

Like Parent, Like Child? The Development of Self-Theories of Intelligence.

Doctorate in Educational Psychology (DEdPsy)

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Summary

Part One: Literature Review

The extended review is concerned with the importance and development of self-theories of intelligence (STol) of children, and the question of whether a relationship exists between the STol of a parent and her/his child. With reference to the literature, it will define STol and place STol into the theoretical context of personality, self-concept and the development of the self in childhood; explain the two types of STol and critically consider research describing the associated behaviour patterns of goal orientation, effort, motivation and achievement; critically consider research which explores factors that may influence the development of children's STol; establish the relevance and importance of STol for educational psychologists (EPs); and provide the rationale for the current study, stating the research questions and hypotheses.

Part Two: Empirical Study

STol are beliefs that individuals hold about the nature of their own intelligence. Previous research has paid little attention to how STol develop, despite the importance held for learning. The current research investigates whether an association exists between the STol of a parent and the STol of her/his child. Self-report questionnaires were completed by sixty parent-child dyads. Parents and year six children across seven schools acted as participants. STol were measured using Dweck's (2000) scale. Findings indicate a positive association between parent and child STol when participants without a clear STol are excluded. The association was stronger among dyads where the parent perceived that opinions within dyads would be similar. Findings are discussed and limitations identified. Implications for EP practice and directions for future research are described.

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List of Abbreviations

Abbreviation	Meaning
APA	American Psychological Association
BPS	British Psychological Society
EP	Educational Psychologist
EPS	Educational Psychology Service
SToI	Self-theory/theories of intelligence

Part One

Major Literature Review

Like Parent, Like Child? The Development of Self-Theories of Intelligence.

1. Literature Review

This review is concerned with the importance and development of self-theories of intelligence (SToI) of primary school-aged children, and the question of whether a relationship exists between the SToI of a parent and her/his child.

The literature relating specifically to self-theories is largely dominated by the work of Dweck and colleagues. Since the early 1970s, Dweck has conducted empirically-based research in the area of motivation and achievement. Part of the research describes a series of empirically-based studies that investigate how people develop and hold beliefs about themselves, termed “self-theories” (Dweck, 2000, p.xi).

With reference to the literature, self-theories will be defined and placed into the theoretical context of personality and self-concept. The changing nature of the self during childhood will briefly be considered. SToI will be introduced and the types of SToI described.

Dweck (2000) describes how self-theories create an individual’s world, shaping thoughts, feelings and behaviours, and causing people to respond differently when faced with the same situation: “theories are necessary because they help to create a meaningful system by providing a framework to guide our goals,” (Dweck, 1995, p.69). Empirical studies which have investigated the role of SToI as predictors of future behaviour will be critically evaluated. In doing so, it is intended to establish the relevance and importance of SToI in the context of the learning environment and the field of educational psychology.

With the importance of SToI established, attention will be given to the development of SToI, and what is known about the way in which children may come to hold a SToI. Consideration will be given to factors that may influence

the development of children's STol. Research evaluating the influences of parental behaviours and cognitions on the development of children's intelligence-related behaviours and cognitions will be critically considered.

As the literature relating specifically to the development of STol in children is very limited, it will sometimes be necessary to take a broader perspective, investigating how children may come to hold intelligence-related implicit beliefs.

1.1 Search Terms and Sources

The PsycINFO 1806-2012 electronic database was used to inform the literature review, conducted between January 2012 and January 2013. Key terms ("self-theory", "self-theories") and a key author ("Carol.S. Dweck") acted as search terms. Search terms were combined to include "self-theory" and intelligence"; "implicit", "theories" and "intelligence"; and "self-theories" and "development". Search terms were truncated to maximise possible results. Not all results were considered relevant. Other key sources include textbooks regarding self-theories, personality, the self, self-concept, personal identity, child development and the mind and cognition.

1.2 Self-Theories

Self-theories are described as, "people's beliefs about themselves" (Dweck, 2000, p.xi). The self and one's beliefs about the self are important. Self-theories can be domain-specific (i.e., referring to one specific attribute) or domain-general (i.e., relating to the person as a whole). Self-report measures have been developed in order to establish an individual's self-theory of intelligence, personality and morality, respectively (Dweck, 2000). Dweck, Chiu

& Hong (1995a) propose that it is possible to hold different self-theories in different domains. In addition to self-theories, individuals also possess theories relating to other people and the outside world (“other-theories”), which can be measured in a similar way and used to predict the judgements that individuals make of others. Different measures have been produced to measure other-theories (using statements about other people rather than the self), indicative of the differentiation between self-theories and other-theories.

The terms “lay theories”, “latent theories”, “implicit theories” and “naive theories” often appear in the literature pertaining to self-theories (Dweck, 2000; Dweck et al., 1995a; Miele & Molden, 2010; Rattan, Savani, Naidu & Dweck, 2012). However, these usually refer more broadly to beliefs held about the self and/or other people, although many of the same fundamental qualities are shared by self-theories. It is important to differentiate between the two, as Lane (2012) comments: “researchers should...take care to carefully define constructs” (p.167). Implicit theories are described as “core assumptions” which are “alternative ways of constructing reality” (Dweck et al., 1995a, p.268).

Similarly, “lay people’s latent theories influence the way the self and other people are perceived” (Dweck et al., 1995a, p.267), and are referred to as “lay” or “implicit” because they are “largely implicit or poorly articulated” (p.267). An individual may hold such beliefs without being explicitly aware of the beliefs. As such, “systematic effort is required on the part of behavioural scientists to identify them [implicit theories] and to map out their effects” (Dweck et al., p.267).

1.3 Theoretical Context of Self-Theories

Dweck's (2000) work relating to self-theories is "built around the idea that people develop beliefs that organize [sic] their world and give meaning to their experiences" (Dweck, 2000, p.xi). These beliefs may be called "meaning systems" (Dweck, 2000, p.xi) and individuals create different meaning systems for themselves. This is an idea that has a "venerable history in philosophy and psychology" (Dweck, 2000, p.xi), featuring in the fields of social-personality psychology, developmental psychology, cognitive psychology and clinical psychology. The meaning system branch of the social-cognitive approach originates with Kelly (1955).

Dweck (2000) asserts that self-beliefs remain fairly stable over time, illustrating how these beliefs form part of people's personalities and are intertwined with identity, self-concept and self-esteem. Although there is "no one universally accepted definition of personality" (Ewen, 1998, p.3), the idea that aspects of personality remain stable over time is consistent with Child's (1968) definition of personality: "more or less stable, internal factors that make one person's behaviour consistent from one time to another, and different from the behaviour other people would manifest in comparable situations" (p.83). A number of complementary and contrasting theories of personality exist, and it is intended to include a summary of those aspects which aid the contextualisation of self-theories. What follows is by no means an exhaustive description of the theories of personality which exist.

1.3.1 Factor theories of personality.

Theories which present personality as biologically determined take little account of the mediating factors of experience and the environment, and are criticised

as being too narrow, ignoring the complexity of human interaction (Hampson, 1992). Trait theorists (e.g., Cattell, 1946; Cattell & Child, 1975; Eysenck, 1944) suggest that personality is a compilation of traits or characteristic ways of thinking, behaving and feeling, and that the basic goals of motivation have biological roots. Personality dimensions are described which are scales of opposing traits (e.g., introversion and extroversion). Skinner (1965) argued that such concepts do not in any way explain the behaviour which they describe. Similar to biological theories of personality, trait theorists suggest that traits have some genetic or biological basis, accounting for the reason why parents can be so influential in the development of children. However, this leaves little room for the effect of experience. Buss (1989) asserts that some emotional or temperamental tendencies may be rooted in human biology, although Bronfenbrenner and Ceci (1994) argue that tendencies and the way these are expressed are greatly influenced by experience. The nature of self-theories does not accord with factor theories of personality.

1.3.2 Psychology of personal constructs.

Kelly's psychology of personal constructs (1955), and Heider's field theory of social perception (1958) are cited as forming the "intellectual roots" (Dweck et al., 1995a, p.267) of the implicit theories model, as a structure for the way individuals understand the world and react to surroundings. Kelly (1955) suggests that people develop personal constructs which are then used for construing the external world:

By construing, we mean 'placing an interpretation': a person places an interpretation upon what is construed. He erects a structure, within the framework of which the substance takes shape or assumes meaning. The substance which he construes does not produce the structure; the person does (Kelly, 1955, p.35).

Kelly (1955) suggests that constructs are not limited to what a person may talk or think about; Kelly's constructs can also be implicit. Kelly advises that "the psychologist should not...accurately infer what one person thinks from what is publicly believed to be true" (Kelly, 1955, p.28). However, to evaluate an individual's constructs is to ask her/him about her/his beliefs, meaning an individual's true, less socially desirable, constructs and unconscious cognitive process may be overlooked (Eysenck, 1994).

Kelly describes constructs as 'abstractions', that is, they are property attributed to several events. Constructs may be permeable or impermeable and may take different forms in different realms. Dweck et al. (1995a) liken self-theories to Kelly's superordinate construct, which "defines the individual's reality and imparts meaning to events" (p.268). Dweck (2000) asserts that her research has attempted to identify core personal constructs that are shared by many and hold important consequences, in the form of self-theories.

Kelly (1955) proposes the notion of the sociality corollary: in order to relate to another person, an individual must understand how that person construes the world, although this does not mean she/he must use identical constructs. Individual differences in cognitive processing and structure are considered in detail in Kelly's (1955) psychology of personal constructs, bringing "richness and variety" (Cantor & Harlow, 1994, p.139) to the theory.

Others can influence the development of constructs. Kelly asserts that the behaviour and language of parents can influence the formation of a child's constructs, although Kelly is criticised for devoting little attention to infancy and childhood, which is largely regarded by other theorists as a time of considerable importance for personality development. Eysenck (1994) criticises the lack of detail which exists about the processes involved in the development of

constructs: “the origins of an individual’s construct system are obscure, as are the processes determining which construct will be selected as the best predictor in a given situation” (p.75). It is the development of specific constructs that relate to STol, in which the current review is interested.

Kelly’s psychology of personal constructs (1955) has been criticised as being a highly dry, scientific theory which overlooks the warmth and depth of human emotion, with an “extreme overemphasis” (Ewen, 1998, p.373) on cognition. Dweck (2000) stresses that the emphasis on cognition in her model does not “deny the great importance of emotion but rather that we see most important emotions as being tied to cognition” (p.139).

1.3.3 Lifecycle model of personality.

Erikson’s (1959) lifecycle model of personality development describes eight sequential stages, from infancy to old age, each of which involves the resolution of a crisis. Resolution relies on interactions with others and the environment and each resolution results in the individual evolution of a positive or negative self-description. For example, the first psychological dilemma to be resolved in infancy is ‘trust versus mistrust’. Children feel secure if they receive love and affection in a stable, predictable environment.

In the pre-school years, the psychosocial dilemma is ‘autonomy versus shame and doubt’, followed by ‘initiative versus guilt’ in the pre-school years. In middle childhood (six to twelve years of age), in the process of education, the dilemma is ‘industry versus inferiority’. At this stage, the child’s need to develop skills and engage in meaningful work emerges in relation to achieving in school.

However, Erikson’s work is largely based on clinical observation rather than empirical research (Ewen, 1998) and it could be argued that as human

personalities are so varied, it may be reductionist to believe that a single set of stages applies to everyone. Contrastingly, Carr (2004) indicates that research on lifespan development shows that people do face the psychosocial dilemmas described by Erikson and thus develop the virtues or vulnerabilities associated with the successful or unsuccessful resolution of psychosocial dilemmas. However, Carr (2004) concedes that the passage through the stages can be more varied than suggested by Erikson's theory.

1.3.4 Self-concept.

Dweck and Leggett (1988; 2000) suggest that "each implicit [self] theory could be seen as a different form of self-concept" (p.271). Rogers (1959) suggested that humans develop a self-concept, that is, "a learned, conscious sense of being separate and distinct from other people and things" (Ewen, 1998, p.394). Like Kelly (1955), Rogers (1959) agrees that how individuals interpret events is more important than objective reality and that beliefs are established through experiences and hypothesis testing in the external world.

Rogers (1959) defines self-concept as being wholly conscious, which appears to be in contrast to the implicit nature of self-theories. Dweck (2000) clarifies that implicit theories "are things that we can become consciously aware of, but at any given moment we may not realize [sic] that they're present and how they are affecting us" (p.139). However, Rogers (1959) defines self-concept as being conscious on practical rather than theoretical grounds, believing that a theory must be empirically tested and it would be challenging to operationally define a partially unconscious self (Rogers, 1959, p.202). The importance of a theory being empirically tested is a notion shared by Dweck (2000).

1.4 The Self and Childhood

Dweck's (2000) model is "very much about the self" (p.136). It could be presumed that in order to possess self-theories, individuals surely must have developed a notion of self, and a self-concept, although Dweck (2000) notes that "our model does not portray the self as one monolithic thing" (p.138). There are numerous philosophical debates about the self, the nature of self and self-knowledge (Hatzimoysis, 2011) which explore the complexities of one's knowing of oneself as oneself. Whilst the study of self-theories may not require an exploration of the philosophical inquiry of the notion of self (i.e., how 'self' can be defined), it is useful to consider the acquisition of self-concept as described in the field of developmental psychology (summarised in Table 1), in order to conceptualise what the self means at different stages of development. It has been asserted that a child's sense of self is crucial to the way she/he approach academic tasks in addition to the tasks and challenges presented in life (Pajares & Schunk, 2002).

1.5 Self-Theories of Intelligence (SToI)

SToI are a person's self-judgements regarding her/his own intelligence. These implicit conceptions about the nature of ability (Dweck & Leggett, 1988; 2000) are not concerned with measuring a cognitive ability or intellectual capacity in any way. SToI are the beliefs which an individual may hold about her/his own intelligence, and it is these beliefs which research has shown to be linked to future learning behaviours, regardless of an individual's confidence in her/his intelligence (Dweck & Bempechat, 1983; Henderson & Dweck, 1990).

Table 1.

A summary of several views of the development of self-concept in childhood

Toddlers (< 3 years)	Early childhood (3 – 6 years)	Middle childhood (6 – 12 years)	Adolescence (12 years+)
<p>Toddlers begin with self-recognition at a physical level (Amsterdam, 1972).</p> <p>Children are likely to establish a categorical self, by classifying themselves in terms of membership to certain groups (Bukatko & Daehler, 2001).</p> <p>A child's concept of her/his self begins to extend beyond physical features to include activities the child likes and is good at, her/his possessions and relationships (Sugarman, 2001).</p> <p>Children at this age are more likely to attribute actions to uncontrollable (i.e, external) factors (Sugarman, 2001).</p>	<p>In early childhood, children begin to make relational statements making social comparisons with peers. Instead of simply categorising or itemising skills, quantities are compared with others (Livesley & Bromley, 1973).</p> <p>Children increasingly coordinate the attributes they apply to themselves (Harter, 1999).</p> <p>Children begin to make relational statements, expressing beliefs about being better than or not as good as others (Sugarman, 2001).</p>	<p>Children start to describe themselves in terms of inner personality traits and motives, rather than the purely physical. Qualities are described increasingly in relation to others and social relationships (Sugarman, 2001).</p> <p>Children come to view themselves in terms of more abstract and increasingly differentiated qualities (Harter & Monsour, 1992).</p> <p>Children become increasingly aware of their own efforts in achieving success (Sugarman, 2001).</p>	<p>The abstract representations are initially relatively compartmentalised, becoming increasingly integrated in adolescence accompanied by the apparent adolescent impetus for conflicting selves (Harter, 1999).</p> <p>Children increasingly acknowledge the contributions of others to their sense of agency (Sugarman, 2001).</p>

1.5.1 Intelligence.

Earlier, Child's (1968) definition of personality was used in describing how self-theories form part of personality. Although not the most recent definition, this was selected as it is a broad definition which includes intelligence as an aspect of personality, something which other theorists might omit (Eysenck, 1994). At the most basic descriptive level, intelligence is a trait on which individuals vary,

impacted upon by both genetic and environmental variables (Neisser et al., 1997). In discussing STol it is not intended to provide a definition of intelligence, as this is not considered integral to the research questions. As described above, STol do not seek to measure intelligence but rather beliefs about intelligence, therefore, the focus remains on exploring the concept of self-theories rather than the concept of intelligence. It is well documented that “psychologists have not been able to agree among themselves on a definition of the elusive concept of intelligence” (Eysenck, 1994, p.4) and attempts to define intelligence have challenged many and served to act as a distraction:

Originally intelligence was abstracted as a property of many different behaviour situations....It was the headlong urgency of writing an operational definition that distracted the psychologist into thinking so concretely about intelligence (Kelly, 1955, p.21).

It is intended to avoid this urgency and distraction by focussing on the definition of “self-theories” rather than “intelligence”. In attempting to define intelligence as part of this study, the danger exists that the definition could show bias to either the entity (i.e., defining intelligence as a fixed, innate capacity) or incremental theory (i.e., defining intelligence in terms of what an individual can do and how hard she/he tries). In viewing a definition of intelligence, the reader may become primed or sensitised to a STol. It is intended, instead, to allow intelligence to remain as an aspect of personality, to be constructed by the reader and by participants.

1.5.2 Entity and incremental STol.

Two different STol have been identified: a fixed, entity theory and a malleable, incremental theory (Bandura & Dweck, 1985; Dweck & Leggett, 1988; 2000). Those with an entity theory of intelligence believe that intelligence is a “fixed,

concrete, internal entity” (Dweck, 2000, p.20) and the amount of intelligence one has is static. The entity theory is so-called because “intelligence is portrayed as an entity that dwells within us and that we can’t change” (Dweck, 2000, p.2). Conversely, those with an incremental theory of intelligence believe that intelligence is a “more dynamic quality that can be increased” (Dweck, 2000, p.20), that effort can increase intelligence (Dweck & Molden, 2007) and that intelligence can be cultivated through learning.

It is reported that when STol have been assessed in adults and children, about 40% hold an entity theory, about 40% hold an incremental theory, and the remaining 15-20% are categorised as neither entity nor incremental theorists (Dweck, 2000; Dweck et al., 1995a; Dweck & Molden, 2007). However, this distribution may be specific to Western culture as research has suggested that the incremental belief is more prevalent in East Asian cultures than in North American cultures, given the greater emphasis on effort prevalent in East Asian societies (Heine et al., 2001).

STol are typically measured by agreement with intelligence-related statements. The Implicit Theory of Intelligence Scale (Dweck, 2000; Dweck et al., 1995a; Dweck, Chiu & Hong, 1995b), uses a six-point Likert scale for individuals to self-record responses to statements about intelligence. Participants are assigned a mean score from one to six; those with a score below 3.0 are classified as entity theorists and those with a score over 4.0 are classified as incremental theorists. Those whose scores do not fall into either category are often excluded from data, because the self-theories are not considered sufficiently differentiated. Tests of reliability and validity have returned positive results (Dweck et al., 1995a; Dweck et al., 1995b).

When using open ended questionnaires to probe undergraduate students about self-theories (including about intelligence) Rhodewalt (1994) suggested that, “It appears that people are not ‘pure’ theorists but rather hold both fixed-entity and incremental views to varying degrees” (p.80). It might not always be possible to classify participants into one of the two categories. Harackiewicz and Elliot (1995) offer an opposing commentary on STol and suggest the possibility that “entity theorists may actually have both incremental and entity theories available in memory, but the relative accessibility of the two beliefs varies” (p.298). They suggest that entity theorists can become incremental theorists in some situations, while incremental theorists have only one theory available.

1.6 Self-theories of Intelligence Predict Future Behaviour

Investigators of STol have undertaken the challenge of identifying “major patterns of behaviour and linking them to underlying psychological processes” (Dweck & Leggett, 1988, p.256). Previous research suggests that whether an individual holds an entity or incremental STol can have consequences for her/his future behaviour, impacting on, or predicting, learning behaviours, even for primary school-aged children (Abdullah, 2008). Research (later summarised in Table 2) suggests that the two differing STol foster different achievement goals (Dweck & Leggett, 1988; 2000), create differences in motivation (Blackwell, Trzesniewski, & Dweck, 2007), differences in effort (Rhodewalt, 1994) and predict differences in achievement outcomes (Blackwell et al., 2007).

1.6.1 Causal relationship.

A causal relationship, linking implicit theories to behaviours, is regularly inferred in the literature pertaining to self-theories, as research has indicated that temporarily manipulating a self-theory can alter other behaviour or judgements. Chiu, Hong and Dweck (1997) found that college students who were led to believe in an entity theory of personality (when compared with participants with an incremental theory) made stronger probability predictions about the targets' behaviour in a particular situation on the basis of information about the targets' traits, believing that it is very probable that someone who displays a given trait in one situation will display that trait again in another situation. Dweck, Tenney and Dinces (1982, cited in Dweck & Leggett, 1988; 2000) claim that the relationship is causal, based on a study which found that temporarily orienting children towards a particular STol could influence their goal choice. This finding was replicated by Bergen (1991, cited in Dweck et al., 1995a).

1.6.2 Goal orientation.

Dweck and Legget (1988; 2000) describe two types of goals within the domain of intellectual achievement: learning goals, where learners strive to increase competence and understand something new and performance goals, where learners strive to document, or gain more favourable judgements of their competence (e.g., obtain a higher score in a test). Dweck and Leggett (1988; 2000) describe STol as a predictor of goal orientation, in children aged nine to fourteen years, based on their own empirical studies (Bandura & Dweck, 1985; Dweck & Bempechat, 1983; Leggett, 1985). Dweck and Leggett (1988) conclude that "research consistently indicates" (p.262) that the more a student held an entity STol, the more likely she/he was to choose a performance goal,

whereas the more a student held an incremental STol, the more likely she/he was to choose a learning goal. Dweck and Leggett (1988) suggest that those who view intelligence as fixed show a preference for the measurable outcome of the task rather than the learning process. These findings are supported by Ablard's (2002) study of 425 sixth-grade students (around 11 years old), which found that a preference for learning goals was associated with an incremental STol. Those who hold an entity STol can become highly concerned with measuring attributes, often to the detriment of learning, while those who hold an incremental STol place a priority on learning and self-development (Dweck & Molden, 2007). However, Harackiewicz and Elliot (1995) suggested that a performance goal is preferable in some situations.

While Dweck and Leggett (1988) are often cited by others (Dweck, 2000; Plaks, Grant, & Dweck, 2005; Rhodewalt, 1994) for their conclusions linking STol to learning goals, fairly little evidence is actually critically cited as forming the basis for this conclusion. That which is cited is largely unpublished raw data, which is challenging to evaluate as the method and findings are not fully described in the citing articles. However, in a questionnaire study of eighty undergraduate students, Rhodewalt (1994) confirmed these findings and the results of Blackwell et al. (2007) provide further support. In addition, a large scale study of 530 ten to twelve year olds used self-report questionnaires to measure STol and goal orientation, and found a positive correlation between entity STol and performance goals (Abdullah, 2008).

1.6.3 Motivation.

It has been reported that STol create different motivational frameworks (Dweck & Master, 2009). Dweck and Leggett (1988; 2000) describe children's

"mastery-oriented" or "helpless" reactions to challenge, based on others' observations of children who were not found to differ in terms of ability (Diener & Dweck, 1978; Dweck, 1975; Dweck & Reppucci, 1973). Those who display the helpless pattern attempt to avoid challenge and give up in the face of failure. In contrast, mastery-oriented children seek challenge and persist or increase effort in response to failure.

Blackwell et al., (2007) suggest that teaching an incremental STol can enhance students' motivation in class. Ninety-one seventh-graders (aged 11 to 12 years) acted as participants. Pre-test self-report questionnaires were used to assess students' motivational profiles and STol. All students showed a pre-test decline in grades in mathematics. The incremental theory intervention was delivered to groups of 12 to 14 students during eight weekly sessions. The control group received a workshop on the structure of memory. After the intervention, students were re-assessed for STol and teachers were asked to keep a record of students who had shown changes in their motivational behaviour. Results indicate that students in the experimental group endorsed an incremental STol more strongly after the intervention while the STol of the students in the control group did not alter. Significantly more students in the experimental group were cited by teachers as showing positive motivational change.

The study is limited as it was conducted in only one school. While the study included both an experimental and control group, the pre-test and post-test measures were not entirely comparable, as students completed a self-report questionnaire to establish motivational profile beforehand and teacher observations were collected post-test. By using two different measures of motivation pre- and post-test, it is not possible to make direct within-participant

comparisons of motivational levels in a quantifiable way. This is not congruous with the use of the STol questionnaire both pre- and post-test, which allowed participants' scores to be compared and was considered a useful measure with school students (Blackwell et al., 2007). Blackwell et al. (2007) describe the choice of participants in terms of their developmental stage; participants were in their first year of secondary school. The authors discuss this school transition as coinciding with the transition from late childhood into early adolescence and also being a time of importance for the development of STol.

1.6.4 Effort.

It has been proposed that entity theorists agree significantly more than incremental theorists with statements such as "If you're really good at something, then you shouldn't have to work very hard to do well in that area" (Legget & Dweck, 1986; Mueller & Dweck, 1998, cited in Dweck, 2000). This suggests that when more effort is required, intelligence is questioned. However, both of these studies are unpublished and are cited by a contributing author without full details of the methodology. It is known that they were conducted with eighth-graders (13 to 14 year olds) and college students. Support for these findings is provided by Blackwell et al. (2007) who, in a large scale study of eleven and twelve year olds, found that an incremental STol was positively correlated with positive effort beliefs. Henderson and Dweck (1990) assert that students with an incremental STol tend to thrive on challenges, apply effort to difficult tasks and show perseverance. These findings are supported by the results of Robins and Pals (2002).

Jones and Berglas (1978) coined the term "self-handicapping" (p.201) to refer to the strategic creation of obstacles to successful performance.

Rhodewalt (1994) found that those who hold an entity STol are more likely to self-handicap than those who hold an incremental theory. Self-handicapping can allow the externalisation of poor performance and it was concluded that it can serve to maintain self-image for entity theorists. In this correlational study, eighty undergraduate college students acted as participants. Rhodewalt and Tragakis (2002) have discussed the implications of self-handicapping for the classroom.

Possessing an incremental STol does not necessarily mean that someone is likely to exert more effort, and an incremental STol does not necessarily eliminate concerns about self-esteem (Crocker, Brook, Niiya & Villacorta, 2006). Studies from peer-reviewed journals have suggested that, when self-worth is contingent on academic achievement, even incremental theorists remain concerned about their self-worth and will self-handicap in academic tasks to protect their self-esteem from the threat associated with failure (Niiya, Brook & Crocker, 2010; Niiya, Crocker & Bartmess, 2004).

1.6.5 Achievement.

Research suggests that students with an entity STol place importance on looking clever whereas those with an incremental STol would sacrifice looking clever in favour of the opportunity to learn something new (Bandura & Dweck, 1985; Dweck & Leggett, 1988). In a study involving over 370 teenage students over two school years, Blackwell et al. (2007) found that an incremental STol predicted an upward trajectory in school results over two years, while an entity STol predicted a flat trajectory in grades. Students completed self-report questionnaires in school at the start of the study, which assessed STol, goals, beliefs about effort and helpless versus mastery responses to failure. The

authors of this longitudinal study concluded that STol can act as a predictor of achievement over time and also discussed the relevance of the school transition which the participants were experiencing. It was suggested that, within the more supportive context of the elementary school (up to 11 years of age, dependent on education authority), entity theorists may be more protected against the negative effects of their beliefs and that when the challenges of middle school arrive, entity theorists are less well equipped to face the challenges. The authors suggest that social environmental conditions such as home environment and school conditions have influence on the psychology of the child (Blackwell et al., 2007) and that the child's beliefs act as mental "baggage" in the achievement situation (p.259). However, this study was conducted in only one school. Future studies could be conducted across schools to assess whether school effects are important. These could also be replicated in the UK.

There is evidence to suggest that those with an incremental STol focus more on self-improvement rather than self-defence when compared to those with an entity STol (Niiya et al., 2004; Nussbaum & Dweck, 2008). A series of empirical studies found that an incremental STol can lead people to address their shortcomings and strive for self-development, when over 130 university students were tested using self-report measures and academic-style tests (e.g., speed reading) (Nussbaum & Dweck, 2008). However, sample sizes were reduced in the individual studies, and varied from 26 to 80 participants.

Additional research suggests that those with an incremental theory have greater expectations for, and openness to, personal improvement (Chiu et al., 1997; Erdley & Dweck, 1993; Plaks, Stroessner, Dweck & Sherman, 2001). Although the series of five studies involved over 250 participants (Chiu et

al.,1997) the implicit theories were not specific to intelligence, therefore it may not be possible to generalise these results to domain-specific self-theories.

1.6.6 Summary of research.

While SToI have both costs and benefits, it has been stated that there are fewer costs for the incremental view and fewer benefits for the entity view (Dweck et al., 1995a). The findings of the studies discussed above generally support this view (summarised in Table 2).

One criticism that much of the empirical evidence described above attracts is that the research was often conducted in partnership with Dweck, rather than independently, which can lead other researchers to question its validity. As Dweck is frequently involved in the research which is cited to support her theories, an element of independence may be lacking from the research.

Table 2

Summary of research findings, behaviours relating to self-theories of intelligence

Theory of intelligence	Goal Orientation	Effort & motivation	Grade trajectory (over 2 years)
Entity (intelligence is fixed or uncontrollable).	Performance (gain positive/avoid negative judgement of competence).	Intentionally withheld when faced with difficult task. Helpless response.	Flat trajectory.
Incremental (intelligence is malleable).	Learning (increase competence).	Applied effort to challenges and persevere. Mastery-oriented response.	Upward trajectory.

The research does, however, consistently indicate similar findings, although it is regularly conducted in America and therefore findings may be limited, in terms of cross-cultural generalisation. Dweck (2000) asserts that the research which she cites in support of her model of self-theories is frequently conducted with large sample sizes and results are found to be statistically significant, indicating the reliability of the research. Schunk (1995) noted that this model of STol has been well supported by empirical research and independent studies have also been found to support the findings of Dweck and her colleagues. Since this observation, even more research into STol has been published by Dweck and other researchers.

1.7 STol and Educational Psychology

The application of psychological theory to practice is a fundamental principle underpinning all aspects of an educational psychologist's (EP's) work as an applied psychologist. Self-theories have a place in applied psychology (Harackiewicz & Elliot, 1995). An EP's distinctive contribution when working with children and young people, is this application of psychological theory to practice, and work surrounding self-theories consistently makes links between psychological research and practice. For applied psychologists, practice-based decisions rely on being able to pose theoretical questions and seek answers to these questions, which are grounded in informed and reasoned action (Gameson & Rhydderch, 2008).

STol are specifically relevant to educational psychology, due to their impact on learning behaviours. As discussed previously, research suggests that the two differing STol create different achievement goals (Dweck & Leggett, 1988; 2000), create differences in motivation (Blackwell, Trzesniewski, &

Dweck, 2007), differences in effort (Rhodewalt, 1994) and predict differences in achievement outcomes (Blackwell et al., 2007). These are all relevant at an individual, organisational and systemic level when EPs are working with pupils, schools and families.

SToI have practical implications for the classroom, for the home and for EP practice, for example, in influencing how EPs could work to support pupils and class teachers in developing more beneficial, incremental, SToI. Five core functions of educational psychology services (EPS) have been proposed (Scottish Executive, 2002). It is proposed that the topic of SToI could inform work within these suggested functions of an EPS (Table 3).

1.8 Stability of Self-Theories

Longitudinal research has indicated that SToI are relatively stable beliefs in high school and college students (Robins & Pals, 2002) and that four to six year old children's beliefs and their helpless versus mastery response to failure remained stable over two years of measurement (Heyman, Dweck & Cain, 1992; Smiley & Dweck, 1994). Dweck (2000) advocates that it is this stability which makes it important to learn how SToI develop. Divergent research has indicated that SToI can be taught or primed at least temporarily, as shown in studies of older students (Niiya et al., 2004). Reportedly, SToI can be changed, at least within the school context, through targeted interventions which teach about the expandable capacity of intelligence (Blackwell et al., 2007; Good, Aronson & Inzlicht, 2003). Further research is needed to establish the long-term effects of SToI interventions (Blackwell et al., 2007). However, interventions can be costly in terms of time and money, produce different effects for different

Table 3

Table to show how the topic of STol may relate to an educational psychologist's practice, in relation to the core functions of educational psychology services proposed by the Scottish Executive (2002).

Core function of EPS	How aspects of STol may relate to EP practice
Consultation and advice	Research has established links between the type of STol an individual holds and associated patterns of learning-related behaviour, which can act as a barrier to, or a facilitator of, a pupil's learning progress. A knowledge and awareness of this may be relevant for EPs when engaging in consultation relating to a child's learning. It allows the EP to consider the beliefs that may be held by an individual pupil, parent or educational practitioner, which may be creating or maintaining a problem that has been identified for change. Knowledge of STol may help those in a consultation meeting to reframe a problem. EPs could provide advice about motivating individual children using the model of STol.
Assessment	Limiting the effects of barriers to learning could be considered an aim of effective educational psychology assessment. STol can be assessed on an individual basis, using self-report questionnaires. These may be used to investigate an individual child's constructs about intelligence, when engaging in individual casework regarding learning. Assessment of STol could also be used as a pre- and post-test measure of the effectiveness of an intervention. Assessing STol may help to understand or explain behaviours that are observed in the classroom.
Intervention	The most likely use of an intervention relating to STol would be to teach beliefs relating to the incremental STol, in order to encourage the positive outcomes which are associated with an incremental STol. EPs could deliver interventions or support teachers and support staff to do so.
Professional development and training	EPs could provide schools or other service providers with training on the impact of STol on goal orientation, motivation, effort and achievement. This could help educational practitioners gain a better understanding of the importance of beliefs that are held in the learning environment, not just by children but by practitioners and parents. Research has shown that the beliefs that practitioners hold can influence their teaching practices (Rogers, 2010).
Research and strategic development	EPs could support schools at a systemic level, assisting with developing praise and reward systems, teaching and learning policies or considering the impact of the whole school ethos regarding the importance of achievement versus learning in school. EPs are also in a position to support and carry out research to evolve an evidence base for educational practice. EPs could also conduct evaluative research across schools, looking at interventions relating to STol.

populations and are often not practically feasible for use in classrooms, where there are competing demands on the educational practitioner's time. An alternative to modifying STol is to consider how they initially develop, and to intervene during their development.

1.9 The Development of STol

Dweck and Molden (2007) advise that the STol which an individual holds can have "profound consequences" (p.124). If it is to be accepted that a STol, to some extent, can impact on an individual's effort, motivation and learning, then it is important to consider how an individual can come to hold a particular STol. Dweck and Molden (2007) posed the question, "Where do self-theories come from?" (p.134) and acknowledge that little is known about this. An exploration of personality theories (Erikson, 1959, Kelly, 1955) and self-concept (Rogers, 1959) has highlighted the importance of external influences. Dweck (2007) has hypothesised that key messages from parents, carers and teachers are likely to have profound effects on children's beliefs about the nature of intelligence. The roles of school, praise and parents in the development of STol are discussed below.

1.9.1 School.

During their formative school years, children spend a significant amount of their waking hours at school, during which time schools and teachers impact upon children's development (Rutter, Maughan, Mortimore & Ouston, 1979). In a longitudinal study of twelve London secondary schools over four years, Rutter and colleagues collected a series of data which led to the conclusion that schools have an impact on a child's development and that it does matter which

school a child attends. However, STol were not specifically considered, although many other variables pertaining to students' behavioural and academic outcomes were.

Dweck (2000) advises that intelligence is an issue that gains importance over the school years, "as children pursue their academic studies, experience successes and failures, observe the successes and failures of their peers" (p.96). A Task Force, appointed by the American Psychological Association (APA) to address the intelligence debate, concluded that school is an environmental variable "with clear-cut importance" because of its role in "developing certain intellectual skills and attitudes" (Neisser et al., 1996). It is these attitudes, in the form of STol, with which the review is concerned. Given the contextual role that school plays, being a learning environment, perhaps it would be expected to influence a child's STol.

From a relatively young age, children are encouraged to evaluate their own and others' intelligence (Furnham, 2000). This may take place in school, where children are often involved in academic and performance tests and take part in their own target setting, assessment and evaluation. In the school setting, it could be argued that that pupils are exposed to the language of assessment and monitoring that forms the rhetoric of teachers in so many schools. Schunk (1995) proposed that there was a need for research to address more fully the relations between school socialisation practices, implicit theories and personal beliefs. Rogers (2010) found that teachers who endorsed an entity theory of intelligence were less likely to teach higher-order thinking skills to students who were identified as low achieving. These findings suggest that teachers' implicit theories of intelligence influence their teaching practices. Lane (2011) proposes that children are more likely to adopt the implicit attitudes

of adults whom they like or with whom they identify. This could be an educational practitioner.

Murphy and Dweck (2010) propose that, although lay theories are traditionally conceptualised at the individual level, they can exist at the organisational level and hold consequences for the organisation's members. Using undergraduate students as participants, they conducted a series of studies where participants were asked to complete an application for a tutoring club, after being presented with information about the club's lay theory of intelligence. It was found that knowing whether the club held an entity or incremental theory of intelligence impacted on the way students presented themselves, promoting corresponding entity or incremental beliefs and traits. While it may be methodologically challenging to measure and conceptualise a school's theory of intelligence, Murphy and Dweck (2010) have begun to reconceptualise implicit theories as influences which can operate at the organisational level. This phenomenon, that implicit theories can operate at the organisational level, becomes increasingly important if it holds consequences beyond surface-level self-presentation and impacts upon the development of self-concept.

1.9.2 Praise.

Findings have indicated that the praise and feedback that adults provide to children can impact on whether an individual develops an entity or incremental STol (Kamins & Dweck, 1999). Research has asserted that feedback which focuses on and judges a child's traits (e.g., intelligence) fosters an entity theory and feedback that focuses on the child's process (e.g., effort) fosters an incremental theory of intelligence (Mueller & Dweck, 1998).

Mueller and Dweck (1998) carried out a series of six studies with children (aged nine to eleven years) who were required to carry out problem-solving tasks. Participants were divided into three groups: one group received praise for achievement (“That’s a very good score”), one group received praise for effort (“You must have worked hard”) and the third group acted as a control (no additional feedback). Results showed that two-thirds of the ability-praise group then self-selected performance goals and were more likely to attribute failures to not possessing the ability to do the task, consistent with an entity STol. Learning goals were self-selected by 90% of the effort-praise group, who were more likely to show an improvement in performance. The ability-praise group were significantly more likely to endorse an entity STol than the effort-praise group, indicating to some extent how STol can be socialised. However, while the authors conclude that this provides preliminary evidence for the effect of praise on STol, the findings are limited by the design of the study. Only fifty-one children were asked to rate agreement with only one entity statement about intelligence, which served as the measure of STol. While the results were statistically significant, the use of only one statement reduces the reliability of the results, which could have been increased with the inclusion of more statements.

While the above study was carried out in the children’s familiar school context, the praise was provided by an unknown adult and in an artificially induced manner. It is not easy to generalise the results of this field experiment or to presume that the feedback that teachers and parents provide to children would have similar effects on the STol of children in a more long-term manner. In addition, the researcher testing the children also provided the praise, and it could therefore be argued that this may have led the children in the ability-

praise group to believe that the experimental task was actually an intelligence test that allowed the experimenter to diagnose ability from performance, thus influencing and encouraging participants to agree with the entity statement of intelligence. The effects of praise may be better measured in a more naturally occurring situation, STol better measured with a selection of both entity and incremental statements for participants to rate and participants not expected to rate at a time when completing a novel achievement task.

Similar research, with an alternative methodology, has been conducted. Dweck and Lennon (2001) asked students (aged 11 to 13 years) to rate whether their parents typically gave trait messages (e.g., about intelligence) or process messages (e.g., about studying strategies or learning) in schoolwork-related interactions. It was found that students who hold an entity theory of intelligence report more trait judgements from their parents than children who hold an incremental theory. Children who hold an incremental theory report relatively more process feedback from parents. Differences in intelligence theories were also linked to attributions for failure, effort and grades. Consequently, Molden and Dweck (2006) advocate that, in the same way that early parental attunement promotes young children's emotion regulation, it is possible that process-focused parenting is an important way in which this attunement is carried on for older children. They assert the likelihood that child-rearing practices which emphasise traits, versus processes, will play a role in the lay theories children develop. Dweck (2000) postulates that a parent's reaction to a child's academic efforts contribute to the child's understanding of intelligence in the school years, a time in childhood when the concept of intelligence is gaining in importance: "as children peruse their academic studies [and] experience successes and failures" (Dweck, 200, p.96).

Dweck and Lennon (2001) used real world scenarios and asked children to report on their own experiences, resulting in research with higher ecological validity than a laboratory experiment. However, the research relies on students' reports only, with parents' reports not being considered, which raises the question as to whether these are a valid measure of parental praise. It is not possible to establish a causal relationship between the praise students reported receiving and the self-theories held. Is it the case that entity theorists report more trait praise because it is consistent with their beliefs and they are more sensitive to recalling such praise, or are entity theorists exposed to more trait praise, which results in the development of an entity theory? It is not yet known. Nor has it been investigated whether children's reports of praise received accord with parents' reports of praise provided.

While the above research begins to establish a link between parental behaviours and children's STol, it does not account for why one parent may provide process-focussed praise while another provides achievement-focussed praise. The research does not consider whether parental beliefs regarding their own intelligence (self-theory) or the intelligence of others (other-theory) influence the way in which parents provide feedback to their child about her/his learning. It would be helpful to investigate whether there is a link between a parent's STol and the type of praise she/he reports providing, and whether there is a link between a child's STol and either the praise she/he reports receiving or the type of praise the parent reports providing.

1.9.3 Parents.

Biological theorists would argue that parents influence children's development, due to the genetic commonalities shared by parent and child. Bronfenbrenner

and Ceci (1994) suggest that, while children may be born with certain temperaments, it is interactions with parents, teachers, peers and siblings that determine how the temperament is expressed. The influence of experience cultivating personality traits is in keeping with Kelly's theory of personality (1955). Kelly (1955) also asserted that the behaviour and language of parents can influence the formation of a child's constructs. Erikson's (1959) model also proposes that the behaviour of parents can impact positively or negatively on the resolution of psychological dilemmas for the child, in the development of personality.

Parents have been acknowledged as children's first educators (Education & Employment Committee, 2000; Qualification and Curriculum Authority (QCA), 1999; Welsh Assembly Government (WAG), 2008). Research into the impact of parents on children's approaches to achievement focusses upon parental behaviours, parental cognitions and "the affective modality of parenting" (Pomerantz et al., 2007a, p.261), which are discussed below.

1.9.3.1 Parental behaviour.

Research indicates that parental behaviour (e.g., parenting practice) serves to socialise the behaviour of children (Pomerantz et al., 2007a; Pomerantz, Moorman & Litwack, 2007b), including those behaviours which have previously been linked to STol (e.g., preference for learning goals, effort, motivation and school achievement).

Hokoda and Fincham (1995) examined interactions of mothers and their third grade children while completing puzzle tasks. Behaviour and communication were found to be different in mothers of children with mastery-oriented responses and mothers of children with helpless responses. These

behaviours have previously been linked to STol (Dweck & Leggett, 1988; 2000). It was found that mothers' suggestions of resignation led to children wanting to stop, and that mothers making performance goal statements led to children making performance goal statements, supporting the hypothesis that mothers may socialise their children's achievement motivation (Hokoda & Fincham, 1995). The finding that children's motivational behaviours accorded with their mother's behaviours is indicative of the role of social learning, or modelling¹ (e.g., Bandura, 1977) in the parent-child relationship. However, because of the small sample size of 21 children, the results should be interpreted with caution. The authors call for further research into the familial origins of helpless and mastery patterns in children.

These findings are supported by those of Ricco, McCollum and Schuyten (2003) whose results suggest that children of mothers with more process-focus and learning goal orientation display similar patterns of behaviour toward learning. The children of mothers who adopted more of a product-focus were less likely to interpret school tasks as opportunities to learn. These results are also indicative of the role of parents in socialising children's learning behaviours, which come to accord with parental behaviours.

In a peer-reviewed journal, Farkas and Grolnick (2010) report on the multiple-findings that caregiver autonomy support, involvement and structure facilitate children's motivation, well-being and school performance. In a two-year cross-cultural study, Cheung and Pomerantz (2012) also provide evidence which indicates that parental involvement in education is positively linked with motivation in children (mean age 12.73 years), resulting in greater academic

¹ Social learning theory is based upon the role of observation and the imitation of behaviours observed in others, usually referred to as 'models'.

achievement. The quality of parental involvement is found to be a mediating factor, although fairly little is known about what motivates parental involvement (Moorman & Pomerantz, 2010).

The above research establishes connections between parents' behaviours and children's behaviours. However, it does not make connections between an individual's cognitions (e.g., self-theories) and her/his own behaviours (e.g., parenting practice). However, it could be hypothesised, from a neo-behaviourist perspective, that behaviours are a reflection of cognitions, with the modelling of behaviours (e.g., child observes and models her/his parent's persistence in a task) leading to internalisation (e.g., child shows persistence in future tasks and comes to value persistence). Earlier research illustrated the links between STol and behaviours.

Grolnick (2001) reported a positive correlation between mothers' controlling behaviours (e.g., giving directions to a child without request, providing answers and writing for the child) and children's entity theories of intelligence, in a sample of children aged 11 to 12 years. This suggests a link between a parent's behaviour and a child's beliefs about intelligence. Dweck and Molden (2007) believe that "these intriguing findings suggest that there is much fertile ground yet to be ploughed with respect to these issues" (p.135).

1.9.3.2 Parental cognitions.

Smiley, Coulson and Van Ocker (2000) present findings linking a parent's STol to the achievement task she/he preferred for her/his four year old child. Parents with an incremental STol were more likely to select a challenging task for their child (even if it meant the child might not succeed) than parents with an entity STol. Smiley et al. (2000) suggest that parents with incremental STol

emphasise effort more than parents with an entity STol. They also found that the children of fathers with an incremental theory show more persistence, placing a value on continued effort. This study is limited in terms of the generalisation of its findings, as it focuses on parental beliefs and task preference rather than the outcome for the child or the development of a child's STol. The child participants were too young to indicate their STol using the self-report measure which are often utilised. However, this study indicates that a parent's STol has an impact on the experiences which they prefer for their child (providing a link from psychological processes to behaviours) and therefore the way in which the child is socialised, even prior to school-age. These findings suggest that at age four a child is already exposed to, and experiencing, patterns of behaviour associated with a STol, based on the STol of her/his parent.

Moorman and Pomerantz (2010) hypothesised that the "mindset" (other-theory) of intelligence of a mother could impact on parental involvement. This hypothesis was based on the idea that parents with an incremental theory of intelligence view children's ability as changeable and may thus be constructively involved in their children's learning, regardless of whether their children experience difficulty. In this laboratory experiment, 79 mother and child (ages six to nine years old) dyads acted as participants. The researchers primed mothers to hold either an entity or incremental theory of intelligence, by having them read a passage and being given a booklet about the use of (the fictitious) Taylor's Progressive Matrices, as measuring either potential or in-born intelligence. Mothers were filmed as they worked on the tasks with their children. Afterwards, mindsets were confirmed by mothers indicating strength of agreement with statements about the tests. It was found that unconstructive

involvement (performance-oriented teaching, control and negative affect) was shown more frequently by those in the entity group rather than the incremental group. The authors claim that “although there has been speculation that mindsets about the malleability of ability influence the quality of parents’ involvement in children’s learning the current research is the first empirical evidence that this is indeed the case” (Moorman & Pomerantz, 2010, p.1359).

This research is valuable in that it links parental cognitions about the nature of intelligence to domain-specific parental behaviours. Parental behaviours have been linked to children’s learning behaviours and outcomes (Farkas & Grolnick, 2010; Hokoda & Fincham, 1995; Ricco et al., 2003). However, when measuring the mothers’ mindsets, the researchers were not measuring maternal SToI but rather their other-theory, that is, their beliefs about intelligence in others, which in this case were their children. In addition, the researchers did not rely on the mother’s naturally occurring mindset, but instead primed participants to hold either an entity or incremental mindset, although the researchers did take steps to ensure this mindset was held across the task. Nevertheless, this manipulation, coupled with the laboratory setting, the introduction of an unknown task and the dimension of being filmed, reduce the ecological validity of this experiment. While the mother-child relationship was naturally occurring, very little else was in this well-controlled laboratory test. Despite these limitations, the researchers ploughed new ground, being the first empirical study to link parents’ mindsets to parental involvement in children’s learning (Moorman & Pomerantz, 2010). A need to better understand how a parent’s mindset socialises the child was identified. It was postulated that mindsets may matter most for parents with an entity SToI, who believe that

intelligence is fixed, and therefore believe that a child's capabilities are fixed and are a reflection of the parent's abilities.

Research investigating the relationship between child and parent cognitions provides evidence for an association between parent's perceptions of children's academic competencies and children's self-perceptions of academic competencies (Jodl, Michael, Malanchuk, Eccles & Sameroff, 2001). Parental values and beliefs about academic related activities were found to predict children's values and beliefs about academic related activities, highlighting the importance of parental beliefs. The authors postulated that their findings highlighted the role of parents as socialisers of achievement-related values. Additional longitudinal research suggests that children's perceptions of their academic competencies are more strongly predicted by parents' perceptions than teachers' perceptions, particularly for younger pupils (Wigfield et al., 1997). This study is indicative of a link between parent cognitions and child cognitions, and a greater parent-child association than a teacher-child association.

1.9.4 Summary.

The research cited suggests that schools, praise and parents all impact upon children's development of intelligence-related beliefs, to some extent. While Pomerantz, Grolnick and Price (2007a) advocate the role of parents in the socialisation of children's attitudes towards achievement, they also acknowledge the importance of social context as a mediating factor. Rogers (2010) suggests that teachers' implicit theories of intelligence influence their teaching practices, although Wigfield et al. (1997) suggest parents' perceptions are a stronger predictor of children's academic competencies than teachers' perceptions.

Research into the role of parents indicates that parents' cognitions of intelligence influence their domain-specific behaviours towards their children (Moorman & Pomerantz, 2010; Smiley et al., 2000); that parent-child relationships exist in domain-specific STol-associated behaviours (Cheung & Pomerantz, 2012; Farkas & Grolnik, 2010; Hokoda & Fincham, 1995; Ricco et al., 2003); and that parent-child relationships exist in domain-specific (i.e., intelligence or achievement related) parental behaviours relating to children's beliefs about intelligence (Grolnick, 2001).

Research discussed earlier described the different patterns of behaviour associated with entity and incremental STols, respectively. Perhaps it is the case that parents behave according to their own STol, which exposes the child to certain behaviour patterns and opportunities for social learning and modelling. The child's imitated behaviours then lead to internalisation, in the form of STol. There is a need to investigate whether there is a link between parent and child cognitions of intelligence in terms of the self, as this has not yet been investigated.

1.10 The Current Study

If, as previously cited research suggests, it is to be accepted that STol can impact on learning behaviours then it would be beneficial to understand how STol are developed: "Given the impact of self-theories, the study of self-theories and their development could be a fruitful place to correct this [research] deficit" (Dweck & Molden, 2007, p.136). Previously cited research indicates that there are more positive outcomes associated with an incremental STol. While research has shown that it may be possible to temporarily manipulate STol in older students (Niiya et al., 2004), contrasting research has indicated that

intelligence-related beliefs remain stable over time (Robins & Pals, 2002), even in young children (Heyman et al., 1992; Smiley & Dweck, 1994). By understanding how STol are developed, the potential exists to promote the more beneficial, incremental, STol with the intention of producing more advantageous learning outcomes.

Although not a great deal is known about the development of STol in children, research suggests that parents play a vital role in the development of their children, (Pomerantz et al., 2007a; Pomerantz et al., 2007b) and links have been established between intelligence-related parent and child behaviours and beliefs (Cheung & Pomerantz, 2012; Grolnick, 2001; Smiley et al., 2003). Wigfield et al. (1997) suggest that parents' perceptions are a stronger predictor of children's academic competencies than teachers' perceptions. Hokoda and Fincham (1995) suggest research is needed into familial origins of related behaviours and Schunk (1995) recommends investigating the factors in the home that might influence the "origin and refinement" (p.314) of implicit theories. Therefore, it is intended to investigate the role of parents in the development of children's STol. The current study aims to add to the field of research into the development of STol by investigating whether a relationship exists between a child's STol and the STol of her/his parent. While research has indicated parent-child similarities in cognitions and behaviours associated with STol (Cheung & Pomerantz, 2012; Farkas & Grolnick, 2010; Grolnick, 2002; Hokoda & Fincham, 1995; Moorman & Pomerantz, 2010; Ricco et al., 2003; Smiley et al., 2000), no research to date has examined whether there is a correlation between the STol of parent and child. The current study intends to accept a response from either parent, as the research previously cited similarly used both mothers and fathers as parent participants.

Using what is known about the development of self-concept in children (Amsterdam, 1972; Bukatko & Daehler, 2001; Livesley & Bromley, 1973; Sugarman, 2001), it would not be appropriate to use younger school-aged children as participants. It is during middle childhood that children develop the capacity to view themselves in terms of more abstract and increasingly differentiated qualities (Harter & Monsour, 1992), such as intelligence. Research indicates that beliefs about intelligence and related behaviours may become more cohesive during middle childhood (Kinlaw & Kurtz-Costes, 2007). Additionally, beliefs about intelligence are fairly consistent within children aged seven to ten years (Allardi, 2004). It has been noted by those researching STol (Blackwell et al., 2007; Dweck, 2002) that beliefs about intelligence appear to become more coherent during adolescence, which is generally acknowledged to occur from 11 years of age, although, it can begin as early as age nine or ten (Sugarman, 2001). Erikson's (1959) model of personality development proposes that during middle childhood that the psychological dilemma of industry versus inferiority occurs within education, with the outcomes being competence² or inertia³. Therefore, given that education is so important and influential at this time, and that children have the developmental capacity to view themselves in terms of abstract qualities such as intelligence over the age of six or seven years, children in middle childhood will act as participants in the present study.

1.10.1 The current study and educational psychology.

Schunk (1995) suggests that research into the development of STol is needed to establish how parents and teachers could work together to foster productive

² "I can use my skills to achieve goals."

³ "I have no skills so I won't try."

beliefs for children. A better understanding of the development of STol could help EPs to consider which systems to engage with, by highlighting how interactions with others may influence a child's STol. This research will investigate unanswered questions, contributing to the solution of a problem, and problem-solving is central to effective EP practice (British Psychological Society, BPS, 2006).

1.11 Research Questions and Hypotheses

The present study will be guided by the following research questions.

RQ1.1. Is there an association between a parent's STol and the STol of her/his child?

Kelly (1955) asserts that the behaviour and language of parents can influence the formation of a child's constructs and previous research has established a parent-child relationship in behaviours and cognitions associated with STol (Dweck & Lennon, 2001; Grolnick, 2001; Hokoda & Fincham, 1995; Moorman & Pomerantz, 2010; Pomerantz et al., 2007a; Smiley et al., 2000). If a parent behaves according to her/his STol, the child is exposed to a particular behaviour pattern, providing the opportunity for modelling and internalisation as a STol. It is therefore hypothesised that a positive correlation exists between a parent's STol and the STol of her/his child (H_1).

RQ1.2. Does the parent-child association of STol vary according to the perceived level of agreement of parent-child beliefs about intelligence?

Lane (2011) proposes that children are more likely to adopt the implicit attitudes of adults whom they like or with whom they identify and Pomerantz et al. (2007a; 2007b) describe how parent-child relatedness impacts on how children

develop. It is hypothesised that a child's perception and a parent's perception, that parent-child beliefs are similar, will be associated with a stronger correlation between a child's STol and the STol of her/his parent (H_1).

RQ2. Is there an association between the factors a parent rates as most and least likely to increase intelligence and the factors her/his child rates as most and least likely to do so?

Based on the research cited above, it is also hypothesised that parent-child dyads will rate the same factors as most and least likely to increase intelligence (H_1).

RQ3.1. Do children's reports of parental praise accord with parental reports?

No research has previously investigated parent-child agreement in the type of praise that parents perceive they provide and the type of parental praise that children report receiving.

RQ3.2. Is there an association between reported praise and STol?

It is hypothesised that children who report more process-focussed praise will have a more incremental STol than children who report achievement-focussed praise (H_1), similar to the findings of Mueller and Dweck (1998), Dweck and Lennon (2001) and Smiley et al. (2000). It is hypothesised that parental cognitions will accord with parental behaviours and parents who report providing process-focussed praise will have a more incremental STol than parents who report achievement-focussed praise (H_1).

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Part Two

Empirical Study

Like Parent, Like Child? The Development of Self-Theories of Intelligence.

Abstract

Self-theories of intelligence (STol) are beliefs that individuals hold regarding the nature of their own intelligence. Two categories of STol have previously been identified: an entity STol and an incremental STol. Previous research has established different patterns of learning behaviour associated with each, pertaining to effort, motivation, goal orientation and achievement. More positive outcomes are associated with an incremental STol. Previous research has paid little attention to how STol develop, despite the importance they hold for learning. The current research investigates whether an association exists between the STol of a parent and the STol of her/his child. Self-report questionnaires were completed by sixty parent-child dyads. Parent and year six children across seven schools acted as participants. STol were measured using Dweck's (2000) scale. Findings indicate a positive association between parent and child STol when participants without a clear STol are excluded. The association was stronger among dyads where the parent perceived that opinions within dyads would be similar, although unrelated to children's perceptions. Significant agreement among parent-child dyads was observed on the factor they believe least likely to increase intelligence, but not the factor they consider most likely to increase intelligence. Parent-child dyads were in agreement about the type of praise a parent provides her/his respective child. No relationships were observed between the type of praise reported and child STol. A more incremental parent STol was associated with parents who report providing process-focussed praise than parents providing achievement-focussed praise. Findings are discussed in relation to the literature and limitations identified. Implications for educational psychology practice and directions for future research are described.

1. Introduction

This study is concerned with the development of self-theories of intelligence (STol) of primary school-aged children. It aims to establish whether a relationship exists between the STol of a parent and her/his child. With reference to the literature, the introduction will:

- define STol, placing them into the theoretical context of personality and self-concept;
- explain the two types of STol and associated behaviours; and
- consider factors that may influence the development of children's STol.

In doing so, it is intended to establish the relevance and importance of STol in the context of educational psychology.

1.1 Self-theories of Intelligence (STol)

Self-theories are "people's beliefs about themselves" (Dweck, 2000, p.xi). STol are a person's self-judgements regarding her/his own intelligence⁴. STol are not a measure of intelligence but rather beliefs about intelligence.

Two different STol have been identified: a fixed, entity theory and a malleable, incremental theory (Bandura & Dweck, 1985; Dweck & Leggett, 1988; 2000). Those with an entity theory of intelligence believe that intelligence is a "fixed, concrete, internal entity" (Dweck, 2000, p.20) and the amount of intelligence one has is static. Conversely, those with an incremental theory of intelligence believe that intelligence is a "more dynamic quality that can be increased" (Dweck, 2000, p.20) with effort (Dweck & Molden, 2007). It is

⁴ The terms "lay theories", "latent theories", "implicit theories" and "naive theories" often appear in the literature pertaining to self-theories (Dweck, 2000; Dweck, Chiu & Hong, 1995a; Miele & Molden, 2010; Rattan, Savani, Naidu & Dweck, 2012). However, these usually refer more broadly to beliefs held about the self and/or other people, although many of the same fundamental qualities are shared by self-theories.

typically reported that about 40% of adults and children hold an entity STol, about 40% hold an incremental STol and 15% - 20% are uncategorised (Dweck, Chiu & Hong, 1995a; Dweck & Molden, 2007). However, this distribution may be specific to Western culture as research has suggested that the incremental belief is more prevalent in East Asian cultures than in North American cultures, given the greater emphasis on effort prevalent in East Asian societies (Heine et al., 2001). Rhodewalt (1994) suggested that it might not always be possible to classify participants into one of the two categories. Harackiewicz and Elliot (1995) suggest that entity theorists can become incremental theorists in some situations, while incremental theorists have only one theory available.

1.1.1 Theoretical basis of self-theories.

Self-theories remain fairly stable over time (e.g., Robins & Pals, 2002; Smiley & Dweck, 1994), suggesting that these beliefs form part of personality and are intertwined with identity, self-concept (Rogers, 1959) and self-esteem. Kelly's psychology of personal constructs (1955) forms the "intellectual roots" (Dweck et al., 1995a, p.267) of the model.

1.1.2 Self-beliefs and childhood.

A child's sense of self is crucial to the fashion in which she/he approaches academic tasks and life's challenges (Pajares & Schunk, 2002), the development of which is summarised in Table 4.

Erikson's (1959) lifecycle model of personality development describes stages from infancy to old age, each involving the resolution of a crisis. Resolution relies on interactions with others and the environment. The model

proposes that during middle childhood the psychological dilemma is “industry versus autonomy”, with the outcome being competence⁵ or inertia⁶.

Table 4.
A summary of several views of the development of self-concept in childhood

Toddlers (< 3 years)	Early childhood (3 – 6 years)	Middle childhood (6 – 12 years)	Adolescence (12 years+)
<p>Toddlers begin with self-recognition at a physical level (Amsterdam, 1972).</p> <p>Children are likely to establish a categorical self, by classifying themselves in terms of membership to certain groups (Bukatko & Daehler, 2001).</p> <p>A child’s concept of her/his self begins to extend beyond physical features to include activities the child likes and is good at, her/his possessions and relationships (Sugarman, 2001).</p> <p>Children at this age are more likely to attribute actions to uncontrollable (i.e, external) factors (Sugarman, 2001).</p>	<p>In early childhood, children begin to make relational statements making social comparisons with peers. Instead of simply categorising or itemising skills, quantities are compared with others (Livesley & Bromley, 1973).</p> <p>Children increasingly coordinate the attributes they apply to themselves (Harter, 1999).</p> <p>Children begin to make relational statements, expressing beliefs about being better than or not as good as others (Sugarman, 2001).</p>	<p>Children start to describe themselves in terms of inner personality traits and motives, rather than the purely physical. Qualities are described increasingly in relation to others and social relationships (Sugarman, 2001).</p> <p>Children come to view themselves in terms of more abstract and increasingly differentiated qualities (Harter & Monsour, 1992).</p> <p>Children become increasingly aware of their own efforts in achieving success (Sugarman, 2001).</p>	<p>The abstract representations are initially relatively compartmentalised, becoming increasingly integrated in adolescence accompanied by the apparent adolescent impetus for conflicting selves (Harter, 1999).</p> <p>Children increasingly acknowledge the contributions of others to their sense of agency (Sugarman, 2001).</p>

Research indicates that children begin to establish a conceptualisation of intelligence at around seven to eight years old (Nicholls & Miller, 1984). In a study involving children aged five to ten years old, older children were more

⁵ “I can use my skills to achieve goals.”

⁶ “I have no skills so I won’t try.”

likely than younger children to express beliefs, goals and motivation that were more related (Kinlaw & Kurtz-Costes, 2007), indicative of the development of an intelligence-related meaning system in this age phase.

1.2 STol Predict Future Behaviours

STol are important because research suggests that the two differing STol can foster different patterns of behaviour, described below.

Dweck and Leggett (1988; 2000) describe two types of goals: learning goals, where learners strive to increase competence and understand something new and performance goals, where learners strive to document or gain favourable judgements of their competence. Dweck and Leggett (1988) assert that the stronger a student's entity STol, the more likely she/he was to choose performance goals, whereas the stronger a student's incremental STol, the more likely she/he was to choose learning goals. Support for this assertion is provided by Ablard's (2002) and Abdullah's (2008) large scale studies of children in which entity STol and performance goals are positively correlated. Those who hold an entity STol can become highly concerned with measuring attributes, often to the detriment of learning (Dweck & Molden, 2007).

Blackwell, Trzesniewski and Dweck (2007) conducted a study of over 370 teenagers over two school years, starting in seventh grade (aged 12 to 13). Self-report questionnaires were completed at school. Incremental STol predicted an upward trajectory in school results over two years, while entity STol predicted a flat trajectory in grades.

Dweck and Leggett (1988; 2000) describe children's 'mastery-oriented' or 'helpless' reactions to challenge. Those who display the helpless pattern avoid challenge and give up in the face of failure. Mastery-oriented people seek

challenge and increase effort in response to failure. Henderson and Dweck (1990) assert that students with an incremental STol tend to thrive on challenges, apply effort to difficult tasks and show perseverance. Support for this assertion is provided by Robbins and Pals (2002).

1.2.1 Summary.

As cited, STol have both costs and benefits (summarised in Table 5). There are fewer costs for incremental STol and fewer benefits for entity STol (Dweck et al.,1995a). Although the majority of research cited has been conducted in American schools and colleges, the model of STol has been well supported by empirical research and independent studies (Schunk, 1995).

Table 5.

Summary of research findings, behaviours relating to entity and incremental STol

Theory of intelligence	Goal Orientation	Effort & motivation	Grade trajectory (over 2 years)
Entity (intelligence is fixed or uncontrollable).	Performance (gain positive/avoid negative judgement of competence).	Intentionally withheld when faced with difficult task. Helpless response.	Flat trajectory.
Incremental (intelligence is malleable).	Learning (increase competence).	Applied effort to challenges and persevere. Mastery-oriented response.	Upward trajectory.

1.3 The Development of STol

The STol an individual holds can have “profound consequences” (Dweck & Molden, 2007, p.124). If STol can impact on an individual’s goals, effort, motivation and achievement, then it is important to consider how an individual comes to hold a STol. Dweck (2007) has hypothesised that messages from parents, carers and teachers are likely to impact on children’s beliefs about the nature of intelligence. Lane (2011) proposes that children are more likely to adopt the implicit attitudes of adults they like or with whom they identify. Research into the development of intelligence-related beliefs is discussed below.

1.3.1 Praise.

Findings indicate that the praise and feedback adults provide can influence a child’s STol (Kamins & Dweck, 1999; Mueller & Dweck, 1998).

Mueller and Dweck (1998) carried out six studies with children (aged nine to eleven years). Children completed problem-solving tasks in three groups: achievement-focussed praise⁷, effort-focussed praise⁸ and control⁹. The achievement-focussed praise group was significantly more likely to endorse an entity STol than the effort-praise group, indicating to some extent how STol can be socialised, or influenced by the messages received from others. However, STol were measured with participant-rated agreement with only one entity statement. Although statistically significant, the reliability of results could have been increased with more statements. The study was carried out in the

⁷ “That’s a very good score.”

⁸ “You must have worked hard.”

⁹ No feedback

familiar school context, although the praise was provided artificially by an unknown adult.

Dweck and Lennon (2001) asked students (aged eleven to thirteen years) to rate whether their parents typically gave achievement-focussed or process-focussed feedback. Students with an entity STol reported more achievement-focussed comments from their parents than children with an incremental STol. Children with an incremental STol report relatively more process feedback from parents. A causal relationship was not established. This research relies on students' reports only and parents' reports were not considered. It is aimed to address this deficit, in the current research, by investigating whether there is any agreement between the type of praise that parents report providing and the type of praise that children report receiving.

1.3.2 School.

During their formative school years, children spend a significant amount of their waking hours at school, during which time schools and teachers impact upon children's development (Rutter, Maughan, Mortimore & Ouston, 1979). In a longitudinal study of twelve London secondary schools over four years, Rutter and colleagues collected a series of data which led to the conclusion that schools have an impact on a child's development and that it does matter which school a child attends. However, STol were not specifically considered. Neisser et al., (1996) proposed that school is an important environmental variable in developing certain intellectual attitudes and Dweck (2000) proposed that intelligence is an issue that gains importance during the school years. Rogers (2010) suggested that teachers' implicit theories of intelligence influence their teaching practices and Murphy and Dweck (2010) reconceptualised implicit

theories as something which can operate at the organisational level, for example, in a school.

1.3.3 Parents.

Parents have been acknowledged as children's first educators (Education & Employment Committee, 2000; Qualification and Curriculum Authority (QCA), 1999; Welsh Assembly Government (WAG), 2008). Pomerantz, Grolnick and Price (2007) advocate the role of parents in the socialisation of children, through parental behaviours, cognitions and the "affective modality of parenting" (p.261).

Research demonstrates that parent behaviour towards children correlates with children's motivational patterns. Hokoda and Fincham (1995) examined interactions of mothers and children completing puzzle tasks. Mothers' suggestions of resignation led to children wanting to give up, and mothers' performance goal statements led to children making performance goal statements. The findings are indicative of parent-child social learning, or modelling¹⁰ (Bandura, 1977). Due to the small sample size (21 children) the results should be interpreted with caution. These findings are supported by Ricco, McCollum and Schuyten (2003) whose results suggest mothers and children display similar patterns of goal orientation and process-focussed behaviour.

In a peer-reviewed journal, Farkas and Grolnick (2010) report that caregiver autonomy support and involvement facilitate children's motivation and school performance. In a two-year cross-cultural study, Cheung and Pomerantz

¹⁰ Social learning theory is based upon the role of observation and the imitation of behaviours observed in others, usually referred to as 'models'.

(2012) provide evidence indicating that parental involvement in education is positively linked with motivation in children (mean age 12.73 years) which results in greater academic achievement. The above research establishes a connection between parent and child behaviours relating to STol but does not make a connection between cognitions (e.g., self-theories).

Moorman and Pomerantz (2010) found that the “mindset” of intelligence of a mother could impact on the quality of parental involvement. This research links parental cognitions about the nature of intelligence to parental behaviour, and parental behaviours have been shown to influence children’s learning behaviours. However, when measuring the mothers’ “mindsets”, the researchers were not measuring self-theory but “other-theory”¹¹.

Grolnick (2001) reported a positive correlation between mothers’ controlling behaviours (as opposed to autonomy supportive behaviours) and children’s entity theories, with eleven to twelve year olds. This suggests a link between parent behaviour and child STol. Smiley, Coulson and Van Ocker (2000) present findings linking a parent’s STol to the achievement task she/he prefers for her/his four year old child. Parents with an incremental STol were more likely to select a challenging task for their child than parents with an entity STol. This study indicates that a parent’s STol has an impact on the experiences which they prefer for their child and therefore the way in which the child is socialised.

¹¹ In addition to self-theories, individuals also possess theories relating to other people and the outside world (“other-theories”), which can be measured in a similar way and used to predict the judgements that individuals make of others. Differentiated measures have been produced to measure other-theories, which are indicative of the discrimination between self-theories and other-theories.

1.3.4 Summary.

The research cited establishes positive connections between parent and child behaviours and cognitions/beliefs pertaining to STol. It is also suggested that school can act as an environmental variable determining STol and that teachers' implicit theories can influence their teaching practices.

1.4 The Current Study

Dweck and Molden (2007) highlight the importance of STol and the limited research into their development. If STol impact on learning behaviours as described, Schunk (1995) suggests research into the development of STol is needed to establish how parents and teachers could work to foster productive STol for children.

Although not a great deal is known about the development of STol in children, research cited indicates positive parent-child connections with domain-specific behaviours and cognitions.

The current study aims to add to the field of research into the development of STol by investigating whether a relationship exists between a parent's STol and the STol of her/his child. The current study intends to accept a response from either parent, as the research cited used both mothers and fathers as parent participants.

Using what is known about personality development (Erikson, 1959), self-concept (Amsterdam, 1972; Livesley & Bromley, 1973; Sugarman, 2001), conceptualisation of intelligence (Nicholls & Miller, 1984) and the development of intelligence-related meaning systems (Kinlaw & Kurtz-Costes, 2007), children in middle childhood will act as participants.

1.5 Research Questions and Hypotheses

The present study will be guided by the following research questions.

RQ1.1. Is there an association between a parent's STol and the STol of her/his child?

Kelly (1955) asserts that the behaviour of parents can influence the formation of a child's constructs. Previous research has established a parent-child relationship in behaviours and cognitions associated with STol (Dweck & Lennon, 2001; Grolnick, 2001; Hokoda & Fincham, 1995; Moorman & Pomerantz, 2010; Pomerantz et al., 2007a; Smiley et al., 2000). If a parent behaves according to her/his STol, the child is exposed to particular behaviour patterns, providing opportunities for modelling and internalisation as a STol. It is therefore hypothesised that a positive correlation exists between a parent's STol and the STol of her/his child (H_1).

RQ1.2. Does the parent-child association of STol vary according to the perceived level of agreement of parent-child beliefs about intelligence?

Lane (2011) proposes that children are more likely to adopt the implicit attitudes of adults they like or with whom they identify and Pomerantz et al. (2007a; 2007b) describe how parent-child relatedness impacts on how children develop. It is hypothesised that a child's perception and a parent's perception that parent-child beliefs are similar will be associated with a stronger correlation between a child's STol and the STol of her/his parent (H_1).

RQ2. Is there an association between the factors a parent rates as most and least likely to increase intelligence and the factors her/his child rates as most and least likely to do so?

Based on the research cited above, it is also hypothesised that parent-child dyads will rate the same factors as most and least likely to increase intelligence (H_1).

RQ3.1. Do children's reports of parental praise accord with parental reports?

No research has previously investigated parent-child agreement in this area.

RQ3.2. Is there an association between reported praise and STol?

It is hypothesised that children who report more process-focussed praise will have a more incremental STol than children who report achievement-focussed praise (H_1), similar to the findings of Mueller and Dweck (1998), Dweck and Lennon (2001) and Smiley et al. (2000). It is hypothesised that parental cognitions will accord with parental behaviours and parents who report providing process-focussed praise will have a more incremental STol than parents who report achievement-focussed praise (H_1).

2. Methods

2.1 Research Paradigm

This study acknowledges that individuals possess unique interpretations or constructs, rather than the existence of one single “truth” or “reality”. It is important that the researcher maintains objectivity in measuring such beliefs (possible within a postpositivist or pragmatic paradigm), rather than creating an influential interactive link with participants (as in a constructivist or transformative paradigm). The present study is guided by a pragmatic paradigm. This paradigm allows the researcher the freedom to link theory to method “in the different ways that you deem appropriate” (Tashakkori & Teddlie, 1998, p.30) employing quantitative and/or qualitative methodologies. The pragmatic paradigm allows the researcher to draw on elements of postpositivism and constructivism, in contrast to more rigid experimental methodologies (Mertens, 2010).

2.2 Procedure and Participants

Each stage of the procedure is described in Table 6. A priori power analysis using G*Power (Faul, Erdfelder, Lang & Buchner, 2007) indicated that 67 participants were needed to detect medium effect size (0.30) with a power of 0.8 for correlational analysis. Sixty parent-child dyads acted as participants, which was 120 participants in total (Table 7). All parents described themselves as fathers or mothers, respectively.

Table 6

Procedure for data collection

Stage (date)	Procedure
Recruitment (June 2012)	A gatekeeper letter (Appendix 1) was sent to the head teacher of eleven schools, with copies of the parent information sheet (Appendix 2), parent consent form (Appendix 3), parent questionnaire (Appendix 4) and child questionnaire (Appendix 5). Seven of the eleven schools initially approached consented to participation.
Data collected from parents (June 2012)	Copies of the information sheet, parent consent form and parent questionnaire were distributed to the parents of all year six pupils in each school. Parent participants were asked to return the completed consent form and questionnaire in the envelope provided, to the school, by a given date. Sixty-two out of 260 parents approached returned a completed questionnaire, a response rate of 23.8%. Sixty of their respective children participated. Parent participants are adults with a year six child attending participating schools. One (self-selecting) parent of each child was asked to complete the parent questionnaire. The use of one parent per child allowed a matched pairs design for aspects of data analysis. Completing the questionnaire included the parent providing consent for her/his child.
Data collected from children (July 2012)	The researcher visited the school within one week of the return deadline to collect parent responses and administer the questionnaire to pupils. Child participants were year six pupils (aged ten and eleven years) from seven schools in one education authority, whose parent returned a completed questionnaire and consent form. It was necessary to have both child and parent data for data analysis. Participants must be aged ten years or older to complete the Implicit Theories of Intelligence Scale (Dweck, 2000) younger children may not have acquired sufficient language competency and cognitive skills to attend to the various items (Blackwell et al., 2007).
Questionnaire administration (July 2012)	Children attended in groups to complete individual questionnaires. Each child was provided with a copy of the questionnaire, information about the study and arrangements for consent and withdrawal. This was read to all pupils so children could provide consent, in addition to parental consent. The use of the scale was explained and each question was read to pupils.
Debriefing arrangements (July 2012)	A debrief form (Appendix 6 and 7) was immediately issued and read to child participants. On the reverse was the debrief form for parents. Children were provided with a copy to take home.
Data storage (July & August 2012)	Completed child questionnaires were paired with the respective parent questionnaire, anonymised and coded. Completed parent questionnaires without a corresponding child questionnaire were destroyed.

Table 7

Participant numbers, by gender

	Male (<i>n</i>)	Female (<i>n</i>)
Parents (<i>N</i> = 60)	15 (25%)	44 (75%)
Children (<i>N</i> = 60)	30 (50%)	30 (50%)

2.3 Measures

Kelly (1955) suggested that the best way to learn about someone's constructs is to ask her/him, and self-report questionnaires were therefore selected for data collection. The questionnaire utilised Dweck's (2000) Implicit Theories of Intelligence Scale, and additional items pertinent to the research questions.

2.3.1 Implicit theories of intelligence scale.

Dweck (2000) published a six-item Implicit Theories of Intelligence Scale for Children – Self Form and an eight-item scale for adults (Dweck, 2000). The Scales use a six-point Likert scale to measure agreement/disagreement with incremental and entity statements about intelligence. Dweck (2000) suggests that three entity items from the child questionnaire and four entity items from the adult questionnaire can be used alone. However, using a small number of items can lead to low internal reliability (Dweck et al., 1995a).

2.3.2 Reliability.

Dweck, Chiu, and Hong (1995b) conducted six validation studies of reliability and validity of the Scale and found it to be a "reliable and valid measurement of these constructs" (p.273). Incremental items were not included by Dweck et al.

(1995b) as they were considered to be “highly compelling” (p.270), that is, participants appeared drawn to agree with these positively worded items. Cronbach alphas ranged from .94 to .98 across the six studies. The test-retest reliability over a two-week interval indicated a very strong positive correlation ($r(62) = .80$).

2.3.3 Validity.

Dweck et al., (1995a) demonstrated that the measure is independent of respondents’ sex, age, political affiliation and religion. Implicit theory of intelligence was not confounded with self-presentation concerns¹². It was also found to be unrelated to measures of cognitive ability, confidence in intellectual ability, self-esteem, optimism or confidence in others.

The inclusion of both entity and incremental items contributes to the validity of the measure (Dweck et al.,1995b). Participants are required to express beliefs in terms of both agreement with, and rejection of, statements, overcoming criticisms of using only entity items (Schunk, 1995).

2.3.4 Questionnaire design.

Items which Dweck (2000) highlights as appropriate to be used alone were included in the measure of STol. Three comparable items were included on both the child and parent questionnaires:

1. Type of praise a participant is most likely to give (parent) or receive (child), using statements similar to Mueller and Dweck (1998);
2. The perceived influence of five factors (both incremental and entity) on the development of intelligence; and

¹² Measured by the Snyder (1974) Self-monitoring Scale and the Paulhus (1984) Social Desirability Scale.

3. The likelihood that participants' opinions would be the same as those of their respective child/parent.

2.03.5 Use of questionnaires.

The advantages and disadvantages of research questionnaires are well-documented (Coolican, 2004; Cozby, 1997; Edwards et al., 2007; Oppenheim, 1992). Response rates are frequently low so an incentive for participation was used. Questionnaires can be limited by their inherent inflexibility, particularly with closed questions. However, it has been asserted that their use is more effective, in terms of time and cost, than interviews, particularly with larger samples.

2.4 Ethical Considerations

Ethical issues relating to this study and the consideration given to them are detailed in Table 8.

2.5 Statistical Analysis

Guidance for statistical techniques and calculations is taken from Field (2009) and Pallant (2010). The majority of the data from both the child (questions one to six and question nine) and parent (questions one to eight and question eleven) questionnaires are continuous, and can be considered discrete, in that responses can only be indicated by the whole numbers on the six-point scale. Categorical data and ranked data were also collected. As participants' ratings of questionnaire items depend on their subjective interpretations, these data are ordinal (Field, 2009). As such, these data violated the assumptions of normal data and non-parametric statistics were applied.

Table 8

The consideration given to ethical issues in the current study

Ethical issue	Consideration given by researcher
Informed consent	Informed consent was obtained from all participants. Parental consent was sought for the participation of children. Consent was also obtained from children. A child could choose not to participate in the study, even if her/his parent had. At the point of completing the questionnaire, children were informed that their parents had consented to take part and now they had the choice whether to take part, without being penalised in any way. As children completed the questionnaires within a group setting and may have been hesitant to be seen to withdraw, they were informed that they could leave any questions unanswered if they wished, that they could pretend to complete questions, and that they could put the questionnaire in their pockets to take home if they did not want to hand in their questionnaires.
Confidentiality and anonymity	Participants were made aware that data were initially collected and stored confidentially, before being anonymised. This was explained before consent was obtained. It was explained on the information sheet and consent form. Responses were coded so that it was possible to match the responses of each parent to the respective child.
Debriefing	<p>Participants were debriefed. The researcher aimed to make the debriefing form free from jargon and the language accessible to all participants. Attempts have been made to convey the purpose and value of the research.</p> <p>The full title of the research was not disclosed to participants until they receive the debrief form. A shorter title was used on the gatekeeper letter and information sheet. In most experimental paradigms some information is withheld from participants so as to ensure that the internal validity of results is not compromised (e.g., the specific hypotheses being tested). Withholding this information is not considered to be deception (Adair, Dushenko, & Lindsay, 1985).</p>

Statistical significance is inferred at the traditional 0.05 level. Effect size is measured as small ($r = .10$), medium ($r = .30$) and large ($r = .50$) (Field, 2009). Kappa measure of agreement is a non-parametric statistic used to assess inter-rater agreement within categorical data. Kappa value is measured as slight (.01 – 0.2), fair (0.21 – 0.4), moderate (0.41 - 0.6), substantial (0.61 – 0.8) and almost perfect (0.81 – 0.99) (Viera & Garrett, 2005).

2.6 Scoring of Implicit Theory of Intelligence Scale items

Scores for incremental items were reversed before data analysis. A higher score is indicative of a stronger incremental STol and a lower score indicative of a stronger entity STol.

Cronbach alpha coefficients for the eight-item parent, and six-item child, STol scales were 0.94 and 0.85 respectively, indicating high internal consistency. A mean STol (ranging from one to six) was therefore calculated for each participant for data analysis. Data from the questionnaires were analysed using SPSS.

3. Results

Results are presented according to research questions.

3.1 Parent and Child STol

3.1.1 Is there an association between a parent's STol and the STol of her/his child?

For descriptive statistics and tests of normality and skewness, see Table 9. There was no significant difference in the STol of parent group (Mdn = 4.50, $n = 59$) and child group (Mdn = 4.33, $n = 60$), $U = 1657.50$, $z = -.60$, $p(2\text{-tailed}) = 0.55$. One outlier (case 48) was identified (Figure1). This was retained in the data because it is not an extreme point. The 5% trimmed mean shows that removing it does not have a great impact on the mean parent STol.

Table 9.

Descriptive statistics: tests of normality and skewness for STol in parent and child groups.

	N	Mean	5% Trimmed mean	Mdn.	Std. Deviation	Kolmogorav-Smirnov	Skewness	Kurtosis
Parents	59	4.33	4.37	4.50	1.06	0.11	-0.42	-0.22
Children	60	4.21	4.24	4.33	.99	0.10	-0.46	-0.40

Figure 1.

Boxplot displaying STol for parent and child groups

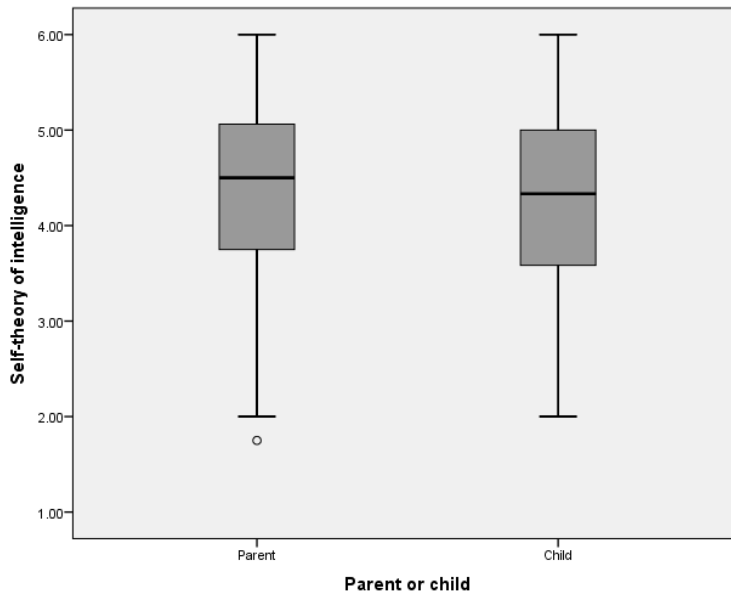


Figure 1. The median STol for parent and child groups is represented by the dark horizontal line. The boxes represent 50% of STol scores (interquartile range, IQR) and the whiskers illustrate the smallest and largest STol values (within 1.5 IQR). The outlier is represented by a circle°, it is more than 1.5 IQR from the edge of the box. No extreme points (more than 3 IQR from the mean) were identified.

The relationship between the STol of parent-child dyads was investigated using Spearman's rho. There was a non-significant positive association between parent and child STol, $r(59) = 0.14$, $p(\text{one tailed}) = .15$ (see Figure 2).

Dweck et al. (1995a) suggest, most typically, "to ensure that only participants with clear theories are included" (p.269) a mean STol (from one to six) is calculated for each participant. A score over 4.0 indicates an incremental STol and a score under 3.0 indicates an entity STol. The remaining participants (3.1 – 3.9) are excluded. The application of these criteria to the data reveals a distribution different from that typically described (Dweck et al., 1995a, Dweck & Mueller, 2007), see Table 10, also represented in Figure 2.

The relationship between the STol of parent-child dyads who meet Dweck et al.'s (1995a) criteria were investigated using Spearman's rho. Only dyads where both participants achieved a clear incremental (4.0 – 6.0) or entity (1.0 – 3.0) STol were included in this part of the analysis ($n = 40$), regardless of whether parent and child were found to have the same type STol. There was a significant positive association between parent and child STol, $r(40) = 0.31$, $p(\text{one tailed}) = 0.03$ (see Figure 2). Post hoc power analysis indicated the statistical power for this test was 0.82.

It was also possible to examine whether parents and children in corresponding dyads had congruent or incongruent STol types. Of the 40 parent-child dyads where both participants met Dweck et al.'s (1995a) criteria for incremental or entity STol, congruent STol type was observed in 30 dyads (75%) and incongruent STol type in 10 dyads (25%). There were 5 dyads where the parent fulfilled criteria for an incremental STol and the child an entity STol, and 5 dyads where the parent fulfilled criteria for an entity STol and the child an incremental STol (see Figure 2).

Table 10.

Distribution of participant STol type using categorisation criteria from Dweck et al. (1995a) and Dweck and Mueller (2007)

	STol <3.0 (Entity)		STol >4.0 (Incremental)		STol 3.1 – 3.9 (Uncategorised)	
	Expected frequency	Observed frequency	Expected frequency	Observed frequency	Expected frequency	Observed frequency
Parents ($N = 59$)		13.6% ($n = 8$)		72.9% ($n = 43$)		13.6% ($n = 8$)
Children ($N = 60$)	40 – 42.5%	13.3% ($n = 8$)	40 – 42.5%	65% ($n = 39$)	15 – 20%	21.7% ($n = 13$)
Parent-child dyads* ($N = 32$)		6.3% ($n = 2$)		87.5% ($n = 28$)		6.3% ($n = 2$)

Note. *= Where both parent and child met the same criteria for STol.

Figure 2.

Scatterplot displaying parent and child STol

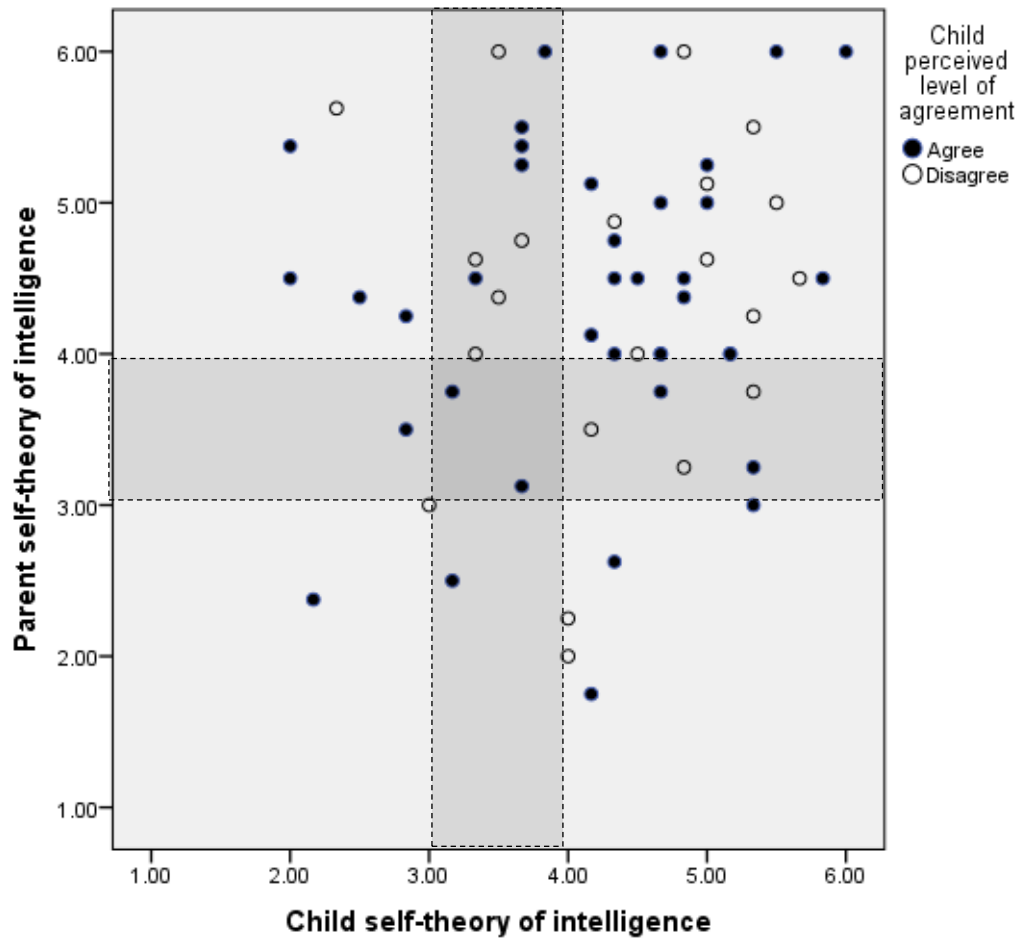


Figure 2. The shaded bars illustrate cases with a STol value of 3.1 to 3.9, which would be excluded using Dweck et al.'s (1995a) criteria on the basis of being 'undecided' ($n = 19$). Using Dweck et al.'s (1995a) criteria, cases above the horizontal bar (parents, $n = 43$) and to the right of the vertical bar (children, $n = 39$) are said to hold an incremental STol and cases below the horizontal bar (parents, $n = 8$) and to the left of the vertical bar (children, $n = 8$) are said to hold an entity STol. Cases in the bottom left quadrant would be where parent and child congruently hold an entity STol ($n = 2$) and cases in the top right quadrant would be where parent and child congruently hold an incremental STol ($n = 28$). Cases where the child agrees to some extent that her/his opinions are likely to be the same as the respective parent are displayed by black circles and cases where the child disagrees to some extent that her/his opinions are likely to be the same as the respective parent are displayed by unfilled circles.

3.1.2 Does the parent-child association of STol vary according to the perceived level of agreement of parent-child beliefs about intelligence?

No data were excluded from this section of analysis. 3.3% ($n = 2$) of children and 3.4% ($n = 2$) of parents “strongly agreed” that their opinions (from the questionnaire) were likely to be the same as their respective parent or child. 16.6% ($n = 10$) of children and 12.0% ($n = 7$) of parents “agreed” (for frequencies see Table 11). Two parents did not provide an answer.

Table 11

Frequency table displaying responses to “My opinions are likely to be the same as my parent’s/child’s”

	Strongly Agree	Agree	Mostly agree	Mostly disagree	Disagree	Strongly Disagree
Children ($N = 60$)	2	10	26	13	7	2
Parents ($N = 58$)	2	7	30	14	4	1

The six-point agreement scale was collapsed to a two-point agree-disagree scale for further analysis, and two groups formed; children who agreed to some extent their opinions were likely to be similar to their parents (group 1, $n = 38$) and children who disagreed to some extent their opinions were likely to be similar to their parents (group 2, $n = 22$). The relationship between STol of parent-child dyads for each group was investigated using Spearman’s rho. This analysis was also conducted based on parent perceptions of shared beliefs. Results are displayed in Table 12.1.

Table 12.1

Results of correlational analysis of parent and child STol, grouped by participants' perception that opinions measured in the questionnaire are likely to be the same as that of the respective child/parent (all dyads).

Group	<i>n</i>	<i>r</i>	<i>p</i> (one-tailed)
Child agrees	38	0.13	0.23
Child disagrees	21	0.11	0.32
Parent agrees	39	0.19	0.12
Parent disagrees	18	-0.04	0.45

Note. Data missing: Two parents did not provide an answer for agree/disagree and STol could not be calculated for one parent.

This analysis was repeated, using only parent-child dyads where both participants had a clear (but not necessarily congruent) incremental or entity STol ($n = 40$), using Dweck et al.'s (1995a) criteria. A significant positive association was found only in the STol of parents and children where parents agreed to some extent that opinions were likely to be the same as the respective child ($r(27) = 0.40$, $p(\text{one-tailed}) = 0.02$). Results are displayed in Table 12.2.

Table 12.2

Results of correlational analysis of parent and child STol, grouped by participants' perception that opinions measured in the questionnaire are likely to be the same as that of the respective child/parent (dyads with a clear STol)

Group	<i>n</i>	<i>r</i>	<i>p</i> (one-tailed)
Child agrees	27	0.20	0.16
Child disagrees	13	0.25	0.21
Parent agrees	27	0.40	0.02*
Parent disagrees	11	0.17	0.31

Note. * = Correlation is significant at the 0.05 level. Data missing: Two parents did not provide an answer for agree/disagree

3.2 Is there an association between the factor a parent rates as most and least likely to increase intelligence and the factor her/his child rates as most and least likely to do the same?

3.2.1 Factor most likely to increase intelligence.

Data from all participants were analysed. There was agreement among 36.7% ($n = 22$) of parent-child dyads. The most popular choice for respective child and parent groups was “trying hard”. No significance was shown using the Kappa measure of agreement ($k(60) = 0.04, p = 0.54$). See Table 13.1 for frequencies.

Table 13.1.

Crosstabulation of factor most likely to increase intelligence, rated by parent-child dyads

	Children						Total
	The way you are born	Your parents	Your teacher	Trying hard	Your friends		
Parents	The way you are born	0	0	5	6	0	11
	Your parents	0	4	4	11	0	19
	Your teacher	0	1	0	1	0	2
	Trying hard	1	4	5	18	0	28
	Your friends	0	0	0	0	0	0
	Total	1	9	14	35	0	60

Note. Shaded boxes illustrate incidences where parent-child dyads agree.

3.2.2 Factor least likely to increase intelligence.

There was agreement among 60% ($n = 36$) parent-child dyads. Kappa measure of agreement indicated fair parent-child agreement ($k(60) = 0.25$, $p = 0.03$).

The most popular choice for respective child and parent groups was “the way you are born”. For frequencies see Table 13.2.

Table 13.2.

Crosstabulation of factor least likely to increase intelligence, rated by parent-child dyads

	Children						
	The way you are born	Your parents	Your teacher	Trying hard	Your friends	Total	
Parents	The way you are born	22	0	0	0	9	31
	Your parents	0	0	0	0	0	0
	Your teacher	2	0	0	0	0	2
	Trying hard	2	0	0	0	1	3
	Your friends	10	0	0	0	14	24
	Total	36	0	0	0	24	60

Note. Shaded boxes illustrate incidences where parent-child dyads agree.

3.3 Parental Praise

3.3.1 Do children's reports of parental praise accord with parental reports?

Data from all participants were analysed. The same praise category was selected by 50% ($n = 30$) of parent-child dyads (see Table 14 for frequencies). Kappa measure of agreement indicated statistically significant parent-child agreement ($k(60) = 0.22, p = 0.01$) in response to the question "If you/your child worked really hard on a spelling test and scored 10 out of 10, what do you think your parent might say to you/you might say to your child?" Participants who reported that they would say something else provided alternative answers (Table 15) which largely describe a combination of effort and achievement-focussed praise.

Table 14.

Crosstabulation of reported praise, rated by parent-child dyads

	Children					Total
	Would not say anything	Well done, you got a really good score	Well done, you worked really hard	Something else		
Parents	Would not say anything	0	0	1	0	1
	Well done, you got a really good score	0	8	3	1	12
	Well done, you worked really hard	1	10	17	6	34
	Something else	0	3	5	5	13
	Total	1	21	26	12	60

Note. Shaded boxes illustrate incidences where parent-child dyads agree.

Table 15.

Alternative responses provided by participants

Parents (<i>n</i> = 13)	Children (<i>n</i> = 12)
Well done, you worked really hard, here's a reward (financial incentive). ^{*a}	Well done, you can have a pound. ^{*a}
Well done that is a really good score keep it up for the next test. ^{*b}	What did others get? ^{*b}
You did really well I am proud of you. ^{*c}	Well done that is great. ^{*c}
Well done you tried your best I'm proud of you. ^{*d}	Well you can do more. ^{*d}
Good well done. ^{*e}	I am really happy with that score well done. ^{*e}
Well done, knew you could do it, practicing paid off.	That's what you should get.
Well done, keep it up.	My dad would say well done mate that is fantastic.
Well done I am very proud of you.	Well done I'll take you out to get something.
You worked really hard and it is reflected in your score.	Well done I'm really proud.
Well done you are amazing keep it up.	Well done.
Well done you worked really hard and you are a clever girl.	Well done you did really well.
Fantastic effort you did really well.	Really? I thought you would.
Excellent work you deserve that mark as you have worked really hard learning them this week.	That's good.

Note. The first five responses (*a - *e) are listed by corresponding parent-child dyads. The remaining responses are not listed in corresponding dyads.

3.3.2 Is there an association between process-focussed and achievement-focussed parental praise and STol?

Only data from participants who reported process-focussed or achievement-focussed parental praise were included in this stage of analysis (parent *n* = 46, child *n* = 47). A series of Mann Whitney U tests were applied to compare STol in process-focussed versus achievement-focussed parental praise groups. No relationships were found between the type of praise reported (by parents or children) and STol in children (see Table 16.1 for child STol and *p* values). The

STol was significantly higher (incremental) in parents who reported providing process-focussed praise (Mdn = 4.63, $n = 33$) than parents who reported providing achievement focussed praise (Mdn = 4.00, $n = 12$) (see Table 16.2 for parent STol and p values).

Table 16.1.

Results of Mann Whitney U tests to compare child STol in process-focussed versus achievement focussed parental praise groups

Praise reported by	Type of praise reported	Median STol	n	U	z	p (one-tailed)	r
Child	Achievement	4.33	21	204.00	-1.48	0.07	0.22
	Process	4.08	26				
Parent	Achievement	4.50	12	173.50	-0.77	0.22	0.11
	Process	4.25	34				
			46				

Table 16.2.

Results of Mann Whitney U tests to compare parent STol in process-focussed versus achievement-focussed parental praise groups

Praise reported by	Type of praise reported	Median STol	n	U	z	p (one-tailed)	r
Parent	Achievement	4.00	12	130.50	-1.74	0.04*	0.26
	Process	4.63	33				
Child	Achievement	4.50	21	257.00	-0.122	0.45	0.02
	Process	4.25	25				
			46				

Note. * = Correlation is significant at the 0.05 level.

4. Discussion

4.1 Parent and Child STol

No significant association was observed between the STol of a parent and the STol of her/his child, providing support for the null hypothesis (H_0). However, when dyads without clear STol (Dweck et al., 1995a) were excluded, a positive association was observed between parent and child STol, with medium effect. This provides support for the experimental hypothesis (H_1). Although it is not possible to infer causality, results indicate that it is only when participants strongly held STols that an association was observed between the STol of a parent and the STol of her/his child.

The majority of parents (72.9%), and children (65%) met criteria for incremental STol, rather than the 40 - 42.5% typically reported (Dweck et al., 1995a; Dweck & Mueller, 2007). Perhaps the use of self-selection resulted in an unrepresentative sample. Alternatively, with school as the intermediary for data collection, perhaps demand characteristics were high. Dweck and Molden (2007) assert that people can be 'cued into' a STol in certain situations, and it has been suggested that the incremental theory is accessed with relative ease (Harackiewicz & Elliot, 1995).

Dweck et al. (1995a) measured STol using only entity statements, whereas the present study included incremental statements, which can be "highly compelling" (p.270), perhaps influencing responses. Alternatively, the distribution data may be based on an American sample in Dweck's work which is culturally different from the present day UK. Cultural differences in the

prevalence of incremental STol have previously been noted (Heine et al., 2001). Current findings may be limited by the distribution of STol.

4.2 Perceptions of Shared Beliefs

No support was found for the experimental hypothesis (H_1), that a child's perception that parent-child opinions were similar would be associated with a stronger correlation in parent-child STol. This may be due to the lack of strong agreement¹³, which may be indicative that children do not strongly identify with their parents, in terms of beliefs about intelligence. Alternatively, this uncertainty may have reflected the developmental age of the child participants. Children's self-concept may still be developing (Rogers, 1959) and they may not yet have developed a clear sense of being separate and distinct from their parents, and are thus unsure about how connected their opinions may be. Alternatively, a larger sample might have found more polarised opinions. It was presumed that children knew which parent completed the parent questionnaire.

When dyads without clear STol were excluded, a positive association was observed between parent and child STol among parents who agreed to some extent that parent-child opinions would be similar, providing support for the experimental hypothesis (H_1). This indicates the possibility of parental attunement (Molden & Dweck, 2006) in the development of STol. Perhaps these parents are aware of their parenting practices, which research has shown to be influential (Grolnick, 2001; Ricco et al., 2003), or perhaps they are simply aware of their child's constructs.

¹³ 65% of child participants selected the two mid-points (mostly agree and mostly disagree) on the six-point agreement-scale.

4.3 Perceptions of Influences on Intelligence

Parent-child dyads were in significant agreement about the factor least likely to influence intelligence¹⁴, providing support for the experimental hypothesis (H₁). No significant agreement was observed in the factor parent-child dyads rated as most likely to increase intelligence, although “trying hard” was the most popular choice for both groups¹⁵. This provides support for the null hypothesis (H₀). These selections may be indicative of the high number of participants with an incremental STol and of children’s developmentally-appropriate sense of agency (Sugarman, 2001).

The second most common answer among children was “your teacher” (23.3%), followed by “your parents” (15%). If children perceive teachers as more influential, it is likely that teachers will be more influential, according to Lane’s (2011) postulation. Additionally, this response could reflect an association of intelligence with school rather than with home, reflected in the observation that intelligence gains importance over the school years (Dweck, 2000). Perhaps it is the case that children establish school as the structure of intelligence, that is, the context in which intelligence holds most meaning, and their constructs about intelligence are developed within this structure, a process described by Kelly (1955).

The second most common answer among parents was “your parents” (31.7%). Only 3% of parents selected “your teacher”. Parents and their children were in disagreement about whether parents or teachers were more influential. Perhaps parents believe themselves to have an influence on intelligence due to research that has indicated the influence and importance of parents in other areas of development and has been presented in educational policies

¹⁴ 51.7% of parents and 60% of children rated “The way you are born” least likely.

¹⁵ Rated by 58.3% of parents and 46.6% of children.

(Education & Employment Committee, 2000; QCA, 1999; WAG, 2008). These findings suggest that parents may overlook the influence of teachers.

The use of “your parents” on the questionnaire did not specify whether this was referring to child-rearing practices, involvement, genetic contribution, etc. However, the inclusion of “the way you are born” may have served to clarify a difference, reducing ambiguity.

4.4 Parental praise

Half the parent-child dyads reported the same type of praise, a result which was shown to be statistically significant, providing support for the experimental hypothesis (H_1). This had not previously been explored.

No significant relationships were found between the type of praise reported and STol in the whole sample. This does not support the experimental hypothesis (H_1). However, when dyads without clear STol were excluded, it was found that the STol of parents who reported achievement-focussed praise was lower (more fixed) than parents who reported process-focussed praise. A parent’s theory about the nature of her/his own intelligence was found to be connected to the way she/he behave toward her/his child, similar to the findings of Similey et al. (2000). The absence of a relationship between children’s STol and parental praise may be indicative of the existence of alternative influential factors on the development of STol.

These findings are divergent from those of Dweck and Lennon (2001) and Mueller and Dweck (1998), possibly due to differences in methodology. However, Dweck and Lennon (2011) measured theories of intelligence, not specifically STol. While Dweck and Lennon (2011) took a more general

approach in measuring praise relating to schoolwork, this study presented participants with a hypothetical situation.

Schunk (1955) criticises the use of hypothetical situations as they minimise the role of important contextual factors, although it would have been problematic to measure parental praise in another way. However, the current research differed from the majority of previous research into STol, as it measures naturally occurring beliefs, rather than manipulating beliefs in a laboratory.

4.5 Additional Limitations

Limitations relating to specific areas of the study are discussed above under relevant sub-headings. This section addresses additional limitations in the design of the study.

Only one parent of each child was asked to complete a questionnaire, self-selected by each family. In two-parent households, or for children with two families, the number of possible parental influences multiplies, and there may be a combination of parental STol within any family. However, it could be hypothesised that the adult who is most actively involved in her/his child's education, who reads the letters from school, was the one who participated. In addition, it cannot be presumed that each child completing the questionnaire was aware which of her/his parent(s) completed the parental questionnaire, as children were not informed by the researcher. It therefore may have been problematic for children to rate the final statement, "My opinions are likely to be

the same as my parent's" as children were not necessarily aware of whose opinions they should be considering.

Additionally, the 'opinions' referred to in the statement could have been clarified. When reading the questionnaire aloud to children, the researcher stressed that this statement related specifically to the opinions expressed in the questionnaire, although the statement could be considered ambiguous for parent participants also. It was presumed that parents would infer that the statement regarding similarities of parent-child opinions would have been read as relating to STol, as the preceding questions consistently related to STol.

This study is further limited by the absence of a pilot study. By piloting the questionnaire, limitations in questionnaire design might have been highlighted and addressed by the researcher, prior to further data collection.

While the majority of research into STol categorises participants as incremental or entity theorists, this research did not, so it is with caution that comparisons to other research should be made. There is also an absence of additional demographic data, for example, ethnic origin or educational background of parent.

Although this study was completed with participants from seven schools, all pupils were year six primary school pupils so findings cannot necessarily be generalised to other age groups and settings for example, secondary school. However, this research contributes a British perspective to self-theories of intelligence, a research area which is largely dominated by American research.

4.6 Implications for EPs.

Findings indicate that there is an association between parent and child STol, when clear STol are held. Although causality cannot be established, findings suggest that children's beliefs about intelligence are related to parental beliefs. This highlights to EPs the importance of engaging with parents, even if something is presented as a 'school-based issue', relating to learning. Systems theory (Burden, 1985) suggests that when involved with an individual child, the EP is not simply working with a child, and can gain a better understanding by engaging with the home and school systems. The association between parent and child STol indicates the importance of home-school interactions and EPs may find it useful to consider parents' STol, and support parents in reframing their STol when working with the child, using the principle of equifinality. EPs could inform parents of their potential influence, should they hold a clear STol.

Findings also suggest that school-aged children across different schools perceive their teacher to be an influence on intelligence. While firm conclusions cannot be drawn from this research, it is possible that the school context may be influential (Neisser et al., 1996; Rogers, 2010; Rutter et al., 1979). EPs could conduct further research in this area to pursue these questions.

EPs could use the model of STol to provide training and highlight the potential influence of teacher-child interactions, the school ethos or praise and reward and teaching and learning policies. Evaluative research could be conducted by EPs.

4.7 Future directions

The finding that a positive association between parent and child STol exists only when clear STol are held (using the criteria of Dweck et al., 1995a), poses

a question for future research: What causes an individual to hold a clear STol, rather than an uncategorised STol?

Murphy and Dweck (2010) have begun to reconceptualise implicit theories of intelligence at the organisational level, indicating that an organisation's beliefs can impact on an individual's self-presentation "through modelling, persuasion, cognitive dissonance and self-perception processes" (p.294). It would be valuable to develop a measure of a school's and/or a class' implicit theory of intelligence. Research could investigate within-school factors that might affect the development of STol, looking at teacher praise, reward systems, classroom rhetoric, plus teachers' STol and practices.

A longitudinal study of school transition could investigate whether STol change with environment, or whether holding an incremental STol is a protective factor (i.e., mitigates associated risks) in the British secondary school transition.

4.8 Conclusions

The present study generated some new findings regarding the development of STol. The findings suggest that, while parents' STol have some association with children's STol, this is not the case in the whole sample. It is only when those without a clear STol are excluded that parent-child associations are observed. It is likely that other factors are involved. Children's perceptions that teachers are more likely than parents to increase intelligence, acts as a signpost to researchers that the social context of school would be a fruitful place to continue the research into the development of STol.

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Appendix 1 – Gatekeeper Letter

NAME
Trainee Educational Psychologist
Cardiff University
School of Psychology
Park Place
Cardiff
CF10 3AT

Date

Dear Headteacher

I am a trainee educational psychologist at Cardiff University undertaking the Doctorate in Educational Psychology. As part of my doctorate I am carrying out a study on self-theories of intelligence. I am writing to enquire whether you would be willing to give permission for parents and pupils from your school to be recruited for participation in this research.

Research Title: The development of self-theories.

A person's self-theory of intelligence relates to the beliefs held about one's own intelligence. This study aims to investigate the development of self-theories of intelligence. This research is being supervised by Dr Simon Griffey, Research Director of the DEdPsy Programme.

I would like to invite all pupils and parents in year six to participate in this study, by sending written information home to parents, via your school. Parents will be asked to complete a short questionnaire at home. When parental consent is obtained, pupils will be asked to complete a short questionnaire (which should take no more than 15 minutes to complete). This will be administered during the school day.

Enclosed is an information sheet, parent consent form and questionnaire and pupil questionnaire.

Following the completion of pupil questionnaire data will be retained anonymously. No schools or pupils will be named in the final report and it will be impossible to trace any data back to any individuals. Parents who participate will be entered into a prize draw for a voucher.

If you agree that parents and pupils at your school may be approached regarding their participating in the project, please send an email e-mail address. I will then be in contact to arrange a convenient time to visit your school to distribute information.

Many thanks in advance for your consideration of this project. Please let me know if you require further information.

Regards,

NAME

NAME
Trainee Educational Psychologist
Cardiff University
School of Psychology
Park Place
Cardiff
CF10 3AT
e-mail address

Research Director (Study Supervisor)
Dr Simon Griffey
Cardiff University
School of Psychology
Park Place
Cardiff
CF10 3AT
Griffeysj@cardiff.ac.uk
02920 870366

Appendix 2 – Information Sheet For Parents

Information Sheet for parents

Research Title: The development of self-theories

My name is NAME and I am a trainee educational psychologist at Cardiff University undertaking the Doctorate in Educational Psychology. As part of my doctorate I am carrying out a study into the development of self-theories of intelligence. A person's self-theory of intelligence relates to the beliefs held about one's own intelligence.

You and your child are invited to take part in this study. All year six pupils and their parents at your child's school have been invited to take part. Only one parent of each child is asked to participate and only one parent will complete the questionnaire.

You have been provided with a short questionnaire about your views of intelligence, which will take approximately 10 minutes to complete. Your child will be asked to complete a similar questionnaire in school, if you give your consent. By completing and returning the parent questionnaire, you will be giving consent for your child to complete a questionnaire in school. Participation is completely voluntary. By participating in this study, you will be entered into a prize draw to win a £10 shopping voucher, to thank you for your time.

The information provided by you will be held confidentially, and only the researcher will have access to it. Information will be stored securely at all times. Your responses will be anonymised once your child's questionnaire is completed and returned and paired with your response. This will be within 6 weeks of you responding. The information will be retained until July 2013 and then it will be destroyed. You are free to withdraw yourself and your child from the study up until the data has been anonymised.

From the questionnaire responses, I will produce an academic report. No schools will be named in the report and it will be impossible to trace any information back to any individuals. The report help to inform future work by educational psychologists.

This study has been reviewed and approved by Simon Griffey, Research Director of the DEdPsy Programme. If you would like to raise any queries, or are unhappy with any aspect of the questionnaire, you can contact him on 02920870366, or via email at Griffeysj@cardiff.ac.uk If you need to contact me, I am available at the e-mail address below.

One copy of the questionnaire has been sent home for completion by a parent of your year six child. Please return completed questionnaire and consent form to your child's school in the envelope provided by **DATE**.

I would greatly appreciate your participation in my project. Thank you very much for taking the time to read this information sheet.

NAME e-mail address

Appendix 3 – Parent Consent Form

Parent Consent Form

I understand that my participation in this project will involve completing a short questionnaire about my own views of intelligence, which will require approximately 10 minutes of my time. I understand that, by completing and returning this questionnaire, I also give permission for my child to participate in this study. I give permission for my child to complete a similar questionnaire about her/his views of intelligence, which she/he will complete at school. Only one parent of each child is asked to complete a questionnaire.

Child's name: _____

I understand that participation in this study is entirely voluntary and that I can withdraw myself and my child from the study up until the time the questionnaire is anonymised, without giving a reason. Anonymisation will take place within 6 weeks of the questionnaire return date.

I understand that by participating in this study, I will be entered into a prize draw to win a £10 voucher.

I understand that I am free to ask any questions at any time. I am free to withdraw myself and my child or discuss my concerns with Simon Griffey (Research Director DEdPsy Programme and Research Supervisor).

I understand that the information provided by me will be held securely and confidentially, such that only the researcher can trace this information back to me individually, before it is anonymised. I understand that my data will be anonymised once my child has completed the questionnaire in school, within 6 weeks of the parent return date. After this point no-one will be able to trace my information back to me. No schools or pupils will be named in the report and it will not be possible to identify any participants from the academic report. The information will be retained until July 2013 and then it will be destroyed. I understand that I can ask for the information I provide to be deleted/destroyed at any time up until the data has been anonymised and I can have access to the information I provide up until the data has been anonymised.

I also understand that at the end of the study I will be provided with additional information and feedback about the purpose of the study.

I, _____(NAME) consent to participate in the study conducted by NAME School of Psychology, Cardiff University with the supervision of Simon Griffey.

Signed:

Date:

.....

PRIZE DRAW - I would like to be entered into the prize draw to win £10 shopping voucher. Child's Name: _____ School: _____

Appendix 4 – Parent Questionnaire

Questionnaire for parents – to be completed by one parent only

This questionnaire has been designed to investigate ideas about intelligence. There are no right or wrong answers. I am interested in your ideas.

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by circling one number for each statement.

Are you male/female? (please delete as appropriate).

Relationship to child (e.g., mum, step-mother, dad): _____

Name: _____

Child's name: _____

1. You have a certain amount of intelligence, and you can't really do much to change it.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

2. Your intelligence is something about you that you can't change very much.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

3. No matter who you are, you can significantly change your intelligence level.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

4. To be honest, you can't really change how intelligent you are.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

Continued overleaf....

5. You can always substantially change how intelligent you are.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

6. You can learn new things, but you can't really change your basic intelligence.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

7. No matter how much intelligence you have, you can always change it quite a bit.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

8. You can change even your basic intelligence level considerably.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

9. If your child worked really hard on a spelling test, and scored 10 out of 10, what do you think you might say to them? *(please circle)*

I would not say anything	"Well done, you got a really good score"	"Well done, you worked really hard"	Something else (please write what you think you would say below):
--------------------------	--	-------------------------------------	---

10. What do you think makes you more intelligent? Please list these in order:
The way you are born, your parents, your teacher, your friends, trying hard.

Most likely to make you more intelligent	1
	2
	3
↓	4
Least likely to make you more intelligent	5

9. My opinions are likely to be the same as my child's.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

**Please return completed questionnaire to your child's school in the
envelope provided by**

DATE

Thank you for completing the questionnaire.

Appendix 5 – Child Questionnaire

Questionnaire for children

Your parent has already filled in a questionnaire like this and has given permission for you to complete this questionnaire. It would be very helpful if you could answers the questions below. If you do not want to fill in the questionnaire that is OK and you can leave out any questions you don't want to answer. If you do fill in the questionnaire I will keep it safely for 3 weeks so that no one else will see it and then I will take your name off it so that no one will ever know you filled it in. Please write your name below if you're happy to fill in the questionnaire.

My name

is: _____

Are you a boy or a girl? I am a GIRL / I am a BOY (put a circle around one)

Read each sentence below and then circle *one* number that shows how much you agree with it. There are no right or wrong answers

1. You have a certain amount of intelligence, and you can't really do much to change it.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

2. Your intelligence is something about you that you can't change very much.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

3. To be honest, you can't really change how intelligent you are.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

4. No matter who you are, you can change your intelligence a lot.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

5. You can always greatly change how intelligent you are.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

6. You can learn new things, but you can't really change your basic intelligence.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

7. If you worked really hard on a spelling test, and you scored 10 out of 10, what do you think your parent might say to you?

Well done, you worked really hard	Well done, you got a really good score	My parent would not say anything	Something else (please write what you think they would say below):
-----------------------------------	--	----------------------------------	--

8. What do you think makes you more intelligent? Please list these in order:
The way you are born, your parents, your teacher, your friends, trying hard.

Most likely to make you more intelligent	1
	2
	3
↓	4
Least likely to make you more intelligent	5

9. My opinions are likely to be the same as my parent's.

1	2	3	4	5	6
Strongly agree	Agree	Mostly agree	Mostly disagree	disagree	Strongly disagree

Thank you for completing this questionnaire.

Appendix 6 – Debrief Form for Children

Debriefing form for children

Research Title: The development of self-theories: is there a correlation between a child's self-theory of intelligence and the self-theory of intelligence of her/his parent?

Thank you for taking part in my study.

I am investigating whether children have similar ideas about their intelligence as their parent.

Some people see intelligence as fixed and something that cannot be changed, while other people see it as something that can grow with effort.

Someone's idea about their intelligence can affect how much they try at things, especially when things are hard.

I am interested in finding out if the ideas a parent has about their own intelligence are the same as a child's idea about their own intelligence.

I will use the information to write a report. There will not be any names of people or schools in my report. Your parents, teachers and friends will not know what you said.

I will look after the information from the questionnaires and no one else will see it until I take your name off.

If you don't want to be included anymore, you can come and tell me today. You don't have to tell me why.

If you have any further questions about the research, please contact the researcher at:

NAME	Dr Simon Griffey
Trainee educational psychologist	DEdPsy Research Director
School of Psychology	School of Psychology
Cardiff University	Cardiff University
Tower Building	Tower Building
Park Place	Park Place
Cardiff	Cardiff
CF10 3AT	CF10 3AT
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<u>email</u>	GriffeySJ@cardiff.ac.uk

If you have any complaints, please contact:
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Cardiff University
School of Psychology
Park Place, Cardiff
CF10 3AT
Griffeysj@cardiff.ac.uk 02920 870366

Appendix 7 – Debrief Form for Parents

Debriefing form for parents

Research Title: The development of self-theories: can a child's self-theory of intelligence be predicted by the self-theory of intelligence of her/his parent?

Thank you for taking the time to participate in this study.

The aim of this study is to investigate whether children have similar ideas about their intelligence as their parent.

Research has shown that some people see intelligence as fixed and something that cannot be changed, while other people see it as something that can grow with effort. A person's idea about their intelligence can impact on how much effort they put into a task, or how motivated they are. I am interested in finding out if the ideas a parent has about their own intelligence relate to a child's idea about their own intelligence.

I will use the information to compile an academic report. The outcomes will be useful for educational professionals, including psychologists.

The data collected from the questionnaires will be held securely and confidentially before being anonymised. Participants have the right to withdraw their data without explanation, up until the time the questionnaire is anonymised, once your child has completed the questionnaire in school. This will be within 6 weeks of parent completion.

If you have any further questions about the research, please contact the researcher at:

NAME	Dr Simon Griffey
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