	2	3	3	3	1
Foster father	2	1	1	1	2	3	2	1	3
Brother 4	3	1	1	2	1	1	1	3	2
Father	3	1	1	2	1	2	1	1	3

Constructs elicited :

Sneakiness (deviousness)

Loyal,

Moodiness

Hypernesss

Cheerfulness

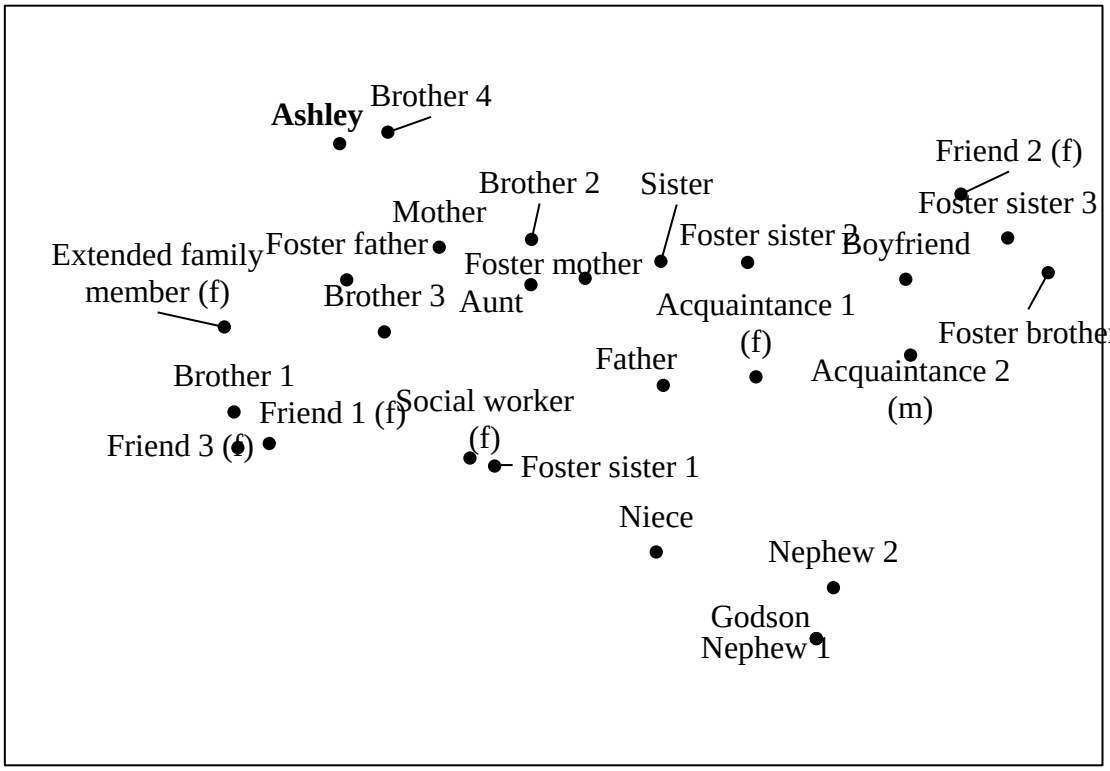
Even tempered

Non-judgemental

Strong heart

Figure 22

Ashley life-space map time 4



Considerable movement is once again observed in the system – Ashley no longer strongly identifies with her father. There is a clear distinction between her younger relatives and others including herself. The most interesting aspect of this map is the merging of foster family and family of origin in terms of how Ashley sees these people. There seems to be a reduction in the family bias evident in the first two maps. In Ashley's case considerable movement is occurring and will likely continue to occur should intervention continue.

Results from GPA analysis for Ashley.

Iteration History

Table 26

Ashley iteration history

Cycle	Stress	Mean RV
1	1.0198	0.0938
2	0.0396	0.6927
3	0.0894	0.7032
4	0.0875	0.7136
5	0.0783	0.7228
6	0.0633	0.7301
7	0.0471	0.7354
8	0.0329	0.7391
9	0.022	0.7416
10	0.0142	0.7431
11	0.0091	0.7441
12	0.0056	0.7447
13	0.0035	0.7451
14	0.0022	0.7453

Note: Fit scores fall within acceptable parameters.

Table 27

Ashley fit of time 3 with time 4 with baseline centroid

Time	Weights	Fit	Uniqueness
3	1.0000	0.2129	0.9547
4	1.0000	0.1085	0.9882

Note. A perfect fit = 1, therefore a fit of 1 indicates no change or departure from the initial configuration. In Table 27 fit of the 3rd time is better than the 4th with the centroid indicating that grater change has occurred at time 4 than time 3. Uniqueness is commonly construed as error and for idiographic purposes uniqueness indicates change or difference between configurations after intervention and hence a less good fit indicates change (Hurley & Murphy, 2015).

Table 28

Ashley correlation of time 3 with time 4

	3	4
Case 3	1.00	0.047
Case 4	-0.056	1.00

Note. Low correlation between times 3 and 4 indicate there is movement in Ashley's construal system.

The centroid configuration shows stability at 0.7453. The fit of subsequent maps with this configuration after intervention is low at 0.21 and 0.11 respectively. This suggests that change has occurred. Uniqueness figures confirm these findings and suggest a large degree of change due to intervention (also reflected in the life space maps). Very low correlations between time 3 and four suggest movement in Ashley's construal system is ongoing due to intervention.

Group 2.

This was the second cohort of people who were participating in the project who engaged in the study.

Tom.

Tom was aged 18. He had completed the applied leaving certificate – a lower level of exam to the more usual leaving certificate. The leaving certificate being exams undertaken upon completion of secondary school, scores for which assess suitability for college and employment. Tom had not liked school and, in conversation, gave his school experience 6/10, being generous. He was quiet, polite and curious. He liked rock music. Tom was unusual for this cohort in that he did not have any substance misuse issues. He lived with his father and two brothers. He had taken part in another project but had dropped out and then signed up for the one where this study took place. Tom had experienced close personal loss prior to the study taking place. Tom has a close relationship with his brother who is just over a year older than him. Tom was very cooperative throughout. Table 29 shows Tom's data matrix at time 1 and the constructs elicited. Figure 23 shows Tom's life space map at time 1.

Table 29

Tom's data matrix time 1

Tom	1	2	1	3	3	3
Friend 1 (f)	2	2	1	3	2	2
Aunt 1	1	1	1	4	1	1
Former best friend (m)	4	4	2	3	4	3
Friend 2 (m)	2	2	1	3	2	3
Friend 3 (f)	3	4	1	2	2	4
Coordinator (f)	3	3	3	1	3	2
Friend 4 (m)	2	3	1	3	4	4
Uncle 1	3	1	3	2	1	1
Friend 5 (f)	2	1	1	4	1	4
Brother 1	3	3	2	1	2	2
Former friend (m)	4	4	4	1	3	4
Acquaintance (f)	4	4	3	2	1	4
Uncle 2	3	1	4	3	4	3
Friend 6 (f)	3	3	1	1	2	2
Uncle 3	2	2	2	4	2	2
Brother 2	3	3	2	2	3	3
Dad	1	3	1	4	3	3
Aunt 2	1	1	1	4	1	1
Mother	1	1	1	4	3	3
Tutor (m)	1	1	2	3	1	1

Honesty

Trust

Open-minded

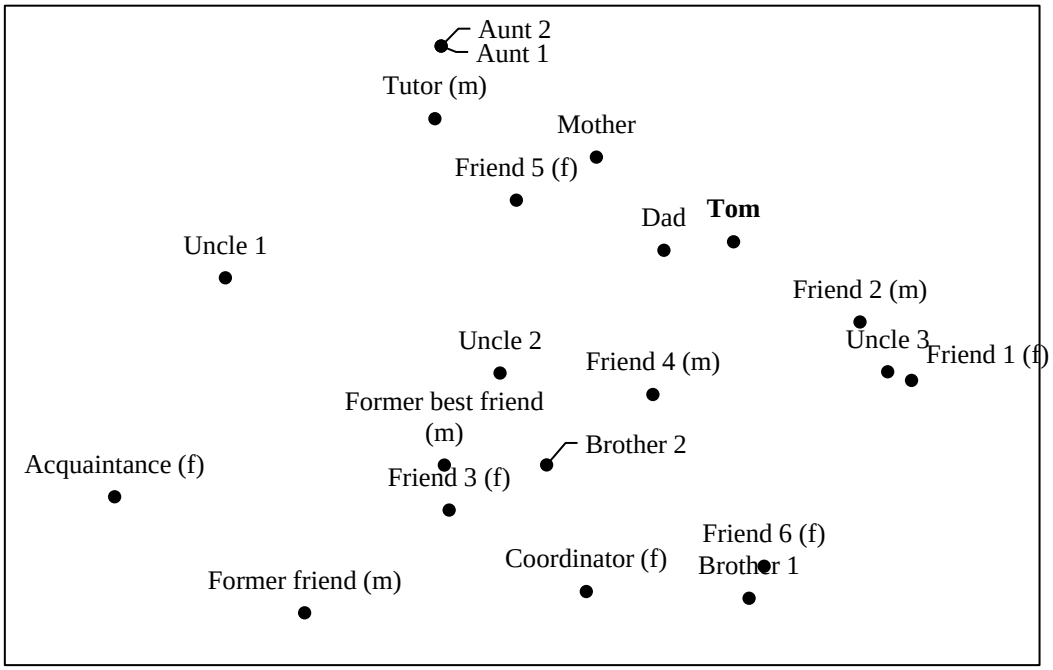
Critical (reverse scored)

Confidence

Motivation

Figure 23

Tom life-space map time 1



Tom presented as shy and made little eye contact. He grasped the construct elicitation process quickly. He sees himself as honest, trustworthy and open-minded while lacking in motivation, confidence with a tendency to be critical. Tom is close to his father on the map and they have similar signature scores. Tom is placed at a distance from people he admires the most, his two aunts, while he sees them both as being very critical. Tom's construal system is complex. He has no difficulty separating the person and his overall impression of them from their component parts. For example, while he professes to having a good relationship with his older brother, he does not see him as trustworthy or honest – constructs which Tom values.

Table 30 shows Tom's data matrix at time 2 and the constructs elicited. Figure 24 shows Tom's life space map at time 2.

Table 30

Tom's data matrix time 2

Tom	1	1	2	1	1	1
Friend 1 (f)	2	2	1	1	2	3
Aunt 1	1	1	1	1	1	1
Former best friend (m)	3	3	3	2	2	1
Friend 2 (m)	2	1	2	2	1	1
Friend 3 (f)	1	2	2	3	2	3
Coordinator (f)	3	1	2	1	1	2
Friend 4 (m)	2	2	3	3	1	1
Uncle 1	1	1	2	2	2	1
Friend 5 (f)	3	2	2	2	2	2
Brother 1	3	3	3	3	2	1
Former friend (m)	3	3	3	3	3	2
Acquaintance (f)	2	1	2	1	2	3
Uncle 2	3	3	3	2	3	2
Friend 6 (f)	1	1	1	2	2	1
Uncle 3	2	2	3	3	2	2
Brother 2	2	2	2	2	1	2
Dad	1	1	2	2	1	1
Aunt 2	1	1	1	1	1	1
Mother	2	1	1	2	2	2
Tutor (m)	1	1	1	1	1	3
Honesty						
Morals/treating people well						
Maturity						
Positive outlook						
Understanding/compassion						
Sense of humour						

At time 2 Tom gives his aunts idealised scores and similarly gives himself and his father overall positive scores, both scoring low in maturity, once again, he sees

himself and his father as being similar. His brother 1 and mother are distanced away from him (Figure 24).

Figure 24

Tom life-space map time 2

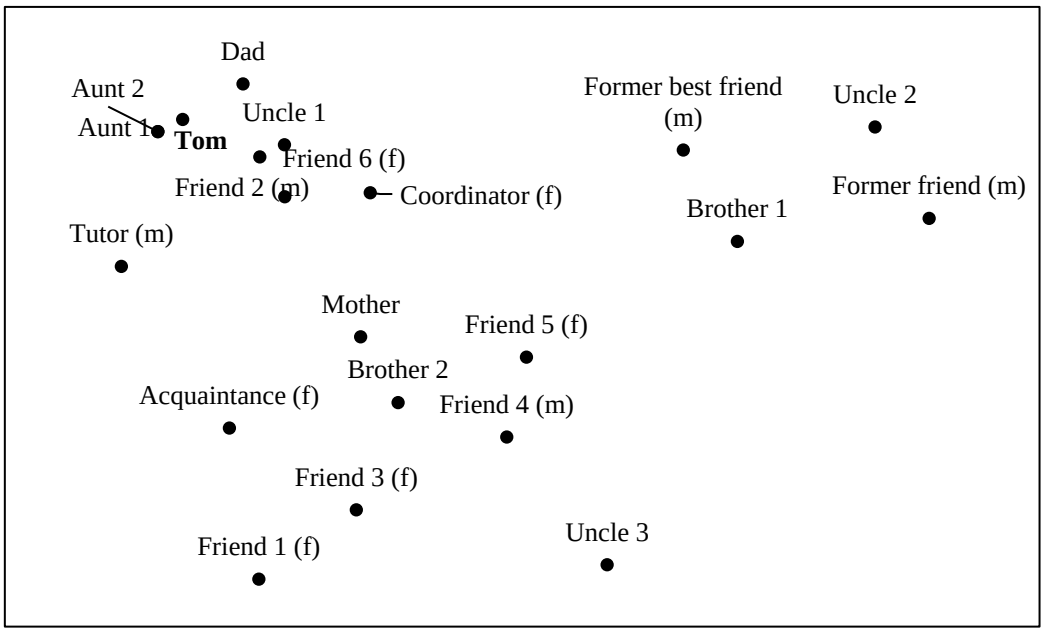


Table 31 shows Tom’s data matrix at time 3 and the constructs elicited. Figure 25 shows Tom’s life space map at time 3.

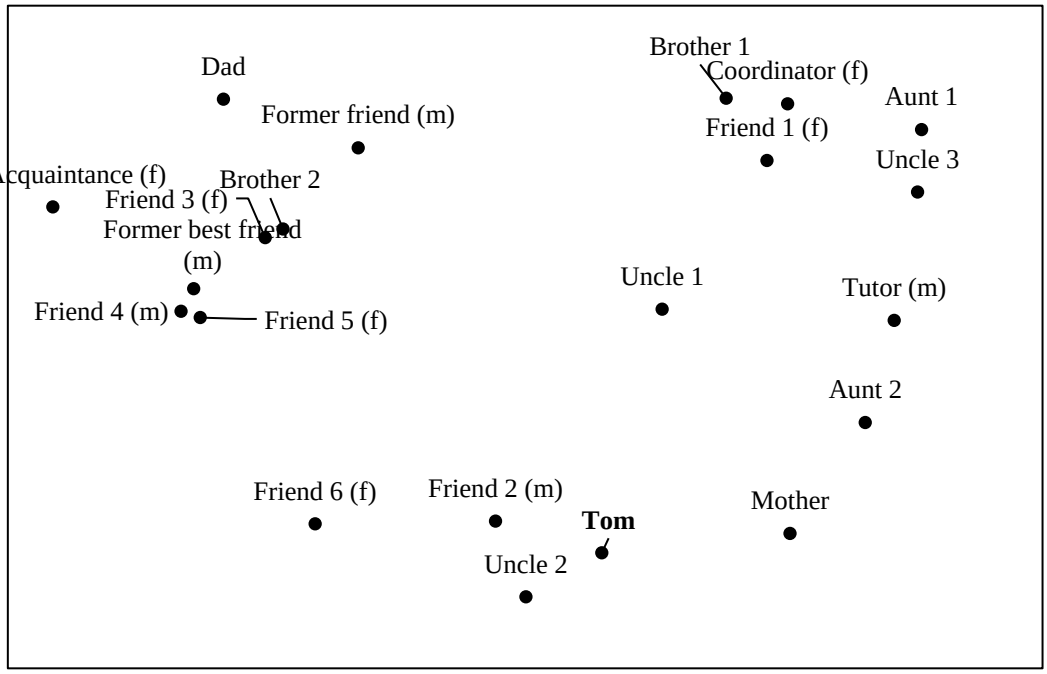
Table 31

Tom's data matrix time 3

Tom	1	2	1	1	3	3
Friend 1 (f)	2	2	1	2	2	2
Aunt 1	2	1	1	2	1	1
Former best friend (m)	1	2	2	3	5	5
Friend 2 (m)	1	2	2	1	3	3
Friend 3 (f)	2	2	3	3	4	4
Coordinator (f)	2	1	2	2	2	2
Friend 4 (m)	3	2	3	1	5	5
Uncle 1	1	2	3	2	1	1
Friend 5 (f)	3	2	2	1	4	5
Brother 1	2	1	2	2	3	2
Former friend (m)	2	2	1	3	5	4
Acquaintance (f)	3	3	2	3	5	5
Uncle 2	1	3	3	1	2	3
Friend 6 (f)	1	2	3	3	4	3
Uncle 3	2	1	1	1	1	2
Brother 2	3	3	3	2	3	4
Dad	3	2	2	2	5	4
Aunt 2	1	1	1	1	2	1
Mother	1	1	1	1	2	3
Tutor (m)	1	1	1	1	1	2
Dedication						
Extrovert						
Paranoid						
Communication skills						
Self-care						
Hard working						

Figure 25

Tom life-space map time 3



There has been a considerable shift in Tom, he now identifies with a more positive group. His self-esteem has also shifted, seeing himself as more motivated. However, he recognises that he does not engage in self-care well. Using open construct elicitation allows for the participant to consider values which surface as sessions progress. For example, in Tom's case, we can see an interest in examining people with regard to how well they engage in self-care at time 3.

Tom's details have been summarised to maintain anonymity. What is of note here and in some of the other studies is the practice of casting some people, generally family members and the self, in a more positive light at the beginning of the process than the participant actually thinks is the case (we can also see this in Lukaz's study for example). This framing can be the result of loyalty sometimes brought on by difficult experiences. This is likely in Toms' case with respect to his father. His

Dad's scores have shifted notably into more negative scores. This bias towards people to whom the person feels loyalty is somewhat accounted for in the collection of data at two time points before intervention as there is some time allowed to build trust. As stated earlier, Tom has experienced some personal losses in his life. Where possible evaluation should initially be made without the influence of the opinions of other professionals to avoid bias. However, possessing salient information regarding the personal circumstances of participants could aid in the building of empathy and trust, thus reducing conflicts between how the participants actually thinks a person should score versus how they actually score that person in session. This highlights the need for a reflexive, whole-person approach to interpretation of the maps in conjunction with the data matrices, constructs elicited and case notes.

Table 32 shows Tom's data matrix at time 4 and the constructs elicited. Figure 26 shows Tom's life space map at time 4.

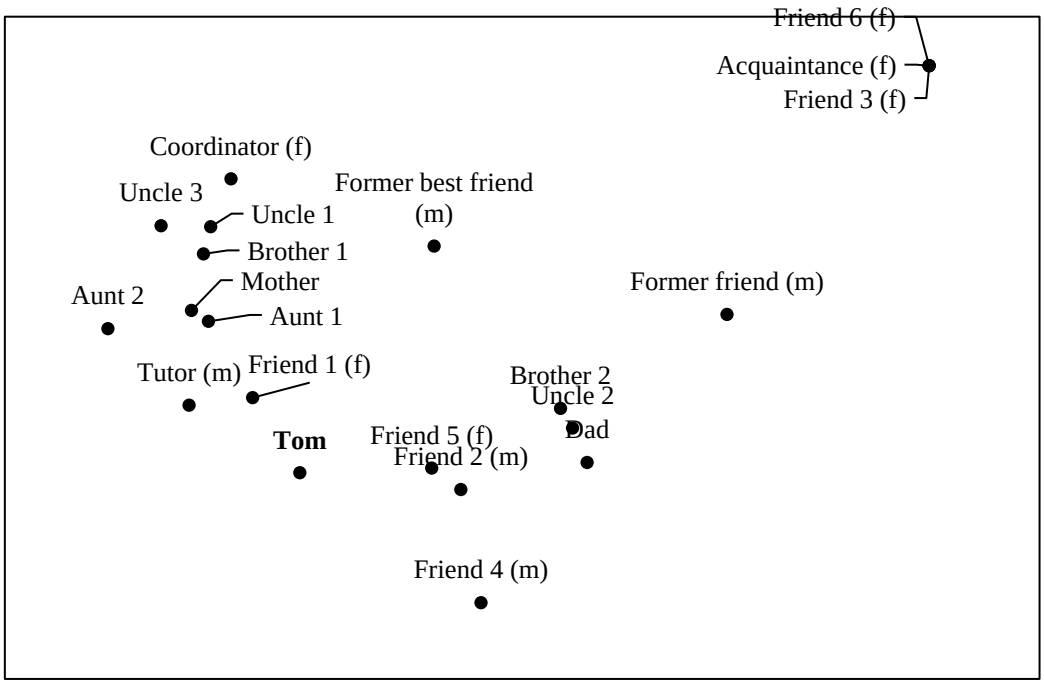
Table 32

Tom's data matrix time 4

Tom	2	1	2	2	2	1
Friend 1 (f)	1	2	2	2	1	2
Aunt 1	1	2	1	2	1	2
Former best friend (m)	2	2	3	2	2	2
Friend 2 (m)	3	1	1	2	3	2
Friend 3 (f)	3	3	3	3	2	3
Coordinator (f)	2	2	1	1	1	3
Friend 4 (m)	3	1	2	2	3	1
Uncle 1	1	2	1	1	2	2
Friend 5 (f)	3	2	2	2	2	1
Brother 1	2	2	1	1	2	1
Former friend (m)	3	2	3	3	3	2
Acquaintance (f)	3	3	3	3	2	3
Uncle 2	3	1	1	3	3	2
Friend 6 (f)	3	3	3	3	2	3
Uncle 3	2	2	1	1	1	2
Brother 2	3	2	1	3	3	1
Dad	3	2	2	2	3	3
Aunt 2	1	1	1	1	1	1
Mother	2	1	1	1	2	1
Tutor (m)	2	1	1	2	1	1
Motivation						
Manners						
Caring						
Talent						
Confident						
Connection						

Figure 26

Tom life-space map time 4



Again, the map suggests a shift in Tom's self-concept from times 1 and 2. A movement towards the positive clustering on the right of the map continues. He identifies more closely with his tutor and positive peer group than people he views in a negative light. The nature of the constructs elicited has shifted from some negative – such as criticism and paranoia - to more positive constructs. Interestingly he sees his brother 1 in a more positive light than at the beginning of these sessions.

GPA analysis.

Table 33

Tom iteration history

Cycle	Stress	Mean RV
1	0.8351	0.1364
2	0.0013	0.6436
3	0.0038	0.6441
4	0.0065	0.645
5	0.0112	0.6465
6	0.0188	0.6491
7	0.0305	0.6533
8	0.0469	0.6598
9	0.0667	0.6689
10	0.085	0.6805
11	0.0949	0.6934
12	0.0918	0.7056
13	0.0778	0.7159
14	0.0588	0.7235
15	0.0408	0.7286
16	0.0266	0.7319
17	0.0166	0.734
18	0.0101	0.7352
19	0.006	0.736
20	0.0036	0.7364
21	0.0021	0.7367

Note: Fit scores fall within acceptable parameters.

Table 34

Tom fit of time 3 with time 4 with baseline centroid

Time	Weights	Fit	Uniqueness
3	1	0.4033	0.8373
4	1	0.3269	0.8931

Note. Fit is very low suggesting a high degree of difference of times 3 and 4 with baseline.

Table 35

Tom correlation of time 3 with time 4

	3	4
Case 3	1.00	-0.022
Case 4	-0.124	1.00

Note. There is very low correlation of time 3 with time 4.

These results coupled with results from the MDS analysis suggest that there is positive movement in Tom's construal of himself. Further intervention is indicated.

Chloe.

Age 20. Chloe was quiet and did not talk or elaborate over and above the construct elicitation process. She did not make eye contact and tended to angle herself away from the mediator during the process. During the card generation process Chloe differentiated between friends and 'course friends' and so these are labelled accordingly.

Table 36 shows Chloe's data matrix at time 1 and the constructs elicited.

Table 36

Chloe's data matrix time 1

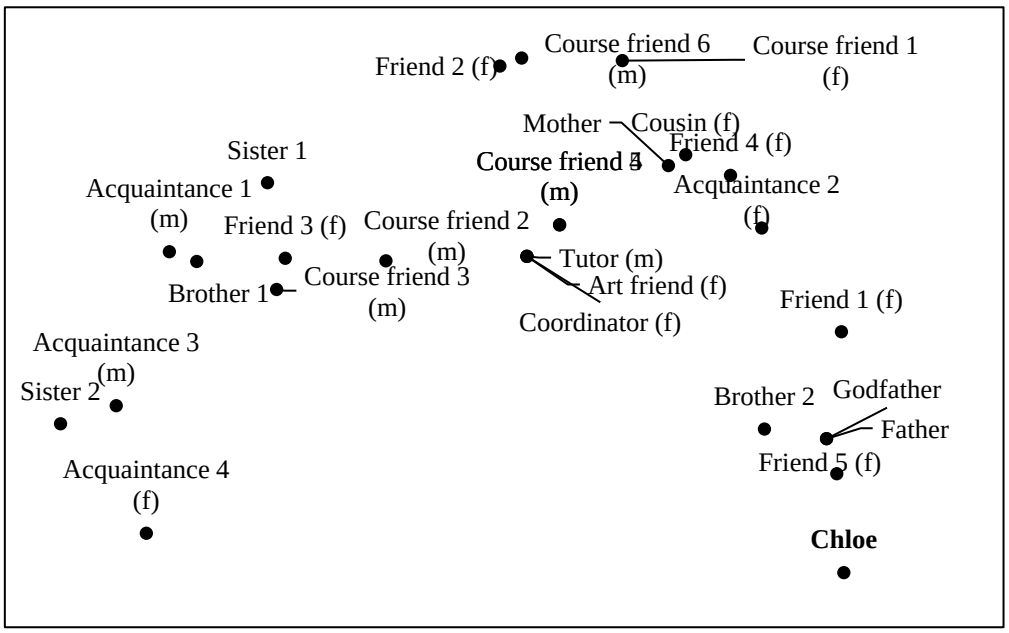
Chloe	1	1	3	1	1	2
Acquaintance 1 (m)	4	2	1	3	2	3
Friend 1 (f)	1	1	2	2	1	1
Course friend 1 (f)	2	2	2	2	1	2
Friend 2 (f)	2	2	2	3	2	1
Acquaintance 2 (f)	3	1	2	2	1	1
Coordinator (f)	3	2	1	1	1	2
Course friend 2 (m)	4	3	2	2	2	2
Course friend 3 (m)	3	3	2	3	2	3
Cousin (f)	2	1	2	3	1	1
Brother 1	4	2	1	3	3	2
Course friend 4 (m)	3	3	2	2	1	2
Friend 3 (f)	4	3	2	3	2	2
Brother 2	1	1	2	1	1	2
Mother	2	1	1	2	1	2
Sister 1	4	2	1	3	2	2
Friend 4 (f)	2	1	1	2	1	1
Father	1	1	2	1	1	1
Course friend 5 (m)	3	3	2	2	1	2
Godfather	1	1	2	1	1	1
Art friend (f)	3	2	1	1	1	2
Acquaintance 3 (m)	4	3	2	3	3	3
Acquaintance 4 (f)	4	3	1	1	3	3
Sister 2	4	3	1	3	3	3
Course friend 6 (m)	2	2	2	3	1	2
Friend 5 (f)	1	1	3	2	2	1
Tutor (m)	3	2	1	1	1	2

Not lying, Confide in, Chatty = find it easy to talk to people, Pride, Respect, Boring.

Figure 27 shows Chloe's life space map at time 1.

Figure 27

Chloe life-space map time 1



Chloe is set apart in the bottom right corner, a space denoted by her description of herself as being 'not chatty', her father and Godfather have positive signature scores overall and are 'chattier' than Chloe, that is they find it easier to talk to people. There are a few clusters on the map - the cluster tutor, art friend and coordinator represent a group that Chloe does not trust and are likely to lie. The cluster of cousin, mother and friend 4, while generally positive, score 2 on pride - a specific concept of, in Chloe's words, 'being able to hold your head high because you do something for your money.' The bottom left quadrant is demarked by people who are extrovert (chatty) but otherwise have negative signature scores.

Table 37 shows Chloe's data matrix at time 2 and the constructs elicited. Figure 28 shows Chloe's life space map at time 2.

Table 37

Chloe's data matrix time 2

Chloe	1	1	2	1	2	1
Acquaintance 1 (m)	2	1	2	2	3	3
Friend 1 (f)	1	3	1	1	2	1
Course friend 1 (f)	1	1	2	2	2	2
Friend 2 (f)	2	2	1	1	3	1
Acquaintance 2 (f)	1	3	3	1	3	1
Coordinator (f)	1	1	1	1	1	1
Course friend 2 (m)	2	2	1	2	3	3
Course friend 3 (m)	2	2	2	2	3	2
Cousin (f)	2	3	3	1	2	1
Brother 1	3	3	3	2	3	2
Course friend 4 (m)	2	1	1	2	2	2
Friend 3 (f)	1	2	1	2	3	1
Brother 2	2	2	1	2	3	3
Mother	2	1	2	2	2	2
Sister 1	2	2	2	3	3	1
Friend 4 (f)	2	1	1	3	2	2
Father	1	1	1	1	2	1
Course friend 5 (m)	2	1	1	2	3	2
Godfather	1	1	2	1	2	1
Art friend (f)	1	1	2	1	1	1
Acquaintance 3 (m)	3	3	1	2	3	3
Acquaintance 4 (f)	3	2	2	3	3	1
Sister 2	3	3	3	3	2	2
Course friend 6 (m)	2	2	1	3	3	2
Friend 5 (f)	2	2	1	1	2	1
Tutor (m)	1	1	1	1	1	1

Positive outlook

Education (to get a job)

Outgoing/bubbly

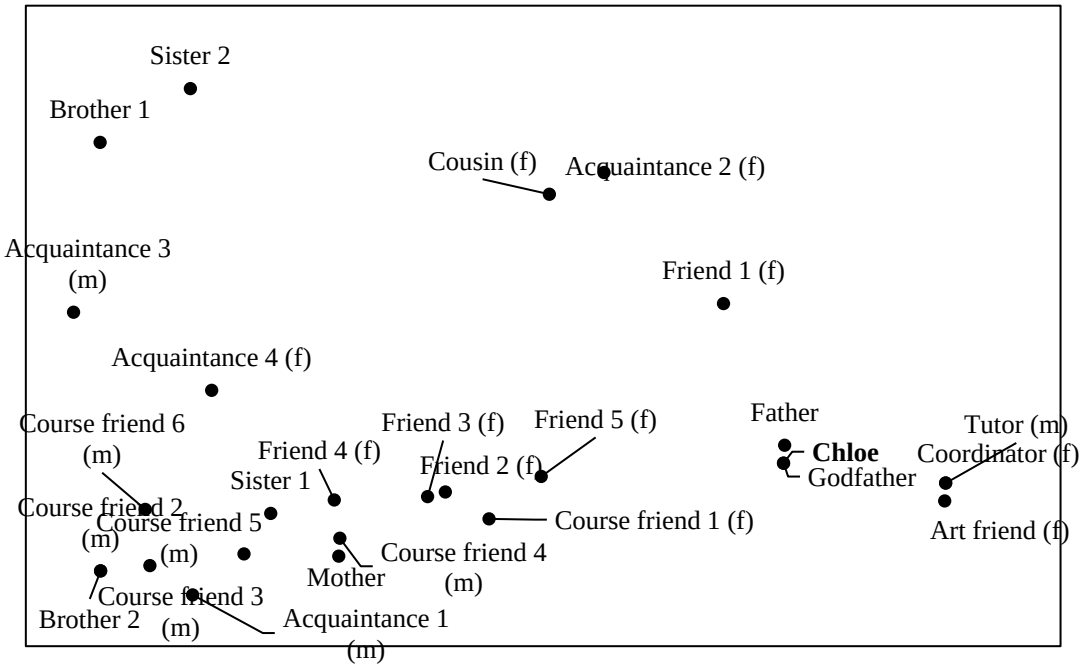
Not honest w you

Motivated

Open minded

Figure 28

Chloe life-space map time 2



There has been a shift in Chloe's perception of some people between time one and time two. For example, the tutor and coordinator now have idealised signature scores. We can extrapolate that this represents a shift as some of the constructs elicited in this session are like the previous sort such as honest (versus lying in the first). This would perhaps be interpreted as a building of trust however Chloe has attended the project for nearly a year and is familiar with the people in this cluster. The movement may be a form of 'slot-rattle' described by Kelly (1951), a reaction to the introduction of these sessions. Chloe's own self-concept appears more positive, however her engagement in the process is careful and it may be that she is sorting herself into positive ends of constructs mindfully and this may be the case for these idealised people. This raises an interesting aspect of these studies, as the mediator is (generally) seen as separate to the institution within which the studies take place, trust is generally generated quickly through the card generation and elicitation

process. However, in this case the mediator is not of the same ethnicity as Chloe and the maps indicate that Chloe mistrusts the ethnicity of which the mediator is a member. It is likely that a mediator who is regularly involved in or works in the institution itself would not be as independent of the institution and so trust-building may take more time.

Table 38 shows Chloe's data matrix at time 3 and the constructs elicited. Figure 29 shows Chloe's life space map at time 3.

Table 38

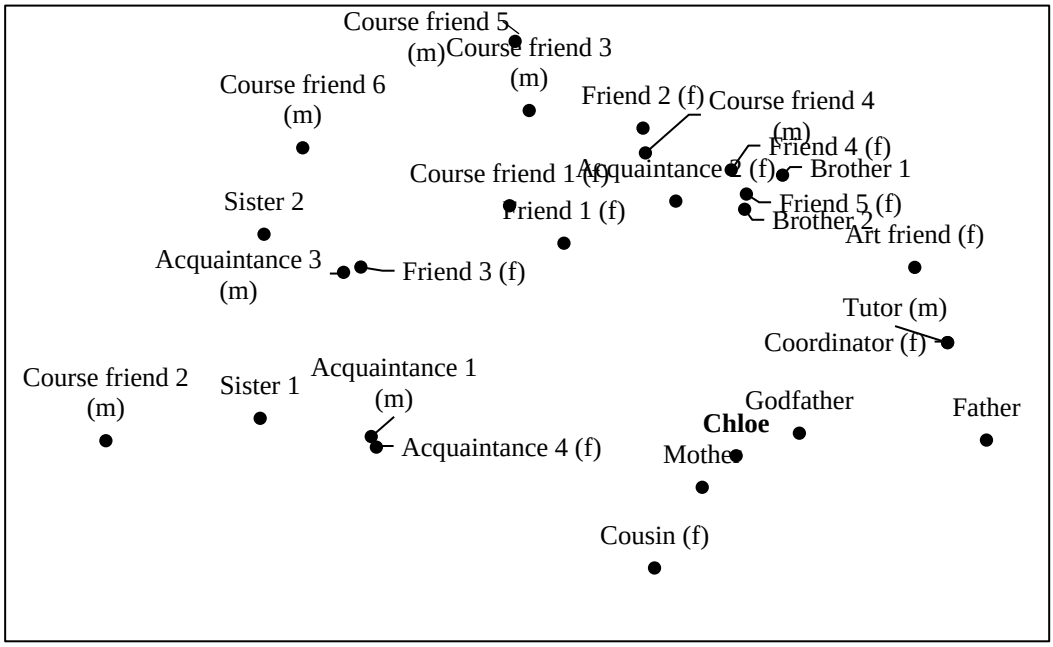
Chloe's data matrix time 3

Chloe	1	1	3	4	2	1
Acquaintance 1 (m)	1	3	3	4	6	5
Friend 1 (f)	2	3	3	6	1	4
Course friend 1 (f)	2	3	3	5	2	4
Friend 2 (f)	2	3	1	2	2	4
Acquaintance 2 (f)	2	2	2	5	4	2
Coordinator (f)	1	1	1	1	1	3
Course friend 2 (m)	3	3	4	7	3	6
Course friend 3 (m)	2	2	1	6	5	6
Cousin (f)	1	1	2	4	3	2
Brother 1	2	2	2	6	1	3
Course friend 4 (m)	1	2	1	2	4	6
Friend 3 (f)	3	3	3	5	2	6
Brother 2	2	1	2	6	4	3
Mother	1	1	4	5	1	2
Sister 1	3	3	4	6	6	2
Friend 4 (f)	1	2	1	5	2	3
Father	1	1	2	1	1	1
Course friend 5 (m)	2	2	1	3	2	6
Godfather	1	1	3	2	1	2
Art friend (f)	2	1	1	1	1	3
Acquaintance 3 (m)	3	3	2	6	5	5
Acquaintance 4 (f)	3	1	4	4	5	6
Sister 2	2	3	1	7	6	6
Course friend 6 (m)	3	3	1	3	4	5
Friend 5 (f)	2	2	2	2	5	1
Tutor (m)	1	1	1	1	1	3

Positive outlook, Education (to get a job),Outgoing/bubbly, Motivated, Open minded, Trustworthy.

Figure 29

Chloe life-space map time 3



It was during the intervention phase of this study that trust was built with Chloe. Chloe performed well during the first series of exercises but needed guidance on more complex tasks such as logic and combined skills (patterns and sequences or puzzles involving two sequences running concurrently). The third map suggests that Chloe still has a poor perception of herself and sees herself as lacking motivation and not ‘bubbly’, a quality she admires.

Table 39 shows Chloe's data matrix at time 4 and the constructs elicited. Figure 30 shows Chloe's life space map at time 4.

Table 39

Chloe's data matrix time 4

Chloe	2	1	2	1	1	1
Acquaintance 1 (m)	4	3	2	2	5	2
Friend 1 (f)	3	5	1	2	3	2
Course friend 1 (f)	4	2	3	3	4	3
Friend 2 (f)	3	4	1	2	3	2
Acquaintance 2 (f)	2	1	2	1	2	1
Coordinator (f)	1	5	2	1	1	1
Course friend 2 (m)	5	5	3	3	5	3
Course friend 3 (m)	3	4	3	2	4	4
Cousin (f)	4	1	2	2	2	2
Brother 1	4	3	3	1	1	2
Course friend 4 (m)	4	5	2	3	3	1
Friend 3 (f)	4	3	2	1	2	2
Brother 2	4	3	1	2	3	3
Mother	2	2	2	1	2	2
Sister 1	3	2	3	2	3	1
Friend 4 (f)	3	2	2	2	2	1
Father	1	1	1	1	1	1
Course friend 5 (m)	3	5	3	1	1	3
Godfather	1	1	1	1	1	3
Art friend (f)	1	5	2	1	1	1
Acquaintance 3 (m)	5	4	2	4	4	4
Acquaintance 4 (f)	4	4	3	4	5	4
Sister 2	5	4	3	3	5	2
Course friend 6 (m)	4	4	3	1	2	1
Friend 5 (f)	3	1	1	2	3	4
Tutor (m)	1	5	1	1	1	1

Honesty

Friendship

Emotionally strong

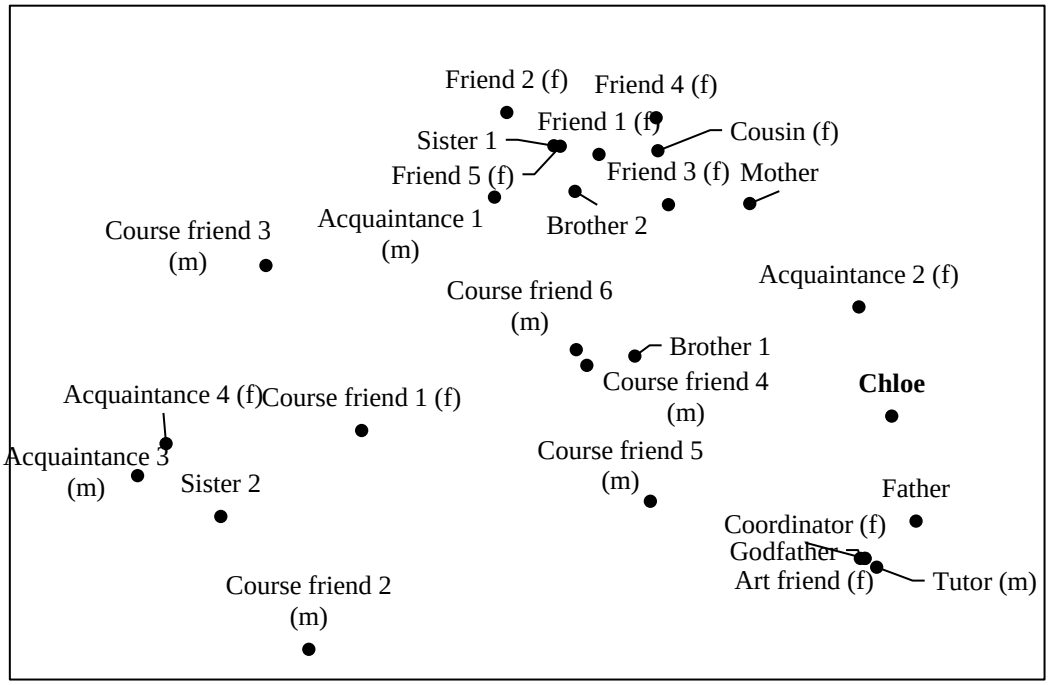
Tolerance of difference

Helping behaviour

Happiness

Figure 30

Chloe life-space map time 4



The left-hand side of the map is denoted by generally negative signature scores. The bottom right by positive scores. Chloe's dad has an idealised score once again and her impressions of the coordinator and tutor remain positive suggesting that perhaps the initial card sort was an indication of a view of these people that has changed (rather than being movement as a reaction to mediation). Chloe's mother, at some distance from her on the map has generally moderate scores but is seen to be tolerant of difference. Chloe's self-concept has shifted and is more positive compared to time 3.

GPA analysis.

Table 40

Chloe iteration history

Cycle	Stress	Mean RV
1	0.7372	0.0656
2	0.0030	0.7117
3	0.0045	0.7123

Note: Fit scores fall within acceptable parameters.

Table 41

Chloe fit of time 3 with time 4 with baseline centroid

	Weights	Fit	Uniqueness
3	1.0000	0.1242	0.9846
4	1.0000	0.3078	0.9053

Note. There is a very low fit of time 3 with centroid, while fit of time 4 is low. The high degree of uniqueness suggests a high degree of change in Chloe's construal system.

Table 42

Chloe correlation of time 3 with time 4

		3	4
Case	3	1.000	0.052
Case	4	0.012	1.000

Note. Similarity of time 3 with time 4 is very low.

Chloe presents with a number of obstacles to learning. She has literacy issues, misuses alcohol and is a member of an ethnic minority. By her own account she experiences racism – both personal and institutional on a daily basis. Chloe does not particularly value education and has a value system firmly grounded in her ethnicity. It is worth noting that people who have different goals (other than academic achievement) are ill-served in the current education system. Nonetheless the results from GPA analysis suggest considerable movement and further appropriate support is warranted.

Callum.

Aged 19, Callum presented as curious, open and interested. His parents are divorced. He has two sisters and a half-brother who is three. He has been diagnosed with dyslexia, has struggled in school and does not want to pursue further formal education. He expressed a very negative attitude towards formal education. He has a good relationship with his father but does not have a positive view of his mother. He primarily lives with his mother and three siblings, his brother being a half-sibling to Callum. Despite his learning difficulties Callum showed an aptitude for learning, he enjoyed the project and enjoyed playing rugby. He hopes to be a chef. Table 43 shows Callum's data matrix at time 1 and the constructs elicited. Figure 31 shows Callum's life space map at time 1.

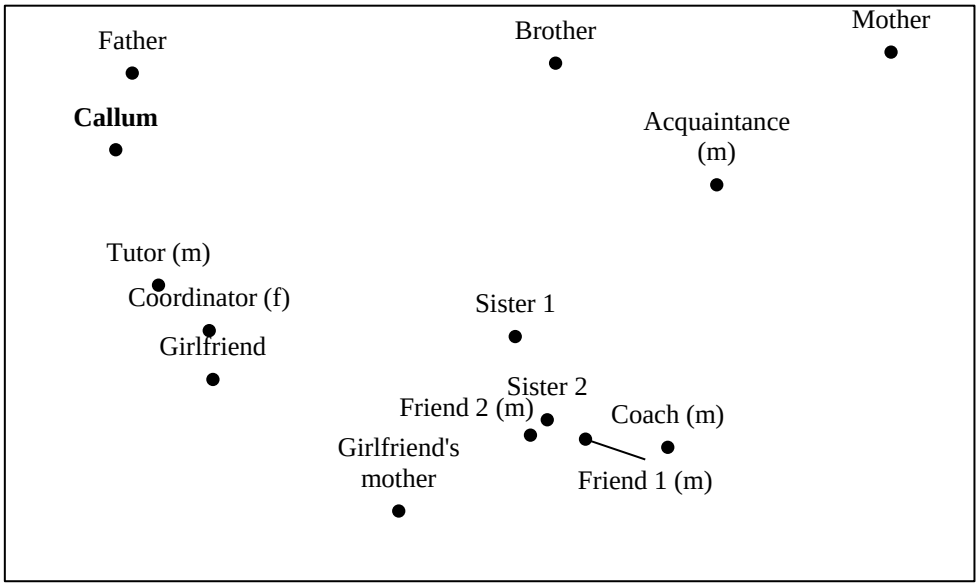
Table 43

Callum's data matrix time 1

Callum	1	1	1	2	1	4
Girlfriend's mother	2	2	2	2	2	1
Coordinator (f)	2	1	1	1	2	2
Friend 1 (m)	3	3	2	2	3	2
Acquaintance (m)	4	3	3	4	4	1
Sister 1	1	4	3	2	3	1
Girlfriend	1	2	1	1	2	1
Friend 2 (m)	2	3	3	3	2	1
Coach (m)	2	3	2	3	3	3
Father	4	1	1	1	1	4
Sister 2	3	3	2	1	3	2
Mother	3	4	4	4	4	3
Tutor (m)	1	1	1	1	2	2
Brother	4	4	4	3	1	2
People skills						
Planning/research						
Motivated						
Creative ability						
Individuality						
Tolerance (patience).						

Figure 31

Callum life-space map time 1



Callum identifies most closely with his father. The cluster of tutor, coordinator and girlfriend is a largely positive cluster. The map reflects the disharmony in Callum's homelife, and he expressed a wish to move in with his father.

Table 44 shows Callum's data matrix at time 2 and the constructs elicited. Figure 32 shows Callum's life space map at time 2.

Table 44

Callum's data matrix time 2

Callum	1	1	2	1	2	3	2
Girlfriend's mother	3	3	1	3	2	2	2
Coordinator (f)	3	3	2	2	2	1	1
Friend 1 (m)	1	3	3	4	4	4	3
Acquaintance (m)	4	3	3	4	4	1	4
Sister 1	1	1	3	1	4	4	2
Girlfriend	1	1	1	1	1	1	4
Friend 2 (m)	3	3	3	3	4	3	4
Coach (m)	3	3	3	3	2	2	3
Father	2	1	1	3	3	2	3
Sister 2	2	3	1	3	1	3	3
Mother	2	2	3	3	4	4	4
Tutor (m)	2	2	2	1	3	1	1
Brother	1	4	4	2	3	2	1

How well people get me*

Sense of personal freedom

Motivation

openness

Maturity

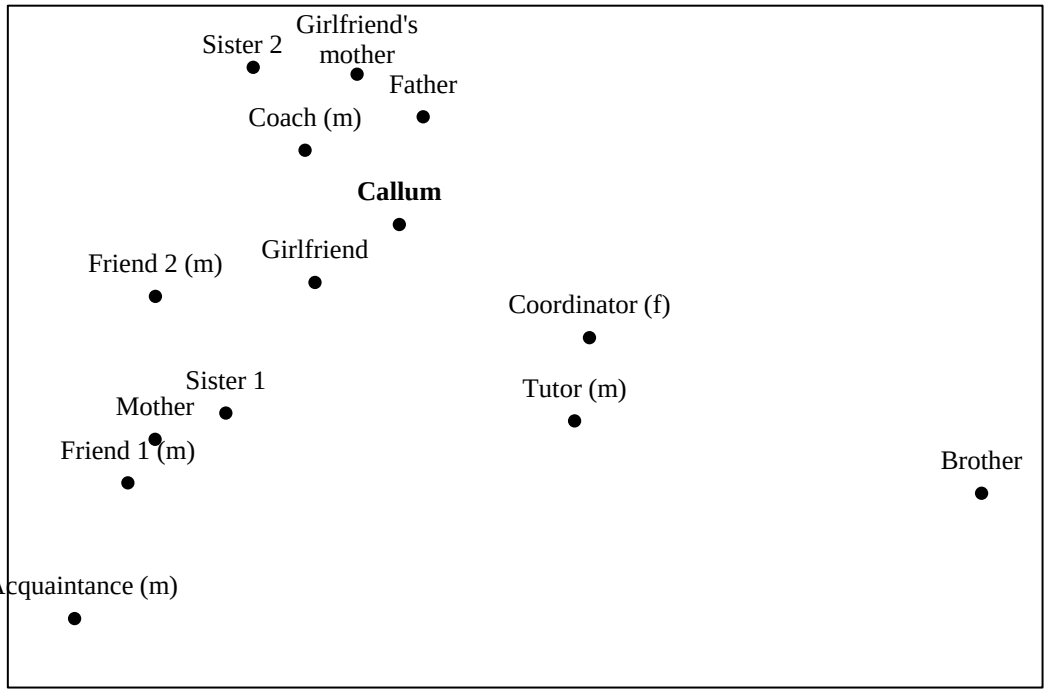
Confidence

Stubbornness

*non-judgement/understanding/commonality

Figure 32

Callum life-space map time 2



Callum was an engaging participant and expressed strong views about treating people well and having a social conscience. He was particularly passionate about human rights and valued openness and tolerance of difference. The map reflects Callum's difficult relationship with his younger brother. This distancing and negative score attributed to his brother is a function of the discord in his family, he describes a difficult relationship between himself and his two sisters and his mother. There appears to be a resentment of his younger brother.

Table 45 shows Callum's data matrix at time 3 and the constructs elicited. Figure 33 shows Callum's life space map at time 3.

Table 45

Callum's data matrix time 3

Callum	1	1	2	1	1	1
Girlfriend's mother	1	2	1	2	2	1
Coordinator (f)	2	2	2	2	2	2
Friend 1 (m)	2	3	4	4	2	3
Acquaintance (m)	3	4	4	3	4	3
Sister 1	3	2	3	4	3	1
Girlfriend	2	1	2	2	1	2
Friend 2 (m)	3	4	3	2	3	3
Coach (m)	2	3	3	3	3	4
Father	1	2	1	2	1	2
Sister 2	3	3	1	3	2	2
Mother	4	4	2	3	4	3
Tutor (m)	2	1	1	1	1	2
Brother	4	3	3	4	4	4

Positive coping skills

Emotional intelligence

Relationship values

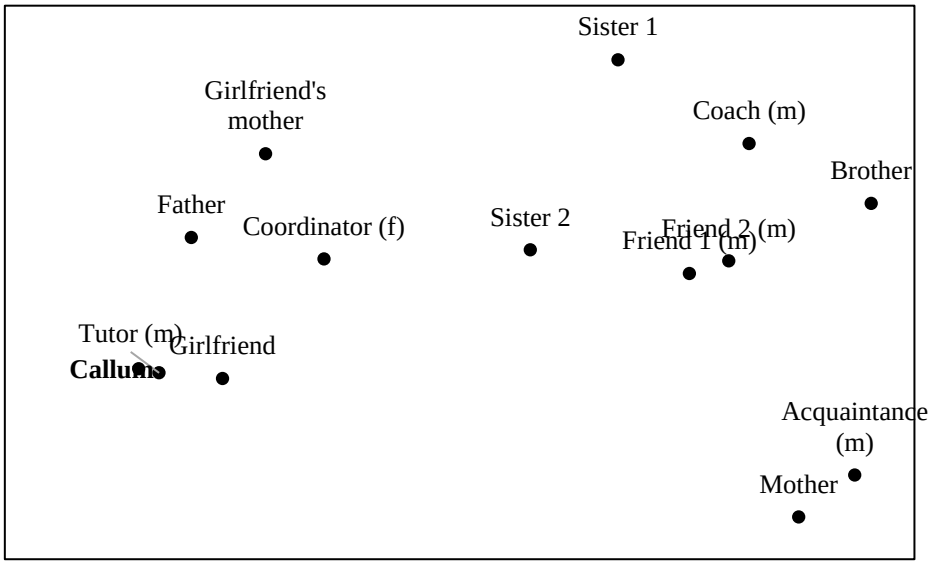
Freely expressed

Responsible

Caring/empathise

Figure 33

Callum life-space map time 3



Callum completed the first series of cognitive exercises without difficulty. Callum had difficulty with focus and memory, displayed during the dot matrix exercise (participants were shown a shape and then had to transpose that shape onto a matrix of dots). Table 46 shows Callum's data matrix at time 4 and the constructs elicited. Figure 34 shows Callum's life space map at time 4.

Table 46

Callum's data matrix time 4

Callum	1	1	1	1	1	2	2
Girlfriend's mother	3	3	3	3	2	3	2
Coordinator (f)	2	2	2	2	2	3	1
Friend 1 (m)	1	3	2	3	3	4	2
Acquaintance (m)	2	2	3	3	3	4	3
Sister 1	1	3	4	3	4	2	3
Girlfriend	1	2	1	1	2	3	2
Friend 2 (m)	1	1	4	2	4	3	3
Coach (m)	3	1	3	4	1	3	3
Father	4	1	1	1	1	1	1
Sister 2	3	1	2	1	3	3	2
Mother	2	2	3	4	3	2	4
Tutor (m)	1	2	2	2	2	3	1
Brother	1	4	4	3	1	1	4

Openness

Stubbornness

Having a plan

Motivation

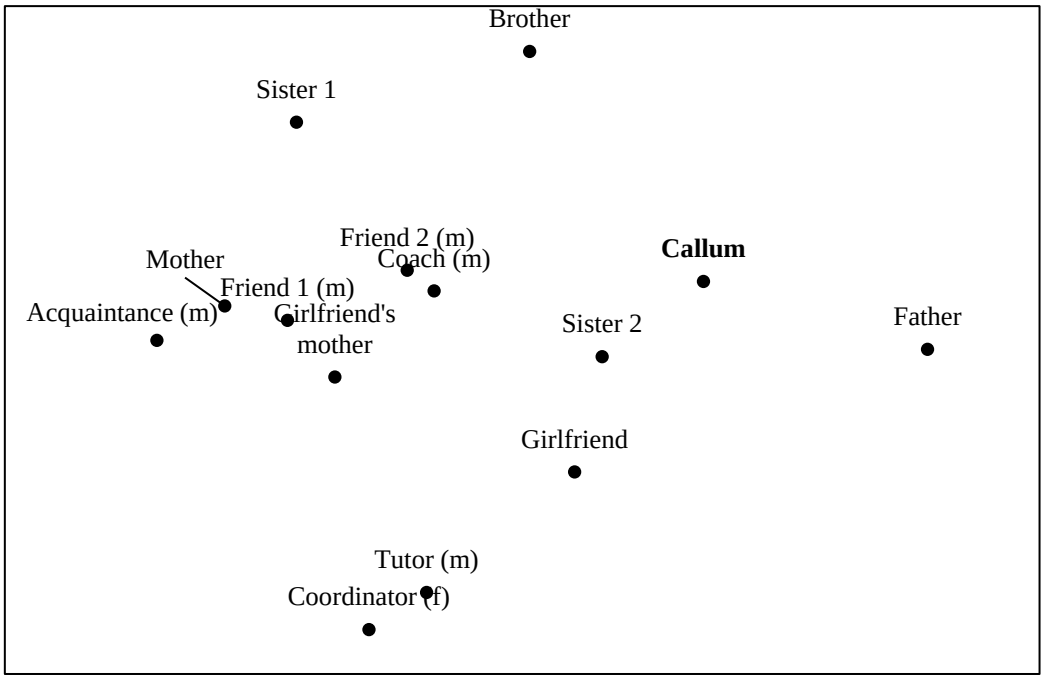
People pleasing

Caring

Practical

Figure 34

Callum life-space map time 4



Callum engaged well with the intervention sessions, which focused on mastery of the cognitive reasoning skill battery. He was particularly interested in strategies to work around his dyslexic patterns and dyscalculia; this was addressed in the second half of intervention sessions. Callum's signature scores have improved over the course of intervention. Further intervention should focus on building self-esteem through

addressing gaps in learning and cognitive skills (which Callum's performance at intervention indicates he can grasp).

GPA analysis.

Iteration History

Table 47

Callum iteration history

Cycle	Stress	Mean RV
1	0.6826	0.0897
2	0.0771	0.747
3	0.0712	0.7568
4	0.0399	0.7622
5	0.0212	0.765
6	0.0107	0.7665
7	0.0053	0.7671
8	0.0026	0.7675
9	0.0013	0.7677

Note: Fit scores fall within acceptable parameters.

Table 48

Callum fit of time 3 with time 4 with baseline centroid

Time	Weights	Fit	Uniqueness
3	1	0.2532	0.9359
4	1	0.2957	0.9126

Note. Fit is very low, uniqueness scores at time 3 and 4 suggest a high degree of change compared to baseline.

Table 49

Callum correlation of time 3 with 4

	3	4
Case 3	1.00	0.137
Case 4	0.07	1.00

Note. Correlation of time 3 with time 4 is low.

Kate.

Kate, age 18, is a member of the Traveller Community, an indigenous ethnic group in Ireland. At the time of the study she lived with her mother in social accommodation (a state-subsidised house) in an economically disadvantaged area. Kate had limited literacy skills. She was interested in following a career in sewing or dressmaking and activism for her community. Table 50 shows Kate's data matrix at time 1 and the constructs elicited. Figure 35 shows Kate's life space map at time 1.

Table 50

Kate's data matrix time 1

Kate	1	1	3	2	1	1
Friend 1 (f)	1	1	1	2	1	1
Teacher 1 (f)	2	3	3	2	2	3
Acquaintance 1 (f)	4	4	4	5	3	3
Coordinator (f)	3	3	3	2	3	3
Friend 2 (f)	1	2	2	2	1	1
Brother 1	1	1	1	1	1	1
Mother	1	1	1	1	1	1
Sister 1	1	1	2	3	1	1
Teacher 2 (f)	3	2	3	4	2	3
Teacher 3 (f)	1	3	3	2	3	2
Cousin	1	1	2	3	2	2
Tutor 1 (f)	3	4	3	2	2	3
Acquaintance 2 (f)	4	4	4	5	3	3
Sister 2	1	1	1	2	1	1
Teacher 4 (f)	3	4	3	4	2	3
Acquaintance 3 (f)	4	3	2	2	3	3
Brother 2	1	1	1	1	1	3
Tutor 2 (m)	2	3	3	2	2	1
Friend 3 (f)	1	2	2	2	1	1

People I can count on

How much I care about x (being passionate about a thing or cause).

Ability to chat away to people

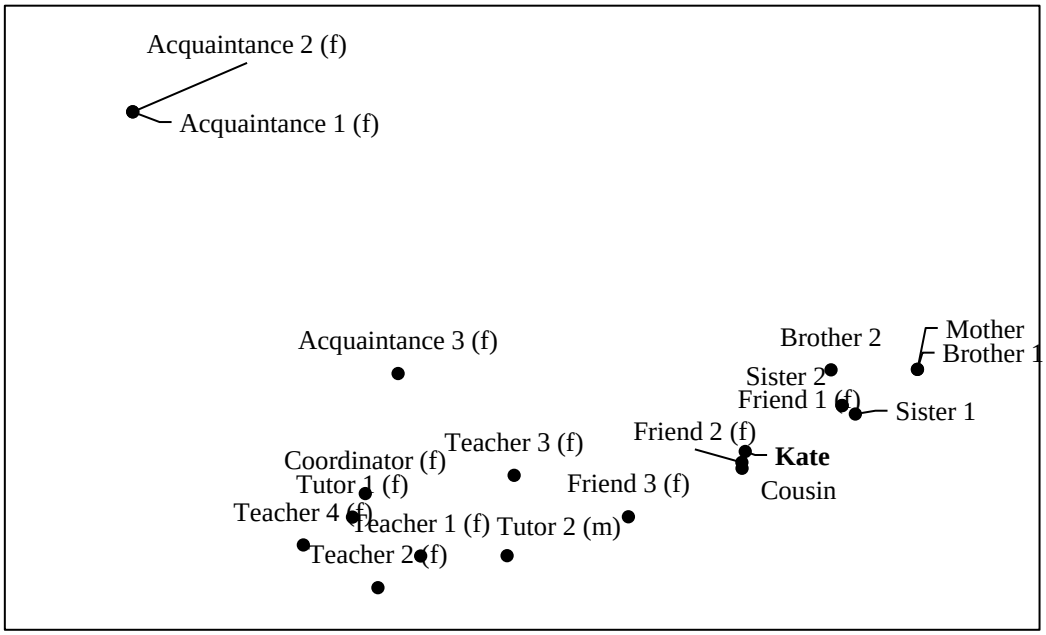
Active Honesty

Devious

Openness (to her community).

Figure 35

Kate life-space map time 1



Kate's mother and brother 1 have idealised signature scores while acquaintance 1 and 2 have negative scores and are situated in the extreme top left of the map. Kate identifies most closely with her cousin, they are similar in age, she is also a member of the Traveller Community. There is a recognisable cluster of people Kate comes in contact with from the project, none of these people are members of her community, the relative proximity of tutor 2 on the map to Kate is indicative of his openness to her community (lack of negative bias).

Table 51 shows Kate's data matrix at time 2 and the constructs elicited. Figure 36 shows Kate's life space map at time 2.

Table 51

Kate's data matrix time 2

Kate	1	1	1	1	1	1	2	2
Friend 1 (f)	1	1	1	1	1	1	2	3
Teacher 1 (f)	2	3	2	2	2	3	2	3
Acquaintance 1 (f)	3	4	2	2	3	3	3	3
Coordinator (f)	3	4	3	3	3	3	3	3
Friend 2 (f)	2	2	1	2	3	2	1	3
Brother 1	1	1	1	1	1	1	1	1
Mother	1	1	1	1	1	1	1	2
Sister 1	1	1	1	1	1	1	2	1
Teacher 2 (f)	2	4	2	2	2	3	3	3
Teacher 3 (f)	2	2	1	2	3	2	2	3
Cousin	3	1	1	1	1	2	3	2
Tutor 1 (f)	3	4	2	3	3	3	2	3
Acquaintance 2 (f)	3	4	3	3	3	3	3	3
Sister 2	1	1	1	1	1	2	3	2
Teacher 4 (f)	3	4	3	3	3	3	2	3
Acquaintance 3 (f)	1	2	1	2	3	3	2	3
Brother 2	1	1	1	1	1	1	1	1
Tutor 2 (m)	2	3	1	2	2	2	1	2
Friend 3 (f)	1	2	1	2	2	2	2	2

Personality(openness).

People I get on with

Family

Racism

Honest

Trust

Selfish

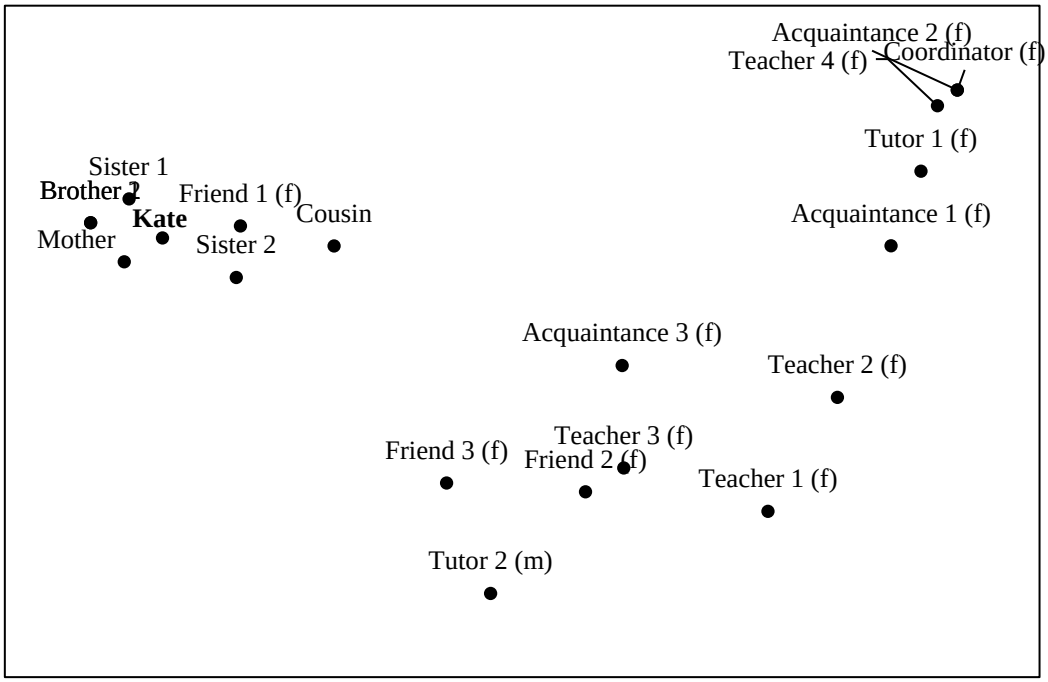
Creative

Kate was a very engaging participant. Despite Kate's separation of people from her community and the settled community (the settled community in Ireland are not traditionally nomadic – a term used to identify others from their own traditionally nomadic ethnic group) trust built quickly in session. She was forthcoming about her value system and showed an awareness of her values. She was proud that her value system was grounded in the values of her community. In this second sort Kate listed creativity as a value she cherished, she liked making art and talked about wanting to make clothes for a living.

Kate consumed large quantities of alcohol on a regular basis and this impacted her quality of life. She had had great difficulty in school and was regularly in trouble. Despite attending the same school consistently, she had literacy issues. This was problematic for Kate as it was important to her that she be able to drive. The driving theory test requires literacy competence and while there are foreign language versions and interpreters available, little accommodation is made for those who are not literate, or at least this was clearly the case for Kate. It was clear that her ethnicity represented a barrier to engagement in society.

Figure 36

Kate life-space map time 2



The clusters at time 2 are very clearly delineated. Kate identifies strongly with her family, while the top right corner is a negative space. Kate has a complex relationship with the people in the project and this is reflected in this map by her extreme positioning of the project coordinator.

Table 52 shows Kate's data matrix at time 3 and the constructs elicited. Figure 37 shows Kate's life space map at time 3.

Table 52

Kate's data matrix time 3

Kate	1	1	3	2	2	1
Friend 1 (f)	2	1	2	2	3	2
Teacher 1 (f)	3	3	2	3	2	2
Acquaintance 1 (f)	3	3	3	3	4	4
Coordinator (f)	3	3	1	3	4	2
Friend 2 (f)	3	2	2	2	4	2
Brother 1	1	1	3	1	3	3
Mother	3	1	3	3	1	1
Sister 1	1	1	1	3	3	2
Teacher 2 (f)	2	3	1	3	4	3
Teacher 3 (f)	2	3	2	3	3	3
Cousin	2	1	2	3	3	3
Tutor 1 (f)	3	3	2	2	4	4
Acquaintance 2 (f)	3	3	3	3	4	4
Sister 2	2	1	1	3	3	2
Teacher 4 (f)	3	3	3	3	3	4
Acquaintance 3 (f)	3	3	3	2	4	4
Brother 2	1	1	1	3	1	3
Tutor 2 (m)	1	3	1	3	1	1
Friend 3 (f)	3	3	2	2	3	2

Security (settled down)

Family

Focus

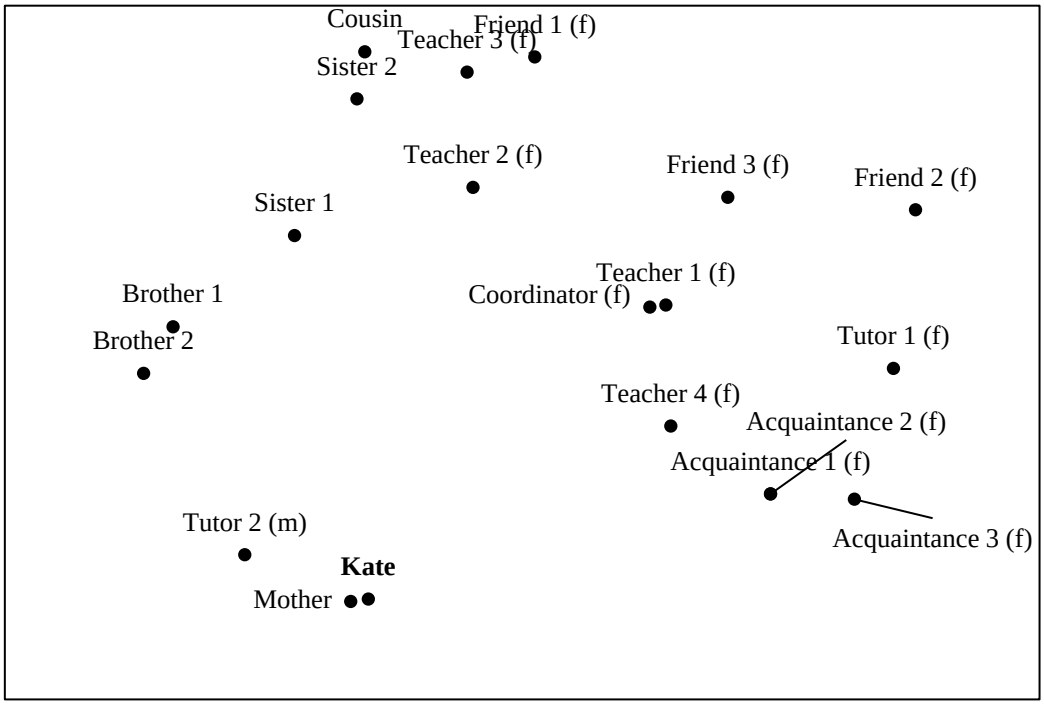
Creative

Rogues (a term describing people who tend to be charming but get into trouble).

Social conscience

Figure 37

Kate life-space map time 3



The clustering of people in Kate's world has shifted considerably after three sessions of intervention. The intervention sessions are designed to require a very low level of literacy to avoid this being a confound in assessing cognitive reasoning performance. Kate engaged well with the puzzles and while her performance was lower than would be typical for her age, it is clear that Kate's difficult relationship with the education system has impacted her level of skill.

Kate wanted to add a person to her cards in this session, someone she had known in the past and has recently rekindled acquaintance. This is consideration for future study designs. Data for this person was collected but not analysed as MSA and MDS in general require matched numbers of items across times. In cases where intervention persists over time similar groups can then be compared usefully where necessary, as participants relationships with new people develop over time.

However, the focus of assessment is the person and sufficient information can be gleaned from evaluating Kate in comparison to the position of people consistently in her life with her own self-concept.

At one of the intervention sessions Kate was hung over. This was addressed in session. We discussed the degree to which she drank and talked about the impact this might have on her quality of life. Kate did not engage in any other kind of drug misuse, citing her cultural background as a reason for avoidance of, particularly cannabis, a drug commonly used by many of her cohort. Kate spoke about how she had been refused from a bar the night before, a common occurrence, and had instead bought a considerable amount of alcohol at an off-licence which she then drank. She seemed surprised that this quantity could be considered excessive. Kate agreed to reduce her alcohol consumption. Table 53 shows Kate's data matrix at time 4 and the constructs elicited. Figure 38 shows Kate's life space map at time 4.

Table 53

Kate's data matrix time 4

Kate	1	2	3	1	2	1
Friend 1 (f)	2	2	1	2	1	3
Teacher 1 (f)	4	5	4	3	2	4
Acquaintance 1 (f)	4	4	1	4	4	4
Coordinator (f)	4	5	1	3	3	4
Friend 2 (f)	3	4	2	4	3	4
Brother 1	2	3	3	2	1	2
Mother	1	1	3	1	1	1
Sister 1	3	2	2	3	1	3
Teacher 2 (f)	4	5	4	4	4	1
Teacher 3 (f)	4	4	3	3	2	4
Cousin	4	1	2	3	3	2
Tutor 1 (f)	4	5	4	4	4	3
Acquaintance 2 (f)	4	4	3	4	4	4
Sister 2	5	2	2	2	1	3
Teacher 4 (f)	7	5	1	4	4	4
Acquaintance 3 (f)	2	4	1	3	3	4
Brother 2	1	3	2	2	1	2
Tutor 2 (m)	5	5	2	1	2	2
Friend 3 (f)	4	4	2	3	3	3

People who are there for me

Traditional views of love (TC)

Things (material wealth)

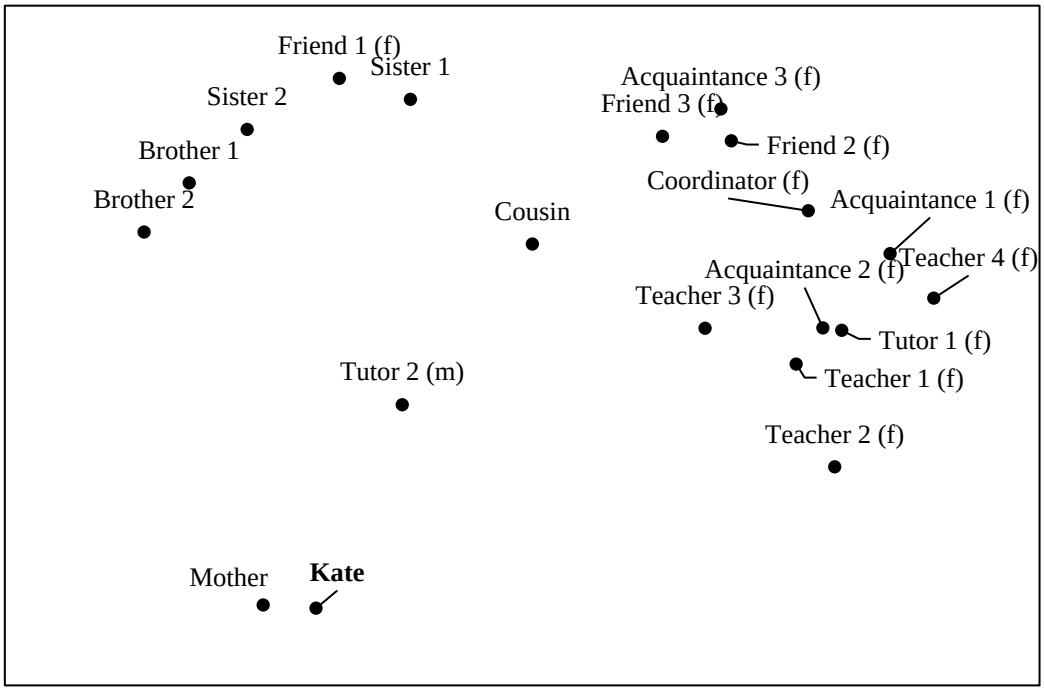
Sneaky

Friendly

Equality

Figure 38

Kate life-space map time 4



Once again there has been a considerable shift in clusters. Kate and her mother are at a distance from others on the map. This is indicative of the unpredictability of Kate's relationships with others. Lack of trust runs through Kate's maps and this is reflected in her negative positioning of a large cohort of people in the far-right corner of the map. The second construct 'traditional views of love' was elicited as a result of her experiences with dating a member of the settled community. Kate has conservative views in this regard and wants to get married and have children.

GPA analysis.

Iteration History.

Table 54

Kate iteration history

Cycle	Stress	Mean RV
1	0.0806	0.2062
2	0.0597	0.6502
3	0.1086	0.6675
4	0.1574	0.6926
5	0.174	0.7199
6	0.145	0.7421
7	0.0958	0.7562
8	0.0538	0.7638
9	0.0272	0.7675
10	0.013	0.7693
11	0.006	0.7701
12	0.0028	0.7705
13	0.0013	0.7706

Note: Fit scores fall within acceptable parameters.

Table 55

Kate fit of time 3 with time 4 with baseline centroid

Time	Weights	Fit	Uniqueness
3	1	0.2109	0.9555
4	1	0.1675	0.9719

Note. Fit is low and high uniqueness scores indicate little similarity with baseline centroid.

Table 56

Kate correlation of time 3 with time 4

		3	4
Case	3	1	0.216
Case	4	-0.171	1

Note. Correlation of time 3 with time 4 is low.

The results from GPA analysis indicate that considerable movement has occurred in Kate's life-space over the course of intervention. Reflexive analysis of her maps and

constructs, coupled with her performance during intervention suggests continued intervention on a number of fronts including literacy training and self-regulation. After the completion of the study Kate sat her driving theory test. Staff at the project had advocated on her behalf to have a reader present for the test, this was not provided. Anecdotal evidence from the studies conducted and a considerable body of research and reports suggests that members of the Traveller Community experience both individual and institutionalised barriers to engagement with education and society in general, coupled with the loss of many of the culturally important traditions they value (Boyle, Flynn & Hanafin, 2018; Hanafin , Boyle, Boyle & Flynn, 2018; McGinnity, Grotti, Kenny & Russell, 2017; Watson, Kenny & McGinnity, 2017; McGorrian, Frazer, Daly, Moore, Turner, Sweeney, Staines, Fitzpatrick & Kelleher, 2012).

This view was strongly expressed by Kate and her ability to be nomadic has been effectively curtailed by the state. Since the completion of the study Kate has married and had a child.

Chapter 8. Testing the Stability of a More Flexible GPA Methodology.

The studies presented in chapter 7 represent a sample of studies using non-weighted GPA. This approach considers that the magnitude or, size, of the shape produced using MDS across times will not vary. The assumption is that the size of constructs and number of levels of similar constructs are stable. It is a conservative approach to comparison.

It was noted during this first phase of testing the methodology that participants tend to become more discriminating in their sorting procedure across times and the number of levels produced across individual sorts increases or decreases upon deeper consideration of how the person construes their value system. This shift is an artefact of the sorting process.

In order to accommodate this shift in outward expression of what is assumed to be a stable internal construal of schema, it was decided to use weighed GPA in studies from subsequent cohorts in this research and to compare the two approaches.

An initial pilot of the second method was undertaken to examine the stability of this method. Both studies described below indicate stability across times and both yield a near perfect fit of time 3 with the centroid.

Subsequently this weighted method of analysis was used with six studies of people who underwent DA intervention using the same protocol as the first series of studies. For comparison purposes the case of Stephen (the first study in the subsequent cohort) is presented using both approaches to GPA fitting.

While both approaches give an indication of degree of movement or change across times, weighted GPA gives a clear indication of change assuming near-perfect stability of the system at rest (where no intervention takes place).

Two Pilot Studies Using Weighted GPA.

Two people were recruited to participate. Both were mature, adult females. These participants had both been in employment in their current positions for some years. Neither had specific learning difficulties. The purpose of recruiting this cohort was to test the stability of the method under conditions where change in self-concept would not be considered likely to occur.

Procedure.

Each study consisted of three card sorts. Card sorts were conducted in the same way as for previous (and subsequent studies). Cards were elicited using the same laddering techniques. Three card sorts for each study were carried out. No intervention took place between card sorts.

Analysis used MSA to produce life-space maps across three times. GPA analysis used weighted GPA to compare time 3 with a baseline centroid produced from T1 and T2.

Study 1. P1.

First card sort.

Table 57 shows P1's data matrix at time 1 and the constructs elicited. Figure 39 shows P1's life space map at time 1.

Table 57

Pilot 1 data matrix time 1

Me	2	1	1	1	1	1	1
Mother	1	1	1	1	2	1	2
Father	2	1	1	2	1	1	2
Brother	2	1	1	2	2	1	2
Husband	2	1	1	2	1	1	2
Sister-in-law 1	2	1	1	2	1	2	2
Close friend (f)	1	1	1	1	1	1	2
Past close friend (f)	2	1	1	2	2	2	2
Family friend 1 (f)	1	1	1	2	1	1	3
Family friend 2 (m)	1	1	1	2	1	1	3
Family friend 3 (m)	1	1	1	2	1	1	2
Friend 1 (f)	1	1	2	2	1	1	3
Mother-in-law	2	1	1	2	2	2	3
Father-in-law	2	1	2	2	2	2	3
Sister-in-law 2	2	2	2	1	2	2	3
Family friend 4 (f)	1	1	1	2	1	1	2
Colleague 1 (f)	1	1	1	1	1	1	1
Colleague 2 (f)	2	1	1	2	1	1	1
Colleague 3 (m)	2	1	1	2	1	1	1
Colleague 4 (m)	2	1	1	2	2	1	1
Colleague 5 (m)	2	1	1	2	2	2	1
Colleague 6 (m)	2	1	1	2	1	2	2
Colleague 7 (f)	2	1	1	1	2	2	1
Colleague 8 (m)	3	2	1	1	1	1	1
Friend 2 (m)	2	1	1	2	1	2	2
Friend 3 (f)	2	1	1	2	2	1	2
Friend 4 (m)	1	1	1	1	1	1	2
Friend 5 (m)	1	1	1	2	2	2	2
Friend 6 (m)	1	1	2	2	2	2	3
Friend 7 (m)	1	1	1	1	1	2	2
Old friend (f)	1	2	2	1	2	2	3

Honest

Friendly

Intelligent

Fitness

Financial acumen

Efficient

Effective Altruism

Figure 39

Pilot 1 life-space map time 1

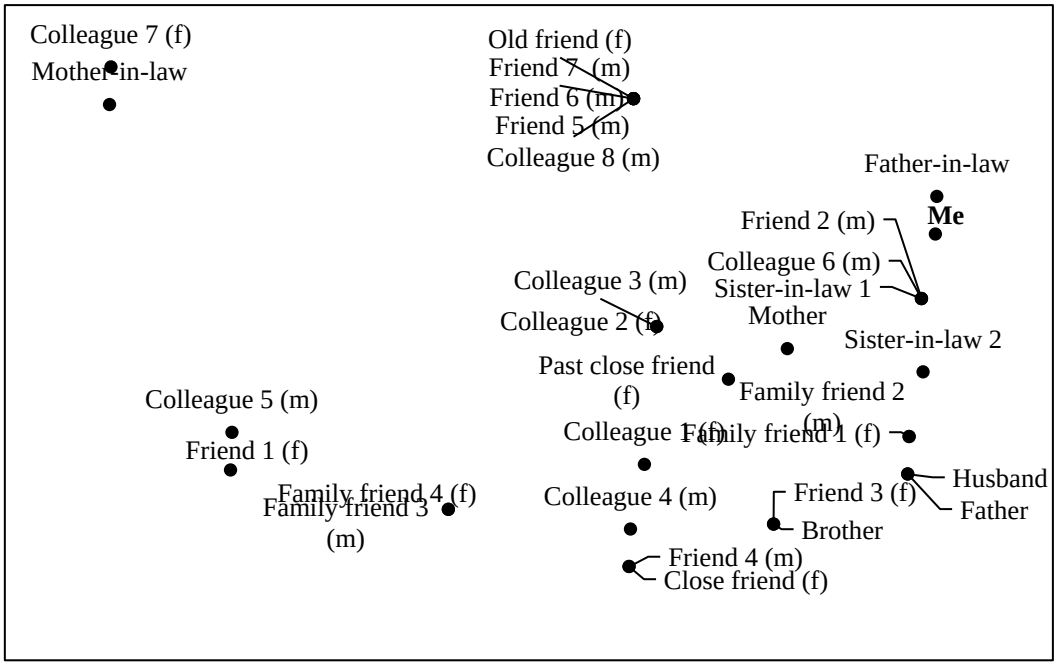


Table 58 shows P1's data matrix at time 2 and the constructs elicited. Figure 40 shows P1's life space map at time 2.

Table 58

Pilot 1 data matrix time 2

Me	1	1	1	1	1	3	1
Mother	2	1	1	2	2	1	1
Father	1	3	1	2	1	3	1
Brother	1	3	1	2	2	1	1
Husband	1	3	1	2	2	1	1
Sister-in-law 1	1	3	1	3	2	2	2
Close friend (f)	2	3	1	1	2	2	2
Past close friend (f)	3	3	1	2	2	1	1
Family friend 1 (f)	3	1	2	3	2	2	2
Family friend 2 (m)	1	1	2	3	2	2	2
Family friend 3 (m)	1	1	1	2	1	2	2
Friend 1 (f)	1	1	2	3	2	2	2
Mother-in-law	2	3	2	3	1	1	2
Father-in-law	2	3	2	3	1	3	1
Sister-in-law 2	2	3	2	2	1	2	3
Family friend 4 (f)	3	1	2	3	1	1	2
Colleague 1 (f)	1	3	1	2	1	3	1
Colleague 2 (f)	2	1	1	3	1	2	1
Colleague 3 (m)	2	3	1	2	1	2	1
Colleague 4 (m)	2	3	1	2	1	2	1
Colleague 5 (m)	2	3	1	3	1	2	1
Colleague 6 (m)	2	1	1	2	1	2	2
Colleague 7 (f)	2	1	1	3	2	2	2
Colleague 8 (m)	3	3	1	1	1	2	1
Friend 2 (m)	2	1	1	2	1	3	1
Friend 3 (f)	2	1	1	3	2	2	2
Friend 4 (m)	2	1	1	2	1	1	1
Friend 5 (m)	1	3	1	3	2	2	3
Friend 6 (m)	1	3	2	2	1	3	3
Friend 7 (m)	2	3	1	2	1	2	2
Old friend (f)	1	2	2	2	2	2	3
Honest							
Friendly							
Intelligent							
Fitness							
Financial Acumen							
Artistic creativity							
Thinking creativity							

Figure 40

Pilot 1 life-space map time 2

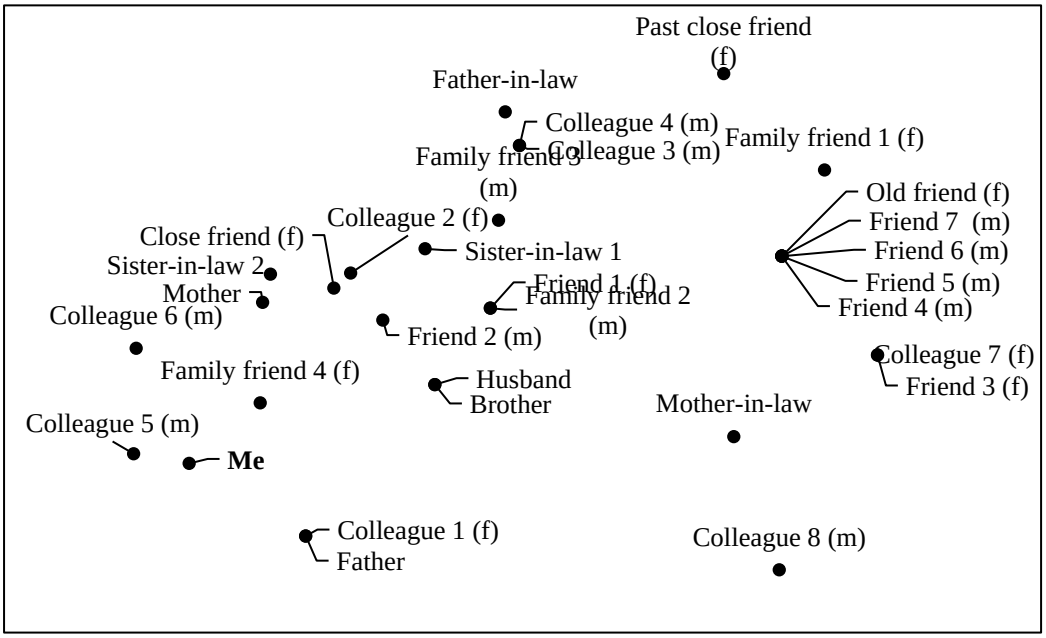


Table 59 shows P1's data matrix at time 3 and the constructs elicited. Figure 41 shows P1's life space map at time 3.

Table 59

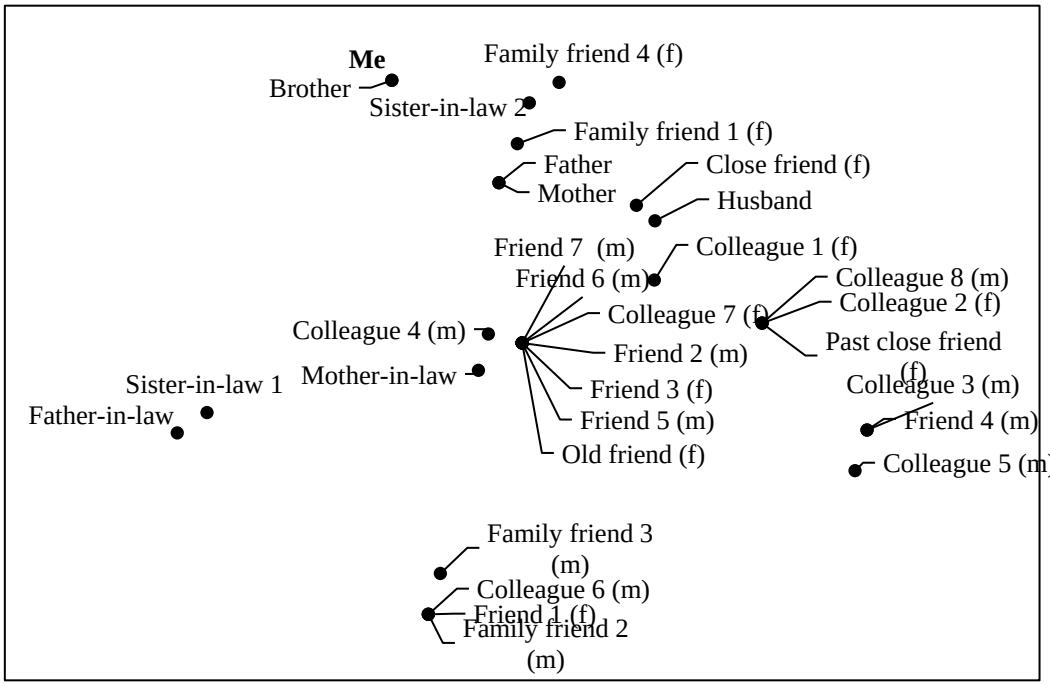
Pilot 1 data matrix time 3

Me	1	1	3	2	2
Mother	1	1	3	2	1
Father	1	1	3	2	1
Brother	1	1	3	2	2
Husband	2	2	3	2	1
Sister-in-law 1	1	2	3	2	2
Close friend (f)	2	1	2	2	2
Past close friend (f)	1	2	3	1	3
Family friend 1 (f)	1	1	2	2	1
Family friend 2 (m)	2	1	2	2	1
Family friend 3 (m)	1	1	1	2	2
Friend 1 (f)	2	1	2	2	1
Mother-in-law	2	2	1	2	3
Father-in-law	2	2	2	2	3
Sister-in-law 2	2	2	2	3	3
Family friend 4 (f)	1	2	1	2	1
Colleague 1 (f)	1	2	3	2	3
Colleague 2 (f)	1	2	3	1	3
Colleague 3 (m)	1	1	2	2	2
Colleague 4 (m)	1	1	2	1	2
Colleague 5 (m)	2	1	3	1	1
Colleague 6 (m)	2	1	2	2	1
Colleague 7 (f)	2	1	2	1	1
Colleague 8 (m)	1	2	3	1	3
Friend 2 (m)	2	1	2	3	1
Friend 3 (f)	1	2	2	3	2
Friend 4 (m)	1	1	2	2	2
Friend 5 (m)	2	1	1	3	1
Friend 6 (m)	2	1	1	2	1
Friend 7 (m)	2	1	2	1	1
Old friend (f)	2	1	1	2	1

Thoroughness
Empathy
Religiosity
Monetary Wealth
Generosity of spirit

Figure 41

Pilot 1 life-space map time 3



GPA analysis.

Iteration History.

Table 60

Pilot 1 iteration history

Cycle	Stress	Mean RV
1	1.2002	0
2	0	1

Note: Fit scores are perfect.

Table 61

Pilot 1 fit of time 3 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.000	1.000	0.000

Note. There is perfect fit between time 3 and time 4.

The issue identified with the first group of studies using non-weighted GPA is apparent particularly in the first study presented here. The initial card sort session consists of sorts using primarily two levels (one construct consists of three levels). Of the seven constructs generated only Honesty and Effective Altruism has three levels. Subsequent sorts indicate a higher degree of discrimination of people. In sort two, for example, five out of six constructs consist of three levels. Results from GPA analysis of time three with a centroid configuration (time one and two collapsed into a common space) indicate that very low stress and a perfect fit of time three with baseline.

Study 2. P2.

Table 62 shows P2's data matrix at time 1 and the constructs elicited. Figure 42 shows P2's life space map at time 1.

Table 62

Pilot 2 data matrix time 1

Me	1	1	1	3	2	1	1
Friend 1 (f)	1	1	2	3	3	2	1
Friend 2 (f)	1	1	1	3	2	2	2
Ex-husband	2	2	3	1	3	3	1
Friend 3 (f)	2	1	2	2	3	2	2
Friend 4 (f)	1	1	2	3	2	1	1
Partner's daughter 1	1	1	1	3	2	2	1
Friend 5 (f)	1	2	1	3	2	2	1
Friend 6 (f)	1	3	2	2	3	2	1
Friend 7 (f)	1	2	1	3	2	1	1
Friend 8 (f)	1	1	1	3	2	2	1
Friend 9 (m)	1	2	1	3	3	2	1
Friend 10 (m)	1	1	1	3	2	1	1
Friend 11 (f)	2	3	3	3	2	1	1
Friend 12 (f)	1	2	3	2	1	2	1
Friend 13 (f)	1	1	2	1	1	1	1
Friend 14 (f)	1	2	3	2	1	2	1
Friend 15 (f)	2	2	3	2	1	2	2
Partner's daughter 2	1	2	1	3	2	2	1
Partner	1	1	2	3	2	2	2
Friend 16 (f)	1	1	2	2	2	2	1
Co-worker 1 (f)	1	2	1	3	2	1	1
Mother	2	3	3	1	3	1	1
Friend 17 (f)	2	3	3	3	3	2	2
Father	1	1	1	3	2	1	1
Boss (f)	2	3	3	1	3	1	1
Co-worker 2 (f)	2	3	3	2	3	2	1
Friend 18 (f)	1	1	2	3	2	2	1
Friend 19 (m)	1	3	1	3	2	2	1
Friend 20 (f)	1	1	1	3	2	2	1
Co-worker 3 (f)	1	3	2	2	3	2	1
Co-worker 4 (f)	1	1	1	2	1	3	1
Friend 21 (m)	2	3	1	3	3	1	1
Friend 22 (f)	2	2	3	3	2	3	1

Kindness

Affection

Sociable

Self-esteem

Humility

Wealth

Health

Figure 42

Pilot 2 life-space map time 1

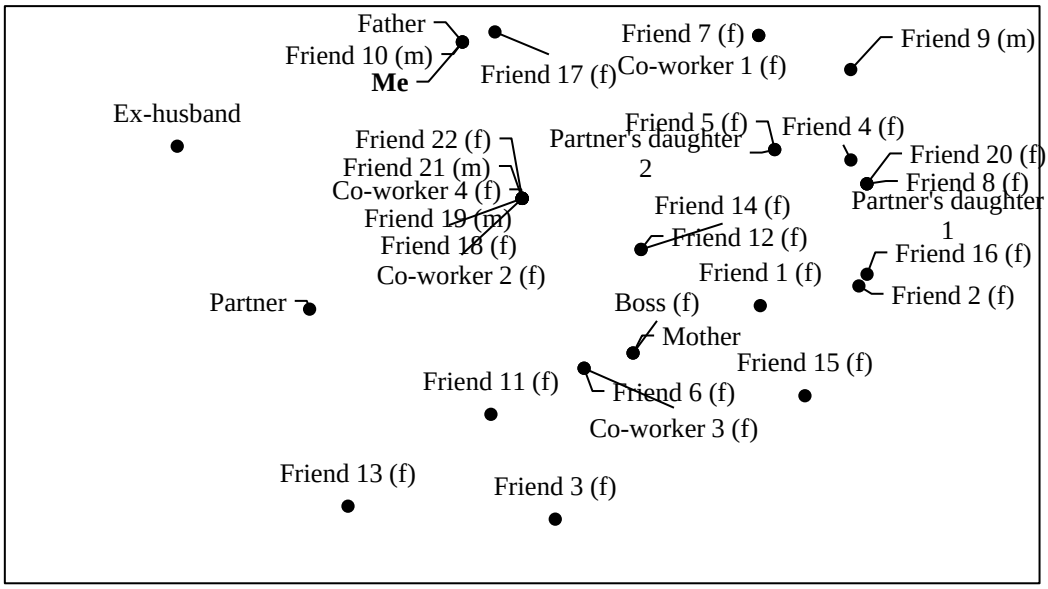


Table 63 shows P2's data matrix at time 2 and the constructs elicited. Figure 43 shows P1's life space map at time 2.

Table 63

Pilot 2 data matrix time 2

Me	1	1	2	1	4	1	1
Friend 1 (f)	2	1	2	2	3	2	2
Friend 2 (f)	1	1	3	1	4	1	2
Ex-husband	3	2	3	2	2	2	1
Friend 3 (f)	2	2	4	1	2	1	2
Friend 4 (f)	1	1	1	1	4	1	1
Partner's daughter 1	2	1	1	1	3	1	1
Friend 5 (f)	3	2	2	2	2	2	2
Friend 6 (f)	3	1	2	3	2	2	1
Friend 7 (f)	2	2	1	1	4	1	1
Friend 8 (f)	3	1	3	2	4	1	1
Friend 9 (m)	2	1	2	1	3	2	1
Friend 10 (m)	3	2	2	3	2	2	2
Friend 11 (f)	3	1	1	1	3	1	1
Friend 12 (f)	2	1	3	1	3	1	1
Friend 13 (f)	3	1	3	2	3	1	1
Friend 14 (f)	2	2	3	2	3	1	2
Friend 15 (f)	2	1	3	2	3	1	2
Partner's daughter 2	2	1	1	1	4	1	1
Partner	2	1	2	1	4	1	1
Friend 16 (f)	2	1	2	1	3	1	1
Co-worker 1 (f)	3	1	2	2	3	1	1
Mother	3	2	3	2	2	2	1
Friend 17 (f)	3	2	4	2	3	1	2
Father	2	1	3	1	3	1	1
Boss (f)	3	2	3	2	2	2	2
Co-worker 2 (f)	3	1	2	2	2	2	1
Friend 18 (f)	2	1	2	1	3	1	1
Friend 19 (m)	2	1	2	1	4	1	1
Friend 20 (f)	1	1	1	1	4	1	1
Co-worker 3 (f)	2	1	2	2	3	2	1
Co-worker 4 (f)	1	1	2	2	4	1	1
Friend 21 (m)	3	1	2	2	2	2	1
Friend 22 (f)	2	2	3	1	3	2	2

Openness

Emotional maturity

Autonomy

Self-awareness

Arrogance

Ego

Boundaries

Figure 43

Pilot 2 life-space map time 2

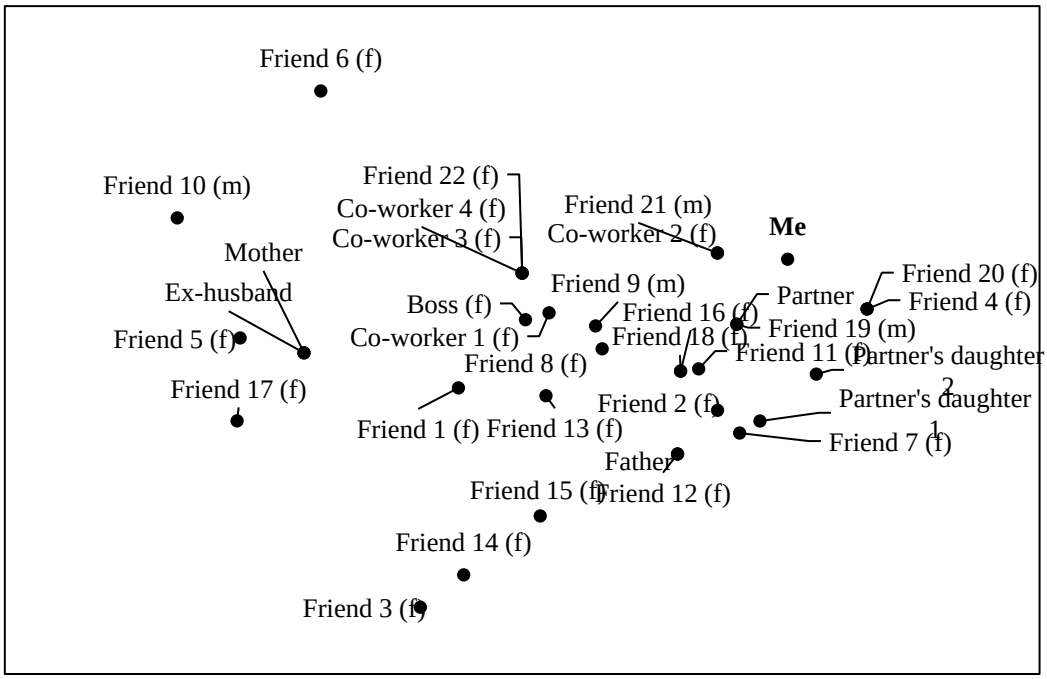


Table 64 shows P2's data matrix at time 3 and the constructs elicited. Figure 44 shows P1's life space map at time 3.

Table 64

Pilot 2 data matrix time 3

Me	2	4	2	2	1	3
Friend 1 (f)	2	2	2	3	2	2
Friend 2 (f)	1	2	2	2	1	3
Ex-husband	1	1	2	1	2	1
Friend 3 (f)	2	4	2	1	2	1
Friend 4 (f)	1	1	2	2	1	3
Partner's daughter 1	1	2	2	2	1	2
Friend 5 (f)	2	3	2	2	2	3
Friend 6 (f)	2	3	2	2	2	1
Friend 7 (f)	1	2	2	2	1	3
Friend 8 (f)	1	3	2	2	1	1
Friend 9 (m)	1	2	2	2	2	2
Friend 10 (m)	1	3	2	2	1	1
Friend 11 (f)	1	2	2	1	2	1
Friend 12 (f)	1	3	2	2	1	2
Friend 13 (f)	2	2	2	2	1	2
Friend 14 (f)	2	2	2	1	2	2
Friend 15 (f)	1	2	2	1	2	1
Partner's daughter 2	1	2	2	2	1	3
Partner	1	2	2	2	1	3
Friend 16 (f)	1	2	2	2	1	3
Co-worker 1 (f)	1	2	2	3	1	3
Mother	1	2	2	1	2	1
Friend 17 (f)	2	3	1	1	2	1
Father	1	4	2	1	2	3
Boss (f)	1	3	2	1	1	2
Co-worker 2 (f)	2	3	1	1	2	1
Friend 18 (f)	2	3	2	3	2	2
Friend 19 (m)	1	3	2	1	2	3
Friend 20 (f)	1	2	2	3	1	2
Co-worker 3 (f)	1	2	2	1	2	2
Co-worker 4 (f)	1	2	2	1	2	1
Friend 21 (m)	1	3	2	1	2	1
Friend 22 (f)	2	3	2	3	1	3

Inner peace

Mindful Honest

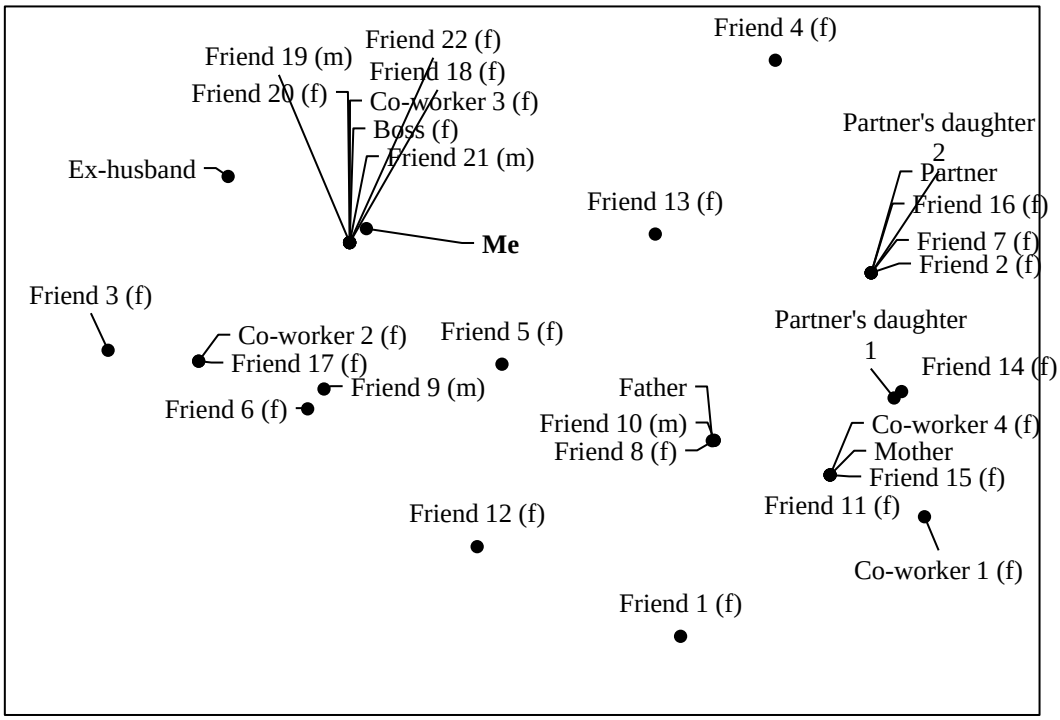
Conventional

Acceptance

Materialism

Figure 44

Pilot 2 life-space map time 3



GPA analysis.

Iteration History.

Table 65

Pilot 2 iteration history

Cycle	Stress	Mean RV
1	2.5321	0.000
2	0.000	1.000

Note. Fit scores are perfect.

Table 66

Pilot 2 fit of time 3 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.000	1.000	0.000

Note. There is a perfect fit between time 3 and time 4.

Once again in this second pilot study the person shows increasing discrimination across people as the sessions progress, with primarily three levels across constructs in the first session and four in the second. While stress is higher prior to iteration (rotation of the vectors on a point of origin for best fit) only two iterations are needed to achieve a high goodness of fit. There is a perfect fit for time three with the baseline configuration.

These results indicate that weighted GPA produces life-space maps across time with a high degree of consistency. Both studies give a perfect fit of time three with the centroid configuration. This finding is particularly interesting given that a fully open card-sort method was used, and number of levels differ across time. The increase in discrimination of constructs, that is the number of levels of constructs increasing across times is interesting. In all this pattern, of increased discrimination in sorting, was observed in ten out of the sixteen studies presented here. Further studies

examining the stability of this method are warranted, however these findings give weight to the assertion that the system is stable unless something new, such as an intervention, is introduced.

Results from six Studies Using Weighted GPA.

Ethics.

Ethics approval was granted for this study from UCC School of Applied Psychology Ethics committee. Procedures adhered to the PSI code of Ethics (2010). This cohort was drawn from a primary school therefore parental consent was obtained for all the participants. An information sheet and consent form were sent to parents through the school which was then returned to the school. Participants gave written consent at the start of the study and at each session were asked if they wished to continue. Sessions took place in the school and although the location varied, sessions were always observable by a third party. Of the ten children identified by the school as being suitable for the study, consent was given by parents or guardians of eight. Of those eight, six completed the study. Since the onset of these studies GDPR regulations have been introduced in Ireland. Data is stored in such a way as to prevent identification of participants (i.e. codebooks, data and identifiers are separated). FAIR guidelines are also followed and data matrices conforming to GDPR guidelines are available on request.

Stephen – a comparison of two approaches to fitting the life-space maps to a common space.

Stephen was thirteen at the time of the study and was in his final year of primary school. He had been held back a year as his performance was considered to be poor. It was the opinion of his educators that Stephen may have Asperger's syndrome (high functioning autism). He was described as largely uncommunicative, a loner who rarely made eye contact. He was awaiting assessment by an educational psychologist and had also been referred to and was awaiting an appointment with an occupational therapist.

Although reportedly uncommunicative, Stephen engaged very quickly during the first session. The generation of cards for sorting, where the relationship of people named with the participant is clarified, generates information quickly but also results in the participant engaging with the mediator. The process of generating the cards, it seems, distances the participant from the sometimes-sensitive nature of the information they are imparting. It is therefore essential that this process is carried out in a sensitive manner in a safe space.

Stephen lived at home with his mother, brother and three sisters. He had little contact with his biological father, a member of the Travelling community. His mother and stepfather, a member of a Muslim ethnic community, had recently separated. Stephen was not clear as to the parentage of his younger siblings.

Table 67 shows Stephen's data matrix at time 1 and the constructs elicited. Figure 45 shows Stephen's life space map at time 1.

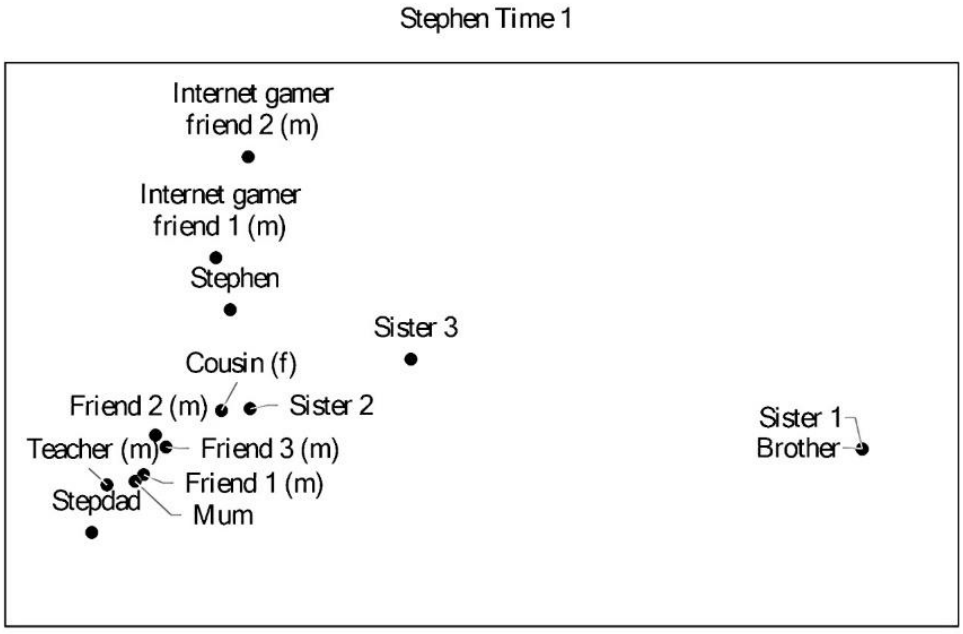
Table 67

Stephen's data matrix time 1

Stephen	5	4	5	5
Friend 1 (m)	3	2	3	1
Stepdad	4	2	4	3
Sister 1	1	1	6	4
Sister 2	4	3	6	4
Internet gamer friend 1 (m)	1	2	6	4
Friend 2 (m)	3	3	7	7
Brother	3	5	7	8
Friend 3 (m)	2	2	1	2
Internet gamer friend 2 (m)	2	1	8	6
Mum	2	3	8	9
Teacher (m)	1	2	2	3
Sister 3	6	4	5	5
Cousin (f)	3	4	2	3
Self-regulation				
Smart				
Liking				
Supportive				

Figure 45

Stephen life-space map time 1



This is Stephen's first life-space map.This methodology results in a large amount of information being gathered in a short space of time and as such a sketch of Stephen's world quickly coalesced. Stephen, it transpired, spends a great deal of time gaming on the internet. The two internet gamer friends depicted on the map live in the USA. Stephen spent much of his night gaming online and got little sleep (two hours by his own estimate). This dynamic is clearly reflected in his life-space map where he identifies most strongly with his internet gamer friends. This region on the map is delineated by poor signature scores (signature scores are the collection of scores of any one individual across constructs in any given session) and can be construed as a negative space. Perhaps more interestingly there is a large cluster of people between who there is little discrimination, Stephen views this group as all being similar (except for his brother and sister), despite these individuals being from disparate groups – family, school friends and teachers. Table 68 shows Stephen's data matrix at time 2 and the constructs elicited. Figure 46 shows Stephen's life space map at time 2.

Table 68

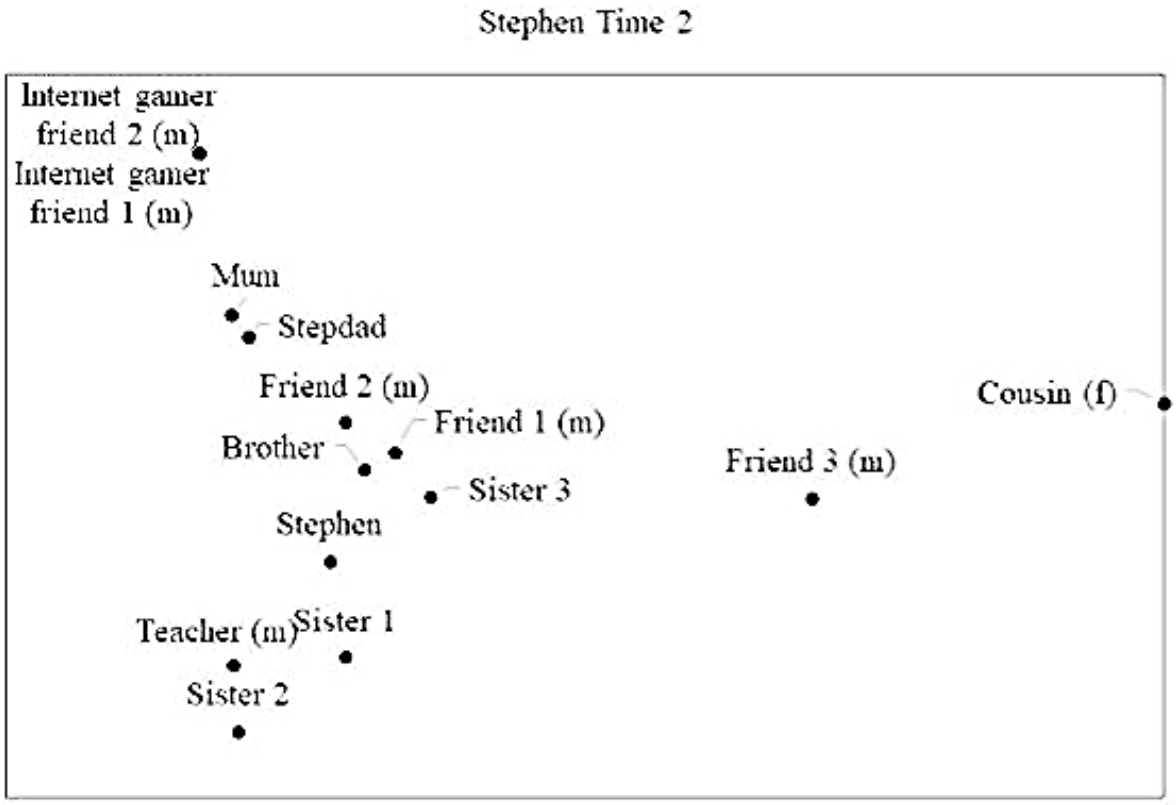
Stephen's data matrix time 2

Stephen	2	4	2	3
Friend 1 (m)	1	4	3	2
Stepdad	1	3	6	6
Sister 1	7	5	2	5
Sister 2	7	6	4	3
Internet gamer friend 1 (m)	5	3	5	4
Friend 2 (m)	5	1	3	3
Brother	2	1	6	5
Friend 3 (m)	6	2	3	5
Internet gamer friend 2 (m)	5	3	5	4
Mum	3	2	1	1
Teacher (m)	4	1	5	6
Sister 3	7	5	4	6
Cousin (f)	6	1	2	2

Motivation
Sociable
Kind
Generous

Figure 46

Stephen life-space map time 2



In the second map (Figure 8) we can see movement in Stephen's perception of himself. His signature score is more positive, and he identifies more strongly with physically closer people such as his sisters and brother. Interestingly he sees his internet gamer friends as the same (they have the same signature score).

Table 69 shows Stephen's data matrix at time 3 and the constructs elicited. Figure 47 shows Stephen's life space map at time 3.

Table 69

Stephen's data matrix time 3

Stephen	3	3	4	3
Friend 1 (m)	5	2	2	2
Stepdad	4	1	7	4
Sister 1	2	4	7	4
Sister 2	6	2	3	4
Internet gamer friend 1 (m)	7	1	4	2
Friend 2 (m)	1	3	5	1
Brother	4	4	5	4
Friend 3 (m)	1	3	5	1
Internet gamer friend 2 (m)	7	1	6	2
Mum	2	2	1	4
Teacher (m)	1	1	2	5
Sister 3	6	4	7	4
Cousin (f)	4	3	3	2

Quick to temper

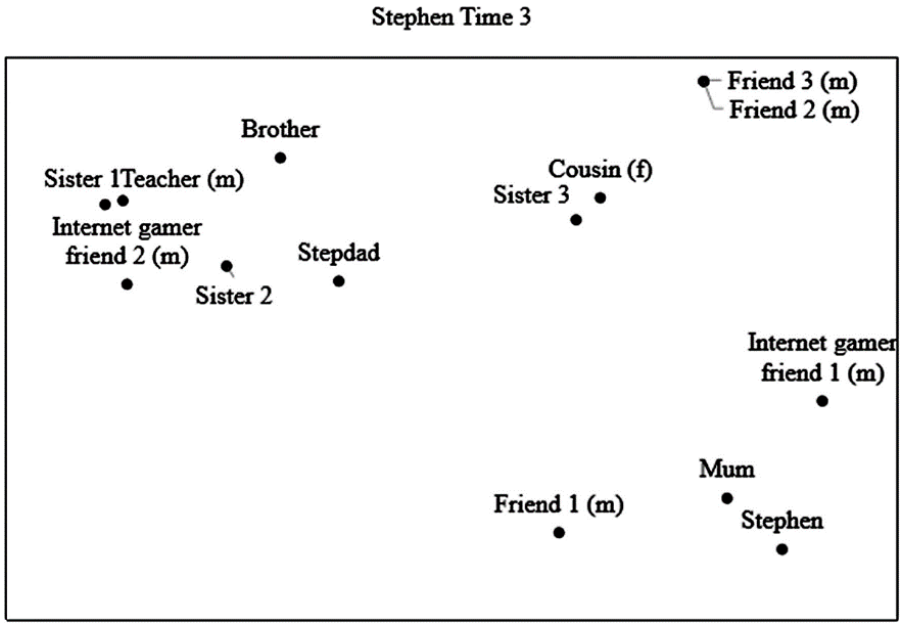
Mellow happy

Creativity

Rebels

Figure 47

Stephen life-space map time 3



The third map (Figure 47) is a representation of Stephen's construal of his world after three sessions of intervention. The primary focus of DA is to maximise learning potential for the person. Given that one of Stephen's barriers to learning was lack of sleep, this was addressed during intervention. Stephen clearly valued his time gaming and felt understood within that environment. He was particularly interested in computer coding and wrote his own 'hacks' for the games he played. He was particularly open to suggestions about how he could manage his time and agreed to get more sleep at night. He also engaged in the cognitive puzzles and memory exercises and was genuinely interested in how they worked. He had little interest in academic work at this time and professed to feeling bored in school. In this map Stephen identifies most closely with his mother and Friend 1 - a friend he also sees outside of school. This area of the map is denoted by scores which are a mix of positive and negative across constructs.

Table 70 shows Stephen's data matrix at time 4 and the constructs elicited. Figure 48 shows Stephen's life space map at time 4.

Table 70

Stephen's data matrix time 4

Stephen	1	1	2	1
Friend 1 (m)	4	2	5	3
Stepdad	5	1	5	4
Sister 1	5	6	5	4
Sister 2	4	3	2	3
Internet gamer friend 1 (m)	3	6	3	2
Friend 2 (m)	4	5	2	5
Brother	6	4	4	5
Friend 3 (m)	4	5	1	3
Internet gamer friend 2 (m)	3	6	3	2
Mum	2	2	1	4
Teacher (m)	5	4	1	5
Sister 3	3	5	4	3
Cousin (f)	3	3	1	1

Loyalty

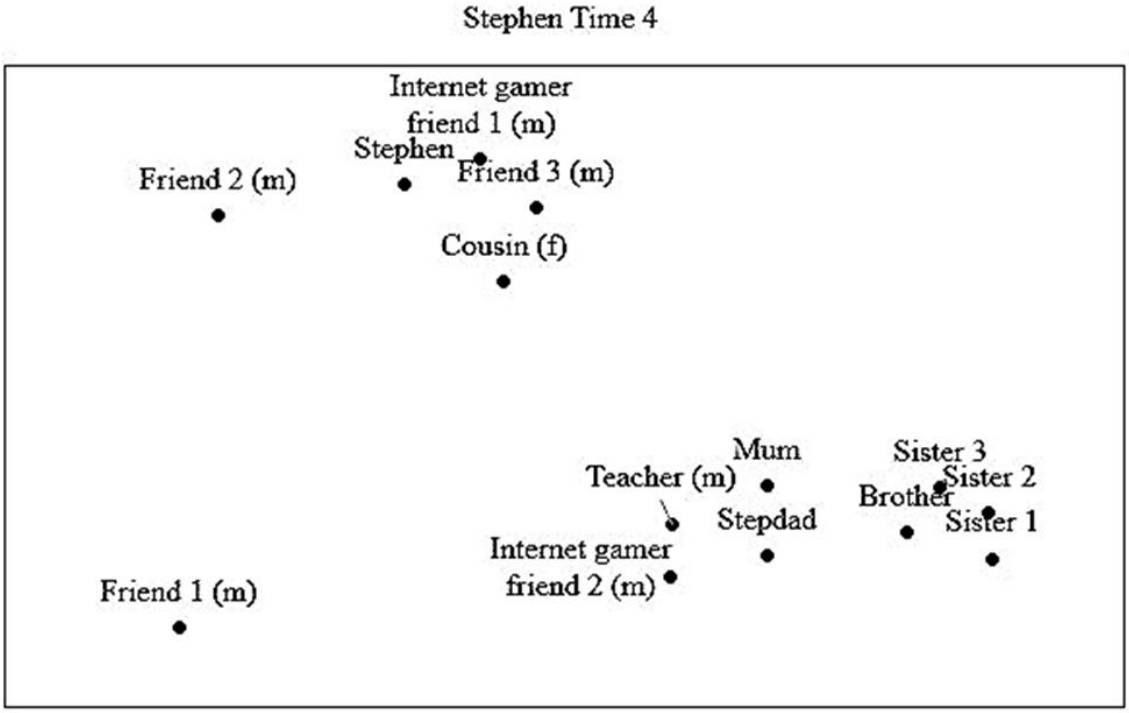
Passionate about something

Openness to other cultures

Appearance

Figure 48

Stephen life-space map time 4



This fourth and final map (Figure 48) indicates that Stephen sees himself in a more positive light than at the onset of the study. There is considerable movement in maps across times and the complex signature scores of individuals mean that construal of regions of the map is not a black-and-white exercise. There is no one person Stephen sees as ‘all good’ or ‘all bad’ and this is something that is unusual. While his teacher scores highly in ‘open to other cultures’ this individual does not excel in other constructs. This is true for many of the people in his world. Likewise, his cousin scores a one on this construct but is not seen as loyal or passionate. While the map indicates that Stephen identifies ‘most closely’ with his stepdad, their signature scores differ considerably, and GP analysis is necessary to give an indication of distances of people from each other and exactly how maps are similar or different across time.

Stephen's construal is interesting for a number of reasons. Firstly, he tends not to collapse positive scores on constructs with liking a person, something that was otherwise common with this younger cohort. His forthrightness is reflected in the signature scores of the people in his world. Guttman (1985) describes these scores as a 'structuple'. For example, Stephen's signature score at Time 1 is 5,4,5,5 and falls towards the negative end of each construct. His scores at T4 are 1,1,2,1 and are all at or nearing the most positive scores for each construct. Comparing the structuples of people with their position on the maps allows for the interpretation of positive and negative spaces, or in this case, subtler differences where Stephen views a person as mostly positive but gives them a low score for one construct (such as 'quick to temper').

There seems to be an increase in how Stephen discriminates between people in his life – the first map (Figure 45) suggests that he sees little difference in a large cluster of people. Given that the number of levels Stephen uses across the card-sort process does not differ appreciably over the course of the study, this increase in discrimination of people is most likely due to intervention. He also moves away from identifying with his online friends and moves towards identifying more closely with people with which he has daily contact.

These findings suggest that considerable change has taken place in Stephen's construal of his subjective reality over the course of intervention. One of the reasons for this is the change in his own self-perception over the course of intervention. Using a reflexive technique of examining Stephen's signature scores across matrices; his position on the map in relation to others and his perception of those people and their strengths and weaknesses coupled with the results of GP analysis, suggests considerable change in Stephen's perception of himself for the better.

GPA analysis.

Table 71

Stephen iteration history unweighted

Cycle	Stress	Mean RV
1	1.1163	0.2841
2	0.0185	0.8077
3	0.0117	0.8093
4	0.0032	0.8097
5	0.0009	0.8098

Note. This data set reaches optimal goodness-of-fit after 5 iterations at .81 suggesting that times 1 and 2 have high similarity. This suggests a high degree of stability in Stephen's perception of his world and the people in it.

Table 72

Stephen fit of time 3 and time 4 with baseline centroid unweighted

Time	Weights	Fit	Uniqueness
3	1	0.4413	0.8052
4	1	0.3369	0.8865

Note. Fit is poor and uniqueness is high suggesting movement in Stephen's system.

Table 73 shows the goodness-of-fit for each of the subsequent sorts with the centroid configuration.

Table 73

Stephen fit of time 3 and time 4 with baseline centroid unweighted

Time	Weights	Fit	Uniqueness
3	1	0.4413	0.8052
4	1	0.3369	0.8865

Note. As can be seen fit is poor at .44 and .34 for T3 and T4 respectively. Poor fit at T4 with centroid suggests a continued change in Stephen's life space.

The decrease in goodness-of-fit across times coupled with an increase in uniqueness (sometimes described as weirdness or error) suggests considerable change has occurred across times.

Table 74

Stephen correlation of time 3 with time 4 unweighted

		3	4
Case	3	1	0.155
Case	4	0.289	1

Note. There is a low correlation of time three with time four.

Finally, we can examine the correlation of T3 with T4. In Table 3, the number above the diagonal is the result before iteration takes place. The number below the diagonal is the figure of interest here. At .29 we can see that there is low correlation between times 3 and 4 indicating considerable movement between these times. When taken collectively, the output from both Tables 2 and 3 all suggest that change has indeed taken place across time and the nature of this change can be deduced by studying the life-space maps over time.

GPA using weighted measures.

Iteration History.

Table 75

Stephen iteration history weighted

Cycle	Stress	Mean RV
1	0.3705	0.1607
2	0.0004	0.7485

Note. Stress is very low, the mean RV, while being above .7 is acceptable

Table 76

Stephen fit of time 3 and 4 with baseline centroid weighted

Case	Weights	Fit	Uniqueness
3	0.9914	0.6476	0.5806
4	1.0086	0.8495	0.2784

Note. Relationships between Cases Before (below diagonal) and After (above diagonal)

Fit at time 3 is poor, however fit scores at time 4 may indicate less change compared to time 3.

These results, as expected, indicate a better fit overall with the centroid. However, the direction of fit changes from poor to better between times three and four while the original methodology indicates little change in fit/uniqueness across times. Inspection of the life-space maps suggests that this second methodology might better reflect similarity and difference across maps. In map 4 we can see that Stephen still identifies with one of his gamer friends for example, clustering appears to have greater similarity with times 1 and 2 than with time 3. It is likely at small differences as indicated in the first methodology directionality of change must be treated with caution.

Relationships between Cases Before (below diagonal) and After (above diagonal)

Table 77

Stephen correlation of time 3 with time 4 weighted

-	3	4
Case 3	1	0.148
Case 4	0.148	1

Note. There is little similarity between time 3 and time 4.

Once again there is low correlation between times three and four, suggesting that Stephen's construal system is still in flux. This suggests further intervention is warranted.

Harry.

Harry, aged 11, gave multiple accounts of being bullied by peers. On first meeting Harry occurred as open and friendly. He was awaiting an appointment with a clinical psychologist. Over the course of intervention Harry was eager to engage and was talkative. He often went off-track during the card development phase to talk about his experiences, particularly with peers he was having difficulty within school. He has an older brother and had a twin (John, on the maps), who had died at a very young age. Despite the young age of the loss of his twin Harry elected to sort him during the card-sort procedure. It is interesting that he seems to have a negative view of his twin.

Harry's first card sort is outlined in table 78. Figure 49 shows Harry's life space map at time 1.

Table 78

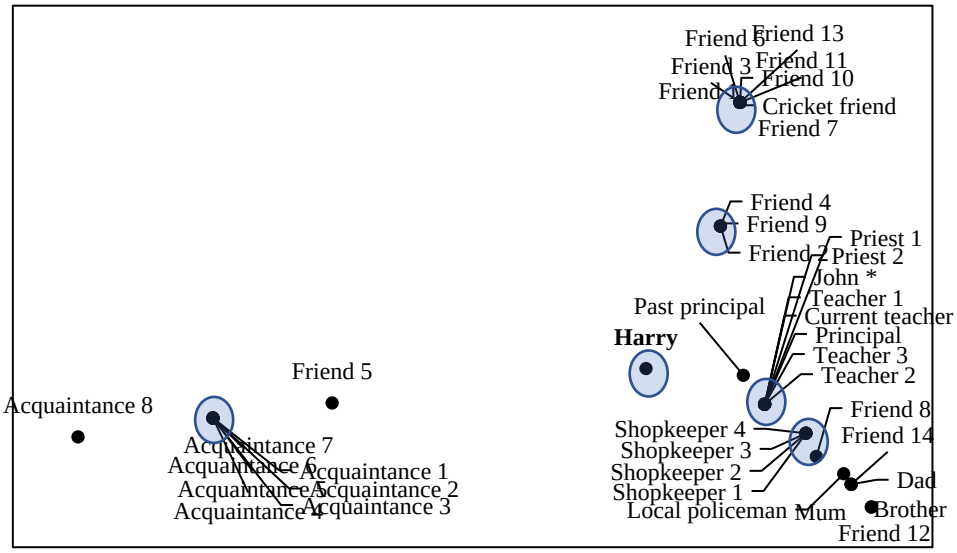
Harry's data matrix time 1

Harry	3	2	3
Mum	1	1	1
Shopkeeper 1	4	3	2
Shopkeeper 2	4	3	2
Acquaintance 1	7	6	7
Friend 1	2	5	5
John *	5	2	2
Acquaintance 2	7	6	7
Acquaintance 3	7	6	7
Friend 2	3	5	6
Friend 3	2	5	5
Acquaintance 4	7	6	7
Acquaintance 5	7	6	7
Friend 4	3	5	6
Friend 5	7	6	3
Priest 1	5	2	2
Priest 2	5	2	2
Teacher 1	6	2	2
Acquaintance 6	7	6	7
Friend 6	2	5	5
Friend 7	2	5	5
Friend 8	1	2	1
Brother	1	4	4
Cricket friend	2	5	5
Acquaintance 7	7	6	7
Current teacher	6	2	2
Past principal	3	2	2
Shopkeeper 3	4	3	2
Principal	6	2	2
Teacher 2	6	2	2
Teacher 3	6	2	2
Friend 9	3	5	6
Dad	1	1	1
Friend 10	2	5	5
Friend 11	2	5	5
Acquaintance 8	8	7	7
Friend 12	1	4	4
Friend 13	2	5	5
Local police officer	4	1	1
Shopkeeper 4	4	3	2
Friend 14	1	1	1

Who I like
Empathy
Get into trouble

Figure 49

Harry life-space map time 1



There are very clear groupings in Harry's map at time one. A large group of acquaintances whom Harry has an adversarial relationship with are shown in the bottom left of the map. A group of Harry's friends are depicted at the top right-hand corner of the map. Although Harry is distanced from people on the map, he identifies most closely with adults in his world, particularly his teachers and the local priest. His father and friend 14 have idealised scores on the map. He scores himself as 3 on 'who I like'.

Harry recounted many instances of him being bullied and harassed by a cohort of his peers, he confided these experiences with his teachers, the local policeman and, by his own account often avoided the group after school by running into the local shop. He has a positive image of his mum, dad, and friend 14. Table 79 shows Harry's data matrix at time 2 and the constructs elicited. Figure 50 shows Harry's life space map at time 2.

Table 79

Harry's data matrix time 2

Harry	1	2	1
Mum	1	2	1
Shopkeeper 1	2	4	1
Shopkeeper 2	2	4	1
Acquaintance 1	8	7	4
Friend 1	6	5	4
John *	3	2	3
Acquaintance 2	8	7	4
Acquaintance 3	6	5	4
Friend 2	7	3	2
Friend 3	6	5	3
Acquaintance 4	6	3	2
Acquaintance 5	8	7	4
Friend 4	7	3	2
Friend 5	6	3	2
Priest 1	3	1	4
Priest 2	3	1	4
Teacher 1	4	3	3
Acquaintance 6	8	7	4
Friend 6	5	5	2
Friend 7	6	5	3
Friend 8	5	3	2
Brother	1	2	1
Cricket friend	6	6	3
Acquaintance 7	8	7	4
Current teacher	4	3	3
Past principal	1	1	1
Shopkeeper 3	2	4	1
Principal	4	3	3
Teacher 2	4	3	3
Teacher 3	4	3	3
Friend 9	7	3	2
Dad	1	2	1
Friend 10	6	5	3
Friend 11	6	3	2
Acquaintance 8	8	6	4
Friend 12	1	3	1
Friend 13	5	2	2
Local police officer	1	3	1
Shopkeeper 4	2	4	1
Friend 14	1	2	1

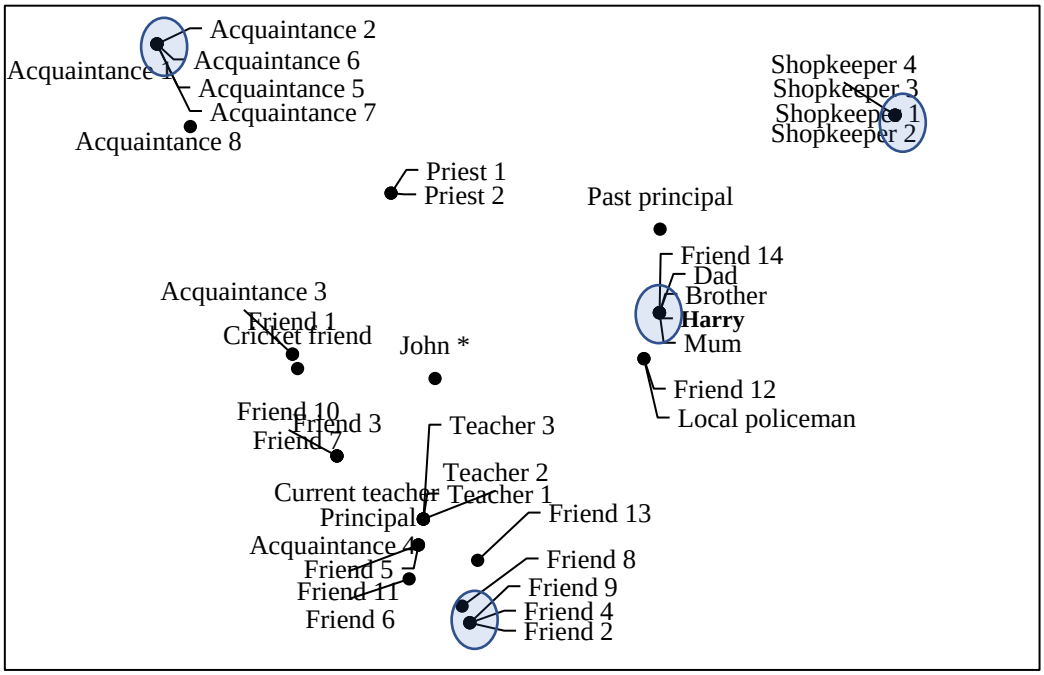
Friendly

Likely to get into trouble!

Trust

Figure 50

Harry life-space map time 2



The past principal of Harry's school represents an idealised person in this map. His dad, mum and friend 14 have consistently positive signature scores. Again, Harry had high levels of energy and would get very animated when recounting his experiences with his acquaintance peers. He was less inclined to talk about himself. Table 80 shows Harry's data matrix at time 3 and the constructs elicited. Figure 51 shows Harry's life space map at time 3.

Table 80

Harry's data matrix time 3

Harry	2	3	1	2
Mum	3	1	1	1
Shopkeeper 1	1	5	4	3
Shopkeeper 2	1	5	5	3
Acquaintance 1	6	7	9	5
Friend 1	4	4	6	4
John *	2	4	4	3
Acquaintance 2	6	8	9	5
Acquaintance 3	5	4	5	4
Friend 2	5	3	5	4
Friend 3	4	5	9	4
Acquaintance 4	4	2	4	4
Acquaintance 5	5	5	9	4
Friend 4	5	3	5	4
Friend 5	5	4	7	4
Priest 1	2	4	3	3
Priest 2	2	4	3	3
Teacher 1	2	4	2	4
Acquaintance 6	6	8	9	5
Friend 6	4	3	4	4
Friend 7	2	3	3	3
Friend 8	4	6	8	4
Brother	4	4	3	2
Cricket friend	4	4	7	4
Acquaintance 7	6	7	9	5
Current teacher	5	6	9	4
Past principal	1	2	2	4
Shopkeeper 3	2	5	3	3
Principal	2	4	5	2
Teacher 2	2	4	4	3
Teacher 3	2	4	3	2
Friend 9	6	2	3	3
Dad	3	1	1	1
Friend 10	4	4	7	4
Friend 11	5	4	7	4
Acquaintance 8	4	4	7	4
Friend 12	4	5	6	2
Friend 13	2	3	5	3
Local police officer	1	4	2	4
Shopkeeper 4	2	5	5	3
Friend 14	4	4	2	2

Mentally tough

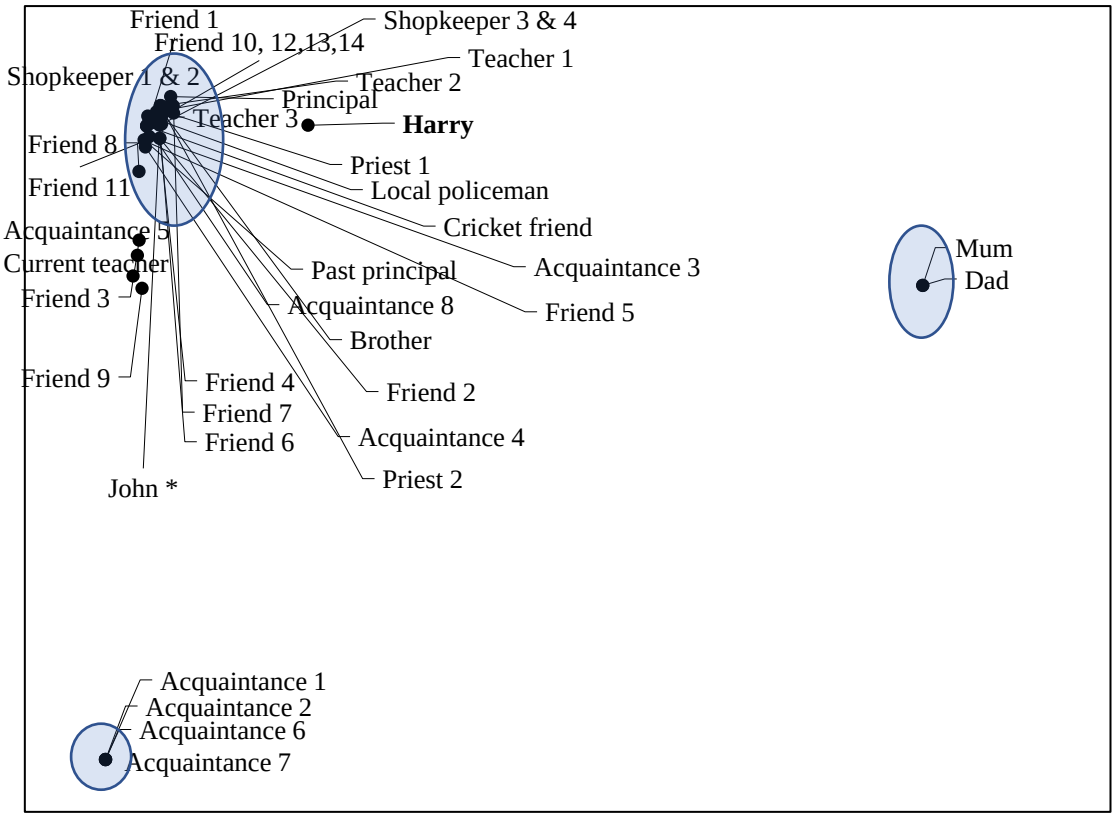
Talented

Skill

Trust

Figure 51

Harry life-space map time 3



There is little discrimination between people in Harry's maps. Large clusters of a few groupings are evident. Harry's maps reflect his somewhat polarised view of people as being good or bad. His parents, while not considered mentally tough are idealised. Table 81 shows Harry's data matrix at time 4 and the constructs elicited. Figure 52 shows Harry's life space map at time 4.

Table 81

Harry's data matrix time 4

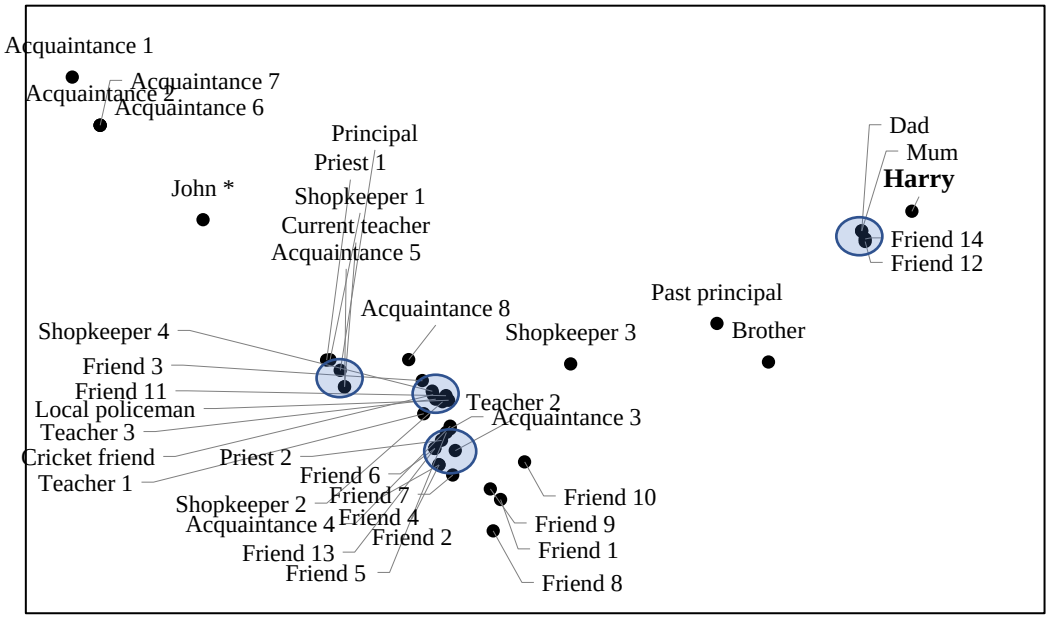
Harry	2	3	1	1
Mum	1	4	1	1
Shopkeeper 1	3	6	2	2
Shopkeeper 2	3	4	3	2
Acquaintance 1	5	6	4	5
Friend 1	4	1	3	3
John *	3	6	4	4
Acquaintance 2	5	6	4	6
Acquaintance 3	4	5	3	6
Friend 2	4	1	3	6
Friend 3	4	5	3	5
Acquaintance 4	4	2	3	6
Acquaintance 5	4	6	3	6
Friend 4	4	1	3	6
Friend 5	4	5	5	6
Priest 1	3	6	3	6
Priest 2	4	7	3	6
Teacher 1	3	7	3	6
Acquaintance 6	5	6	4	6
Friend 6	3	1	3	2
Friend 7	4	1	3	2
Friend 8	4	8	3	3
Brother	1	1	1	3
Cricket friend	4	2	2	4
Acquaintance 7	5	6	4	6
Current teacher	4	6	3	6
Past principal	1	7	3	1
Shopkeeper 3	3	7	3	1
Principal	3	6	3	2
Teacher 2	4	7	3	2
Teacher 3	3	2	2	2
Friend 9	4	1	2	3
Dad	1	4	1	1
Friend 10	4	3	3	3
Friend 11	4	3	2	4
Acquaintance 8	4	4	2	5
Friend 12	1	5	1	1
Friend 13	3	1	3	2
Local police officer	3	3	2	2
Shopkeeper 4	3	4	2	2
Friend 14	1	2	1	1

Friendship
Energetic
Confident
Honest

Harry displays some dissonance between his perception of himself and the persona he displays and describes in his interaction with others. He sees himself as confident yet talks about ongoing bullying by several peers, for which he seeks redress from multiple adults (the local policeman, the shopkeepers in his town, the school principal). His focus in sessions is poor and he was resistant to exercises designed to increase focus and concentration. He does not see himself as being energetic yet he participates in several sports and is fit and healthy. It is possible that Harry may qualify for a diagnosis for ADHD. Further, he feels persecuted by his peers and feels that some adults do not take him seriously. He is troubled by the loss of his twin at a young age, yet his twin has a very negative signature score. At times he would get very excitable in session and showed displays of temper at his mistreatment by others. Very few people have positive signature scores and are visible in the cluster of dad, mum, friend 14 and friend 12. Harry is close to this cluster on the final map.

Figure 52

Harry life-space map time 4



GPA analysis.

Iteration History.

Table 82

Harry iteration history

Cycle	Stress	Mean RV
1	0.4288	0.1131
2	0.2677	0.771
3	0.141	0.7936
4	0.0528	0.8013
5	0.0171	0.8036
6	0.0052	0.8044
7	0.0015	0.8046
8	0.0004	0.8046

Note. Stress is very low and mean RV at .80 is good.

Table 83

Harry fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	0.9265	0.8291	0.3126
4	1.0735	0.7802	0.3913

Note. Fit is good. While uniqueness at .31 and .39 is moderate. This suggests a low degree of change with baseline. This suggests that while intervention may be having some effect that effect is small (or slow to develop). This is a common factor for participants who have difficulty with attention and focus. This may indicate that sections of the intervention which target focus and memory are not effective and warrants further investigation.

Table 84

Harry correlation of time 3 with 4

_	3	4
Case 3	1	0.297
Case 4	0.044	1

Note. Correlation of time three with time 4 is low suggesting change is occurring.

Harry was engaging, yet difficult to engage. While he purported to enjoy the sessions, progress over the course of intervention was slow. He frequently exhibited resistance to engagement and was not open. His description of his experiences of his peers, coupled with his very mixed feelings about his twin and erratic behaviour in sessions suggest that referral to a clinical psychologist may be warranted. Harry would benefit from a longer intervention than was offered here, beginning with a more targeted intervention for self-regulation, focus and attention.

Matilda

Matilda was aged 8 at the time of the study. By her own account Matilda has been diagnosed with visual stress. She has trouble reading tracts of text and struggles with focusing on words. She wears glasses to ameliorate this issue, but she does not seem to have other accommodations in school. Matilda presented with low self-esteem and often lacked confidence in her answers (which were often correct). While Matilda enjoyed the intervention sessions and performed well on most tasks, she often had difficulty focusing. Table 85 shows Matilda's data matrix at time 1 and the constructs elicited. Figure 53 shows Matilda's life space map at time 1.

Table 85

Matilda's data matrix time 1

Matilda	1	1	4	2	2
Childminder	1	3	1	2	1
Friend 1	3	4	4	2	1
Aunt	2	2	4	2	1
Imaginary friend	1	1	2	2	1
Cousin 1	2	4	3	2	3
Friend 2	3	4	3	1	2
Brother	3	2	4	1	3
Grandmother	3	3	3	2	1
Friend 3	3	2	3	2	2
Friend 4	3	2	3	1	2
Cousin 2	2	4	1	2	1
Dad	2	2	1	2	1
Best friend	3	1	3	2	1
Cousin 3	2	3	3	2	2
Mum	2	1	1	1	1
Friend 5	1	4	2	1	2
Teacher	3	2	1	2	1
Friend 6	1	2	1	1	1
Cousin 4	3	4	3	2	2
Toddler brother	3	4	4	2	3
Grandad	3	3	3	2	1
Childminder's daughter	1	4	2	1	2
Friend 7	2	2	2	2	1

Animal cruelty (degree to which person cares about).

Musical ability

Smart

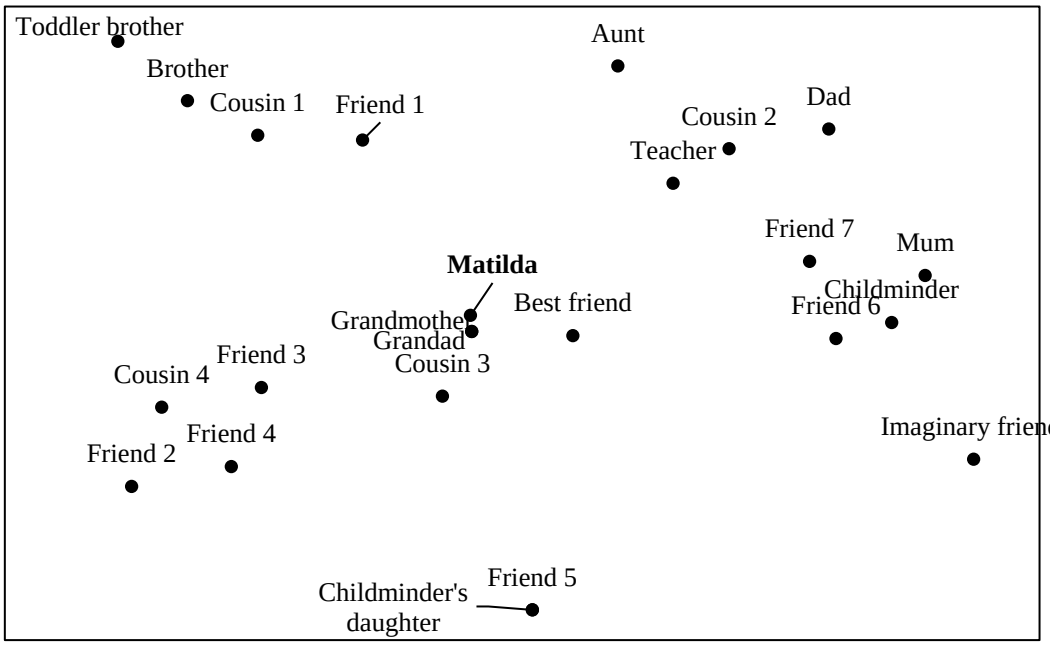
Vanity

Selfless

It is a concern that this process of eliciting constructs may be difficult for younger people, who perhaps have not consolidated their sense of self. While this might be the case Matilda engaged in and understood the process. Schema develop in interaction with the experience of the person, it is clear however that such schema has a development of their own over time.

Figure 53

Matilda life-space map time 1



In some studies participants have very young siblings or people in their lives about whom they have little or no opinion, or deem the constructs generated as being inapplicable to a person who has not, yet, developed a 'self'. In these cases, the person is excluded from the sorting process. However, in Matilda's case we can see

she views her younger brother in a negative light and may bear some sibling resentment. Here we can see the extreme signature score of her toddler brother (upper left corner).

The cluster on the right-hand side of the map is generally positive, she sees her imaginary friend as being smarter than herself. Matilda disclosed her imaginary friend during the card generation process. Upon naming her (a girl about the same age as Matilda) I asked who she was. Matilda was clearly relieved when I wrote the name and role on the card without judgement. Table 86 shows Matilda's data matrix at time 2 and the constructs elicited. Figure 54 shows Matilda's life space map at time 2.

Table 86

Matilda's data matrix time 2

Matilda	1	2	2
Childminder	1	3	1
Friend 1	1	2	2
Aunt	1	4	2
Imaginary friend	1	2	2
Cousin 1	1	4	3
Friend 2	1	4	3
Brother	2	2	1
Grandmother	1	4	2
Friend 3	1	4	2
Friend 4	1	4	3
Cousin 2	1	5	2
Dad	1	2	2
Best friend	1	4	1
Cousin 3	1	1	2
Mum	1	4	2
Friend 5	1	2	2
Teacher	1	2	2
Friend 6	1	2	3
Cousin 4	1	3	2
Toddler brother	2	4	1
Grandad	1	3	2
Childminder's daughter	1	2	1
Friend 7	1	2	2

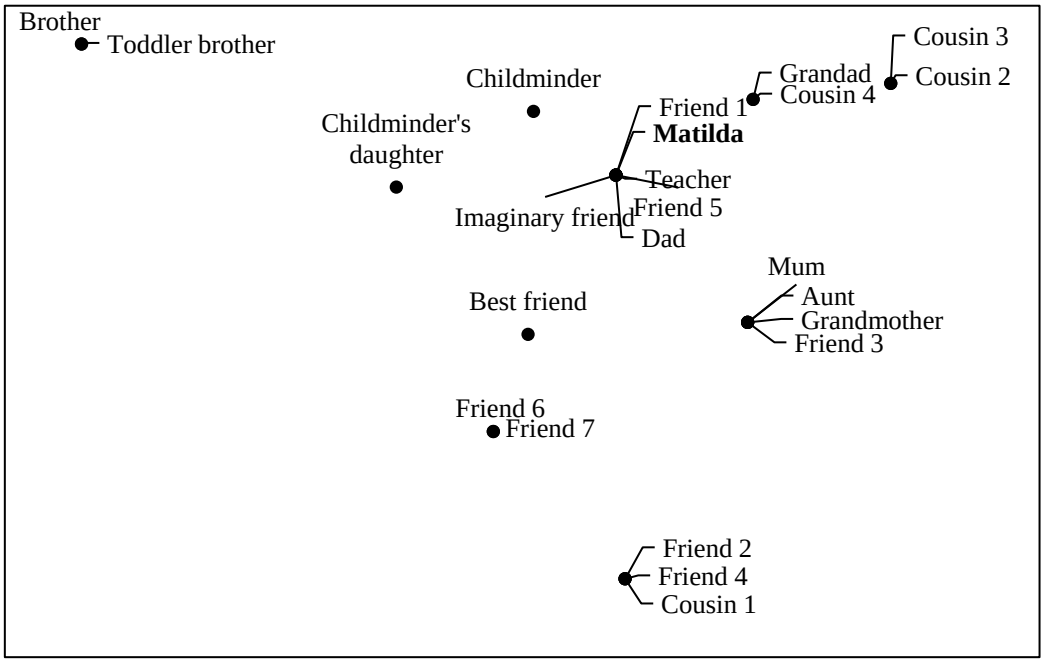
Jealousy

Health conscious

Caring about what people think

Figure 54

Matilda life-space map time 2



Matilda was distracted and found difficulty focusing in this second session. The cluster including Matilda represents a mixture of scores generally in the centre of this cohort of people, while the cluster including her mother, aunt and grandmother a less positive group. The lack of discrimination between people is, to a degree, the result of a low number of sorts consisting of a low number of levels in each sort and must be interpreted conservatively.

Matilda engaged in the intervention sessions willingly, however she displayed difficulty focusing. She spoke of how this lack of focus often got her into trouble in

class and described how she often daydreamed in class. It appears that her teacher has little sympathy for Matilda's lack of focus.

Table 87 shows Matilda's data matrix at time 3 and the constructs elicited. Figure 55 shows Matilda's life space map at time 3.

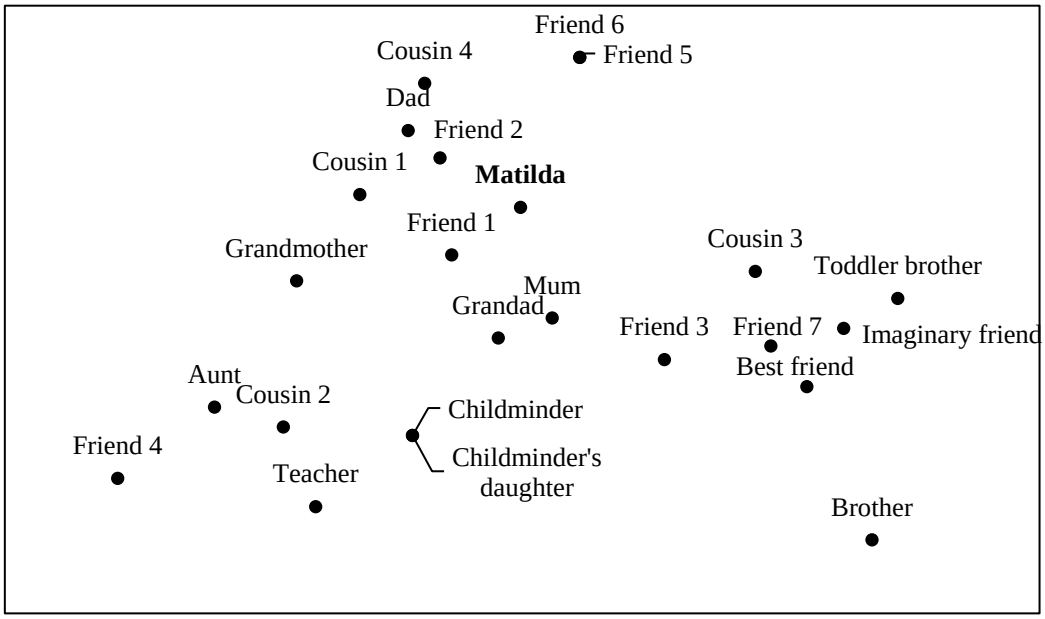
Table 87

Matilda's data matrix time 3

Matilda	2	2	5	2
Childminder	2	3	2	3
Friend 1	2	3	1	2
Aunt	2	3	4	4
Imaginary friend	1	2	1	1
Cousin 1	4	3	5	3
Friend 2	4	2	5	4
Brother	5	2	2	1
Grandmother	2	3	5	4
Friend 3	2	2	3	3
Friend 4	3	3	4	4
Cousin 2	2	3	4	3
Dad	4	4	5	3
Best friend	2	2	3	1
Cousin 3	1	1	3	3
Mum	1	3	1	3
Friend 5	4	1	1	2
Teacher	3	3	2	3
Friend 6	4	1	1	2
Cousin 4	4	1	5	4
Toddler brother	1	1	3	1
Grandad	1	4	2	4
Childminder's daughter	2	3	2	3
Friend 7	1	2	3	3
Kindness				
Happy				
Responsible				
Creative				

Figure 55

Matilda life-space map time 3



Once again Matilda's imaginary friend has a near-ideal signature score. It is clear from conversations during intervention sessions that Matilda has a very clear idea about who her friend is, and she speaks about her in an admiring tone, she is stronger mentally than Matilda, smarter and more 'selfless'. It appears that Matilda's imaginary friend is a manifestation of who she thinks other people thinks she should be.

Matilda's poor self-image is reflected in this map, along with a negative view of her dad – something that oscillates over maps. Table 88 shows Matilda's data matrix at time 4 and the constructs elicited. Figure 56 shows Matilda's life space map at time 4.

Table 88

Matilda's data matrix time 4

Matilda	1	2	2	3	3
Childminder	3	1	1	2	1
Friend 1	1	2	2	1	2
Aunt	3	1	2	2	2
Imaginary friend	2	3	3	1	2
Cousin 1	3	1	1	2	2
Friend 2	1	1	1	3	3
Brother	2	1	2	2	3
Grandmother	3	3	4	3	3
Friend 3	1	1	1	1	3
Friend 4	3	1	1	2	3
Cousin 2	3	1	1	1	3
Dad	3	1	3	2	2
Best friend	1	1	2	2	3
Cousin 3	3	1	1	2	2
Mum	3	2	3	1	2
Friend 5	3	1	2	1	2
Teacher	3	1	1	1	1
Friend 6	3	1	2	1	1
Cousin 4	3	1	2	2	1
Toddler brother	1	1	1	3	1
Grandad	4	3	4	2	1
Childminder's daughter	3	1	2	2	1
Friend 7	3	1	2	2	2

Fairness

Like the company of other people

Technology/nature

Organised/conscientious

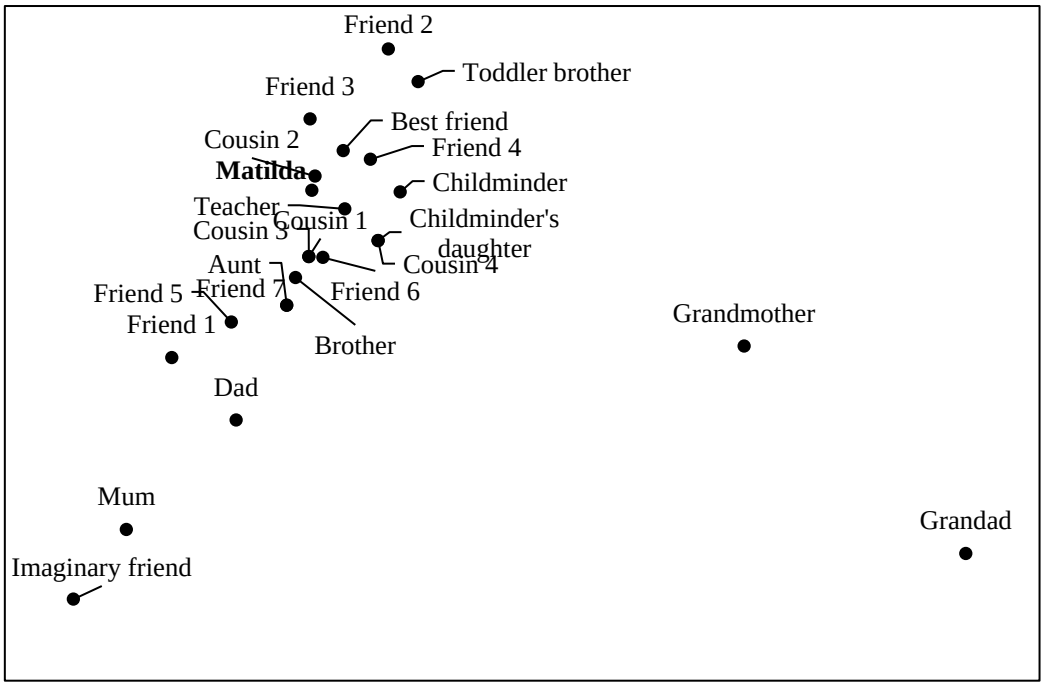
Self-esteem

Perhaps what is interesting here is how few people Matilda sees as being fair, she seems aware that on the whole extroversion is valued over introversion. Her imaginary friend's scores are somewhat muddied here as the only person she interacts with is Matilda. Matilda is an engaging young person with very fragile self-esteem, this is impacted by how people react to her lack of focus and attention and tendency to daydream. At this point it is difficult to ascertain if Matilda's poor

attention skills are a function of visual stress, ADHD (Matilda exhibited many of the behaviours associated with ADHD in girls) or a dynamic between her visual stress and the negative response by others to the manifestation of these difficulties (avoiding schoolwork and lack of focus in class). Further intervention would continue to address her ability to focus on-task and build self-esteem. It is worth noting here that a diagnosis of a specific disorder or learning difficulty is not necessary in order to extrapolate future directions for intervention.

Figure 56

Matilda life-space map time 4



GPA analysis.

Iteration History.

Table 89

Matilda iteration history

Cycle	Stress	Mean RV
1	0.0202	0.1802
2	0.0784	0.6931
3	0.0882	0.7082
4	0.0861	0.7227
5	0.0718	0.7346
6	0.0525	0.7431
7	0.0348	0.7486
8	0.0215	0.752
9	0.0127	0.7539
10	0.0073	0.7551
11	0.0041	0.7557
12	0.0023	0.756
13	0.0013	0.7562

Note: Fit scores fall within acceptable parameters.

Table 90

Matilda fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	0.4383	0.7331	0.4626
4	1.5617	0.7796	0.3922

Note. Fit suggest some movement in Matilda's construal system but like other participants who have difficulty focusing this movement is less than those who don't.

Relationships between Cases Before (below diagonal) and After (above diagonal)

Table 91

Matilda correlation of time 3 with time 4

-	3	4
Case 3	1	0.146
Case 4	-0.074	1

Note. Correlation between time 3 and time 4 is low.

Further intervention is indicated, focus on building focus and self-esteem.

Peter.

Profile. Age 10. Peter's mother had recently experienced the loss of one baby and had just had a new baby. Peter exhibited some jealously regarding this new baby. He spent a lot of time in his grandparents' house which seemed to be a function of his family's current trying circumstances. He is from a farming background. In many ways Peter is a typical 10 year old boy. He loves playing Gaelic sports, something he seems to be good at and helping with farming activities. He suffers from eczema which results in cracked skin and bleeding which sometimes must be bandaged. Peter was cooperative, serious and soft spoken, a demeanour which persisted throughout the study. Table 92 shows Peter's data matrix at time 1 and the constructs elicited. Figure 57 shows Peter's life space map at time 1.

Table 92

Peter's data matrix time 1

Peter	1	1	1	1	2
Cousin 1	1	1	1	2	3
Best friend 1	3	1	1	1	2
Cousin 2	2	1	2	1	2
Neighbour 1	2	1	1	1	3
Uncle 1	2	1	1	1	2
Grandad 1	2	1	1	1	3
Friend	1	1	3	3	2
Uncle 2	1	2	1	1	2
Grandmother 1	1	1	1	1	3
Grandad 2	1	1	1	2	2
Neighbour 2	2	2	1	2	3
Aunt 1	1	1	2	1	3
Grandmother 2	2	1	1	1	2
Mum	1	1	1	1	1
Aunt 2	1	1	2	1	3
Dad	1	1	1	1	3
Teacher	1	2	1	2	1
Uncle 3	2	2	1	1	3
Best friend 2	1	1	1	1	2

Healthy

Skilled

Clever

Responsible

Angry

His mother has a positive signature score. It transpired that his mother had suffered the loss of a baby and had recently had another baby. Reflexive inspection of maps shows that many of his family members, apart from his mother score high on anger. Many score negatively on optimism. This coupled with Peter's flat demeanour was concerning. His teacher has a mixed score throughout, most notably around level of skill and 'sticking with something'.

Figure 57

Peter life-space map time 1

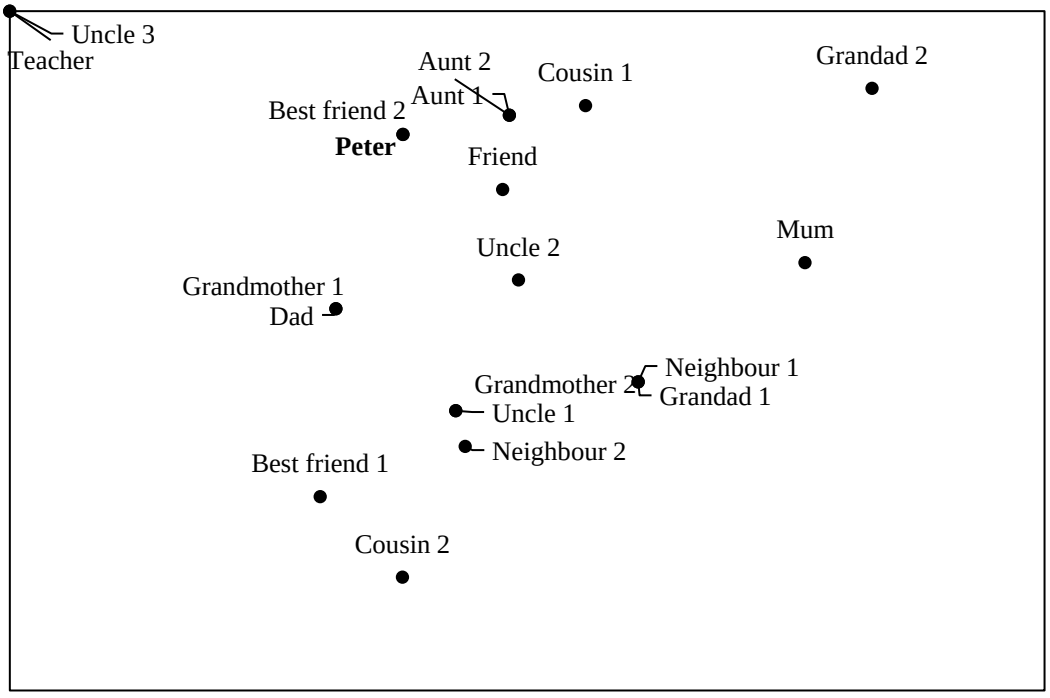


Table 93 shows Peter's data matrix at time 2 and the constructs elicited. Figure 58 shows Peter's life space map at time 2.

Table 93

Peter's data matrix time 2

Peter	3	1	2	3	1
Cousin 1	1	2	1	4	3
Best friend 1	3	1	2	4	2
Cousin 2	1	1	1	4	2
Neighbour 1	1	1	1	1	5
Uncle 1	1	1	1	2	1
Grandad 1	1	1	1	1	3
Friend	4	1	2	3	1
Uncle 2	3	1	1	2	1
Grandmother 1	2	1	1	1	2
Grandad 2	1	1	1	1	3
Neighbour 2	1	1	1	2	4
Aunt 1	2	1	1	2	4
Grandmother 2	2	1	1	2	5
Mum	1	1	1	2	4
Aunt 2	3	2	1	3	3
Dad	2	1	1	1	4
Teacher	1	2	1	1	3
Uncle 3	2	1	1	1	5
Best friend 2	3	1	1	3	2

Calm

Stick with something

Smart

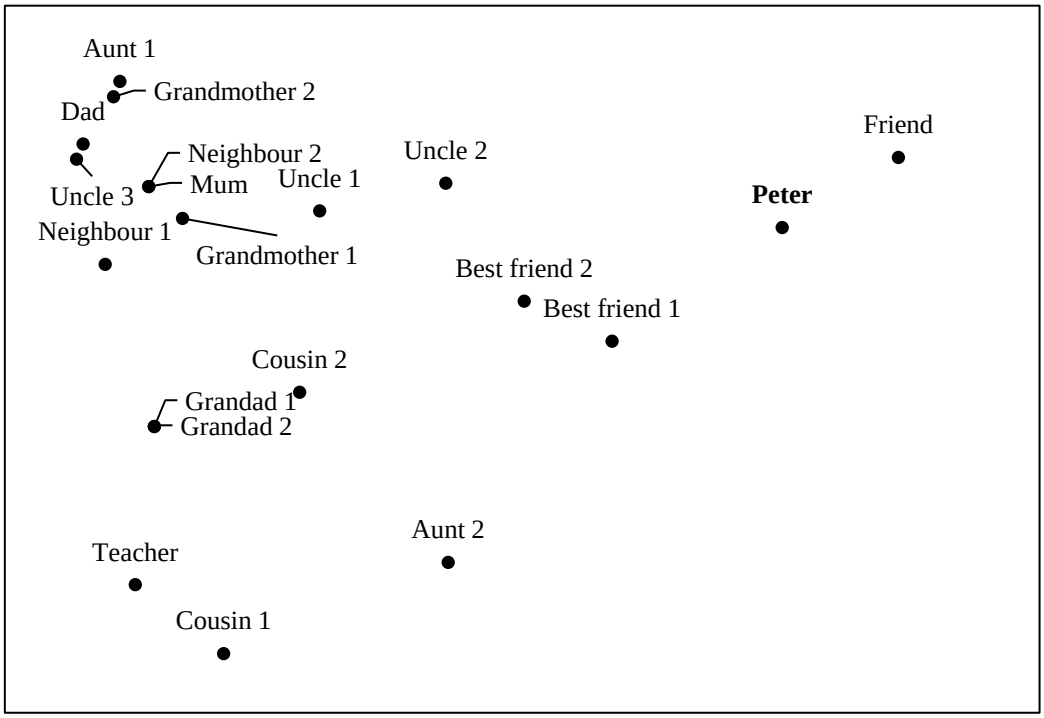
Optimistic

Present

Peter has a low opinion of his own intelligence, something that was not borne out by his performance during intervention. It seems family circumstances are impacting his mood and he feels neglected by his parents.

Figure 58

Peter life-space map time 2



The map reflects Peter's sense of separation from his family and is unusual in a young participant. Table 94 shows Peter's data matrix at time 3 and the constructs elicited. Figure 59 shows Peter's life space map at time 3.

Table 94

Peter's data matrix time 3

Peter	1	3	2	2	3
Cousin 1	3	3	1	1	1
Best friend 1	2	1	2	2	3
Cousin 2	1	1	2	3	3
Neighbour 1	1	1	1	1	1
Uncle 1	1	2	1	1	2
Grandad 1	1	2	1	1	3
Friend	1	1	1	3	2
Uncle 2	1	1	2	1	2
Grandmother 1	1	1	1	1	2
Grandad 2	1	2	1	1	1
Neighbour 2	1	1	1	1	1
Aunt 1	1	1	1	1	1
Grandmother 2	2	1	1	1	2
Mum	1	1	2	2	1
Aunt 2	1	1	1	1	1
Dad	1	1	1	1	3
Teacher	3	1	1	1	1
Uncle 3	1	1	1	1	1
Best friend 2	1	2	2	1	3

Skilled

Happy

Indoor/outdoor

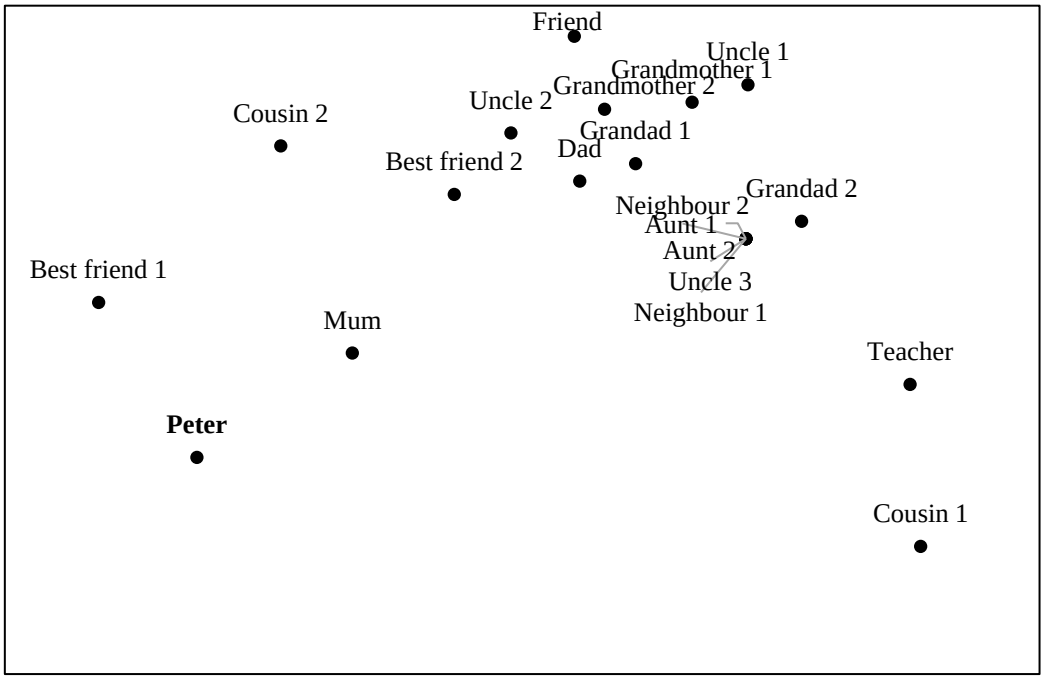
Good eating habits

Academic ability

Again, the low score Peter gives himself for ‘happy’ and ‘academic ability’ are of concern.

Figure 59

Peter life-space map time 3



Once again Peter is distanced from his family members. The cluster of uncle 3 and aunt 1 and neighbour1 are an idealised cohort. Peter has regular contact with this group. Table 95 shows Peter's data matrix at time 4 and the constructs elicited. Figure 60 shows Peter's life space map at time 4.

Table 95

Peter's data matrix time 4

Peter	1	1	1	1	2
Cousin 1	1	2	1	1	2
Best friend 1	2	1	1	1	2
Cousin 2	1	1	2	2	2
Neighbour 1	1	2	1	2	3
Uncle 1	1	1	1	1	2
Grandad 1	1	1	1	1	1
Friend	1	1	1	1	2
Uncle 2	1	2	1	1	2
Grandmother 1	1	1	1	1	1
Grandad 2	2	2	1	1	1
Neighbour 2	2	2	1	2	3
Aunt 1	1	1	1	1	1
Grandmother 2	2	2	1	1	1
Mum	1	2	2	2	1
Aunt 2	1	1	1	1	2
Dad	1	1	1	2	1
Teacher	2	2	1	2	2
Uncle 3	1	2	1	2	1
Best friend 2	1	2	2	2	1

Fitness

Morning/night people

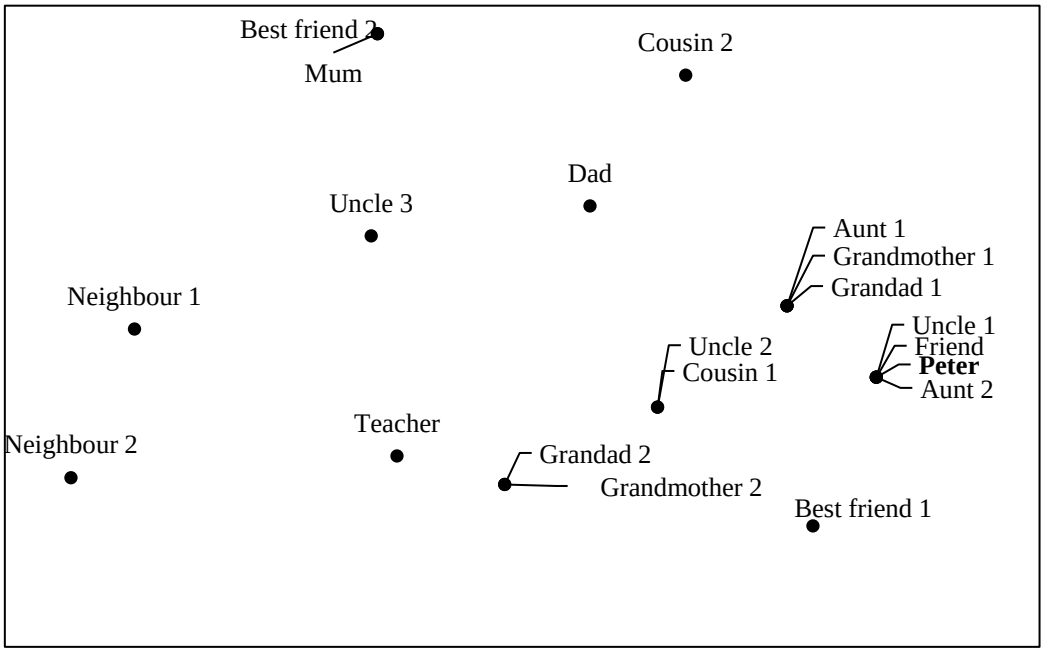
Speak up for yourself

Angry

Clever

Figure 60

Peter life-space map time 4



This map suggests a positive movement in Peter's self-esteem. It seems likely that Peter would benefit from further support as his family deal with their difficulties.

GPA analysis.

Iteration History.

Table 96

Peter iteration history

Cycle	Stress	Mean RV
1	0.9126	0.2304
2	0.0002	0.799

Note: Fit scores fall within acceptable parameters, Mean RV is close to .8 indicating good fit.

Table 97

Peter fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.0039	0.8315	0.3086
4	0.9961	0.7666	0.4123

Note. Fit scores indicate lower levels of change compared to other participants.

Table 98

Peter correlation of time 3 with time 4

-	3	4
Case 3	1	0.281
Case 4	0.28	1

Note. Relationships between Cases Before (below diagonal) and After (above diagonal)

Peter's case is one described by Feuerstein as social deprivation; it seems likely that this deprivation is the result of circumstances rather than an ongoing fixed aspect of his home life. His lack of mediation and general interaction with his immediate family in this regard is therefore probably temporary.

Justyn.

Justyn was aged 11 at the time the study took place. He presented as bright but exhibited very poor focus, was frequently agitated and energetic. Although English was not his first language, he was fluent and had a grasp of the language which was above average for his age.

Peter had been assessed by a psychologist who was fluent in his native language. While ADHD was suspected it was recommended that an actual diagnosis be delayed as there was variance between ratings in terms of his behaviour between home and school.

While Justyn's teachers suggested that his grasp of English was poor this was not the experience of the researcher, in fact Justyn's grasp of English appeared to be above average for his age. Overall Justyn presented as enthusiastic and happy. He was inclined to short bursts of focus and fidgeted a considerable amount. An outburst of bad language and very high energy in session three, coupled with his lack of focus suggest an ongoing attention deficit. Justyn's teacher has put a reward system in place for Justyn and while it seems he is generally liked by the teaching staff and presented as likable, he has a history of outbursts and getting into trouble. Table 99 shows Justyn's data matrix at time 1 and the constructs elicited. Figure 61 shows Justyn's life space map at time 1.

Table 99

Justyn's data matrix time 1

Justyn	1	2	1	1	1
Friend 1 (m)	2	3	1	1	1
Friend 2 (f)	1	2	1	1	1
Friend 3 (f)	2	3	1	1	1
Friend 4 (m)	2	3	2	2	2
Friend 5 (f)	2	1	1	1	1
Acquaintance 1 (f)	3	3	3	3	3
Grandmother	1	3	1	1	1
Friend 6 (m)	2	3	1	2	1
Friend 7 (m)	3	2	2	2	2
Friend 8 (m)	3	2	2	2	1
Friend 9 (f)	2	3	2	2	2
Friend 10 (f)	1	3	1	1	1
Mum	1	3	1	1	1
Cousin 1 (m)	3	3	1	1	1
Teacher 1 (f)	3	1	2	1	2
Teacher 2 (f)	2	1	1	1	1
Teacher 3 (f)	2	1	1	1	1
Cousin 2 (f)	3	1	2	2	1
Friend 11 (f)	3	3	1	1	1
Brother	3	2	1	2	1
Dad	2	1	1	1	1
Uncle	3	2	1	1	1

Not wasteful

Able to fix things

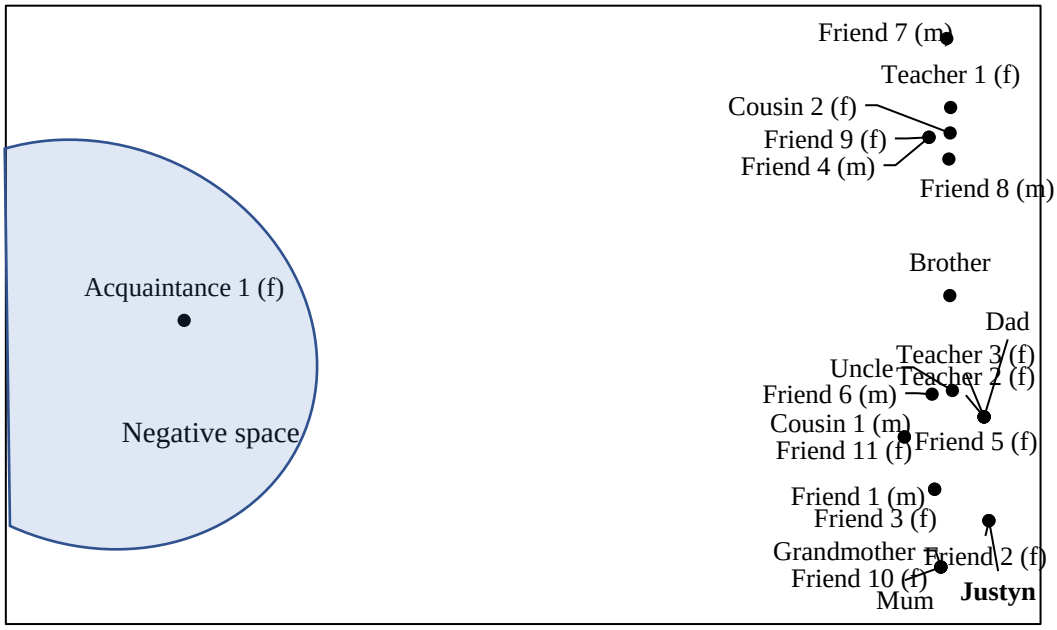
Friendly

Telling the truth

Healthy eating

Figure 61

Justyn life-space map time 1



He engaged with the elicitation of constructs with enthusiasm and his concern with environmental sustainability and health are reflected in his schema. While Justyn displayed poor 'in the moment' self-regulation he mentioned several ways he curtails his on-screen time by his own volition and valued outdoor play over being indoors. The label acquaintance refers to people with whom the participant comes into regular contact but does not consider to be a friend (or have a specific role). Often the label is used for people not liked by the participant. Acquaintance 1, a peer in his class, is extremely positioned to reflect the negative view Justyn has of this person. Justyn showed a keen awareness of the process overall and struggled with consistently sorting this person into the last pile of cards in any given sort.

Clusters in maps where there are extreme cases tend to be closer together and while this may seem obvious, interpretation of these seemingly proximate clusters are important. The bottom right corner cluster represents people Justyn sees as being like

him – his mother, grandmother and some of his friends. While the cluster consisting of his dad, uncle, teacher 2 and teacher 3 are a distinct cluster, all scoring low on 'wastefulness' a strong value of Justyn's.

The top right corner of the map represents a largely negative space. During intervention, it was clear that Justyn viewed the behaviour of this cluster in a negative light including teacher 1 and some of his friends. Table 100 shows Justyn's data matrix at time 2 and the constructs elicited. Figure 62 shows Justyn's life space map at time 2.

Table 100

Justyn's data matrix time 2

Justyn	1	1	1	1	2
Friend 1 (m)	1	1	1	3	2
Friend 2 (f)	1	1	1	3	1
Friend 3 (f)	1	1	1	3	2
Friend 4 (m)	1	1	2	3	2
Friend 5 (f)	1	1	1	3	2
Acquaintance 1 (f)	2	3	1	2	3
Grandmother	2	1	2	3	2
Friend 6 (m)	3	2	1	1	2
Friend 7 (m)	2	1	1	2	2
Friend 8 (m)	2	2	1	1	2
Friend 9 (f)	1	1	1	3	2
Friend 10 (f)	1	1	1	3	2
Mum	1	1	1	2	2
Cousin 1 (m)	1	1	1	3	2
Teacher 1 (f)	2	1	2	3	1
Teacher 2 (f)	1	1	2	1	1
Teacher 3 (f)	1	1	2	3	1
Cousin 2 (f)	1	1	2	3	2
Friend 11 (f)	1	1	1	3	2
Brother	1	1	2	1	2
Dad	1	1	1	1	1
Uncle	1	1	2	1	1

Fit

Extrovert

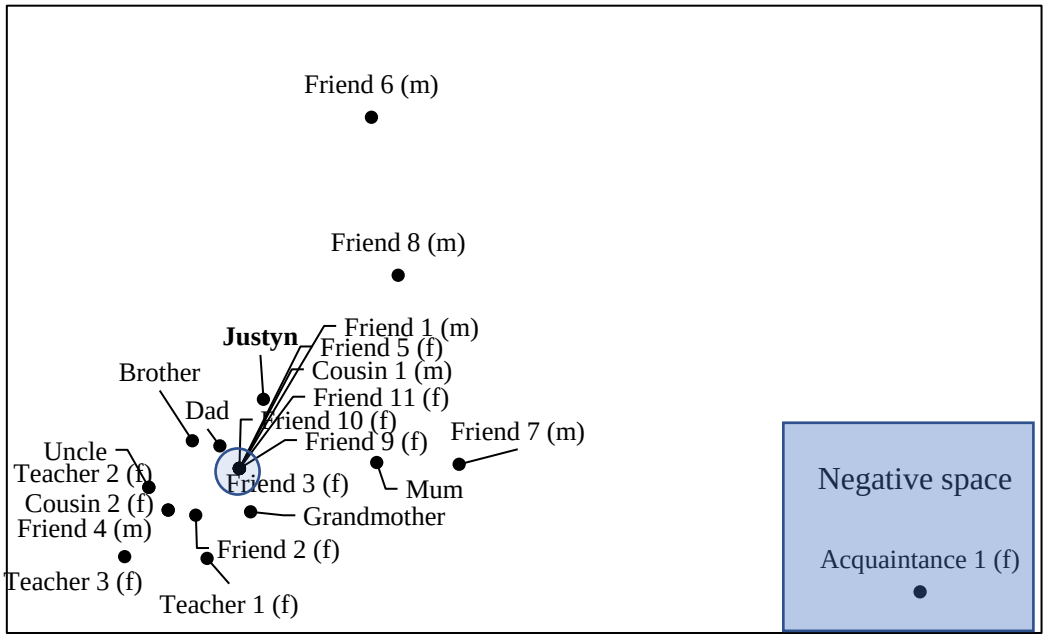
Fun

Delicate

Pay attention

Figure 62

Justyn life-space map time 2



This map indicates a shift in clustering. Justyn's dad's signature score is a perfect positive score and he is now positioned away from other people Justyn views in a somewhat negative light which positions him closer to Justyn. Justyn showed considerable self-awareness and while he views himself in a mostly positive light recognises his ability to pay attention is poor.

Table 101 shows Justyn's data matrix at time 3 and the constructs elicited. Figure 63 shows Justyn's life space map at time 3.

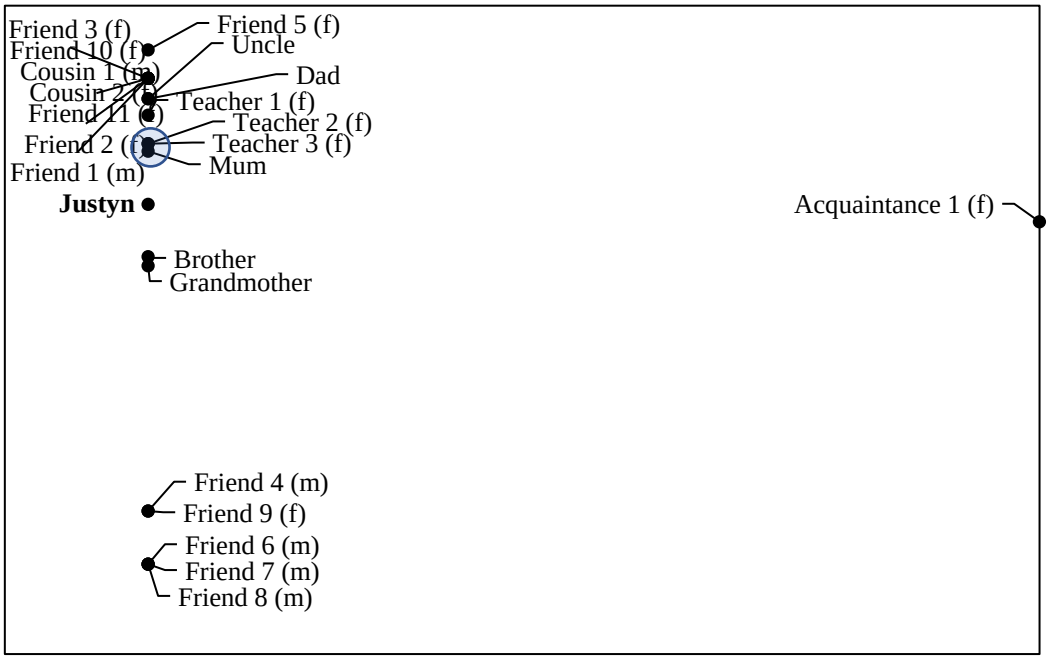
Table 101

Justyn's data matrix time 3

Justyn	1	1	1	1	2
Friend 1 (m)	1	1	2	1	4
Friend 2 (f)	1	1	2	1	4
Friend 3 (f)	1	1	2	1	4
Friend 4 (m)	2	2	4	1	3
Friend 5 (f)	1	1	3	1	4
Acquaintance 1 (f)	3	3	5	2	5
Grandmother	2	1	1	1	3
Friend 6 (m)	2	2	4	1	2
Friend 7 (m)	2	2	4	1	2
Friend 8 (m)	2	2	4	1	2
Friend 9 (f)	2	2	4	1	3
Friend 10 (f)	1	1	2	1	4
Mum	1	1	1	1	3
Cousin 1 (m)	1	1	2	1	4
Teacher 1 (f)	1	1	3	1	3
Teacher 2 (f)	1	1	2	1	3
Teacher 3 (f)	1	1	2	1	3
Cousin 2 (f)	1	1	2	1	4
Friend 11 (f)	1	1	2	1	4
Brother	1	2	2	1	3
Dad	1	1	1	1	1
Uncle	1	1	1	1	1
Healthy					
Honest					
Caring					
Happy					
Tough					

Figure 63

Justyn life-space map time 3



The top left corner includes idealised scores (his father and uncle). While moving down the left side of the map people considered to be ‘tough’, a negative attribute to Justyn, can be seen highlighted (teacher 3, mum and friend 2), while acquaintance 1 represents a negative space.

Table 102 shows Justyn’s data matrix at time 4 and the constructs elicited. Figure 64 shows Justyn’s life space map at time 4.

Table 102

Justyn's data matrix time 4

Justyn	1	2	1	1	2
Friend 1 (m)	1	2	1	1	1
Friend 2 (f)	1	2	1	1	1
Friend 3 (f)	1	2	1	1	1
Friend 4 (m)	1	3	2	1	2
Friend 5 (f)	1	2	1	1	1
Acquaintance 1 (f)	3	4	5	2	3
Grandmother	1	1	1	2	1
Friend 6 (m)	1	2	2	1	2
Friend 7 (m)	2	3	2	1	2
Friend 8 (m)	2	3	3	1	2
Friend 9 (f)	2	3	4	2	1
Friend 10 (f)	1	2	1	1	1
Mum	1	1	1	1	1
Cousin 1 (m)	1	3	1	1	1
Teacher 1 (f)	1	1	1	2	1
Teacher 2 (f)	1	1	1	2	1
Teacher 3 (f)	1	1	1	2	1
Cousin 2 (f)	1	2	1	1	2
Friend 11 (f)	1	2	1	1	1
Brother	2	3	1	1	2
Dad	1	1	1	1	1
Uncle	1	2	1	2	1

Well behaved

Maths

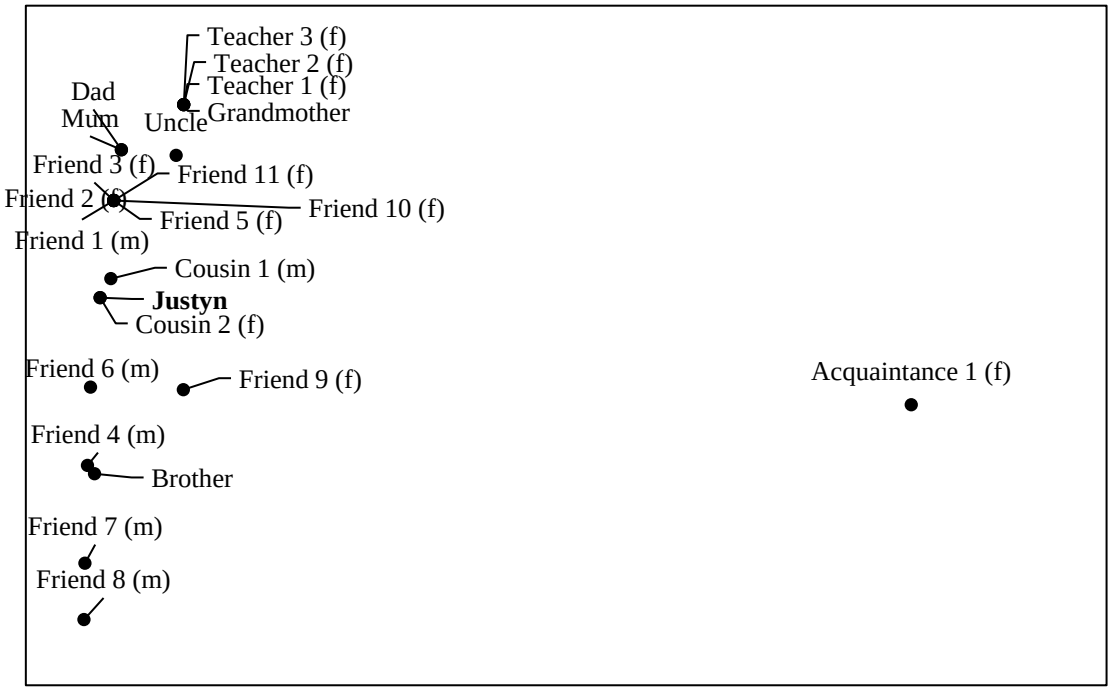
Nice

Active

Respectful

Figure 64

Justyn life-space map time 4



Justyn showed poor concentration skills during the cognitive reasoning exercise puzzles, but also displayed an ability to learn. During one session Justyn was unfocused and uncooperative and seemed intent on provoking the mediator. This was at odds with most of the other sessions. The most effective method of increasing Justyn's attention span was to allow activity breaks after each puzzle session (which generally take about ten minutes). Future intervention should focus on self-regulation, focus and attention.

GPA analysis.

Iteration History.

Table 103

Justyn iteration history

Cycle	Stress	Mean RV
1	0.6869	0.1405
2	0.0159	0.7943
3	0.0082	0.7955
4	0.0027	0.7959
5	0.0009	0.796

Note. Fit is good, with low stress and Me RV close to .8.

Table 104

Justyn fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	1.124	0.8181	0.3308
4	0.876	0.7741	0.4008

Note. Fit is good indicating a high degree of similarity with baseline.

Table 105

Justyn correlation of time 3 with 4

	3	4
Case 3	1	0.269
Case 4	0.252	1

Note. Relationships between Cases Before (below diagonal) and After (above diagonal).

Justyn generally has a positive self-image; he recognises that he has difficulty with attention. He scores himself in the negative on maths, suggesting he does not see himself as academically capable, something not borne out by his progress through intervention. This aspect of negative self-image may be due to several factors however his difficulty with self-regulation is a strong contributor. This coupled with his distance from friends on the maps and teachers with whom he comes into conflict suggest that he may have ADHD (note the psychologist's report was provided after

intervention). GPA shows that change is occurring in Justyn's construal of both himself and others on the map. However, his change scores are lower than some of the other participants. It has been noted that some participants with low change scores (such as Harry) have low focus thresholds. Intervention would be recommended to further increase Justyn's sense of self-efficacy from an academic perspective through increasing attention, self-regulation, and focus.

Results from this study took place in the second half of a school year, Justyn was looking forward to moving up a class to a teacher with whom he had a positive relationship.

Lukaz.

Profile age 8. Lukaz lives with both parents and his uncle. English is his second language. His teacher has described him as being behind in terms of academic performance with a poor grasp of English. His coordination was poor. Lukaz displayed a high degree of confidence in his ability which was coupled with low demonstration of ability. He had difficulty grasping 'opposites' and transferring these ideas. He had a good grasp of patterns and how things can be used to make something different (bricks to make a wall for example). Table 106 shows Lukaz's data matrix at time 1 and the constructs elicited. Figure 65 shows Lukaz's life space map at time 1.

Table 106

Lukaz's data matrix time 1

Lukaz	1	1	1	5
Mum	1	4	1	2
Dad	1	2	1	1
Uncle	3	5	3	1
Brother	2	5	1	2
Friends dad	1	3	2	3
Friend 1	1	1	1	5
Friend 2	1	4	2	4
Friend 3	1	2	2	6
Friend 4	2	2	1	4
Friend 5	2	4	3	3
Friend 6	2	3	3	6
Friend 7	2	2	1	4
Friend 8	1	3	1	5
Friend 9	2	2	3	5
Teacher	1	2	1	4
Acquaintance 1	3	3	1	4
Acquaintance 2	3	1	3	6
Acquaintance 3	3	2	1	5
Acquaintance 4	3	4	1	4
Acquaintance 5	3	5	1	4
Acquaintance 6	3	3	3	4
Acquaintance 7	3	5	3	4
Resource teacher	2	1	1	1
Friend 10	1	4	2	6

Friendly

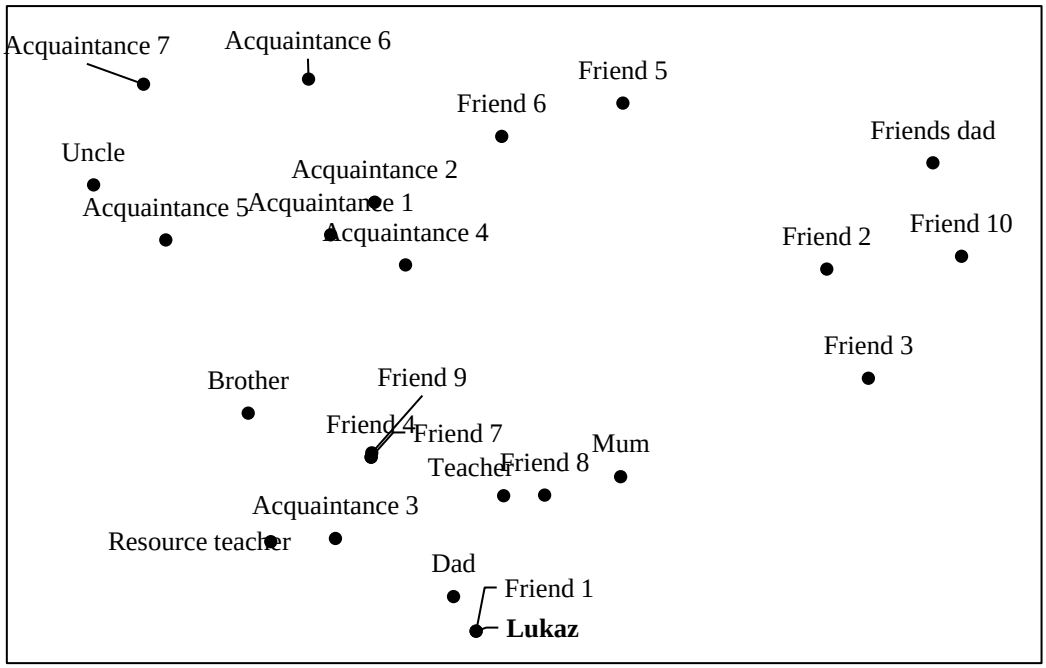
Helpful

Afraid

Fat

Figure 65

Lukaz's life-space map time 1



Lukaz sorted people using a high number of levels which was unusual. At times he appeared to confuse the construct along which he was sorting with the degree to which he liked a person. At times the mediator brought him back to the specific construct and reminded him that his overall opinion of a person was not the focus – it was the specific construct we were working with that mattered. This suggests that Lukaz had difficulty understanding the difference between the construct under consideration during sorts and a simpler conception of people as either good or bad. This is likely due to his age (although other young participants had no difficulty with this process). Lukaz also has a very high number of levels in his sorts which was

unusual, once again he struggled with the process of discriminating along a sole construct. Again, this is likely a developmental issue. We would not expect Lukaz to have a fully matured sense of self at age 8. The top left corner of the map is a clearly delineated negative space. Lukaz was perhaps unusual in that he described a few peers whom he did not like denoted on the map as acquaintances. People who are most positively described are Lukaz and his friend 1, followed by a few adults including his dad and resource teacher. Despite having attended an English-speaking school for three years and having a mix of friends, Lukaz had a poor grasp of English for his age. His mother does not speak English and English is not spoken at home. He struggled with words for things typically found in the home (such as 'fridge' for example). Table 107 shows Lukaz's data matrix at time 2 and the constructs elicited. Figure 66 shows Lukaz's life space map at time 2.

Table 107

Lukaz's data matrix time 2

Lukaz	1	1	1	2
Mum	2	2	3	2
Dad	2	2	3	3
Uncle	5	4	6	7
Brother	2	4	3	5
Friends dad	3	4	4	6
Friend 1	1	1	1	3
Friend 2	4	6	4	4
Friend 3	3	2	6	6
Friend 4	2	4	2	3
Friend 5	5	6	5	5
Friend 6	1	5	3	1
Friend 7	1	4	4	5
Friend 8	1	4	2	4
Friend 9	1	4	4	4
Teacher	1	3	2	3
Acquaintance 1	5	1	3	6
Acquaintance 2	1	5	3	4
Acquaintance 3	2	5	4	2
Acquaintance 4	5	6	5	5
Acquaintance 5	4	6	5	1
Acquaintance 6	5	6	5	7
Acquaintance 7	3	6	5	1
Resource teacher	1	3	2	1
Friend 10	1	4	1	2

Hard worker
Wealthy
Mean/kind
Angry

Lukaz engaged in the construct elicitation phase well, with levels of attention typical for his young age. He struggled sometimes with the sorting procedure, sometimes forgetting that he was sorting people according to a specific construct rather than in terms of whether he viewed them in a positive or negative light. This meant that the

sorting process took longer than it had for older participants. There are a few inconsistencies in his sorts, for example he sees himself as wealthier than his parents. He describes himself positively consistently across constructs during the first two sorts, except for the construct ‘fat’ (he is overweight). He generates the construct ‘angry’ during two sorts and describes his uncle consistently in a negative light. Initially Lukaz did not fully engage in the intervention phase and was dismissive and somewhat defensive. He was confident that anything presented would be too easy for him. However, he gradually became involved. Lukaz struggled with many of the exercises and had great difficulty transferring learning from one scenario to a proximate scenario. Some of the exercises were therefore broken down into smaller subsets and puzzles developed for this purpose. In order to avoid blocks to learning caused by Lukaz’s limited vocabulary in some areas, puzzles were developed around a computer game with which Lukaz was very familiar and primarily involved building structures. At the time the game was extremely popular among this younger cohort. The game has all the elements necessary to engage a participant in the various cognitive skills targeted. Materials must be gathered, calculations must be made as to how much of each material are needed, construction must be planned, and trade-offs made. This is an example of using cultural signs and symbols with which the participant is familiar in order to engage them in learning. The mediator initially was only vaguely familiar with the game in question and had to familiarise themself with the game in order to use it in intervention sessions. Several steps for each phase were needed to embed learning at each stage and as stated transference to proximal and distal situations was poor.

Figure 66

Lukaz's life-space map time 2

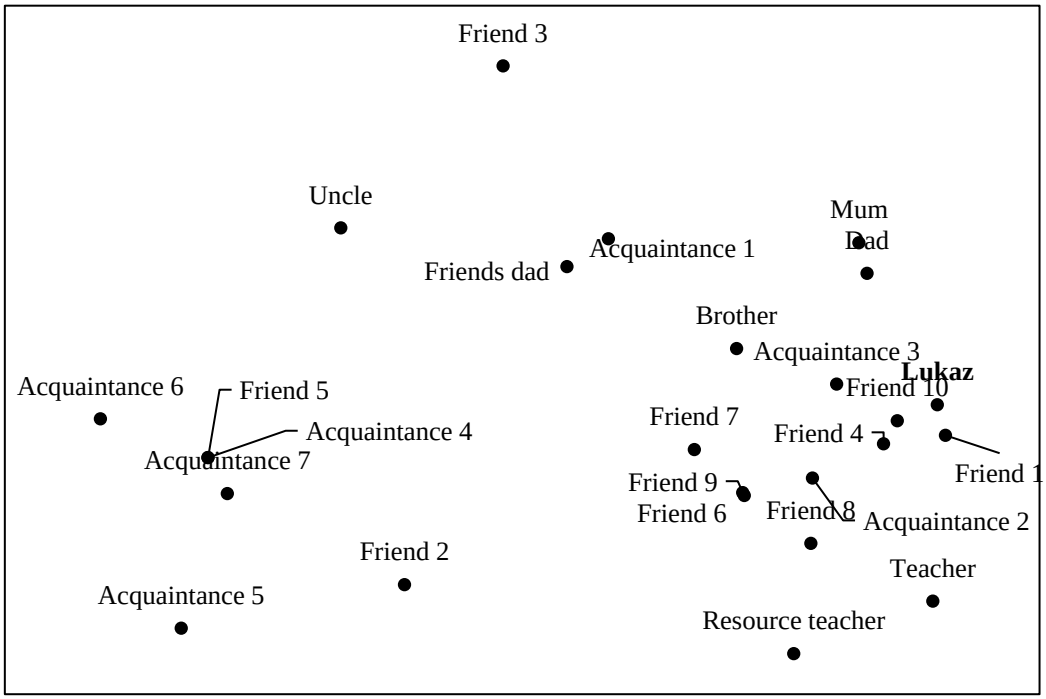


Table 108 shows Lukaz's data matrix at time 3 and the constructs elicited. Figure 67 shows Lukaz's life space map at time 3.

Table 108

Lukaz's data matrix time 3

Lukaz	1	2	3	5
Mum	1	1	1	5
Dad	2	3	4	6
Uncle	6	6	7	3
Brother	1	2	6	2
Friends dad	3	4	5	3
Friend 1	3	2	2	5
Friend 2	1	5	5	4
Friend 3	2	5	5	4
Friend 4	4	2	6	3
Friend 5	5	6	6	6
Friend 6	2	3	4	3
Friend 7	2	4	4	4
Friend 8	2	3	3	5
Friend 9	2	5	3	6
Teacher	4	1	3	4
Acquaintance 1	3	3	4	5
Acquaintance 2	5	2	7	4
Acquaintance 3	6	3	4	2
Acquaintance 4	3	4	4	4
Acquaintance 5	5	3	7	1
Acquaintance 6	5	3	6	6
Acquaintance 7	6	4	7	5
Resource teacher	1	3	3	4
Friend 10	2	4	3	4

Friendly

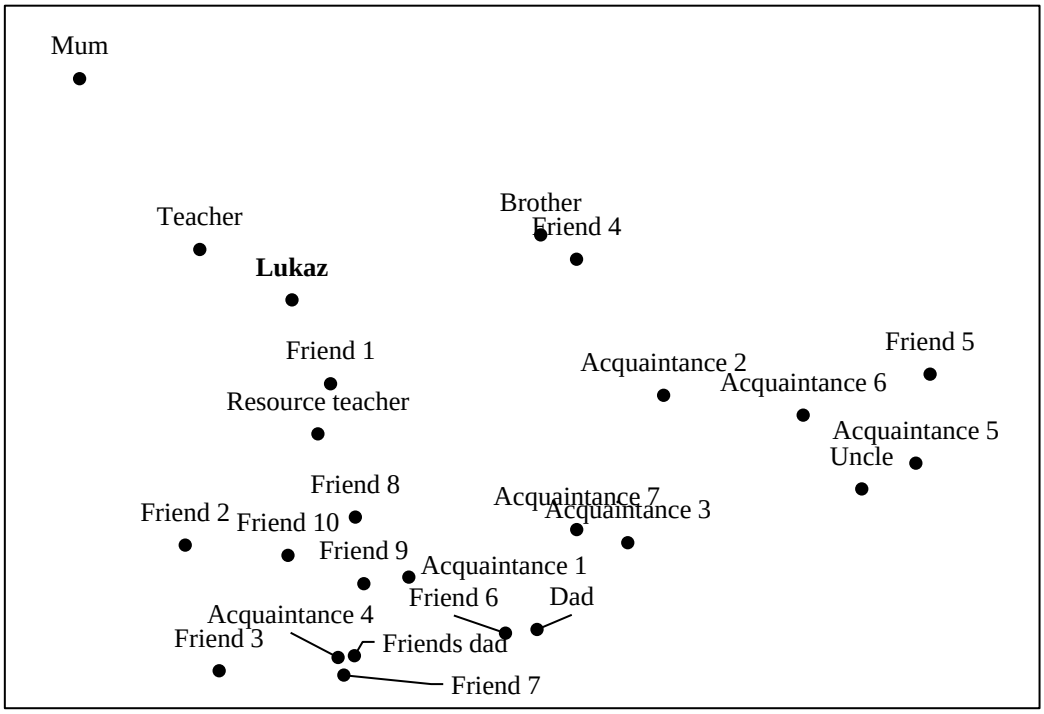
hard working

bold

healthy

Figure 67

Lukaz's life-space map time 3



Of interest here is Lukaz's move away from idealising himself. His mum scores well on all constructs bar 'healthy'. In general, Lukaz's has become more discriminating in his sorting and it is worth noting that this may be because it took time for him to grasp the process and separate liking or endorsing a person from how they occur along a construct. Future studies should take this possibility into account.

Table 109 shows Lukaz's data matrix at time 4 and the constructs elicited. Figure 68 shows Lukaz's life space map at time 4.

Table 109

Lukaz's data matrix time 4

Lukaz	1	2	2	6
Mum	2	2	3	8
Dad	1	4	6	2
Uncle	5	2	8	3
Brother	5	3	8	6
Friends dad	2	2	6	5
Friend 1	2	4	5	4
Friend 2	1	2	2	4
Friend 3	2	2	3	5
Friend 4	5	3	7	8
Friend 5	5	2	1	6
Friend 6	4	5	7	3
Friend 7	3	2	4	9
Friend 8	1	2	5	7
Friend 9	5	2	8	4
Teacher	1	1	4	1
Acquaintance 1	2	4	4	4
Acquaintance 2	4	2	5	4
Acquaintance 3	1	3	1	10
Acquaintance 4	2	3	5	4
Acquaintance 5	2	5	6	5
Acquaintance 6	4	4	5	8
Acquaintance 7	1	5	6	7
Resource teacher	6	5	7	10
Friend 10	5	4	5	9

Fun

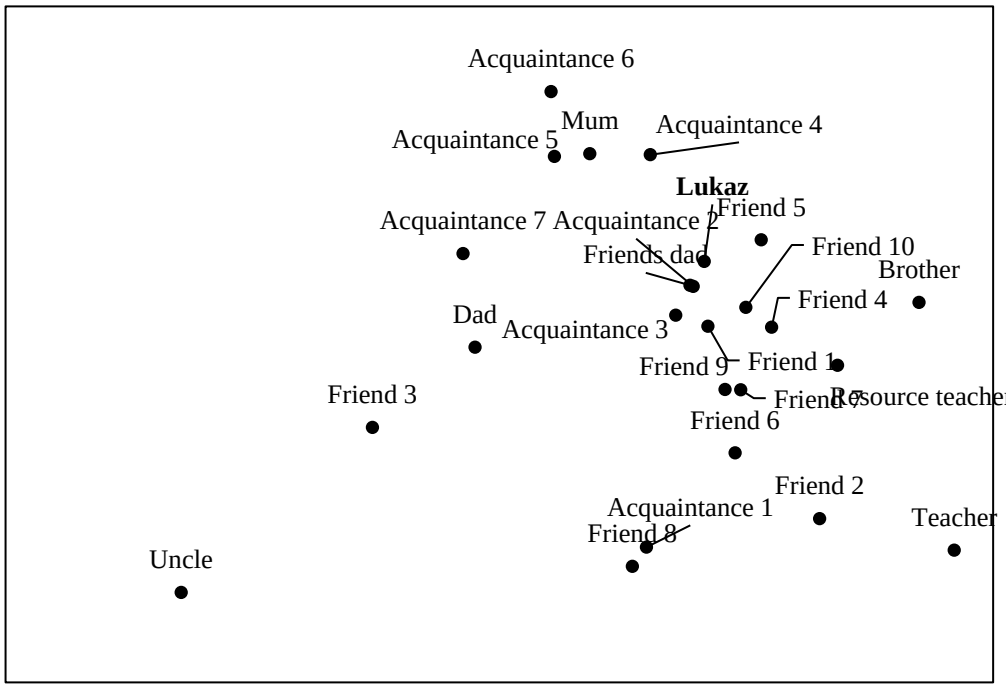
Exercise

Rich

Angry

Figure 68

Lukaz's life-space map time 4



Once again, this map suggests a move away from an idealised self, however it is possible that this is an artefact of trust building slowly over the course of sessions.

GPA analysis.

Iteration History

Table 110

Lukaz iteration history

Cycle	Stress	Mean RV
1	0.3177	0.1048
2	0.3091	0.7655
3	0.1608	0.7922
4	0.063	0.8017
5	0.0206	0.8046
6	0.0062	0.8054
7	0.0018	0.8057
8	0.0005	0.8057

Note. Stress is low and mean RV is good.

Table 111

Lukaz fit of time 3 with time 4 with baseline centroid

Case	Weights	Fit	Uniqueness
3	0.9932	0.8197	0.328
4	1.0068	0.7918	0.3731

Note. Relationships between Cases Before (below diagonal) and After (above diagonal)

Table 112

Lukaz correlation of time 3 with 4

	3	4
Case 3	1	0.299
Case 4	0.012	1

Note. Correlation between time 3 and time 4 is low.

The slow building of trust was unusual compared to other participants in these studies, however it does highlight the need for consideration of defensive idealising of the self or others during the sorting process. Once again fit is better with baseline compared with participants who did not have an issue with focusing. On a pragmatic note Lukaz would benefit from English classes specifically targeting vocabulary, overall his grasp of English was good with gaps being due to lack of exposure to specific words, particularly those typically used in the home (certain foodstuffs, appliances and so on). His performance during intervention suggests that Lukaz has difficulty grasping concepts which would be typically grasped by his cohort and that he has difficulty transferring this learning to even proximal situations. Steady, targeted intervention would benefit his engagement with learning.

Chapter 9. Discussion.

Findings from The Studies Conducted.

The primary purpose of this thesis was to develop an idiographic method of evaluation of DA intervention within the ISLT framework. Studies carried out over the course of this thesis testing the viability of IDEA-1 suggest this objective has been achieved. IDEA is a highly structured, controlled, repeated measures case study design. It provides a psychometric solution to the examination of individual change over time. This suite of tools provides information-rich evaluation of both the person's self-concept and the effectiveness of individualised, yet structured, intervention which is potentially applicable to several contexts. The sixteen studies presented here provide the beginnings of an evidence-base for the use of this method in evaluating intraindividual change over time.

The initial studies conducted, described in chapter 7 used a conservative approach to fitting, based on the premise that a person's construal system has a fixed or near-fixed magnitude and degree of discrimination within constructs. It was observed that over the course of card sort sessions 1 and 2 that participants often moved from a low number of levels of sorting to increasing the number of levels for sorts in subsequent sessions. This artefact is likely the result of the person pondering their construal system between sessions. It was therefore decided to utilise weighted GPA to control for this confound. The hypothesis here being, that while a person may be more discriminating in terms of the number of levels they perceive in any one construct, the shape of their construal system, the relative distance between themselves and others based on their value system, should remain stable once a clear sense of self has been developed (Kelly, 1955).

The results from the two pilot study cases using weighted GPA strongly suggest that MDS coupled with GPA using the first two timepoints as a centroid baseline provides a methodology which highlights stability or change over time. This baseline gives an indication of instability, or movement, already inherent in the person's construal system. The two pilot studies conducted for the evaluation of movement or change in a person's construal of themselves suggest that a person's construal system is stable unless something new is introduced to that system. This is congruent with personal construct theory (Kelly, 1955), dynamic systems theory (Van Geert, 1991, 1994, 1998, 2000) and Lewin's field theory (Lewin, 1936; Lewin, 1942; Lewin, Lippitt & Escalona, 1940).

Poor fit at baseline indicates that caution should be taken when interpreting change in subsequent maps undertaken during intervention. Both the pilot studies gave a perfect fit of time three with the centroid (or baseline) map, however studies conducted with participants across cohorts show poorer (albeit high levels) of fit. This is to be expected as the people participating in these studies have all been identified as needing support due to a myriad of circumstances, which may impact the stability in their construal system. Age, or more accurately, stage of development would also be expected to impact this stability. Younger participants will not necessarily have developed a strong set of values or constructs against which they evaluate themselves or others. The findings from the final cohort do not bear out this assumption. Stephen at 13, was the eldest of that group and has the poorest fit at baseline. Other participants, while younger at age 8 and 10 had goodness of fit indices of .79 and .8. Once again it is necessary to examine the person rather than compare people across one or a few attributes to understand what is most likely to be occurring in their system. Stephen's family circumstances are complex, he is not

clear about the structure of his own family, he has moved location and school several times. He exhibits behaviours consistent with Asperger's, or high functioning autism and professes to feeling isolated in school. The lack of stability and high degree of change in his external world, coupled with atypical processing of information, may have impacted the development of a clear construal system. His construal system may be in a state of flux. This hypothesis is further borne out by his maps, which to begin with, show little discrimination between people. Stephen's subsequent maps show an increased degree of change occurring compared to baseline, however where fit is poor, caution must be exercised in asserting that subsequent change may be due to intervention.

Results across the studies, bolstered by results from the pilot studies conducted, indicate that this methodology provides a system of evaluation or change in a person's construal system over time which controls for existing movement within the system. These results consistently show that DA intervention has an impact on a person's self-concept.

IDEA Discussion.

Data from all studies indicate that the method gives a quantitative indication of degree of change due to intervention. The nature of that change must be construed by the researcher or practitioner using a reflexive process of referring to case notes, constructs elicited and signature scores of the person in relation to others. Reflexive examination of these elements allows for construal of positive, negative, or complex spaces in the life space maps (Guttman, 1985; Lewin, 1938).

The reflexive interpretation of life-space maps is grounded in suitable psychological theory, those theories which are situated within the ISLT framework. As can be seen from the cases presented suitable theoretical explanations for a person's position, or

current self-concept, are considered depending on age and presentation of a myriad of factors such as learning difficulty, family circumstances and experiences of childhood trauma such as displacement, loss of a parental figure or social depravation. This results in the mediator identifying directions for future intervention. DA studies often address emotional factors which may impact progress. The widening of educational interventions purview to include intervention that not only specifically targets cognitive reasoning skills but resilience, building of self-esteem, self-regulation, self-efficacy and other factors identified during assessment places DA as a suitable method for psychoeducational support within current educational systems which emphasises inclusion and integration (Ebadi, & Bahramlou, 2014; Elliott, Lauchlan & Stringer, 1996; Feuerstein, 2007; Falik, 2000; Fuchs, Compton, Fuchs, Bouton & Caffrey, 2011; Lauchlan, & Elliott, 2001). Blocks to learning such as poor emotional regulation, affect, attention and other dysfunctional coping mechanisms can be considered in tandem with addressing gaps in cognitive development, elements that Tzuriel refers to as 'non-intellective factors' and are an integral element in DA mediation (1992).

The method allows a move away from a diagnostic model for intervention. In so doing the methodology provides an evaluative tool without the attendant difficulties associated with the use of cognitive test of ability for this cohort, such as increased error at the tail ends for such tests and practice effects (Hammond, 2012). Students and adults identified as needing support by teachers, project workers and other gatekeepers can be referred without prior formal diagnosis. The purpose of intervention is to address blocks to learning regardless of origin. Consideration of the scope of skill of the mediator is critical. For example, in Harry's case a referral to a clinical psychologist (already underway) was warranted. In cases where the best

interests of the client are not being met, referral is necessary. These studies were conducted with a minimum of interference from other professionals - teachers, principals, and coordinators. The advantage here is that the mediator has no prior expectations of the client. However, working more closely with a multi-disciplinary team could have added benefits for the client. Ways of integrating this system in current support systems for clients is necessary.

IDEA is a psycho-educational approach in the strictest sense. Ability and context are interrelated in DA, therefore examining ability without being mindful of and identifying other possible barriers to learning is contrary to this assumption (Vygotsky, 1978). The approach here identifies participants who have blocks in cognitive reasoning due to their own level of skill, having missed opportunities or not being exposed to that skill in a way that they have been able to grasp that skill or have experienced several barriers to accessing learning. Barriers such as family circumstances (particularly those that impact quality of mediation from parents and other family members), experiencing long-term health issues (both physical and mental), stigma of being associated with an ethnic minority or having being labelled with learning difficulties, Specific Learning Difficulties (particularly those that impact focus and memory), being a second-language student, having issues with substance dependence and misuse have all been identified as impacting the potential maximisation of ability for the participants described here. Often participants have multiple barriers to learning, those barriers having varying levels of impact, highlighting once again the need for an individualised approach to intervention. The advantage of this type of whole-person assessment is that intervention can be usefully targeted for an individual. Certain critiques suggest that the intervention phase of DA such that is presented here is too subjective (Grigorenko & Sternberg,

1998). This thesis has already discussed that other methods such as CBT are deemed structured and therefore are deemed objective measures, albeit not being identical across clients. The veracity of any intervention must also apportion reliability to the expert, professional practice of the mediator/clinician. This thesis bolsters the methods employed by Feuerstein (1990) and Lidz (2002) designed to address this issue of a structured approach to intervention by drawing on methods of interaction with participants as described by others within the ISLT framework. This integration of approaches makes a connection between DA methodologies of interaction and the other more familiar approaches of Rogers (1959), Perls (1973) and Ellis (1962) which should make the DA approach more accessible to those who are currently unfamiliar with DA.

The expertise required to engage in conducting the data collection techniques here are grounded in this practice aspect of ISLT and require a working knowledge and orientation to the practice premises described by Kelly (1955), Feuerstein (2003), Lidz (1998, 2002), Rogers (1959) and so on. Nonetheless the practitioner must work within their own scope of expertise and where necessary suggest clear avenues for referral and work within a multi-disciplinary framework in cooperation with other professionals. The integration of cognitive and emotional support inherent in this methodology may have implications for policy and practice. The current system in Ireland separated assessment of these two things for young people. The move towards inclusion and person-centred practice indicates an amalgamation of these two systems.

The open card sort used here was designed to capture elements of a person's self-concept. It was further designed to apply as few constraints as possible on the elicitation process. This assumes that a person's construal system cannot be known

unless one enquires (Kelly, 1955; Fransella, 2005). Further how a person conceives of the length or degrees of discrimination along a construct cannot be known, this element is generated during the sorting process. For these reasons external constraints were not imposed on the sorting process. The mediator guides but does not influence the elicitation of constructs the purpose of the card-sort is to generate a representation of the person's *self-concept*. Further there was no assumption made regarding how the novice conceptualised the number of levels any one construct had; this too was generated by the novice. The novice then on completion of a sort defines each level. Interestingly this process gives insight into how a person construes their world. For example, participants who at the outset generate only two levels or consistently very few levels of a construct may see the world in a polarised way, conversely participants who sort their cards across several levels may not have yet coalesced their construal system, as was the case with Lukaz for example.

Closed card sorts are used to establish how a person constructs specific objects or concepts that are 'known' to the researcher. They are particularly suited to marketing concepts or contexts where we want to compare participants experiences of an object, say a website. They are also sometimes used to compare people across psychological constructs grounded in nomothetic scales which have been developed within that framework. Within the ISLT framework the person's subjective experience means we cannot know how they construct their own self-concept. Therefore, an open card-sorting procedure is indicated. The open card-sort methodology has several advantages. The technique provides a greater degree of discrimination between people than the repertory grid technique first developed by Kelly (1955). One notable observation from these studies is that the method builds trust between the participant and the mediator very quickly and is an effective

mechanism for engaging reluctant or closed participants. The orientation to the task at hand i.e. writing down names on cards and stating their relationship to the participant enables an openness which would otherwise take more time to develop. A large amount of information is gathered in a short space of time compared to some other therapeutic methods. However overall, the process takes time. In these studies, four sessions took place for each participant, each lasting between 40 minutes and 90 minutes. In most cases further intervention was indicated. A computerised version of the card sorting element would speed up this process.

The integration of Feuerstein's MLE guidelines (1990, 2003) and Lidz's MLE checklist (2002) with Rogers' guidelines regarding the demeanour of the mediator (1959), that is unconditional positive regard, mirroring and use of appropriate language and culturally appropriate tools such as specific language presented in this thesis engenders a cooperative environment.

The card generation stage of the evaluation process quickly brings into relief a summary of the person's situation and gives an overview of the people in the person's life. The oft sensitive nature of information being disclosed becomes apparent when a participant notices that the information they are giving is something they would not usually disclose as rapidly, as happened several times during these studies. People are asked about the relationship of the individuals named and their relationship to the client which can reveal a complex family structure or accounts of loss. Trust is generally quickly established. It is therefore critical that the mediator exudes an air of trust and non-judgement. Once again drawing from copasetic psychological theory such as those describes by Rogers (1959), Perls (1973) and Ellis (1962) enhances the DA exchange. The card sort method has been used in forensic and clinical settings previously as a method of data collection (Hammond &

O'Rourke, 2007) however the potential therapeutic applications of IDEA-1 warrant further investigation.

Limitations of IDEA.

This system for data collection meets the criteria for the sampling of a person's self-concept over time. One limitation of the method is that currently cards cannot be added to the sorting process in subsequent sorts. This is because the data analysis technique essentially treats the collective data coordinate points produced as a shape consisting of x number of points, against which subsequent sorts are compared. Simply put this would be akin to comparing a shape with three coordinate points (a triangle) with a shape with four points (a quadrilateral). It is therefore critical to enquire as to all of the people with which the novice comes into contact at the initial session. Additional people added at subsequent sorts may be compared only with like data sets. Where intervention takes place over a long period of time, collection of data for added people may be warranted, it is likely that shifts in self-concept will be reflected in how these new people are sorted along constructs. For this reason, data collected for additional people can be collected but datasets can only be compared with like datasets (i.e. same number of cards).

The method used here generates constructs within session anew. It is possible to carry out subsequent card sorts using constructs elicited in the first session. This may add a higher degree of stability to the baseline configuration and further reduce error. This can be tested in future studies. This degree of repetition may increase participant fatigue. However, the process would be faster which may in fact reduce participant fatigue. It was noted over the course of the first series of studies that participants shifted the degree of discrimination in card sorts, generally from lower to a greater number of levels of sorting. Some cases showed a movement from

higher to lower number of levels, this was noted in younger participants. These factors are accounted for, to some degree in the baseline centroid taken before intervention. It was also observed in some studies (for example, Kevin) that participants' constructs began to repeat over later card sorts. This may be an indication of a coalescing construal or maturation of self-concept. For these reasons using a wholly open-card sort can provide valuable information while one using the same constructs over time may not.

Like all methods where the exchange of words between practitioner and client, or novice and mediator, is not wholly scripted there is the possibility that the mediator will insinuate themselves or their worldview into the elicitation process. Sufficient training and awareness of these issues is therefore essential for robust data collection. Being fluent in construct elicitation and laddering of constructs is essential. One of the limitations with the method applies to all methods used with marginalised groups, particularly second language participants, participants with literacy issues and students with intellectual difficulties - effective communication. The objective is to gain an insight into the person's subjective meaning-making system and nuance must be understood. In cases where second language students are not sufficiently fluent in the language used during assessment, this is problematic. Where possible assessment should be carried out in a language fluent to the participant. Literacy issues are addressed by the mediator writing names and roles on the cards and do not pose a barrier to participation. The studies presented here did not engage students with profound intellectual challenges. Further studies could consider the use of visual prompts (pictures and photographs) for use in card sorts, with simplified versions of sorting where constructs are not expressly stated. This is an area which warrants further investigation.

IDEA does not give a figure value for change in ability over time. This may seem counterintuitive given that the objective of intervention is to maximise learning potential. The separation of ability from self-concept – the self is contrary to individual psychology. Ability is a process in interaction with all other elements of and processes that constitute the dynamic system that is the person. The studies described here indicate how positive change in self-concept can be asserted by interpretation of the meanings of spaces represented in the life-space maps in conjunction with indicators of change and movement from GPA analysis. Maximisation or positive movement in potential and the degree of that movement can be observed.

There were some technical issues with versions of the software used in these studies. The software package originally used for the first two studies using unweighted GPA became obsolete on newer computer systems. For this reason, a third study was undertaken to examine the use of weighted GPA using a newer program designed for this purpose.

One of the objectives of this thesis was to produce a methodology which would be of use to practitioners. This objective has been achieved; however, the software package is not readily accessible (although it can be requested from the author). Further interesting avenues for addressing this problem are underway, including developing a package in R using NMDS as the basis for analysis. This would allow for the output of the centroid configuration of time one with time two – a useful graphic for interpretation. Further recent advances in the field of idiographic psychometrics, including network analysis of data matrices taken over time which give clearer indications of the strength of association between individuals on the map merit further exploration.

The Intervention.

The intervention for these studies was a dynamic assessment intervention consisting of a series of cognitive reasoning exercises designed by the author (Appendix A). The intervention satisfies the criteria of what makes an intervention dynamic, relying as it does on the specific requirements laid out by Feuerstein (1990) and expounded upon by Lidz (1998). The cognitive skills targets are based on Feuerstein's structure of cognitive modifiability (2003). Findings from the 14 studies utilising this intervention suggests that this intervention engendered improvement in self-concept for the participants.

Limitations.

Movement over the course of the latter half of the intervention series – targeting metacognition and executive functioning showed a decreased rate of change in most cases. This may be because these cognitive skills are more complex and require longer to become embedded. Investigation of this aspect of the intervention, including longer periods of intervention, would address these questions.

The efficacy of the intervention warrants further investigation. This is because while there was evidence that intervention induced positive change, that change for some participants decreased during the second tranche of three sessions of intervention. The rate of movement through the intervention exercises differed across participants. This is to be expected. Younger participants, for example, typically did not move to engaging with the more complex reasoning tasks until the end of the intervention sessions if at all – this is the nature of targeted intervention. For those who did complete the basic tasks – patterns, sequences and analogies it was noted that those participants who struggled with metacognition and planning had lower levels of change as compared to the first tranche of intervention exercises. It was also noted

that some participants who had a difficulty with focusing showed a lower degree of change due to inattention. This would suggest that elements which focus on this aspect of cognition may not be effective for some participants. There could be a few reasons for this. This section of intervention was brief, consisting of three one-hour sessions. However, the exercises targeting attention and focus warrant further scrutiny for efficacy. There must be a degree of readiness to grasp the cognitive skills being mediated. Vygotsky posited that learning potential is constrained (not dictated) by biological factors such as genetics and developmental readiness (1959, 1962a, 1962b). Therefore, some of these exercises may be simply too advanced for some participants. Executive functioning, including planning and metacognition, is a higher order process which depends on mastery of simpler cognitive reasoning skill coupled with brain development in the neocortex.

It is important to analyse and produce the person's life-space maps at the time of completion and use the information therein to guide subsequent sessions, when the novice has grasped the more basic cognitive skills should they advance to more complex puzzles and exercises.

The mediator must be aware of the underlying theory guiding their actions; the role of environment, the subjective nature of experience and the idiosyncratic nature of that experience. The elements described by Feuerstein (2003) impacting the mediated learning experience including social and cultural deprivation and how these can interact as described by Bronfenbrenner (1976, 1979, 2006) and Rogoff (2003). It is also important to recognise that teleological nature of culture, that while overall culture may remain seemingly stable over time each generation moves and shapes their own cultural landscape. A simple example of this was evident in the younger cohort where cultural symbols such as references to popular computer games

proliferated their thinking. Familiarising oneself with these cultural references allows a common understanding within sessions and cements the mediator/novice relationship thus enhancing the quality of the MLE. This acknowledges that culture, while being transferred across generations, is dynamic in nature. The necessity for positive regard also requires a familiarity with other, more obvious, cultural differences between mediator and novice. The case studies presented here draw from several groups such as members of the Travelling Community and other non-indigenous minority groups. An indication of a familiarity with and respect of cultural traditions, a core component of identity, engenders a positive learning environment – one where the person is accepted for who they are.

This is also necessary regarding beliefs and behaviours of the person not associated with culture, for example having an imaginary friend as was the case with Matilda or presenting as non-communicative as was the case with Stephen. Both of these participants engaged quickly with the process, seemingly a function of the non-stigmatising demeanour of the mediator. The impact of negative bias has been discussed by Binet (Binet & Simon, 1904, 1905), DA intervention carried out in this way offers an opportunity to ameliorate and identify negative bias experienced by learners. However, beliefs and behaviours deemed to negatively impact the maximisation of learning potential of the novice, such as a mismatch between the novice's perception of their own efficacy and demonstrated ability, as was the case with Lukaz, can be identified and addressed. In Lukaz's case a movement from identification with adults who display high degrees of efficacy towards peers is seen over the course of intervention suggesting a more accurate perception of self. The method also identifies developmentally incongruent identification, as was the case with Kevin, a young adult who identified very closely with his family of origin but

not with his peer groups (either positive or negative). Once again movement over time suggests that Kevin moves due to intervention in a way that is more developmentally congruent with his age. The importance of good training in these techniques and a comprehension of the theoretical principles' underpinning should be emphasised.

The intervention package is easily delivered to practitioners as short-course training and covers a range of cognitive reasoning skills. Training in the approach and underpinning philosophical foundations of the approach make this intervention package attractive to practitioners and novices alike.

Using MDS and GPA to produce Life Space-Maps.

At the micro level this thesis sought to examine the viability of the methodology developed for use in DA to address criticisms made regarding how we have evaluated change in previous studies. A second aim of this element of the research is that it be useful and usable. These findings suggest that these aims have been met. This method does not measure ability or intelligence per se but rather manifests a representation of the person's identity as a collation of their own value system and constitutes a sampling of the person's self-concept. Self-esteem, self-efficacy, sense of competence and satisfaction with self are all elements which are reflected in the life-space maps. By construing the meaning of regions of these life space maps we can extrapolate whether movement in self-concept is positive or negative.

This method classifies the person according to their own construal system. This is in accordance with facet (Brown, 1985; Canter, 1985) and field theory (Lewin, 1938). Relationships between objects, that is distance in the mathematical sense is not presumed, rather the objects (a function of the vector constituting their coordinates along a number of constructs) occupy a space. The spaces or areas of the life-space

map have meaning based on the aggregate of scores along constructs that constitute any one area.

Despite drawing from Euclidian geometry to produce life space maps the GPA figures for uniqueness derived are not indicative of an actual measure – rather we can assert more or less similarity with the initial centroid space. By examining the correlations of life-space with each other it is possible to ascertain if the system is still in flux or moving towards stability. This indicates if the effect of an intervention has run its course or if it should continue.

The studies presented here were finite in delivery spanning thirteen weeks in total with six sessions of intervention. Longer studies with more timepoints of evaluation are needed to examine if, when and under what circumstances stability is likely to be reached. A serious limitation of this methodology is the lack of a collated software package which is necessary for dissemination to researchers and practitioners.

ISLT Discussion.

ISLT is designed to integrate individual, developmental, and social learning theories into a paradigm which sets itself apart from interindividual approaches for the study of human thought, behaviour, and action. The lens of ISLT is necessarily intraindividual and the focus is on processes. The framework developed here was designed to situate DA within a framework which allows for the scientific study of its myriad approaches. This was necessary to address critiques that DA lacked the necessary elements at the macro level (Grigorenko & Sternberg, 1998) which would allow it to advance as a method for the maximisation of learning potential for people. ISLT provides the container for the paradigm shift called for by Jensen (2003). There have been several calls for such a framework in psychology and some suggestions as to how this can be best achieved from Allport's individual psychology (1937),

Murphy's (2011) metatheoretical framework to Molenaar's (2004) argument that the focus of all psychology should be intraindividual.

A consideration of the core philosophical tenets and grand theories of intraindividual psychology was discussed. Namely that humans are engaged in their environment in a dynamic way which forms and impacts their self-concept.

Self-concept is therefore a reflection of their experiences in their environment coupled with the top-down process of testing that experience against current theories of self (Kelly, 1955). Constructs constitute a person's value system against which they evaluate their own self-concept and while this system is generally stable it is subject to change by internal and outside forces – elements of which are described by Bronfenbrenner (1976, 1979, 2006), Bandura (1971), Rogoff (2003), Mischel (1973), Sternberg (1988) and other social learning theorists and by DA theorists such as Binet (Binet & Simon, 1914, 1905, 1916; Nicolas, 1994), Vygotsky (1930, 1962a, 1962b, 1978, 2012), Haeussermann (1958) and Feuerstein (1990, 2003). The separation of elements, such as intelligence, from the person situated within their environment is contrary to the argument that the person is a dynamic whole and that the examination of higher-order process of thinking such that occur in the neocortex cannot be usefully examined in isolation under experimental conditions (Luria, 1976; Luria & Cole, 1976; Luria, Cole & Cole, 2006; Luria & Yudovich, 1956, 1959). Such a separation is akin to removing a liver in order to examine how it functions, ability is a *process* and that process is impacted by many elements feeding into the expression of that one element. The person is a dynamic system.

This position is bolstered by recent studies examining brain plasticity and still more research using AI techniques examining brain processes. It is further bolstered by the ever-dwindling amounts of intelligence attributed solely to heritability (Plomin,

2018). Terman's work was interpreted according to the zeitgeist of its time where anti-immigration sentiment was extremely high in USA (Okrent, 2019). Terman's original findings (1928) attributing 80% of general intelligence to genetic factors now rests at approximately 40%. The relationship between biology and environment is far more complex, intelligence is not a fixed element residing within a new-born. Terman emphasised the importance of IQ however, like DA theorists, he recognised that ability was a far more complex attribute stating that an IQ score should 'never serve as a detailed chart for the vocational guidance of children' (Terman, 1916, p 49). The idiosyncratic becomes critical to examine in order to understand humans from a psychoeducational perspective.

Conclusion.

The primary purpose of this research is to address issues of evaluating dynamic assessment research and practice. In order to usefully consider a methodology of measurement which aligns with the philosophical foundations of DA it was necessary to propose a widening of the parameters or scope of reference within which DA is situated. The situation of DA within a copasetic framework – ISLT clarifies the theoretical basis for research and practice.

DA is primarily concerned with the mediation of learning between the expert and novice. The focus of DA is the person, and the examination of movement or change *for that person*. Drawing from development and social learning theories which align with this position bolsters the grand theories of dynamic DA posited by Vygotsky, Luria (Luria, 1976; Luria & Cole, 1976; Luria, Cole & Cole, 2006; Luria & Yudovich, 1956, 1959), Haeussermann (1956), Feuerstein (1990, 2003; Feuerstein, Rand & Hoffmann, 1979; Feuerstein, Feuerstein, Falik & Rand, 2002) Bruner (1956, 1960) & Rey (1938). The ISLT framework allows for the useful consideration

of intraindividual methods of evaluation and measurement. A position has been taken – namely that nomothetic methods of measurement are not best suited to the goal of usefully examining change over time in DA contexts, nor do nomothetic measures adequately inform practice or indicate directions for further intervention.

To date there have been a few notable contributors to the investigation of the viability of evidence-based idiographic measures notably van Geert (van Geert, 1991, 1994, 1998, 2000) and Jensen (2000) and Molenaar (Molenaar, 2009, 2013; Nesselroade & Molenaar, 2016). In particular van Geert's dynamic systems theory provides a rationale for the development of idiographic methods of measurement is described in these pages. Once again drawing from other theories of evaluating systems and methods of representing those systems gives DA a firmer footing in terms of the psychometric measurement of the individual. Lewin's field theory (1936), Kelly's personal construct theory (Kelly, 1955; Fransella & Neimeyer, 2005) and Guttman's (Guttman, 1950, 1968, 1971; 1977; Guttman & Greenbaum,1998) work on representing partial order measures likewise inform directions for research into the scientific investigation of intraindividual change. Barrett's discussion of measurement and evaluation in psychology (2003) in particular provides a useful blueprint for understanding the capabilities of any method of measurement thus far developed. By applying these measures in the correct context, while also being mindful of the limitations of any method of evaluation, we are engaging in scientific endeavour.

Within DA there has been some discussion regarding the future direction DA should take (Lidz, 2014), some disagree that a coherent framework is required. Like Grigorenko and Sternberg (1998) and Murphy (2011) the author argues for necessity

of a coherent framework if DA is to usefully progress. The ISLT reconfigures how measurement is considered – moving away from the more typical qualitative and quantitative taxonomy. Instead the ISLT makes the distinction between the interindividual and the intraindividual as proposed by Molenaar (2009, 2014). Unlike Molenaar this thesis does not go so far as to suggest that the intraindividual should be the only concern of psychological investigation but rather that this distinction and discrimination of group and individual psychology places one alongside the other, rather than the current perception that one is more scientific than the other. The current hierarchy is the result of several circumstances both temporal and political which have been described in these pages. In order to advance intraindividual research and evidence-based practice a paradigm shift is required. ISLT is proposed as a framework for that paradigm.

Within DA there are a myriad of tools and methods which have been developed to maximise the learning potential of people (Murphy, 2011). Essentially there are two approaches – one that integrates a scoring system into the intervention process and one that evaluates or measures outside of the intervention using a split-half test of ability. Norm-based split-half tests used for indicating intervention for individuals are a hybrid of interindividual and intraindividual methodologies, the use of group studies to evaluate an intervention for homogenous groups is not. DA studies which have focused on the use of this method to assert that ability is not fixed but is malleable seek to establish the veracity of the theories advancing the importance of impact of environment on learning. Such studies are useful in providing an evidence base for the grand theories of DA.

The use of this method has resulted in less than satisfactory outcomes for researchers and practitioners and their clients regarding individual intervention. The use of what

is a hybrid method of interindividual and intraindividual is, it seems, driven by the assumption that the experimental method is the gold standard for testing and refuting within psychology. This results in an entrenched belief that this dominant interindividual approach *is* psychology. Conversely this position considers intraindividual psychology as less than and ill-suited to inquiry from an evidence-based perspective. This thesis has described how such erroneous assumptions came about, from the advancement of dualism, the rejection of the study of mind as a viable area of interrogation from a scientific perspective and an entrenched holding onto objectivity as the only viable standpoint for the study of human lives. This position is more stridently advanced by some, as is evidenced by Plomin's (2018) recent work, it continues to be presented as hierarchically better than intraindividual psychology. One of the reasons for this is the seeming lag between the development of theory and resultant ways to measure and evaluate from an intraindividual standpoint. In fact, there have been a number of attempts to utilise the methods described in these pages to classify individuals' representations of their self-concept; from Lewin's Field Theory (1936, 1942) to Gower (1975), Guttmann (Guttman, 1968, 1977; Guttman & Greenbaum, 1998), Kruskal (Kruskal, 1964; Kruskal & Wish, 1978) and Lingoes' GPA. (Lingoes, Roskam & Borg, 1979). Access and usability of software and technology required to conduct such studies was often limited to those who developed the computer algorithms necessary to analyse the data. Cantor (1985), Cox (2001), Hammond (2007) and others have developed programs that have been made available for periods of time, but again advances in computer science have often rendered these packages obsolete. They are also often tricky to use, this contrasts with the myriad software packages, handbooks, and online tutorials available for conducting analysis of interindividual data. For these

reasons, these methods have not heretofore proliferated psychometrics. This situation is beginning to change, most notably with the introduction of R Studio which is an open source system containing many of these heretofore difficult-to-access computer scripts for the analysis of data matrices using the data reduction techniques described in this thesis.

Difficulties regarding the veracity of methods of measurement can be examined with consideration of the lens being used – nomothetic or idiographic; interindividual or intraindividual. N=1 case study often represents a hybrid of these paradigms, split half testing is also a hybrid of these two paradigms, and we must be mindful of the difficulties that arise when utilising methods of measurement intended for one purpose and using them for another. This thesis presents a novel N=1 case study design which is wholly idiographic in nature.

The methodology for evaluation described here provides a basis for evidence-based practice while maintaining a focus on the progress of the individual under targeted intervention. The repeated measures design described here is one which has a format with which practitioners and researchers are familiar. It stands separate from the intervention procedure unlike integrated scoring systems and is idiographic in focus unlike previous sandwich study designs. The results from the sixteen studies presented here provides the beginnings of an evidence-base for the use of this approach in intraindividual contexts.

The open card sort methodology for data collection described here may not be familiar to all but training in construct elicitation techniques grounded in Kelly's personal construct theory (1955) is an accessible, straightforward exercise. Although MDS and GPA data reduction and representation techniques have been around for as long as other data analysis techniques in psychology their use has largely been

limited to psychologists who have written their own algorithms for analysis, some of which are now obsolete on newer platforms. They tend not to be ‘user friendly’ to the extent required by researchers and practitioners. Like methods of analysis in psychometric domains MDS has evolved over time. Originally a series of scales had to all have the same number of levels, MDS is now capable of analysing variables with varying numbers of levels rendering this a flexible multivariate technique capable of considering this type of data. Barrett (2003) identifies as suitable of the scrutiny of individual cases from a psychometric perspective. Original equations produced by Lingoes have been refined and developed over time to allow for the flexibility of nonmetric datasets and solving for restrictions in unfolding (an unnecessary restriction of the data in this case). Data can now be reduced and represented in a smallest space. There are several MDS analysis functions available on most statistical software packages commonly used by the social sciences, however, few are suited to the analysis of small, non-metric, multivariate datasets of the type described here. Common license or proprietary, readily available software packages which will analyse non-metric data sets, such as are produced in this thesis are only recently being developed and are only now becoming more available to end-users. As stated, R shows promise for the production of a user-friendly analysis platform suited to the analysis of the data produced using this methodology and is an area currently under consideration for providing accessible data analysis software to practitioners and researchers who wish to use this method.

More recent development of methods for the investigation of brain structure and processes have and will continue to develop. This branch of research is fascinating and renders the hitherto unobservable observable. The degree of complexity of brain processes is currently being examined using AI simulations (Kanari, Ramaswamy,

Shi, Morand, Meystre et. al., 2019; Markram, 2013). Other studies establish that the brain is subject to external stimuli well into adulthood and remains plastic throughout lifespan (Blakemore, 2012; Blakemore & Choudhury, 2006; Boldrini, Fulmore, Tartt, Simeon, Pavlova et. al., 2018). The behaviour and function of certain cells, such as glia cells are now more clearly understood as is the process of brain cell generation and death (Barres, 2008). New or more discriminatory cell structures have been discovered, the purpose and functions of which are still not clearly understood. These breakthroughs have direct ramifications for our understanding of what individuals are capable of learning across several domains and challenge the assumption that ability and intelligence are largely fixed. The dynamic nature of the interaction between person and environment is critical not just in childhood but throughout life. As these studies advance our understanding of the dynamic interaction of genes and biology with environmental factors including relationships with others so too the case for predeterminism and the level of significance it plays in human thought, behaviour and action wains. It is no longer scientifically acceptable to dismiss factors outside of inherent factors at birth as 'idiosyncratic' and therefore outside of the purview of examination. If we are to understand humans from a psychological perspective examine the idiosyncratic, we must.

The Integrated Social Learning Theory proposed here consists of three main branches of consideration: theory, measurement and practice.

Theories, levels of measurement and practices which are copasetic to the goals and tenets of DA are coalesced to provide a framework for the useful consideration of research and practice where the primary focus is the individual. This reframes and positions intraindividual psychology as a paradigm as complex and worthy of the term 'scientific' as its interindividual cousin. Within this framework the connections

between methodology, practice and measurement/evaluation can be clearly drawn. In much the same way that in the interindividual framework we can say using an experimental design may allow for assertions of causation, but correlational designs cannot, so too within ISLT we can argue that differing levels and approaches within this framework have their strengths and limitations – but are nonetheless valid as a result. By clarifying and structuring the myriad of approaches, methodologies and methods of evaluation and measurement of the individual into such a frame we can test and refute. Evidence based enquiry has a firmer footing than has previously been the case. Within this framework single case studies, ethnographic studies, contextual studies, studies of lived experiences and studies of intervention examining the impact of such interventions on the individual across times can be examined and assessed. The dynamic, multifaceted nature of humans requires an individuated, dynamic approach to evaluation and intervention.

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Appendix A. The Intervention Used (abridged).

The intervention used consisted of a portfolio of exercises designed to target cognitive reasoning skills. Each series of exercises consisted of three (or more) levels of difficulty. All exercises were designed to be manipulatable by the novice. The novice was encouraged to interact with the materials.

The protocol for all exercises was guided by Feuerstein's MLE and Lidz's MLE checklist to ensure that the expert/novice interaction was dynamic. Evidence of proximal learning was ascertained by asking the novice to produce a 'puzzle' based on the materials that was similar to the tasks they had already been presented with by the mediator. Evidence of distal learning was ascertained by asking the novice 'where have you seen something like this before?', 'how could you use this skill?' or 'can you tell me where you might have used this before?'. Tasks were designed based on Feuerstein's elements described in his structure of cognitive modifiability (1990).

A series of prompts were used within each task, an example of which is given for the second series of tasks - patterns. Prompts were metacognitive or procedural in nature (Tzuriel, 2001). The tasks described below are sampled from the overall intervention portfolio.

For each series all materials are put on the table by the mediator.

1. Analogy and antonym (same and opposite).

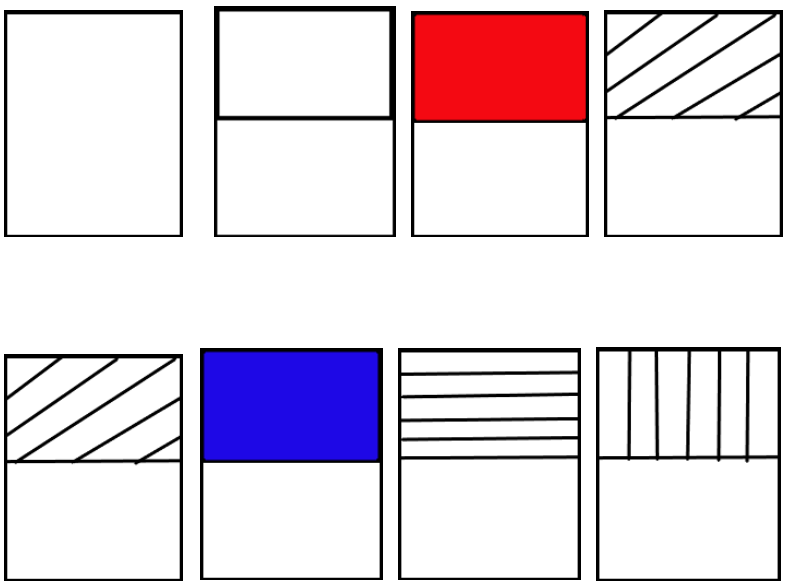
The novice is presented with a number of shapes – triangles, squares and circles of varying sizes and colours (some of which are black and some of which are white) and asked to make the same or opposite as a target. The novice is then asked to make an example of a puzzle for the mediator to solve – ‘the same’ and ‘opposite’. The novice is then asked; ‘how is this skill useful?’, ‘when do you use this skill?’.

2. Patterns.

The first level of this series consisted of a series of transparent rectangular shapes (Figure 69), or tiles, some of which were coloured and some striped. Coloured areas were transparent while stripes were solid.

Figure 69

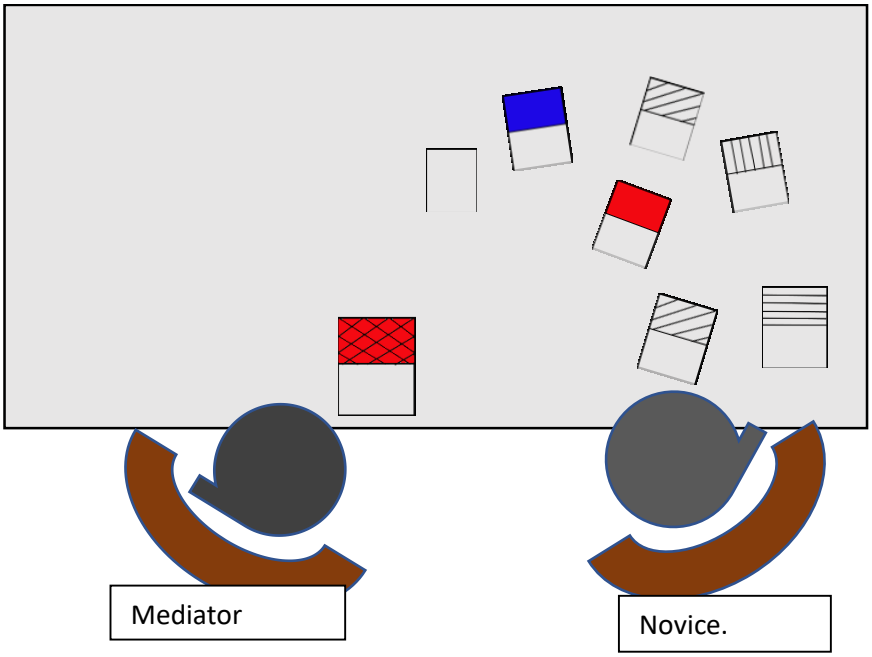
Elements from the pattern exercises



The mediator presents the novice with a target and askes the novice to ‘make the same’ with the tiles available (Figure 70).

Figure 70

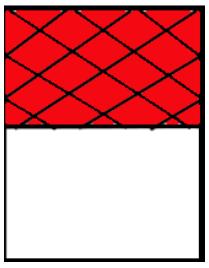
How patterns are presented in the mediation space



For example:

Figure 71

A target pattern for pattern exercises



In this case the novice must rotate and flip the tiles available to mimic the target. The trajectory of the exercise is then guided by the novice. For example, if the novice completes the task without prompts, they are then asked how they resolved the task. They are then asked to give examples of how this applies in the real world (examples given have included mixing colours for art and making material/designs).

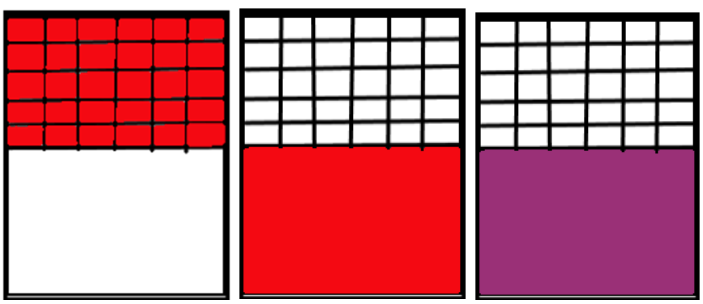
If the novice makes an error and gets stuck trying to complete the task the mediator will first of all try to guide the novice asking, ‘Is that the same?’, ‘How is it different?’, ‘What do you need to do to make it the same?’.

Novices who do not grasp, initially, that the tiles can be flipped over to reverse the direction of the diagonal pattern are encouraged to pick up the tiles and see if they could ‘do anything’ that would result in the target shape. If the novice still does not grasp the concept, the mediator instructs the novice to pick up the tile and turn it over, stating ‘now, can you solve the puzzle?’, or ‘does that help?’.

Novices who complete these tasks did not receive further intervention on simple patterns. Novices who demonstrate difficulty receive further intervention; practice with similar tasks (Figure 72) and explicit statements about the reasoning required to complete the tasks. Other targets in this phase include:

Figure 72

Sample targets for pattern exercises



(blue overlaid with red making purple).

3. Sequences.

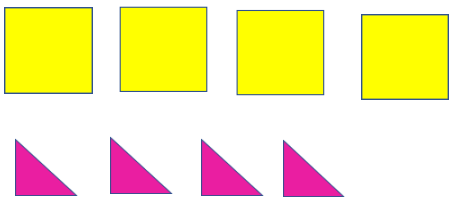
This series consists of five levels, beginning with very simple sequences (Figures 73 and 74) and working towards combined sequences involving shapes (Figure 75), numbers and patterns.

3.a A simple sequence.

The novice is presented with these shapes:

Figure 73

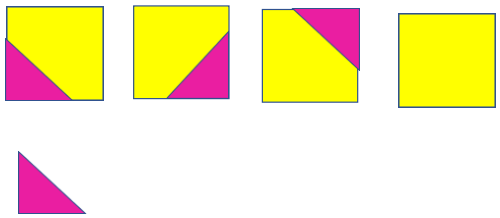
Some elements used for sequence exercises



The mediator arranges the shapes and asks the novice to complete the task:

Figure 74

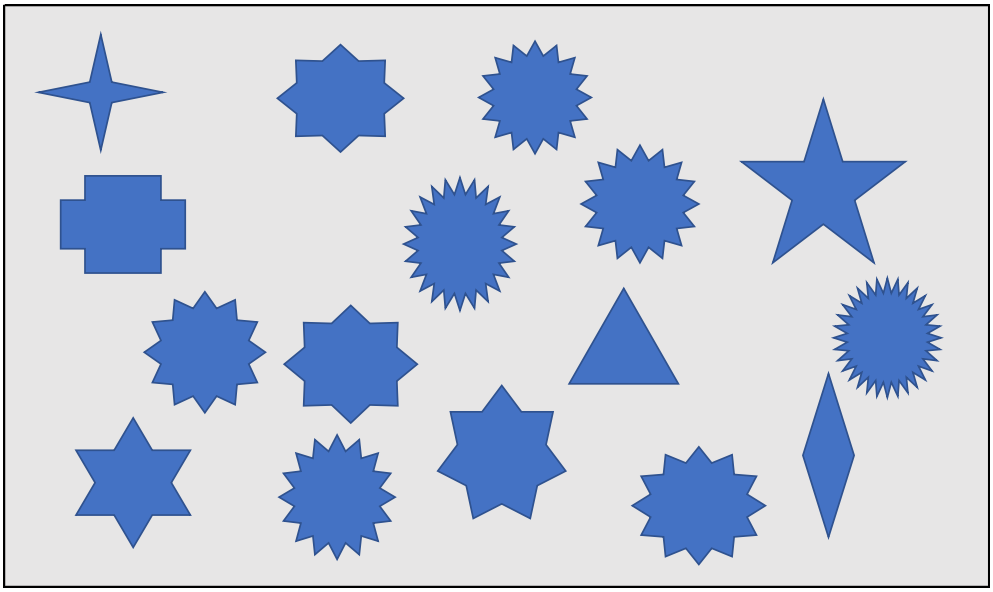
A sequence exercise



3b. Numeric sequences.

Figure 75

Numeric sequences examples



From the shapes available pick the next shape in the sequence:



From the shapes available pick the next shape in the sequence:



Make your own sequence, then make a sequence for the mediator to solve.

4. Mathematical deduction and meaning.

This series of tasks involves a number of tasks designed to evaluate mathemathical deduction and reasoning. Symbols in the form of images of animals are used to infer meaning (Figure 76).

Figure 76

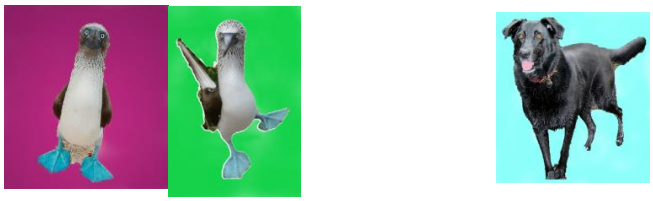
Sample elements for mathematical deduction exercises



Addition. The novice is pressented with a number of images (sampled above). The mediator arranges some of the images thus:

Figure 77

Mathematical deduction example 1

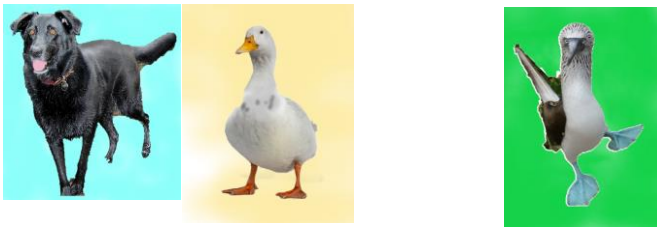


The novice is told this is a puzzle for them to solve. They are asked how might this be a puzzle? What do all of the pictures have? They all have legs, how many? When

the novice solves the puzzle, i.e. that 2+2=4, they are presented with another puzzle (Figure 78):

Figure 78

Mathematical deduction, example 2



The novice should be able to transfer their learning from the previous puzzle.

Therefore 4-2=2

They are then asked to make a puzzle (sum) using the duck and any other items. This indicates if the novice understands that the duck symbolises -2. Proximal and distal learning can be evaluated.

5. Combined patterns, sequences and mathmathical deduction.

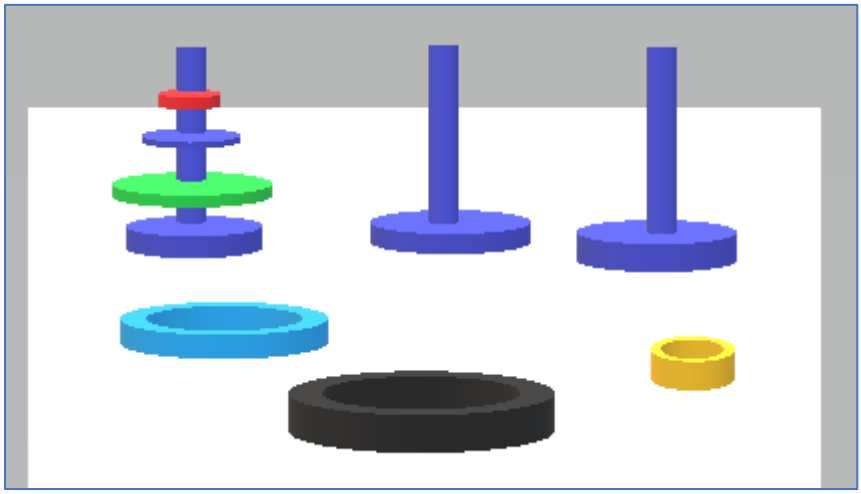
The novice is invited to make a series of sequences using: Patterns and sequences, sequences and mathematical sequences.

6. Towers of Hanoi.

The Towers of Hanoi (Figure 79) is an exercise commonly used to mediate planning and problem solving - elements of metacognition. Research suggests that there is a relationship between skill in solving the puzzle and fluid intelligence (Unterrainer et al, 2004).

Figure 79

The Towers of Hanoi



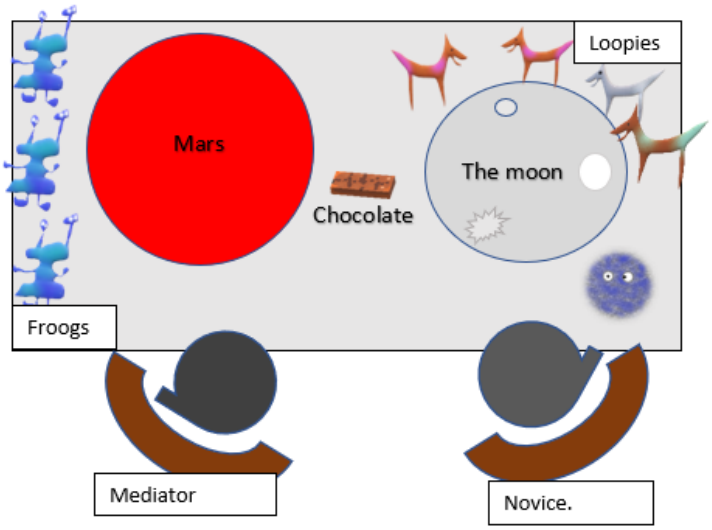
There are three spools. The exercise begins with three disks of increasing size stacked on the first spool. The novice is given a set of rules. They can only move one disc at a time and a larger disc cannot be stacked on a smaller disc. The objective is to stack discs on the third spool in as few moves as possible. The least number of moves for three discs is seven moves (2^N-1) where N= the number of discs. Strategy differs depending on whether there is an odd or even number of discs.

7. Logic – deduction, induction, valid and invalid arguments. Deductive(true), valid and invalid arguments and inductive (likely true).

The novice is presented with a number of aliens, food items (for example bars of chocolate) and planets (Figure 80). They are told the names of the species and Grover (a fuzzy blue alien).

Figure 80

Logic – deduction, induction, valid and invalid arguments workspace



Sample questions-

“All blue aliens live on Mars” (move all blue aliens to Mars).

“All Froogs like chocolate. Frank is a Froog. Does Frank like chocolate?”

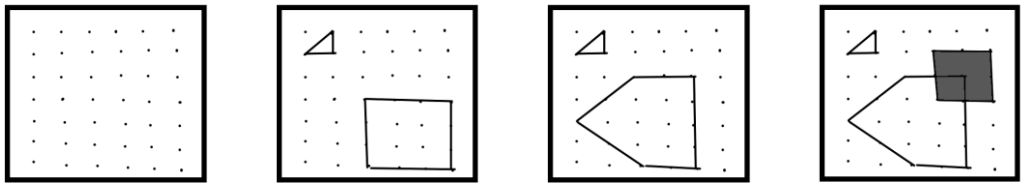
“Grover lives on Mars, does Grover like chocolate?”

8. Focus and menory – dot matrix (Figure 81).

The novice is given a blank dot matrix. They are presented with a target for a short period of time and are then asked to draw from memory what they have seen.

Figure 81

Focus and memory - dot matrix sample



Where a novice struggles with the exercise they are encouraged to think of strategies that might aid their success, essentially how they might chunk the information they see.

9. Solving a problem in the real world.

Novices were asked to pick something of interest to them they would like to do and then plan (with the aid of a pen and paper and sometimes with the aid of a computer) the steps required and the action needed to execute that plan. They were asked to point out the type of reasoning (from their prior learning) they needed to engage to solve the problem. Problems ranged from building a building in a computer game, fitting an engine part in a car, learning a song, writing code for cheats in a game, changing the tyre on a car, and learning to drive.

Appendix B. The Mediated Learning Experience (MLE) Rating Scale.

MEDIATED LEARNING EXPERIENCE (MLE) RATING SCALE (for use with parent-child, teacher-child, examiner-child interactions with preschool children) Developed by Carol S. Lidz, PsyD Based on the theory and research of Prof. Reuven Feuerstein

Child:

Mediator:

Task:

Rater:

Date Location: _____

INTENTIONALITY: a conscious attempt by the mediator to influence the behaviour of the child. This includes communication to the child of the purpose for the interaction, as well as attempts by the mediator to maintain the child's involvement in the interaction. For children who are already self-regulating and do not require interventions by the mediator to engage them in the activity, rating of intentionality includes the readiness of the mediator to become involved as necessary; therefore, the mediator shows ongoing interest in the activity involvement of the child (in this case, the rating would be a 2, unless a statement of a principle is provided).

0 = not in evidence

1 = inconsistently present; loses involvement

2 = consistently in evidence

3 = in evidence, with statement or encouragement of a principle to induce self-regulation in the child; this principle would apply to the child's ability to maintain attention and inhibit impulsivity

NOTES:

TRANSCENDENCE: promotion of cognitive bridges between the task or activity and related but not currently present experiences of the child; these may refer to the past or may anticipate the future. These bridges must promote visual images and help to move the child from the perceptual to the conceptual

0 = not in evidence

1 = simple, non-elaborated reference to past or future experience

2 = elaborated reference

3 = elaborated reference that includes hypothetical, inferential, or cause-and-effect thinking

MEANING: moving the content from neutral to a position of value and importance; this may be done by affective emphasis or stating that the object or aspect of focus is important and should be noticed (or, in contrast, that it is negative and to be ignored or avoided).

0 = not in evidence

1 = calling up labels or concepts already within the child's repertory; saying that it is important and should be noticed (e.g., "Look at this"), but without elaboration

2 = adding animation or affect to make the activity come alive and provoke interest

3 = elaboration that expands the information about the activity or object; this elaboration addresses information that is perceptible to the child within the situation

NOTES:

COMPETENCE (Task Regulation): manipulation of the task to facilitate mastery by the child.

0 = not in evidence

1 = simple directions or passive manipulation of the task (e.g., holding it, moving pieces toward the child, building a model without elaborated directions)

2 = elaborated directions; nonverbal organization into a kind of conceptual grouping

3 = induction/statement/encouragement of strategic thinking and a planful attitude (e.g., “Where shall we start?” “What should we do first?”), or statement of a principle that the child can use to solve similar problems

Notes

Copyright C. Lidz, 1991.

Appendix C. Information Sheet Emma Hurley – To be read to the participant.

Purpose of the Study. As part of the requirements for my PhD at UCC, I have to carry out a research study. The study is concerned with looking at how you learn and finding ways to improve learning. I will be doing this study with lots of people some of whom are from CDYS.

What will the study involve? We will meet thirteen times. For the first three times we will do a card sort (expand) and a computer game. Then we will meet over the next few weeks to do a number of puzzles. These puzzles are short and mostly use pictures. At the end we will do another card sort and computer game.

Why have you been asked to take part? You have been asked because my study is about helping people to learn as best they can, the study can be done with anyone.

Do you have to take part? Participation is voluntary. If you agree to participate, you'll sign a consent form, and you'll get to keep a copy of this information sheet and the consent form. You can withdraw at any time even if you have agreed at first to participate. You can withdraw your permission to use your information within four weeks of the end of the study; if you withdraw permission, then your information will be permanently deleted.

Will your participation in the study be kept confidential? Yes. I will ensure that no clues to your identity appear in the thesis (the study I’m writing). Any extracts from what you say that are quoted in the thesis will be entirely anonymous.

What will happen to the information which you give? The data will be kept confidential for the duration of the study. On completion of the thesis, the data will be retained for a further six years and then destroyed.

What will happen to the results? The results will be presented in my thesis. They will be seen by my supervisor, a second marker and the external examiner. The thesis may be read by future students on the course. The study may be published in an academic journal. You will not be personally identified in any of these.

What are the possible disadvantages of taking part? I don't envisage any negative consequences for you in taking part.

What if there is a problem? At the end of the study, I will discuss with you how you found the experience and how you are feeling. People from the centre will be available to talk to if you want to talk to someone else.

Who has reviewed this study? Approval must be given by The School of Applied Psychology Ethics Committee in UCC before studies like this can take place, and this approval has been granted to this study

Any further queries? If you need any further information, you can contact me:

Emma Hurley Email: .....or Phone:.....

If you agree to take part in the study, please sign the consent form overleaf.

.

Appendix D. Consent Form- Participant.

I _____ agree to take part in Emma Hurley's research study.

The purpose of the study has been explained to me and I understand it.

I am doing the study because I want to (voluntarily).

I understand I will receive a small gift on successful completion of the study.

I give permission for my interview with Emma Hurley to be tape-recorded/such personal details as I have provided to be kept on record.

I understand that I can stop doing the study, withdraw from the study no problem, at any time whether before it starts or while I am doing the study.

I understand I can withdraw my permission to use my study details within 4 weeks of the study, in which case the material I have provided will be deleted. / I understand that after I am paid for taking part that I cannot further change my mind about whether the data may be kept or not.

I understand that anonymity will be ensured in the write-up by disguising my identity. No one will know that I have done the study.

I understand that disguised extracts from what I say may be quoted in the thesis and any subsequent publications if I give permission below:

(Please tick one box)

- ☐ I agree to quotation/ publication of extracts from my data (in which I will not be identified)
- ☐ I do not agree to quotation/ publication of extracts from my data

Signed_____ Date: _____

Appendix E. Letter to Parents.



Dear parent/guardian,

My name is Emma Hurley. I am a PhD candidate in UCC. I am carrying out a study at the moment on learning. My study uses puzzles to teach people skills that are used in solving all kinds of problems. We use these skills every day – whether we want to figure out how to change a tyre on a car, make a shopping list, write a song, make decisions about courses we want to do, or do schoolwork.

Sometimes people miss out on learning these skills, which can make figuring out how to do things hard. My study is about teaching those skills in an easy and enjoyable way. By the end of the study your child should have improved these skills. Your child will already have some of these skills – my study is about working with your child on the skills they may not have. I design each session for the person I work with.

All of the puzzles used are pictures and shapes. The study is not about reading and writing – but how we think. However, the things learned during the study should help anyone who wants to learn anything they would like to learn in an easier way.

Your child does not have to take part in the study but if they do all of the information, I gather will be strictly confidential. Results from the study will be included in my write-up and may be published in a Journal, but no one will be identified in any way

– the names of the people who took part, your name, and the name of the Centre will not be in the report.

If you are happy for your child to take part in the study, please sign this letter. Your child will be asked if they would like to take part also. If they do not want to – that's fine. If they do take part and decide they don't want to keep doing the study they are free to stop at any time. I will ask them at each session of they are happy to keep taking part.

Each person who completes the study will be given a small thank-you for his or her time (a voucher of their choice to the value of 20€).
Feedback from other people who took part in this study is positive – people think it's enjoyable. Thank you for taking the time to consider this study.

Appendix F. Letters to Principals/Coordinators.

Dear ,

I am currently going into the third year of my PhD in Applied Psychology in UCC. I am developing an educational intervention for children and adolescents. The purpose of the study is to give students necessary support in order to engage with the education system more successfully. Although the study is suited to all students it is particularly suited to those not flourishing in school. The approach, dynamic assessment, is widely used in other countries particularly Canada, The Netherlands, USA and Israel. The focus is not on diagnosis but rather on maximising the learning potential of the individual student.

The sessions involve working through a series of cognitive reasoning exercises, the building blocks of problem solving. These strategies, if unlearned, can provide obstacles to further learning. All exercises are visual; literacy is not a requirement for participation. The process is non-invasive and previous participants have found the process quite enjoyable. Over the next year I will by carrying out the study in a number of schools with individuals on a one-to-one basis. The design consists of thirteen visits per student in all – three of which involve carrying out an

individualised, non-invasive assessment of the potential for each student. Eight one-hour sessions are dedicated to the cognitive reasoning exercises.

I understand that this may involve some organisation on the part of the school to make students available, but I believe that the study should benefit both the school and student. I would like to work with six students over the course of the study in your school if you are open to participating.

I would be happy to meet with you to discuss the finer points of the study and any other question you might have. The study has been given ethical approval by the Ethics Board at UCC.

Yours sincerely,

Emma Hurley

PhD researcher

School of Applied Psychology

University College Cork

What is dynamic assessment?

Dynamic assessment, as its name suggests, considers the interaction of the individual with their environment. Performance or learning ability is ascertained by observing performance across different situations. For example, observing performance without the support of a mediator, or expert and then with (typically involving a series of prompts). The difference in performance across these conditions gives an indication of learning potential - the gap between current performance and potential maximum proficiency in that area for the individual. The purpose of intervention then is to effect tangible change in performance, change that will provide the individual with the skills to engage with the education system or employment in a meaningful and rewarding way.

Support takes the form of one-on-one sessions. A series of cognitive reasoning exercises in the form of 3d puzzles that can be manipulated by the participant are used. Cognitive reasoning is the bedrock of successful engagement with any activity involving the individual interacting with their world – from figuring out how to change a tyre, budget expenses for the week, planning any activity or learning of any kind. Areas of cognitive reasoning include mathematical deduction, logic, analogy, syllogisms and understanding sequences and patterns. Meta-cognition is ‘thinking about how we think’. It is an overarching skill we use to bring our cognitive skills together. Support sessions also include exercises on focus and memory.

Letter 2.



My name is Emma Hurley. I am currently a PhD researcher in the School of Applied Psychology in UCC.

My area of interest, and that of my supervisor Dr Raegan Murphy, is the use of Dynamic Assessment in order to maximise the learning potential of individuals not flourishing within a formal education or work setting. Dynamic Assessment targets those people who, either due to biological or social factors, have a gap between their performance in an academic setting and their ability.

This approach in also considered by many to be a solution to the criticisms often directed at psychology regarding assessment and labelling of people. Such practices are avoided, and the approach is very much client centred and clinical (hands on) in nature.

Prominent psychologists such as Robert Sternberg among others support the view that Dynamic Assessment is particularly suited to clients for whom the language they are learning through is their second language, clients from socio-economically challenged backgrounds and clients who for whatever reason, have experienced a gap in their learning. DA is widely used in many countries now including The Netherlands, Israel, Canada and the USA among others.

In using a Dynamic Assessment intervention, the goal of the mediator (or assessor) is to ascertain the current learning ability of the client and then through a series of exercises ascertain what the learning potential of that individual is. This will enable the assessor, the client, the parent and the school to determine the actual ability of the client and formulate any supportive intervention according to the specific requirements of the individual.

It would be my intention, consent of all parties permitting (the institution, the parents, the individuals concerned) to carry out an intervention project.

The study, for each participant, consists of thirteen sessions in total, each lasting about an hour. The study takes place on a one-to-one basis and consists mainly of the use of cognitive reasoning exercises in the form of puzzles.

A previous study has indicated that participants felt more empowered regarding their own learning and that their reasoning skills and self-regulation improved. Levels of self-esteem increased, and students had a more positive attitude to formal learning.

Yours sincerely,

Emma Hurley.