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Self-concept in Children with Intellectual Disabilities

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SELF-CONCEPT IN CHILDREN WITH

INTELLECTUAL DISABILITIES

By

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Under the Direction of Rose Sevcik

ABSTRACT

Self-concept, or feelings about oneself, encompasses various areas including social and academic domains and has been suggested to be a predictor and mediator of other outcomes (Bryne, 1996). In this study, the relationships between achievement, intelligence scores, and self-concept in children with mild intellectual disabilities were examined. Self-concept and WISC verbal intelligence scores evidenced significant relationships. Additionally, relationships were demonstrated between gains in achievement and higher ratings of self-concept. These results suggest that relationships exist between intelligence, achievement, and self-concept in elementary school children with MID. Specifically, a positive relationship was demonstrated between achievement gains and self-concept. Associations between intelligence and self-concept also were demonstrated, where higher intelligence scores were related to both lower nonacademic self-concept and higher cognitive self-concept.

INDEX WORDS: Self-concept, disabilities, achievement, intelligence

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DEDICATION

This thesis is dedicated to my mother, who has always been supportive of my education. Thanks for your encouragement.

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I would like to acknowledge all of the guidance that my advisor, Rose Sevcik, gave to me during the creation of this document. Her assistance and direction made this research possible.

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Individuals develop in and through their physical and social environment. During this process, they begin to cultivate the concept of "me" (Stipek, Gralinski, & Kopp, 1990). This self-realization occurs progressively over time with increasing complexity through experience and cognitive development within social contexts (DeSocio, 2005). According to Brooks-Gunn and Lewis (1975), self-development generally proceeds through cognitively associated stages that begin with self-recognition. Self-recognition involves the capacity to discriminate oneself from others. This construct has been examined in experiments in which researchers dab rouge on the noses of children between 9 and 24 months of age and place them in front of a mirror (Brooks-Gunn & Lewis, 1975). Children who exhibited self-recognition engaged in nose-directed behaviors such as touching and/or wiping their nose, at approximately 15 months of age (Lewis & Ramsay, 2004). A similar developmental progression is revealed in children with developmental disabilities, but this process generally occurs more slowly and is associated with mental age (MA) rather than chronological age (CA; Cunningham & Glenn, 2004).

Emergence of the Self

With the development of language skills and additional cognitive development, children are able to engage in self-description, which is a function of both age and culture. Younger children tend to explain themselves by describing their appearance, family, and possessions (e.g., "I have long hair" or "I have a sister and a brother"), while older children explain themselves with more internal characteristics that reflect an inner self (e.g., "I feel like I am a good person"; Glenn & Cunningham, 2004). Culture also influences self-descriptions. Wang (2006) has found diverse self-descriptions across cultures at an early age, where, in interviews of children between 3 and 4.5 years, Euro-American children focus more on internal dispositions and characteristics (e.g., "I am smart"), while Chinese children described themselves with situation-related traits and explicit behaviors (e.g., "I play the piano"). The differences in self-descriptions may be due, in part, to distinct cultures in which emphases are placed on different traits such as independence in America or collectivism in China.

With additional experience, children begin to self-evaluate, which in so doing, cultivates their self-concept and self-esteem. Although the terms self-concept and self-esteem are often used interchangeably in the literature, the contemporary consensus appears to be that self-concept denotes how individuals feel about themselves in specific arenas such as physical, social, and academic domains, in contrast to self-esteem, which refers to one's overall sense of well-being as a person (Zeleke, 2004). For typically developing individuals, self-concept is said to develop as a product of social experiences and cognitive structures (Glenn & Cunningham, 2004) that interact with the environment to create the responses and outcomes for self-evaluations (Harter, 1999), but there has been controversy as to when these hypothesized cognitive structures actually develop (Marsh, Ellis, & Craven, 2002). Likewise, this developmental progression is seen with individuals with developmental disabilities when MA is taken into account (Glenn & Cunningham, 2004). Using Piagetian theory (Piaget, 1952), it has been suggested that increased cognitive functioning, gained from advancing age and experience, must emerge before children can embark on self-evaluative tasks (Harter, 1982), a view that may or may not be accurate and has not been supported definitively by the literature to date. Research that has attempted to measure self-concept in children younger than the age of 8 has demonstrated varied results with some research indicating that children of this age do not have a well-defined self-concept (Harter & Pike, 1984) and other work suggesting that they do have a multidimensional self-concept (Marsh et al., 2002).

Self-evaluations (e.g., self-concept and self-esteem) are believed to occur through several routes. According to Festinger's social comparison theory (Festinger, 1954), when independent methods (e.g., rank and achievement) of ability measurements are unavailable, individuals will compare themselves socially to determine their status. In a typical sample of adults, depressive symptoms were associated with participants' perceived self-other trait discrepancies (Furnham & Brewin, 1988). Similar findings were found in a sample of children and adolescents with Asperger syndrome (ages 10 to 16 years), where a significant positive correlation was revealed between depressive symptoms and social comparison methods (Hedley & Young, 2006). Depending on whether self-enhancement or shame avoidance is the goal, social comparisons can be directed upwards, to those who are perceived to be better at some skill or attribute, or downwards to individuals who are thought to be inferior on a particular characteristic or quality (Allan & Gilbert, 1995). In addition, it is hypothesized that self-concept emerges through the capacity to distinguish between one's real self and one's ideal self (Harter, 1983) and that feedback from important others, such as parents, peers, and teachers, also augments feelings of self-concept (Gest, Domitrovich, & Welsh, 2005; Murray & Greenberg, 2006). Hence, around age 8, children integrate this information to make judgments about themselves and develop various degrees of self-concept in domain specific areas. As children progress into their later elementary years, their self-concepts become more realistic and levels of self-concept tend to decline with additional experience. Furthermore, the various self-concept domains, such as physical abilities, social skills, and academic competence, become more differentiated with skill development and self-concept scores become more highly associated with external performance measures (Shavelson, Hubner, & Stanton, 1976).

Finally, high self-concept has been suggested to be not only desirable in and of itself, but also functions as a predicting or mediating variable that can facilitate other important outcomes such as academic performance and social competence (Bryne, 1996). For example, research with typically developing adolescents has suggested that low self-concept is associated with adverse outcomes such as low school achievement, depression, and suicide (Hay, 2005). In addition, the role of self-concept appears to change as children progress in school. Studies that have assessed the relationships between reading self-concept and reading performance in elementary school children, for instance, have revealed that in the first and second grades, children's reading performance predicts their reading self-concept; in later grades, however, children's reading self-concept affects their reading achievement (Chapman & Tunmer, 1997).

Self-concept constructs

Self-concept research with typically developing children has evolved over the past several decades. Paradigms began with a unidimensional focus on self-esteem and have advanced to measures that included various dimensions of self-concept, such as in academic and nonacademic areas, which sum to a global self-esteem score (Piers & Harris, 1969). This approach has been discounted by some, though, because as Harter (1984) contends, the importance of different domains to an individual probably carries different weights and a single score ignores the differentiation between distinct areas. For instance, one’s evaluation of oneself may be very complementary in sports but poor in academics, yet because academics are more important to the individual, he or she may have low self-esteem. This is a simplified example, however, because self-concept is a multidimensional construct and encompasses several areas (e.g., physical, social, academic). Contemporary theories (e.g., Marsh and Shavelson’s multifaceted, hierarchical self-concept) take into consideration that the various dimensions of self-concept contribute unequally to global self-esteem; therefore, scales that simply sum the scores for distinct dimensions are inadequate to compute a global self-esteem score.

Debate about the appropriate model for self-concept continues because researchers lack agreement about the role of global self-esteem and the way in which the various self-concept domains relate to it. Despite the discord, the methodology used to study self-concept has improved considerably over the years due to more robust theoretical models and multifaceted measurements (e.g., distinct scales for multiple self-concept areas) resulting from those paradigms (Van den Bergh & Rycke, 2003). Especially, these improvements can be noted with self-concept measurement in children younger than the age of 8 years, where successful assessments of a multifaceted self-concept has not been demonstrated until recently (Marsh, Craven, & Debus, 1998; Marsh et al., 2002; Van den Bergh & Rycke, 2003). The major improvement to self-concept models is the advancement from a unidimensional focus to one that incorporates a multidimensional approach. Although all integrate distinct self-concept domains such as physical ability self-concept and mathematics self-concept, many measures also include a measure of global self-esteem (Marsh & Hattie, 1996). Other researchers argue that self-concept paradigms need to incorporate multidimensionality with a corresponding hierarchical structure (Shavelson et al., 1976), but this idea has been discounted by some because the multiple self-concept domains (e.g., academics, social, physical) become increasingly distinct with age (Marsh & Craven, 1997) and the structure for the hierarchy would be distinct between individuals since everyone has different ideas about what is important in their lives.

Self-concept in typical populations

Past research has revealed that young children frequently report their skills and abilities as being high in virtually every domain (Harter & Pike, 1984). Some researchers have suggested that children ages 5 to 6 years judge themselves with an optimistic bias that becomes more accurate as they grow older (Eccles, Wigfield, Harold, & Blumenfeld, 1993). These unrealistic appraisals may be due to undeveloped age-related cognitive capacities that mature with knowledge and experience, or these findings may be, in part, because of developmentally inappropriate measures used with these samples of children. For example, Marsh and colleagues (1998) dispute Harter's contention that children younger than 8 years of age do not have measurable self-concepts and they suggest, instead, that young children's self-concept needs to be evaluated with age appropriate measures. They suggest that research findings that indicate children younger than 8 years of age lack a multidimensional self-concept may be an artifact of inappropriate methodology that was used.

It has also been suggested that children younger than eight years of age do not have the ability to verbalize how they feel about themselves and self-concept in these children can only be studied through manifestations of their behavior (Harter, 1990). Other researchers contend that although children 4 to 5 years of age cannot articulate how they feel about themselves, they have a measurable self-concept and thus, self-concept measures that use open-ended questions, requiring children to generate language, are unsuitable for participants below the age of 8 years (Eder & Mangelsdorf, 1997). Contemporary self-concept research has illustrated that children have a multidimensional self-concept at a younger age than previously believed (Eder, 1990; Marsh & Hattie, 1996). By asking children direct, positively worded questions using a double binary (e.g., yes or no, followed by yes/no sometimes or yes/no always) response method, Marsh and colleagues (Marsh et al., 2002) found a multidimensional self-concept in children ages 4 to 5 years for mathematics, appearance, peer, and parent domains.

Harter has been one of the most influential and prolific researchers of self-concept with children. In her initial attempt at measuring self-concept in children four to seven years old, she devised the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (hereafter referred to as the Harter Pictorial Scale; Harter & Pike, 1984). It has been the most frequently used measurement of self-concept in young children because it was the first measure that demonstrated relative success with children younger than 8 years old. It is divided into four subscales that measure cognitive competence, physical competence, peer acceptance, and maternal acceptance. Each subscale contains six items that are presented in the form of pictures illustrating two children involved in an activity (e.g., good at puzzles, has many friends). The children are told that one child is good at puzzles (or any activity), but the other child is not good at puzzles. Then, they are asked to report which child they are more like (the one who is good at the activity or not). After making that decision, children are told to consider the picture that they have chosen and shown a large and small circle. The examiner asks the participants how much they identify: “Are you just pretty good at puzzles (depicted by a small circle) or really good (depicted by a large circle)” (Harter & Pike, p. 1972).

There are two versions of the Harter Pictorial Scale, one for preschoolers and kindergarteners and one for first and second grade students. Both have separate picture plates for male and female participants (the pictures are drawn with boys or girls), but the activities depicted and questions asked between the male and female versions are identical. Questions between the different grade versions may be similar or distinct; the Harter Pictorial Scale asks questions that are relevant to that particular age group and skills associated with a grade level. For example, the preschool-kindergarten scale has an item that reads “knows alphabet,” while the first-second grade equivalent is “good at spelling.” The scales are administered individually and the items are computed on a one to four point range. A score of one indicates that the participant identifies with the child who is not good at the depicted activity, while a four designates that the child believes that they are like the child who is depicted doing the activity well.

For their sample of typically developing children 4 to 7 years of age, factor analyses indicated that a two-factor solution best fit the data for the Harter Pictorial Scale, with Factor 1 labeled General Competence, which incorporated the physical and cognitive scales and Factor 2, termed Social Acceptance, made up of a composite of the peer and maternal scales. Because the Harter Pictorial Scale was created to measure four separate areas of cognitive competence, physical competence, peer acceptance, and maternal acceptance, Harter and Pike concluded that children of this age range do not have a multidimensional self-concept. Moreover, they concluded that children from 4 to 7 years of age have yet to distinguish among various self-concept domains because they have not developed the cognitive skills to make these more advanced assessments of themselves.

Several self-concept researchers, though, have doubted the accuracy of Harter and Pike's interpretation of their findings and questioned the utility of the Harter Pictorial Scale for children younger than 8 years of age because it may be developmentally inappropriate. Some have questioned the Harter Pictorial Scale's reliability and validity (Madigan, Winsler, Maradiaga, & Grubba, 2002). Other researchers have piloted the Harter Pictorial Scale with samples of children younger than eight years of age and ascertained that the pictures distracted children and that the bi-polar response method of the instrument was confusing to them as well (Fantuzzo, McDermott, Manz, Hampton, & Burdick, 1996; Marsh et al., 1998; Marsh et al., 2002). Despite the criticisms of the pictorial scale, the addition of picture plates may facilitate children's understanding of the self-concept items. That is, by depicting the items in a visual mode, the Harter Pictorial Scale removes the need for children to comprehend verbally what the examiner is saying.

A different approach for measuring self-concept in children between the ages of 5 to 8 years is the Self-Description Questionnaire-I Individual Administration (SDQI-IA; Marsh, Craven, & Debus, 1991). The SDQI-IA is designed to measure three total scores of self-concept: academic self-concept (an average of reading, math, and school self-concept scores), nonacademic self-concept (the average of physical, appearance, peer, and parent relations scores), and total self-concept (the average of all self-concept scales). In addition, the SDQI-IA measures a general self-concept, which is meant to evaluate how the children feel about themselves generally (e.g., "I am a good person").

The standard Self-Description Questionnaire-I (SDQ-I; Marsh, 1988), which has been suggested to be the self-concept measure that has demonstrated the best construct validity of all current self- concept scales (Bryne, 1996), includes an additional 12 negatively worded items that were deleted from the individually administered version because younger children often have difficulty interpreting and responding to negatively worded phrases. In addition, the response format was changed to a double binary response. That is, the interviewer reads positively-worded sentences to participants (e.g., "I am good at reading.") and asks them to respond with either "yes" or "no". These responses elicit a follow-up question with the interviewer asking "yes sometimes" or "yes always" and a no response is followed by the same type of question. The interview begins with a set of instructions and examples and the interviewer is encouraged to clarify any questions that the children may have about any words or statements. Answers are scored on a five-point scale, with one corresponding with "no always" and five with "yes always." A score of three is reserved for when children acknowledge that they understand the question but do not state yes or no; a scores of three, however, is rarely utilized.

Results for the SDQI-IA suggested a multidimensional self-concept factor structure for children 5 to 8 years old. In a sample of 501 children in kindergarten, first, and second grade, confirmatory factor analysis identified each of the eight SDQI-IA factors that were found previously in older children. When comparing between grades (kindergarten, first, second), the size of the correlations between the factors (self-concept domains) decreased as the children increased in age. Low correlations among self-concept areas are desirable because self-concept is believed to become more differentiated and multidimensional with age. Correlations between factors are expected to decrease until around the age of 10 years, when the relationships between achievement and nonachievement factors drop close to zero.

Additionally, a Dutch version of the Self-Perception Profile for Children (SPPC; Harter, 1985), a more recent version of the Perceived Competence Scale for Children (PCSC; Harter, 1982), found a multidimensional self-concept in children in second and third grades (Van den Bergh & Rycke, 2003). Although little information was given about their revised scale in the article, these researchers state that they developed the SPPC-s, which was shorter, more concrete, and less complex than the SPPC. Through pilot testing, they found the way in which the bipolar statements were formulated (e.g., "Some kids often forget what they learn" but "Other kids can remember things easily") in the original SPPC were confusing to the children. For this reason, the bipolar statements were eliminated and only positively phrased sentences were used (e.g., "Some kids often forget what they learn"). Children responded on a four-point scale with one representing "no never" and four representing "very often." Findings indicated a five-factor structure that included scholastic competence, social acceptance, athletic competence, behavioral conduct, and global self-esteem in children without disabilities 6 to 8 years of age.

Self-concept in special populations

The development of self-concept has been studied in children who follow nontypical paths of development. One population that has received some limited attention in the literature on this topic to date has been children with mild intellectual disabilities. Children with mild intellectual disabilities have IQ scores ranging from 50-70 and have limits in adaptive abilities and communication skills (Diagnostic & Statistical Manual of Mental Disorders, 4th ed., APA, 2000). The etiology of children's mild intellectual disabilities is heterogeneous and may stem from a range of causes including environmental agents, prenatal complications, genetics, or other origins. It appears to be that some research studies with children with developmental disabilities have been slow or stymied because of methodological issues. Research with children with mild intellectual disabilities, however, offers an opportunity to learn ways in which children with developmental disabilities think and feel about themselves. Furthermore, research on self-concept presents the chance to understand if children with ID demonstrate similar patterns with typically developing children, or if not, how they distinguish themselves.

Silon and Harter (1985) hypothesized that the self-concept of children with mild intellectual disabilities (ID) would be similar to that of MA matched typical 4 to 7 year olds. In addition, they hypothesized that children with mild ID progress in a relatively similar manner as do typically developing children, but with slower cognitive development and a self-concept that has a stronger association with MA than with CA. They sought to measure self-concept and related factors such as perceived competence, motivation, and anxiety in students with developmental disabilities 9 to 12 years of age with a mean MA of approximately 7.4 years. They used measures including the Perceived Competence Scale for Children (PSCS; Harter, 1982), the School Concerns Scale (Buhrmeister, 1980), and the Scale of Intrinsic Versus Extrinsic Orientation (Harter, 1981). Items were administered to groups of 3 to 4 children so the examiner could ensure that children understood the items and test format.

A reliable two-factor solution was demonstrated for each of the three scales. The factors found for the PSCS were termed Competence, a synthesis of the physical and cognitive competence domains, and Popularity, as characterized by four of seven social acceptance subscale items, primarily referring to the number of friends children have. The School Concerns scale revealed two factors associated with the child's teacher. One, they labeled Concern about Evaluation, combined schoolwork and conduct items. Silon and Harter suggest that children with mild ID equate the inability to excel in the classroom with classroom misconduct. The other factor, Concern about Teacher Support, is a composite of the children's concern about teacher support and acceptance.

The two factors that emerged from the Intrinsic-Extrinsic Orientation scale were Motivation for Hard Work and Autonomous Judgment. Because the items from the three original motivational subscales collapsed into one factor (i.e., Motivation for Hard Work) in their sample, Silon and Harter suggested that the most salient issue pertaining to motivation in these children might be the attitude that they take toward hard work, either approach or avoidance. The Autonomous Judgment factor, on the other hand, evaluates the children's classroom knowledge and represents confidence about whether children believe they are doing their work correctly.

Because the measures generate four to five-factor solutions for each scale with a typically developing sample of children, Silon and Harter concluded that the utilized measurement instruments were inappropriate for their sample and that they may be more suitable in a modified form. They suggested that children with ID's self-perceptions are less differentiated and less complex than typically developing children, which is similar to Harter's findings and conclusions for self-concept in preschool children (Harter & Pike, 1984).

It has been suggested that the majority of individuals with developmental disabilities have a delayed rather than different developmental trajectory (Cunningham &

Glenn, 2004; Silon & Harter, 1985; Zigler & Hodapp, 1986). In a study of 72 young adults with Down syndrome (mean CA = 19 years, 11 months; mean MA= 6 years, 4 months), Glenn and Cunningham (2004) attempted to measure participants' self-concept. They used the Harter Pictorial Scale and the Joseph Pre-School and Primary Self-Concept Screening Test (Joseph, 1979) for the participants with a verbal mental age (VMA) 5 years and younger and the Self-Perception Profile for Learning Disabled Students (Renick & Harter, 1988) for participants with a VMA above 5 years. Results indicated that the most impaired individuals in the sample (VMA = 40 months and below) were either unable to give self-descriptions or exhibited no self-recognition at all. Participants who were functioning at a higher cognitive level (mean non-verbal mental age; NVMA = 68 months), however, were able to make relative comparisons (downward, upward, and relative) and had significantly higher VMAs and NVMAs than those who were only able to provide simple non-comparative evaluations of themselves and others.

Glenn and Cunningham noted that there was a strong bias in their sample for positive rather than negative descriptions. This tendency, termed the general positivity hypothesis, where people are inclined to focus on the positive aspects of themselves and minimize the negative, also is found in people of all ages who are typically developing (Kealy, Kuiper, & Klein, 2006). In contrast, the findings that individuals with ID rated themselves highly in nearly all self-concept areas may be comparable to a developmental Piagetian framework, which suggests that individuals with an MA below 8 years have an inability to discriminate their actual abilities and instead report who they would like to be (Harter & Pike, 1984).

Some research has indicated that children with disabilities have differentiated, multidimensional, and measurable self-concepts. In a sample of 211 students with mild ID ages 7 to 13 years, Tracey and Marsh (2002) used the SDQI-IA to assess the multidimensionality of participants' self-concepts and to understand the impact of educational placement (mainstreamed or non-mainstreamed classes) on children's self-concepts. Confirmatory factor analyses indicated the presence of all eight SDQI-IA factors (average factor loading = .80) in their sample of children with mild intellectual disabilities. Furthermore, correlations among self-concept domains (factors) were low, indicating that children with mild intellectual disabilities differentiated between various self-concept areas. Unlike typically developing preadolescents whose general self-esteem is most highly associated with physical appearance, however, these children's general self-esteem was most highly related to their general-school self-concept. Tracey and Marsh relate this to Harter's (1990) contention that academic difficulties may be a salient issue in the lives of children who develop atypically, and thus, have a major impact on how they view themselves as a global entity. It was revealed that nonacademic and general self-concepts did not significantly differ between children in mainstreamed and non-mainstreamed classes, but children who are in non-mainstreamed classes had significantly higher academic self-concepts than those in mainstreamed classes. Students in mainstreamed classes did have significantly higher math achievement scores than children in non-mainstreamed classes, but no other main effects of educational placement were found.

Interventions

Much of the literature regarding language and academic achievement in children with developmental disabilities is in the context of interventions. This may be, in part, because children with ID are particularly susceptible to developing low self-concept due to impaired cognitive ability, stigma, and internalizing negative labels (e.g., “slow” or “retarded”; Cunningham & Glenn, 2004). Academic or behavior-based interventions have been shown to alleviate negative feelings about ones self in typically and atypically developing children. A behavior-oriented intervention model aimed at increasing children’s academic behaviors and diminishing feelings of depression evidenced success with typically developing low-income children in middle school (Oyserman, Bybee, & Terry, 2006). The model linked social identities with possible selves (e.g., good or bad images of oneself in a future state) and possible selves were then linked to persistent engagement and self-regulatory behaviors. The intervention was implemented in a school-based program twice a week over seven weeks. Children who participated in the intervention reported more self-regulatory behaviors, increased academic success, and reduced feelings of depression. Oyserman and colleagues reported that the children sustained these feelings and behaviors over a two-year period.

Behavioral or academic interventions can be successful in a variety of forms and some have been successful in children with ID (Palmer, Wehmeyer, Gipson, & Agran, 2004). Twenty-two middle school children with developmental disabilities (IQ M = 64.6, SD = 9.97) participated in a 15-week intervention to promote self-determination. The intervention emphasized problem-solving abilities, self-monitoring, and study planning skills to use with their school curriculum. The aims were to promote self-directed learning, where students were introduced to three phases of problem solving: phase 1, What is my goal?; phase 2, What is my plan?; phase 3, What have I learned? Results indicated that children who participated in the intervention significantly increased their knowledge and skills in the curriculum area compared to children with ID who did not participate in the intervention. In addition, participants were able to develop relevant goals associated with mastering their school curriculum.

Children's self-concept also may be increased by performing well academically. In their review of effective academic interventions, Good, Simmons, and Smith (1998) stressed the importance of literacy skills in children. Because reading performance is the foundation on which other academic skills can be built (Stanovich, 1986), increasing reading skills in children with and without developmental disabilities is essential. Good and colleagues linked children's reading difficulties with behavioral problems and feelings of low self-concept. Findings revealed that the most effective reading interventions are evidence-based and include skill enhancement of phonological awareness, alphabetic knowledge, phonological recoding, and fluency. Effective reading instruction, in turn, created improved reading achievement outcomes and higher feelings of self-concept in participants.

Similar to individuals who are typically developing, discovering the most effective method of reading instruction for individuals with disabilities also is important. The relationship between phonological awareness and reading in individuals with Down syndrome (ages 6 to 17 years) was compared to reading level matched typically developing 4 to 6 year olds found and no differences were found in sight word or nonword identification (Snowling, Hulme, & Mercer, 2002). Differences were revealed between groups in phonological awareness, however, where letter-sound knowledge did not predict reading for children with Down syndrome but did for children who were developing typically. Snowling and colleagues posited that in contrast to the typical group, individuals with ID might rely less on phonological awareness and instead tend to read using the sight-word method due to low IQs and language difficulties.

Conversely, other studies have demonstrated that children with ID employ phonological skills for reading achievement and that children with developmental disabilities learn to read similarly to children who are typically developing and likewise may benefit from evidence-based phonics instruction (Gombert, 2002). Gombert (2002) evaluated eleven children (mean age = 13 years, 9 months) with Down syndrome (IQ 44-50) who were matched with eleven younger, typically developing children (mean age = 7 years) on reading ability. Both groups were administered reading and phonological tasks. Results indicated that although the children with Down syndrome exhibited lower metaphonological performance, phonological awareness and reading were significantly correlated in both groups.

Similarly, preliminary findings of ongoing research revealed that children with mild ID in a phonologically based reading intervention made significant reading gains over the course of a school year (Sevcik, Wise, & Morris, 2007). Forty-seven students (mean age = 9 years, 2 months) with developmental disabilities (mean verbal ability = 5 years, 6 months) were assessed on measures of phonological awareness and other language performance measures at the end of an academic yearlong reading intervention. Findings indicated that phonological awareness was significantly associated with measures of word and nonword identification, suggesting that, like typically developing children, children with ID may profit from phonics-based reading instruction.

Because both academic and behavior-oriented interventions indicate beneficial results for a variety of children, they may aid typically and atypically developing children in forming and maintaining a high self-concept by increasing academic abilities, teaching problem-solving skills, and changing children's outlook about their own potential. Thus, interventions may have the ability to directly enhance self-concept through interventions specifically aimed at encouraging children to feel good about themselves, but also through indirect means, by improving children's academic skills in areas such as reading. For these reasons, children who make improvements in their performance over the course of an intervention may have a measurable increase in domain specific self-concept areas (e.g., reading) and/or an increase in their general self-concept.

Self-concept methodology

Measuring self-concept in children with ID has been challenging and research with this population has revealed equivocal results. Some studies have revealed that children with ID have a lower self-concept (Heiman & Margalit, 2005), while others have indicated that their self-concept is the same or even higher (Glenn & Cunningham, 2001) than the self-concept of typically developing children. Dissimilar research findings may stem from a variety of reasons including the heterogeneous nature of the population because of cognitive differences in intellectual development and varying life experiences of participants, in addition to the challenges in measurement. Studies that use self-concept instruments that are suitable for this population, however, might find that children with mild developmental disabilities exhibit a self-concept that is comparable to those of typically developing children.

Finlay and Lyons (2001) conducted a comprehensive review of methodological issues that need to be considered when administering tests to individuals with ID. They contend that using questionnaires that have been created for typically developing populations often are not suitable because people with developmental disabilities may be unable to understand the questions and provide acceptable answers. They review particular matters to attend to during test administration including question content, phrasing, response format, and the psychometric properties of the measure. Question content must be worded at an appropriate developmental level to ensure that participants can understand the items. When phrasing questions, they should be asked in an affirmative form (e.g., “I cause trouble”) rather than phrased negatively (e.g., “I have no energy”), because the meaning of negatively phrased items is generally more difficult to comprehend. Another matter to be considered when testing individuals with ID is the response format of items, especially those that require generating language such as open-ended questions (e.g., “What did the person’s hair look like?”). Finlay and Lyons summarize other difficulties that people with ID may have with question content, including avoiding comparisons (instead, ask each question separately) and including abstract concepts (rather, use concrete situations). Finally, they recommend not assuming that the factor structure of questionnaires developed for typical populations will be the same as the factor structure found in atypical populations.

Proposed research

There is a dearth of knowledge about children with developmental disabilities because extensive research has yet to be conducted with this population due primarily to methodological issues (Zigler, Bennett-Gates, Hodapp, & Henrich, 2002). Understanding how children with ID feel about themselves in relation to their performance in a variety of academic or nonacademic settings, however, is important in assisting them to have a high quality of life. This study examines the relationships between self-concept, intelligence, and achievement in children with mild developmental disabilities. Participants were recruited in the context of a larger reading intervention, which evaluates the most effective method of reading instruction for elementary school children with intellectual disabilities. Children in the current self-concept study were assessed after they had participated in the reading intervention and associations between the achievement gains they had made over the course of the year were examined in conjunction with participants' self-concept. Relationships between self-concept and intelligence scores were also evaluated.

To understand these issues, the following research questions were examined. Research question 1: Do participants' WISC-III verbal or performance intelligence scores predict their self-concept? It is believed that participants' WISC intelligence scores will significantly predict SDQI-IA Academic and General self-concept. This is suggested to be the case because participants' WISC-III intelligence scores should exhibit a positive relationship with their academic abilities. Since academics may be a salient issue to children with developmental disabilities, WISC-III intelligence scores also may influence their General self-concept. Conversely, it is possible that children who evidence low WISC-III scores have low cognitive capabilities, which makes them unaware that their skills in some academic or social areas may be deficient.

Research question 2: Do gains in achievement and language scores predict self-concept? It is expected that gains in particpants' language scores would predict high self-concept scores. This is suggested because individuals with good expressive and receptive vocabularies should excel in academic and social areas more than those individuals with poor language skills. Additionally, it is expected that those who are making gains in achievement scores over the course of the intervention would have higher self-concept scores than participants who are making fewer achievement gains.

Research question 3: Does SDQI-IA Academic self-concept (i.e., Math, Reading, General-School) predict achievement gains or changes in language scores? It is believed that significant, positive relationships will be exhibited between Academic self-concept and gains in achievement. Relationships are expected since self-concept has been suggested to play a role in students' motivation to persevere at difficult tasks (Bryne, 1996).

Research question 4: Do participants' SDQI-IA Peer or Parent self-concept scores predict reading or math achievement gains or changes in language scores? It is expected that both Peer and Parent self-concepts will predict achievement gains. This is anticipated because the support that children think that they have from their parents and friends may motivate them to achieve.

Research question 5: What are the reliability estimates of the SDQI-IA and the Harter Pictorial Scale? It is expected that both self-concept scales will evidence adequate internal consistency estimates measured by Cronbach alpha coefficients.

Method

Participants

Data were collected in the context of a larger study that focused on developing effective reading interventions for children with mild intellectual disabilities. Participants were 46 children with mild developmental disabilities in Atlanta elementary schools from 2nd to 5th grade (approximately 7 to 12 years of age) that have evidenced difficulty learning to read and were referred by their classroom teachers. Children of any ethnicity with IQs ranging from 50-70 and poor reading skills were included in the study. Exclusionary criteria included English as a second language, hearing impairment, uncorrected visual impairment, and comorbid emotional problems. Teachers trained and employed by the research project delivered the interventions to the participants.

All participants were enrolled in a 120-hour phonologically based reading intervention or in a mathematics contrast group. Participants had been randomly assigned to one of two reading programs or to a contrast mathematics group. Both reading programs included the Phonological Analyses and Blending/Direct Instruction program (PHAB/DI; Englemann & Bruner, 1988). The PHAB/DI instruction program involves a focus on direct instruction on blending and segmenting words. The second instructional program includes both the PHAB/DI plus Retrieval-rate, Accuracy, Vocabulary Elaboration, and Orthography (RAVE-O; Wolf, Miller, & Donnelly, 2000). The RAVE-O instruction program focuses on the development of vocabulary and orthographic knowledge and the facilitation of word retrieval speed. The mathematics program utilizes Connecting Math Concepts (Englemann & Carnine, 1991), has a similar instructional format as the PHAB/DI reading programs, and is supplemented with additional instructional materials. A comprehensive battery of achievement and language measures were administered to children before they received instruction and was repeated again after 60 hours and 120 hours of instructional time.

Measures

Peabody Picture Vocabulary Test-III (*PPVT-III*; Dunn & Dunn, 1997). The PPVT-III is a standardized measure of receptive vocabulary and a screening test of verbal ability for those who speak English as a first language. Each easel page of the PPVT-III contains four numbered pictures and the child must select a drawing that matches a word spoken by the examiner. The depicted words are nouns, verbs, or adjectives. The test manual reports internal consistency coefficients that ranged from .67 to .88 (median = .80) for Form L and from .62 to .86 (median = .81) for Form M. Immediate re-test alternate form reliability coefficients range from .73 to .91 (median = .82) and delayed re-test alternate form reliability coefficient range from .52 to .90 (median =.78).

Expressive Vocabulary Test (EVT; Williams, 1997). The EVT is an individually administered, norm-referenced measure of expressive one word vocabulary and word retrieval. Each individual item is depicted on the easel page and children identify the item (ages 2-4) or give a synonym for the item (ages 5-adult). The pictures were nouns, verbs, or adjectives. The EVT reliability coefficients indicate internal consistency with split half reliability coefficients ranging from .83 to .97 with a median of .91.

Key Math Revised-A Diagnostic Inventory of Essential Mathematics (*Key Math*; Connolly, 1988). Key Math is a content-referenced mathematics test for grades kindergarten to 9. There is a Form A and Form B, each containing 258 test items. It is an individually administered and designed to assess understanding and application of basic mathematics skills in three primary areas, each containing various subscales: Basic concepts, (Numeration, Rational numbers, Geometry), Operations (addition, subtraction, Multiplication, Division, and Mental Computation), and Applications (Measurement, Time and Money, Estimation, Interpreting Data, and Problem Solving). Key Math alternate form reliability coefficients range from .63 to .75 and split-half reliability coefficients for grades 1 to 3 range from .52 to .89.

Weschler Intelligence Scale for Children-3rd edition (*WISC-III*; Wechsler, 1991). The WISC-III is a standardized measure of children's intelligence and provides subtest and composite scores of general intelligence and specific cognitive abilities. The verbal subtest is composed of four subscales including similarities, arithmetic, vocabulary, and comprehension. The performance (non-verbal) component of the WISC-III includes picture comprehension, coding, picture arrangement, block design, and object assembly. Four subtests were administered in this study including the vocabulary, arithmetic, coding, and block design tests. Internal reliability coefficients for the WISC-III subtests range from .79 to .90 (mean = .86) for participants 6 to 16 years of age.

Woodcock Reading Mastery Test (*WRMT*; Woodcock, 1987). The WRMT is a widely-used reading measure. Three subtests were administered in this study including measures of single word identification (Word Identification), non-word decoding (Word Attack), and passage comprehension (cloze task). The Word Identification subtest is a measure of single word decoding ability. The Word Attack subtest provides children with a nonsense word that they are to decode. The passage comprehension subtest involves providing an appropriate missing word in a sentence or phrase. Internal consistency reliability coefficients of the WRMT-R obtained by split-half reliability for first through third grade range from .91 to .98.

Self-Description Questionnaire I- Individual Administration (*SDQI-IA*; Marsh et al., 1991). The SDQI-IA is a multidimensional measure of self-concept factors in children aged 5 to 8 years. Items are presented to participants in the form of a positively-worded statement (e.g., “I like to read”). Children answer through a double binary response, (e.g., “yes” is followed by “yes sometimes” or “yes always” and no is followed by “no sometimes” or “no never”).The SDQI-IA is a 64 item instrument. It taps self-perceptions relative to four non-academic areas (physical ability, appearance, peer relations, parent relations), three academic areas (math, reading, general-school) and produces a total self-concept score (the average of the total academic and nonacademic scales). Internal reliability coefficients of the SDQI-IA range from .72 to .86 for each age group (kindergarten, first grade, second grade) and for the total sample except for the Parent Relationships (.69) and Physical Ability (.51) scales with the kindergarteners.

Pictorial Scale of Perceived Competence and Social Acceptance for Children (*Harter Pictorial Scale*; Harter & Pike, 1984). The Harter Pictorial Scale is a measure of perceived competence and social acceptance for children from preschool to second grade. In this study, the scale designed for first and second graders was used. Participants look at pictures that depict two children involved in an activity. The experimenter read a statement to the children about the picture and the child reported which picture the child is most like, the child who is good at the activity or the one who is not. After the child answered, the experimenter asked the child how much he or she is like the depicted child, a little (represented by a small circle) or a lot (represented by a big circle). Preschoolers ratings on the subscales range from low to acceptable internal consistency, with alphas ranging from .66 to .85. Internal consistency for the total scale was reported to be .89 with acceptable subscale inter-correlations ranging from .43 to .64.

Procedure

Several research assistants, trained to administer the measures, delivered the self-concept and intelligence scales to individual participants in one session. Children were presented with instructions on how to complete each measure before the items were given. Self-concept measures were administered before the intelligence tests. To avoid order effects, the administration order of the SDQI-IA and the Harter Pictorial Scale was randomly assigned. Following the self-concept measures, the WISC-III subscales were administered. The achievement measures were collected along with the data from the larger reading study at baseline and following the instructional intervention. Generally, these data were collected several days before the self-concept and intelligence data. All assessments were given during normal school hours and the total time for the self-concept and intelligence measures was approximately 60 minutes.

Data Analysis

In all analyses, the Harter Pictorial Scale was assessed in conjunction with the SDQI-IA to create comparative contrasts of the self-concept scales. In order to investigate whether intelligence scores predict self-concept, standard regression analyses were run. Verbal intelligence scores (vocabulary, arithmetic) or performance intelligence scores (coding A, block design) were simultaneously entered into a regression predicting the self-concept subscales. It was hypothesized that participants' intelligence scores would significantly predict SDQI-IA Academic, Nonacademic, and General self-concept.

To understand whether achievement or language scores predict self-concept, standard regression analyses were run to assess research question 2. Standard regression analyses employed the self-concept measures as the criterion variables. Predictors included reading, math, or language variables. It was expected that participants' language scores would significantly predict SDQI-IA Nonacademic, Academic, and General self-concept. Additionally, it was expected that achievement scores would predict Academic and General self-concept, but not Nonacademic self-concept.

After some consideration, it was decided to collapse the original research questions 3 and 4 into one general research question that analyzed whether self-concept scores could predict achievement and language scores. It was determined that this strategy would reduce the number of regression analyses run and still potentially reveal the relationships between the variables. Standard regression analyses were run using the self-concept subscales as the predictors and the criterion variables were either achievement or language change scores. It was expected that Academic, Nonacademic, and General self-concept scores would significantly predict achievement gains.

Reliability estimates of the self-concept scales were analyzed in the last research question. In addition, the inter- and intracorrelations of the self-concept subscales were analyzed. It was expected that the SDQI-IA and the Harter Pictorial Scale would exhibit adequate reliabilities. Moreover, the SDQI-IA was expected to have lower intracorrelations than the Harter Pictorial Scale.

Results

Descriptive Statistics

Prior to analysis, the data were inspected for accuracy of data entry and missing values. Several of the achievement and intelligence variables displayed a substantial positive skew. To adjust for this characteristic, these variables were corrected using a standard logarithmic transformation. Those not improved by a transformation were left in raw form. In addition, a reflected logarithmic transformation was employed for all self-concept variables which corrected for their negative skew. Because reflecting variables causes their regression coefficients to flip their signs, the effects of reflected variables that are displayed in the tables have been manually adjusted. Changes in achievement and language scores from baseline to end-of-year testing were computed with residualized change scores, where the scores from the second timepoint were regressed on scores from baseline. Missing values were deleted listwise and no outliers were identified. Four participants were not included in the analyses due to missing data; the final sample consisted of 42 participants. Variable means and standard deviations are shown in Table 1. Bivariate correlations between the self-concept variables and measured variables are displayed in Tables 2 and 3.

Table 1.

Variable means and standard deviations

Measured variable	Mean (SD)	Range	Measured variable	Mean (SD)	Range
Raw WISC Coding A Scale Scores	36.00 (15.58)	0-65	Residualized WRMT Word ID Scores	0 (6.82)	-12.23 – 17.68
Raw WISC Block Design Scale Scores	7.80 (7.64)	0 - 30	Residualized WRMT Word Attack Scores	0 (3.7)	-7.1 – 11.62
Raw WISC Arithmetic Scale Scores	5.36 (4.35)	0 - 16	Residualized WRMT Passage Comp Scores	0 (4.42)	-11.32 – 10.78
Raw WISC Vocabulary Scale Scores	7.52 (4.72)	0 - 19	Residualized KeyMath Numeration Scores	0 (1.67)	-4.42 – 5.05
SDQI-IA General Self-Concept Scale Scores	4.29 (.69)	2.25 - 5	Residualized KeyMath Geometry Scores	0 (2.44)	-5.66 – 5.03
SDQI-IA Academic Self-Scale Scores	4.28 (.67)	1.79 - 5	Residualized KeyMath Addition Scores	0 (2.23)	-4.03 – 5.72
SDQI-IA Nonacademic Self-Concept Scale Scores	4.27 (.60)	2.53 - 5	Residualized KeyMath Subtraction Scores	0 (1.5)	-3.69 – 4.06
Harter Pictorial Cognitive Self-Concept Scale Scores	3.56 (.49)	2.33 - 4	Residualized KeyMath Measurement Scores	0 (1.83)	-3.55 – 4.44
Harter Pictorial Physical Self-Concept Scale Scores	3.55 (.57)	2 - 4	Residualized KeyMath Time-Money Scores	0 (1.47)	-3.57 – 2.4
Harter Pictorial Peer Self-Concept Scale Scores	3.42 (.64)	1.67 - 4	Residualized PPVT Scores	0 (10.87)	-35.49 – 18.42
Harter Pictorial Maternal Self-Concept Scale Scores	3.28 (.64)	2 - 4	Residualized EVT Scores	.09 (8.02)	-13.17 – 27.11

Note: WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test), WISC (Weschler Intelligence Scale for Children – IV)

Table 2.

Bivariate correlations between SDQI-IA and measured variables; (“L” denotes transformed variables, “R” denotes variables in raw form)

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1. R -WISC coding	---																	
2. L- WISC block	.57**	---																
3. R -WISC arith	.51**	.46**	---															
4. R-WISC vocab	.33**	.20	.47**	---														
5. L-nonacad SC	.04	.18	.11	-.24	---													
6. L-academic SC	.04	.24	.17	-.11	.78**	---												
7. L-general SC	.03	.15	.10	-.17	.84**	.79**	---											
8. R-WRMT wd id	.34*	.13	.46**	.36*	-.01	.03	-.02	---										
9. L-WRMT wd at	.06	.29	.25	.33*	.06	.18	.22	.20	---									
10. L-WRMT ps cp	.25	.21	.37*	.51**	.14	.30*	.11	.29*	.32*	---								
11. L-KM num	.18	.09	.02	.09	.01	-.19	-.07	-.19	-.09	.13	---							
12. R-KM geo	.39*	.30	.25	.15	-.06	-.08	-.07	.10	.09	.32*	.29	---						
13. R-KM add	.35*	.36*	.40**	.54**	.11	.23	.07	.28	.27	.41**	.07	.38**	---					
14. L-KM sub	.18	.13	.18	.38*	-.12	.00	-.23	.00	.29	.34*	.19	.14	.26**	---				
15. L-KM measure	.16	.49**	.39**	.23	-.14	-.13	-.24	.06	.06	.06	-.04	.19	.22	.32*	---			
16. L-KM time-mon	.31*	.33*	.14	-.10	.17	.14	.07	-.02	.10	-.20	.26	-.04	.13	.31*	.28	---		
17. R-PPVT	.11	.28	.11	.25	.06	.13	.10	.13	.10	.36*	.12	.22	.33*	.15	.06	-.01	---	
18. R-EVT	.35*	.27	.29	.54**	-.23	-.23	-.05	.21	.24	.29	.07	.27	.24	.09	.05	-.23	.36*	---

*Note:*p < .05,**p < .01; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test)*

Table 3. Bivariate correlations between Harter Pictorial Scale and measured variables; (“L” denotes transformed variables, “R” denotes variables in raw form)

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
1. R-WISC vocab	---																		
2. L-WISC block	.57**	---																	
3. R-WISC arith	.51**	.46**	---																
4. R-WISC vocab	.33**	.20	.47**	---															
5. L-Har Cognitive	.20	.09	.24	-.10	---														
6. L-Har Physical	.27	.11	.06	-.30*	.54**	---													
7. L-Harter Peer	.09	-.07	.10	.00	.62**	.44**	---												
8. L-Har Maternal	.20	.06	.09	-.16	.54**	.64**	.51**	---											
9. R-WRMT wid	.34*	.13	.46**	.36*	.07	.01	-.01	.19	---										
10. L-WRMT watk	.06	.29	.25	.33*	.39**	.14	.28	.33*	.06	---									
11. L-WRMT p-cp	.25	.21	.37*	.51**	.02	.00	.26	.10	.32*	.25	---								
12. L-KM num	.18	.09	.02	.09	-.11	.07	.11	-.06	-.09	.13	.18	---							
13. R-KM geo	.39*	.30	.25	.15	.31*	.28	.36*	.14	.09	.32*	.29	.39*	---						
14. R-KM addition	.35*	.36*	.40**	.54**	.24	-.07	.33*	.05	.27	.41**	.07	.38**	.35*	---					
15. L-KM sub	.18	.13	.18	.38*	.10	-.12	.09	.05	.29	.34*	.19	.14	.26**	.18	---				
16.L-KM meas	.16	.49**	.39**	.23	.10	-.18	-.28	-.22	.06	.06	-.04	.19	.22	.32*	.16	---			
17. L-KM tm	.31*	.33*	.14	-.10	.29*	.17	.03	.05	.10	-.20	.26	-.04	.13	.31*	.28	.31*	---		
18. R-PPVT	.11	.28	.11	.25	.11	.11	.12	.19	.10	.36*	.12	.22	.33*	.15	.06	-.01	.11	---	
19. R-EVT	.35*	.27	.29	.54**	-.02	-.02	.04	.00	.24	.29	.07	.27	.24	.09	.05	-.23	.36*	.35*	---

*Note: *p < .05, **p < .01; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test)*

Standard multiple regression analyses

To determine the relationships between the self-concept scores, intelligence scores, and achievement or language change scores, standard multiple regression analyses were run. Using WISC-III intelligence scales as the predictor variables and SDQI-IA and Harter Pictorial subscales as the criterion variables, research question 1 was investigated. Verbal intelligence scores (vocabulary, arithmetic) or performance intelligence scores (coding A, block design) were simultaneously entered into a regression predicting the self-concept subscales. An "L" indicates the independent variables that have been logarithmically transformed and an "R" denotes those in raw form. Table 4 displays the regressions for the SDQI-IA, which used the Nonacademic, Academic, or General self-concept subscales as the dependent variables. The findings indicated that vocabulary intelligence scores significantly predicted Nonacademic self-concept ($\beta = -.37$, $p = .03$). Table 5 contains the analyses that employed the Harter Pictorial subscales as the dependent variables. Arithmetic intelligence scores were a significant predictor of Cognitive self-concept ($\beta = .36$, $p = .04$), while vocabulary scores were predictive of the Physical subscale ($\beta = -.42$, $p = .02$).

Table 4.

Standard regression analyses with WISC-III subscale scores predicting SDQI-IA self-concept

Predictor	Dependent Variable	B	SE B	β	t	sr^2
R-WISC vocabulary	*Log Nonacademic Self-concept*	**-.01**	**.01**	**-.37***	**-2.25**	**.11**
R-WISC arithmetic		.01	.01	.28	1.69	.06
R-WISC coding A		.00	.00	-.11	-.56	.01
L-WISC block design		.08	.06	.26	1.35	.04
R-WISC vocabulary	*Log Academic Self-concept*	-.01	.01	-.24	-1.40	.04
R-WISC arithmetic		.01	.01	.28	1.64	.06
R-WISC coding A		.00	.00	-.16	-.85	.02
L-WISC block design		.11	.06	.34	1.82	.08
R-WISC vocabulary	*Log General Self-concept*	-.01	.01	-.28	-1.67	.06
R-WISC arithmetic		.01	.01	.24	1.38	.04
R-WISC coding A		.00	.00	-.17	-.91	.02
L-WISC block design		.09	.07	.25	1.33	.04

Note. *$p < .05$; *"R" denotes variables in raw form, "L" denotes transformed variables*

Table 5.

Standard regression analyses with WISC-III subscale scores predicting Harter Pictorial Scale

Predictor	Dependent Variable	B	SE B	β	t	sr^2
R-WISC vocabulary	*Log Harter Cognitive*	-.01	.01	-.26	-1.58	.05
R-WISC arithmetic		**.01**	**.01**	**.36***	**2.16**	**.10**
R-WISC coding A		.00	.00	.22	1.15	.03
L-WISC block design		-.01	.06	-.04	-.18	.00
R-WISC vocabulary	*Log Harter Physical*	**-.01**	**.01**	**-.42***	**-2.55**	**.14**
R-WISC arithmetic		.01	.01	.26	1.57	.05
R-WISC coding A		.00	.00	.31	1.63	.06
L-WISC block design		-.02	.06	-.06	-.33	.00
R-WISC vocabulary	*Log Harter Peer*	.00	.01	-.07	-.38	.00
R-WISC arithmetic		.01	.01	.14	.77	.01
R-WISC coding A		.00	.00	.19	1.01	.03
L-WISC block design		-.06	.01	-.18	-.94	.02
R-WISC vocabulary	*Log Harter Maternal*	-.01	.01	-.26	-1.50	.05
R-WISC arithmetic		.01	.01	.21	1.22	.03
R-WISC coding A		.00	.00	.24	1.23	.04
L-WISC block design		-.02	.07	-.07	-.37	.00

Note. *$p < .05$; "R" denotes variables in raw form, "L" denotes transformed variables

Achievement (reading, math) or language (expressive vocabulary, receptive vocabulary) change scores were employed to predict self-concept scores in research question 2. Tables 6 and 7 display the regression analyses that used the SDQI-IA and the Harter Pictorial Scale as the dependent variables. Standard multiple regressions utilizing residualized change scores for the reading measures (Word Identification, Word Attack, Passage Comprehension), language measures (EVT, PPVT), or math measures (Numeration, Geometry, Addition, Subtraction) were used as the independent variables. KeyMath Subtraction was a statistically significant predictor of SDQI-IA General self-concept ($\beta = -.39$, $p = .03$).

Several statistically significant relationships were revealed between the Harter Pictorial Scale and achievement gains. Word Attack scores were a significant predictor of Cognitive self-concept ($\beta = .44$, $p = .01$) and Maternal self-concept ($\beta = .32$, $p = .04$). Additionally, KeyMath Geometry scores significantly predicted Cognitive self-concept ($\beta = .37$, $p = .02$) as well as Peer self-concept ($\beta = .36$, $p = .02$). Peer self-concept was also significantly predicted by KeyMath Addition scores ($\beta = .41$, $p = .02$).

Table 6.

Standard regression analyses with achievement scores predicting SDQI-IA self-concept

Predictor	Dependent Variable	B	SE B	β	t	sr^2
R-WRMT word id	Log Nonacademic Self-concept	.00	.00	-.05	-.32	.00
L-WRMT wd attack		.01	.07	.03	.15	.00
R-EVT		-.01	.00	-.29	-1.84	.07
R-PPVT		.00	.00	.17	1.06	.03
L-KM numeration		.04	.20	.03	.18	.00
R-KM geometry		.00	.01	-.07	-.44	.00
R-KM addition		.02	.01	.26	1.44	.04
L-KM subtraction		-.18	.12	-.27	-1.49	.05
R-WRMT word id	Log Academic Self-concept	.00	.00	-.08	-.49	.00
L-WRMT wd attack		.05	.07	.10	.63	.01
R-EVT		-.01	.00	-.30	-1.93	.07
R-PPVT		.00	.00	.21	1.30	.04
L-KM numeration		-.25	.21	-.19	-1.18	.03
R-KM geometry		.00	.01	-.03	-.20	.00
R-KM addition		.02	.01	.33	1.88	.08
L-KM subtraction		-.13	.13	-.18	-1.03	.02
R-WRMTword id	Log General Self-concept	.00	.00	-.08	-.51	.01
L-WRMT wd attack		.10	.08	.21	1.32	.04
R-EVT		.00	.00	-.09	-.52	.01
R-PPVT		.00	.00	.09	.56	.01
L-KM numeration		-.07	.22	-.05	-.32	.00
R-KM geometry		.00	.01	-.05	-.32	.00
R-KM addition		.02	.01	.29	1.65	.06
L-KM subtraction		**-.29**	**.13**	**-.39***	**-2.22**	.10

*Note: * $p < .05$; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables*

Table 7.

Standard regression analyses with achievement scores predicting Harter self-concept

Predictor	Dependent Variable	B	SE B	β	t	sr^2
R-WRMT word id	Log Harter Cognitive	.00	.00	.03	.21	.00
L-WRMT wdattack		**.18**	**.06**	**.44****	**2.97**	.18
L-WRMT p comp		-.10	.09	-.17	-1.14	.03
R-EVT		.00	.00	-.06	-.37	.00
R-PPVT		.00	.00	.11	.64	.01
L-KM numeration		-.26	.17	-.22	-1.48	.04
R-KM geometry		**.02**	**.01**	**.37***	**2.52**	.13
R-KM addition		.02	.01	.27	1.50	.05
L-KM subtraction		-.03	.11	-.05	-.30	.00
R-WRMT word id	Log Harter Physical	.00	.00	-.01	-.09	.00
L-WRMT wdattack		.07	.07	.15	.96	.02
L-WRMT p comp		-.03	.11	-.04	-.25	.00
R-EVT		.00	.00	-.06	-.35	.00
R-PPVT		.00	.00	.11	.65	.01
L-KM numeration		-.01	.20	-.01	-.06	.00
R-KM geometry		.02	.01	.29	1.87	.07
R-KM addition		.00	.01	-.01	-.07	.00
L-KM subtraction		-.08	.13	-.11	-.59	.01

*Note: *p < .05; **p< .01; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables*

Table 7.

cont.

Predictor	Dependent Variable	B	SE B	β	t	sr^2
R-WRMTword id		.00	.00	-.12	-.75	.01
L-WRMT wd attack		.11	.08	.23	1.52	.05
L-WRMT pass comp		.15	.11	.21	1.36	.04
R-EVT		.00	.00	.00	.02	.00
R-PPVT	**Log Harter Peer**	.00	.00	.09	.56	.01
L-KM numeration		.02	.21	.01	.08	.00
R-KM geometry		**.02**	**.01**	**.36***	**2.43**	.12
R-KM addition		**.03**	**.01**	**.41***	**2.40**	.12
L-KM subtraction		-.11	.13	-.15	-.85	.01
R-WRMTword id		.00	.00	.14	.90	.02
L-WRMT wd attack		**.16**	**.08**	**.32***	**2.09**	.09
L-WRMT pass comp		-.03	.11	-.05	-.29	.00
R-EVT		.00	.00	-.06	-.39	.00
R-PPVT	**Log Harter Maternal**	.00	.00	.18	1.08	.03
L-KM numeration		.15	.22	-.11	-.69	.01
R-KM geometry		.01	.01	.17	1.11	.03
R-KM addition		.00	.01	.04	.20	.00
L-KM subtraction		.02	.14	.03	.14	.00

*Note: *p < .05; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables*

To determine whether self-concept predicted achievement (research question 3), subscales from either the SDQI-IA (Nonacademic, Academic) or Harter Pictorial Scale (Cognitive, Physical or Peer, Maternal) served as the predictors and the criterion variables were either achievement or language change scores. Tables 8 and 9 display the regression analyses. SDQI-IA Academic Self-concept was a statistically significant predictor of Passage Comprehension scores ($\beta = .50$, $p = .03$) and KeyMath Numeration ($\beta = -.50$, $p = .03$).

As presented in Table 9, Harter Cognitive self-concept significantly predicted Word Attack scores ($\beta = .45$, $p = .01$) and KeyMath Addition scores ($\beta = .39$, $p = .03$). Furthermore, Peer self-concept significantly predicted both KeyMath Geometry scores ($\beta = .39$, $p = .02$) and KeyMath Addition scores ($\beta = .41$, $p = .02$).

Table 8.
Standard regression analyses with SDQI-IA predicting achievement

Dependent Variable	Predictor	B	SE B	β	t	sr^2
R- WRMT Word ID	L-Nonac SC	-3.44	11.38	-.07	-.30	.00
	L-Acad SC	3.89	10.84	.09	.36	.00
L-WRMT Word attack	L-Nonac SC	-.45	.54	-.20	-.83	.01
	L-Acad SC	.71	.51	.33	1.39	.04
L-WRMT Passage comp	L-Nonac SC	-.40	.36	-.25	-1.12	.03
	L-Acad SC	**.75**	**.34**	**.50***	**2.20**	.10
L-KM numeration	L-Nonac SC	.32	.18	.40	1.75	.06
	L-Acad SC	**-.38**	**.17**	**-.50***	**-2.20**	.10
R-KM geometry	L-Nonac SC	.15	4.07	.01	.04	.00
	L-Acad SC	-1.45	3.87	-.09	-.37	.00
R-KM addition	L-Nonac SC	-2.71	3.59	-.18	-.75	.01
	L-Acad SC	5.38	3.42	.37	1.57	.05
L-KM subtraction	L-Nonac SC	-.47	.35	-.31	-1.31	.04
	L-Acad SC	.35	.34	.25	1.03	.02
R-EVT	L-Nonac SC	-7.05	13.56	-.13	-.52	.01
	L-Acad SC	-6.83	13.14	-.13	-.52	.01
R-PPVT	L-Nonac SC	-8.46	-17.96	-.11	-.47	.00
	L-Acad SC	15.59	17.10	.22	.91	.02

*Note: *p < .05; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables*

Table 9.
Standard regression analyses with Harter self-concept predicting achievement scores

Dependent Variable	Predictor	**B**	**SE B**	**β**	**t**	**sr^2**
R-WRMT Word ID	L-Har Cog	4.90	9.14	.10	.54	.01
	L-Har Phys	-2.19	8.29	-.05	-.26	.00
	L-Har Peer	-5.85	7.37	-.14	-.79	.01
	L-Har Mat	10.92	7.28	.26	1.50	.05
L-WRMT Word attack	L-Har Cog	**1.11**	**.41**	**.45****	**2.72**	.14
	L-Har Phys	-.24	.37	-.11	-.66	.01
	L-Har Peer	.31	.34	.15	.88	.02
	L-Har Mat	.53	.34	.26	1.56	.05
L-WRMT Passage comp	L-Har Cog	-.06	.31	-.04	-.19	.00
	L-Har Phys	.03	.28	.02	.12	.00
	L-Har Peer	.40	.24	.28	1.63	.06
	L-Har Mat	-.06	.24	-.05	-.26	.00
L-KM numeration	L-Har Cog	-.18	.15	-.21	-1.20	.03
	L-Har Phys	.14	.14	.19	1.05	.03
	L-Har Peer	.14	.13	.20	1.12	.03
	L-Har Mat	-.11	.12	-.16	-.91	.02
R-KM geometry	L-Har Cog	4.01	3.09	.22	1.30	.04
	L-Har Phys	2.66	2.80	.16	.95	.02
	L-Har Peer	**5.99**	**2.52**	**.39***	**2.38**	.12
	L-Har Mat	-.88	2.49	.06	-.35	.00
R-KM addition	L-Har Cog	**6.48**	**2.82**	**.39***	**2.30**	.11
	L-Har Phys	-4.26	2.55	-.29	-1.67	.06
	L-Har Peer	**5.75**	**2.30**	**.41***	**2.50**	.13
	L-Har Mat	-2.23	2.27	-.16	-.98	.02
L-KM subtraction	L-Har Cog	.36	.28	.22	1.27	.04
	L-Har Phys	-.34	.26	-.24	-1.34	.04
	L-Har Peer	.11	.24	.08	.47	.00
	L-Har Mat	.00	.24	.00	.02	.00

*Note: *p < .05, **p < .01; WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables*

Table 9.
continued

Dependent Variable	**Predictor**	**B**	**SE B**	**β**	**t**	**sr^2**
R-EVT	L-Har Cog	-1.09	10.83	-.02	-.10	.00
	L-Har Phys	-.56	9.80	-.01	-.06	.00
	L-Har Peer	2.39	8.90	.05	.27	.00
	L-Har Mat	-1.22	8.85	-.02	-.14	.00
R-PPVT	L-Har Cog	5.84	14.50	.07	.40	.00
	L-Har Phys	5.21	13.14	.07	.40	.00
	L-Har Peer	2.46	11.82	.04	.21	.00
	L-Har Mat	11.25	11.69	.17	.96	.02

Note: WRMT (Woodcock Reading Mastery Test), KM (KeyMath), EVT (Expressive Vocabulary Test), PPVT (Peabody Picture Vocabulary Test); "R" denotes variables in raw form, "L" denotes transformed variables

SDQI-IA and Harter Pictorial Scales internal consistency reliabilities were measured in research question 4. In addition, inter- and intracorrelations were examined for both self-concept scales. The correlations are exhibited in Table 11. Subscale reliabilities, presented in Table 10, were assessed by computing Cronbach alphas for both measures. Both measures demonstrated adequate reliabilities, with estimates ranging from .59 to .95 in the SDQI-IA and ranging from .67 to .81 for the Harter Pictorial Scale.

Table 10.
Internal consistency reliabilities (α) of the self-concept subscales

Self-Description Questionnaire – IA (64 items)		Harter Pictorial Scale (24 items)	
Nonacademic	.90	Competence	.78
Peer	.80		
Parent	.59	Cognitive	.67
Appearance	.81		
Physical	.70	Physical	.71
Academic	.91		
Reading	.84	Acceptance	.81
Math	.81		
General School	.71	Peer	.76
General	.72		
Total	.95	Maternal	.69

Table 11.

Inter- and intracorrelations of the SDQI-IA and Harter Pictorial Scale

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. L-Total SC	---														
2. L- Nonacademic SC	.96**	---													
3. L-Academic SC	.92**	.78**	---												
4. L-General SC	.90**	.84**	.79**	---											
5. L-Physical SC	.78**	.85**	.60**	.65**	---										
6. L-Appearance SC	.82**	.85**	.66**	.77**	.68**	---									
7. L-Peer SC	.87**	.88**	.71**	.82**	.59**	.70**	---								
8. L-Parent SC	.83**	.83**	.75**	.64**	.60**	.62**	.68**	---							
9. L-Reading SC	.79**	.65**	.85**	.75**	.47**	.53**	.61**	.65**	---						
10. L-Math SC	.80**	.68**	.88**	.64**	.60**	.62**	.57**	.66**	.57**	---					
11. L-Gen School SC	.82**	.67**	.93**	.67**	.47**	.52**	.65**	.67**	.73**	.76**	---				
12. L-Har Cognitive SC	.30*	.30*	.26	.33*	.21	.23	.40**	.14	.30**	.17	.20	---			
13. L-Har Physical SC	.15	.17	.09	.20	.22	.03	.24	.02	.12	.04	.05	.54**	---		
14. L-Har Peer SC	.46**	.44**	.39**	.57**	.28	.44**	.52**	.25	.51**	.22	.29	.62**	.44**	---	
15. L-Har Maternal SC	.20	.16	.23	.21	.15	.07	.20	.12	.35*	.09	.18	.54**	.64**	.51**	---

*Note: *p < .05, **p < .01; "L" denotes transformed variables*

Discussion

The purpose of this study was to investigate the relationship between self-concept, intelligence scores, and rates of change in achievement in a population of elementary school students with mild intellectual disabilities. Participants had been identified as poor readers and were involved in a reading or math intervention over the course of the school year. In addition to the achievement and intelligence measures, two self-concept scales previously used with children with disabilities, the SDQI-IA and the Harter Pictorial Scale, were employed.

Conceptually, the self-concept scales contain many items that attempt to elicit similar information concerning the way in which individuals feel about their capabilities in different areas. For example, an SDQI-IA math item states, “I am good at math”, while a similar item from the Harter Pictorial Scale states, “This boy is good at math and this boy is not very good at math. Which is most like you?”. Despite that these items theoretically mean the same thing, the self-concept scales did not always evidence similar significant relationships among the measured variables. While it is unclear exactly why these distinctions occurred, there may be several potential explanations for these findings. They may include that asking the questions in different formats elicit distinct responses from the children or that the children understood one self-concept scale format better than the other one. Although the explanation for these findings is not obvious, comparative analyses of the results using both self-concept measures are discussed here.

Research question 1: Does intelligence predict self-concept?

Research question 1 was investigated using WISC-III intelligence subscales as the predictor variables and SDQI-IA and Harter Pictorial subscales as the criterion variables.

It was of particular interest to analyze the relationships between verbal (i.e., vocabulary, arithmetic) and nonverbal (i.e., coding, block design) intelligence scores and both self-concept scales.

Participants' intelligence scores predicted neither academic nor general self-concept of the SDQI-IA. For the SDQI-IA, only WISC-III vocabulary scores significantly predicted nonacademic self-concept. Vocabulary scores indicated a statistically significant negative relationship, suggesting that children with lower vocabulary scores tended to have a higher nonacademic self-concept. Comparable findings were found with the physical self-concept scale of the Harter Pictorial Scale. Vocabulary intelligence scores significantly predicted physical self-concept and exhibited the same pattern, where vocabulary scores had a negative relationship with physical self-concept.

Findings such as these may suggest that children with lower cognitive capabilities find that because they do not excel in academic areas, they focus their energy in areas outside of school such as in their physical abilities or socializing with their peers. Similar patterns are evidenced in typically developing children. Research has indicated that children struggling in school may become especially skilled in nonacademic settings to compensate for what they lack in academic areas (Wiest, Wong, & Kriel, 1998).

Another explanation for these findings may be that children with higher cognitive skills have lower nonacademic self-concept. Nonacademic self-concept has a strong social component, since it encompasses areas such as peer relations or perceptions of appearance. Children who do not have strong expressive vocabulary skills, then, may struggle in nonacademic areas because they do not have the abilities to interact successfully with others. Participants with higher cognition may be more aware of their disabilities, especially in social settings. For this reason, they rate their self-concept in nonacademic areas, such as physical skills or quality of friendships, lower.

Additionally, arithmetic intelligence scores significantly predicted cognitive self-concept. Arithmetic scores, however, revealed a significant positive relationship with cognitive self-concept. This indicates that participants with higher arithmetic intelligence scores rated their cognitive abilities higher than those with lower arithmetic scores.

Findings such as these may be indicative of the characteristics that the arithmetic task shares with children's school-based learning. When considering typical curricula, math lessons may be taught in a more explicit manner in comparison to vocabulary, which children may learn primarily through tangential means. In other words, children learn and practice math skills daily and these skills may help participants excel at the arithmetic intelligence task. It may be that, relative to their peers with disabilities, children with high scores on the arithmetic task are also high achievers in their classes. For this reason, they may have a high cognitive self-concept.

In sum, it appears that intelligence evidenced some relationships with self-concept. Largely, these effects were influenced by the relationships that were revealed between the self-concept measures and verbal intelligence scores. This may be because self-concept is, in part, developed through social contact, which is often facilitated by verbal interactions. Performance intelligence scores, on the other hand, pertain primarily to participants' visual and spatial skills. Possibly, this might indicate why verbal intelligence scores were associated with self-concept, while no significant relations were revealed with performance intelligence scores.

Research question 2: Do gains in achievement or language scores predict self-concept?

Achievement (reading, math) or language (expressive vocabulary, receptive vocabulary) change scores were employed to predict self-concept scores in research question 2. Gains in achievement would be expected to increase self-concept in academic areas if children are aware of their progress. Word Attack nonword reading scores were significant predictors of both Harter cognitive self-concept and Harter maternal self-concept. In both regressions, reading scores had a positive relationship with the self-concept variables, indicating that participants who made gains in their reading scores over the course of the intervention had high self-concept ratings.

While reading gains would be expected to have a positive relationship with cognitive self-concept, they would not be expected to relate to maternal self-concept. There are several potential explanations for these findings. One possible explanation may relate to Silon and Harter's (1985) contention that typical children cannot distinguish between various self-concept areas until approximately 8 years of age. Children with lower cognitive capabilities may not be expected to differentiate among self-concept domains until a couple of years later since they are expected to follow a similar but delayed pattern (Glenn & Cunningham, 2001; Zigler & Hodapp, 1986). Participants in this study may not yet have reached the cognitive maturity to distinguish between self-concept domains. The high intracorrelations in both the SDQI-IA and the Harter Pictorial Scale suggest that this may be a possible explanation.

Alternatively, achievement gains may have predicted maternal self-concept because others have noticed the children's progress. It is possible that participants' parents have been encouraging them because they have observed their recent reading successes. Their reading improvements, in fact, may have made participants feel better socially because they are receiving accolades from others.

Mathematics scores also predicted variance in self-concept scores, but these effects varied. In both Harter cognitive self-concept and Harter peer self-concept, gains in geometry scores were associated with higher ratings of self-concept. Also, addition gains were related to higher peer self-concept, but subtraction gains were predictive of lower general self-concept. That subtraction gains and general self-concept had a negative association was surprising.

This unexpected finding could be linked to the contention that the interpretation of a general self-concept is more challenging to children than understanding the other components of self-concept (Silon & Harter, 1985; Tracey & Marsh, 2002). That is, knowing oneself in a general way entails considerable cognitive maturation. Marsh and colleagues (2001) argued that weighing one's skills and deficits in a multiplicity of spheres and generating a general feeling of oneself is a difficult task and current mood often is used as a heuristic. Thus, the discrepancy in the results may be an artifact of children's inability to understand the general self-concept notion.

To summarize, the findings suggest that achievement gains can predict self-concept. Specifically, nonword reading gains revealed a consistent relationship with higher ratings of self-concept. All but one significant relationship between math scores and self-concept indicated that math gains also predicted higher self-concept. Language scores, on the other hand, failed to reveal any significant self-concept associations.

Research question 3: Does self-concept predict gains in achievement or language scores?

To determine whether self-concept predicted achievement, research question 3 was investigated. Subscales from either the SDQI-IA (nonacademic, academic) or Harter Pictorial Scale (cognitive, physical or peer, maternal) served as the predictors and the criterion variables were either achievement or language change scores. SDQI-IA academic self-concept significantly predicted a positive relationship with reading scores and a negative relationship with math scores.

This finding suggests that reading and math gains might have had a differential impact on academic self-concept. Perhaps participants who were making gains in their reading scores felt that they were improving in all areas of academics, while those who were making progress in math scores did not experience the same overall feeling of academic improvement. This finding may result from the ubiquitous nature of reading skills, where it seems to affect many academic and life areas, while math skills probably do not impact as many areas to the same degree.

In addition, high self-concept scores on the Harter subscales predicted achievement gains. In particular, cognitive self-concept showed a strong, positive relationship with nonword reading gains. This finding indicates that increased ratings of self-concept predicted gains in participants' decoding skills. Additionally, cognitive self-concept predicted addition gains and Harter peer self-concept predicted geometry and addition gains. In all of these regressions, a positive relationship was revealed between self-concept and achievement gains.

Taken together, the findings suggest that higher self-concept scores can predict gains in achievement measures. Theoretically, self-concept would be expected to be associated with achievement. It is believed to predict other outcomes such as behavior, motivation, and development of new skills (Harter & Pike, 1984). In addition, self-concept is thought to act as a mediating variable that facilitates other important outcomes such as academic functioning and social competence (Byrne, 1996).

Research question 4: What are the reliability estimates of the SDQI-IA and Harter Pictorial Scale?

The last research question measured the reliability estimates and the intercorrelations of the SDQI-IA and the Harter Pictorial Scale. Alpha coefficients indicated that the SDQI-IA had an adequate internal consistency, with alpha coefficients for the subscales ranging from .59 to .84. Subscale reliabilities for The Harter Pictorial Scale ranged from .67 to .76, indicating good internal consistencies. In both the Harter Pictorial Scale and SDQI-IA, combining the subscales into their designated factors considerably increased the reliability estimates.

Intracorrelations within the two scales were high, indicating that participants were not able to differentiate completely between multiple self-concept areas. This suggests that participants' feelings about themselves in one self-concept area were highly associated with how they felt about their skills in other areas. As expected, the subscales that comprise nonacademic self-concept were more highly correlated with each other than with the academic subscales. In typically developing populations, correlations between academic and nonacademic scales are expected to approach zero around age 10 (Tracey & Marsh, 2002). On average, though, these correlations were lower between the

Harter Pictorial subscales than SDQI-IA subscales. This may indicate that the format of the Harter Pictorial Scale allows participants to distinguish their abilities in different areas better than the SDQI-IA does. Intercorrelations between the scales were moderate, with the exception of the Harter peer self-concept which evidenced correlations with the SDQI-IA as high as r = .57 with general self-concept. The moderate intercorrelations suggested a modest cross validation between the self-concept scales.

Marsh and colleagues (1991) argue that, in regards to the addition of picture plates in the Harter Pictorial Scale, the need to process parallel stimuli (e.g., visual and auditory) complicates the task of understanding the items. In addition, they criticize the brevity of the Harter Scale. The results of this study did not appear to reflect these criticisms. The Harter Scale's picture plates appeared to engage the participants, concretely depict the items, and eliminate participants' need to comprehend the examiner verbally. Furthermore, the administrative length of the Harter Scale may have been more appropriate for this population. Because the SDQI-IA requires approximately thirty minutes to administer and many of the items are redundant, the participants often lost focus and became bored during the task. Frequently participants would make statements such as, "You've already asked me that!" or "I've told you the answer already!" Additionally, the Harter Pictorial Scale exhibited more relationships and significant findings with intelligence and achievement variables in this research. Moreover, the lower intracorrelations of the Harter Scale suggest that the format of this self-concept measure may permit participants to distinguish better between self-concept areas. For these reasons, it seemed that the Harter Pictorial Scale might have been a more suitable tool to assess self-concept in this sample.

There were several limitations in this study. First, the modest sample size may have reduced the power to find significant findings. Some predictors approached significance and exhibited moderate effect sizes, but did not cross the threshold of significance. A larger sample, therefore, might have increased the chances for some predictors to reach statistical significance. Additionally, the sample size constrained the analyses that could be performed. Because participants were each involved in one of three interventions, it would be interesting to examine potential differences in the relationships among the variables between the intervention groups.

The small sample size also necessitated participants to be collapsed over chronological age and grade level. While the predictive relationship between self-concept and achievement has been suggested to change throughout the elementary years (Chapman & Tunmer, 1997), no clear differences emerged in these analyses. These distinctions may have been masked because the participants' scores could not be assessed separately by age or grade. Distinguishing between these age groups may shed light on the developmental nature of self-concept in elementary school children with disabilities.

The relationships that achievement, intelligence, and self-concept have with age and gender could be other potentially interesting relationships to investigate. For example, research has suggested that adults with mild intellectual disabilities have a markedly lower self-concept than typically developing adults or adults with more severe disabilities (Harter, 1990). Understanding when and how this decline in self-concept occurs could be informative to researchers and educators interested in creating behavioral interventions.

In conclusion, the findings revealed relationships between self-concept and intelligence or achievement scores. In particular, verbal intelligence scores revealed significant relationships with self-concept, where performance intelligence scores did not. Additionally, gains in achievement were significantly related to higher scores of self-concept. Specifically, nonword reading gains evidenced the most consistent associations with participants' high self-concept ratings. Both self-concept measures exhibited adequate internal consistencies, but the relatively high subscale intracorrelations may indicate that the measures did not incorporate a format that permitted participants to differentiate entirely between distinct aspects of their lives. Nevertheless, as a whole, this study indicates that children with mild intellectual disabilities exhibit positive relationships between their academic progress and the way that they feel about themselves.

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APPENDIX A

SELF DESCRIPTION QUESTIONNAIRE I-INDIVIDUAL ADMINISTRATION

INSTRUCTIONS TO CHILDREN:

This is a chance to help me find out how you feel. It is not a test. **There are no right or wrong answers** and everyone will have different answers. I will ask you a question and then ask you to tell me how you feel by stating yes or no. Be sure your answers show how you feel about yourself. I will not show your answers to anyone.

Some sentences you may not understand. If you do not understand a sentence or a word in a sentence say you don't know what that means.

Before we start let's try a few examples. I will read you a sentence and you will tell me how you feel by saying yes or no. I will also tell you how a friend called James answered each of these examples.

EXAMPLES:

1. In general, I am neat and tidy.

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.(yes sometimes or yes always? / no sometimes or no always?)
(James answered yes sometimes as he is at most times very neat and tidy but not always).

2. I like to paint.

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.
(James answered no sometimes as most times he does not like to paint but not always).

3. I like to watch TV

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.
(James answered no sometimes as most of the time he does not like to watch TV).

4. I am good at drawing

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.
(James answered yes always to this question as he thinks he is really good at drawing).

5. I like to go shopping

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.
(James answered yes sometimes as sometimes he likes to go shopping but not always).

6. Drawing is easy for me

Ask the child if he/she understands the sentence. Repeat the sentence. Ask the child to say yes or no. Probe the child's response.
(James answered no always as drawing is really hard for James to do well)

1	2	3	4	5
No Always	No Sometimes	Child does not have answer	Yes Sometimes	Yes Always

1. I can run fast
2. I am good looking ('nice looking')
3. I have lots of friends
4. My parents understand me ('know me')
5. Work with numbers is easy for me ('counting and maths')
6. I do well in reading
7. I am good at school work
8. I do lots of important things ('special')
9. I like to run and play hard
10. I like the way I look
11. I make friends easily
12. I like my parents
13. I look forward to working with numbers ('get excited about')
14. I like reading
15. I enjoy doing school work
16. I like being the way I am
17. I enjoy sports and games
18. I have a nice looking face
19. I get along with other kids easily
20. My parents like me
21. I am good at reading
22. I do well on work with numbers ('counting and maths')

23. I do well at school
24. I have lots of things to be proud of (‘feel good about’)
25. I have good muscles
26. I am a nice looking person
27. I am easy to like
28. If I have kids I would bring them up the same way my parents raised me (‘If I have kids I would treat them the same way my parents treat me’)
29. I am interested in reading
30. I am interested in work with numbers (‘counting and maths’)
31. I learn things quickly in all school work
32. I can do things as well as most people

*** STOP AND ASK THE CHILD
TO STRETCH

33. I am good at sports
34. Other kids think I am good looking (‘nice looking’)
35. Other kids want me to be their friend
36. My parents and I spend a lot of time together
37. I enjoy doing work in reading
38. I learn things quickly in work with numbers (‘counting and maths’)
39. I am interested in all school work
40. A lot of things about me are good
41. I can run a long way without stopping
42. I have a good looking body
43. I have more friends than most other kids
44. My parents are easy to talk to
45. Work in reading is easy for me
46. I like work with numbers (‘counting and maths’)
47. I look forward to all school work (‘get excited about’)
48. I am as good as most other people
49. I am a good sportsperson
50. I am better looking than most of my friends
51. I am popular with kids my own age (‘liked by’)
52. I get along well with my parents
53. I look forward to reading (‘get excited about’)
54. I am good at work with numbers (‘counting and maths’)
55. All school work is easy for me
56. Other people think I am a good person
57. I am good at throwing a ball
58. I have nice features like nose, and eyes and hair
59. Most other kids like me
60. My parents and I have a lot of fun together
61. I learn things quickly in reading

62. I like all school work
63. I enjoy doing work with numbers (‘counting and maths’)
64. When I do something, I do it well