

## *Journal of Trainee Teacher Education Research*

### **A critical study investigating the relationship between pupils' academic self-concept and their academic achievement**

**James Daly**

(PGCE General Primary, 2011-2012)

email: [jjd100@hotmail.co.uk](mailto:jjd100@hotmail.co.uk)

#### **Abstract**

*The study investigates the relationship between pupils' academic self-concept and their academic achievement. Research suggests that there is a positive relationship between the two variables and the study tests this hypothesis. The small-scale research was conducted with Year Four pupils in a Norfolk school. Pupils' academic self-concept was measured using the Self Description Questionnaire I which recorded results numerically and pupils' levels in numeracy and literacy were the measures of academic achievement. Statistical analysis was then used to assess whether there was a significant relationship between the variables, and pupils were interviewed individually in an attempt to help explain the discovered relationships. The research analysis found positive correlation and a significant relationship between pupils' academic self-concept and their numeracy achievement. However, the relationship between pupils' academic self-concept and their literacy achievement did not reach statistical significance and although positive, the correlation was small and weak. The semi-structured interviews suggested that these relationships existed because pupils had a more accurate view of their numeracy abilities compared to their literacy abilities.*

## Introduction

An individual's self-concept is the perception one has of themselves, formed through their experiences and interpretations with their environment (Marsh & Martin, 2011). Academic self-concept forms part of a person's total self-concept. A pupil's academic self-concept is an index of their perceived academic competence and school history up to the present day (Burns, 1982; Ireson & Hallam, 2009).

Self-concept is one of the most significant constructs in social science. It is related to the idea of positive psychology which emphasises the benefits a positive outlook and view of oneself can have on life (Marsh & Martin, 2011). As a trainee teacher, I am interested in the effect of self-concept on education; specifically academic achievement. Self-concept is viewed with importance in education policy and this is shown in the National Curriculum; the National Curriculum places "the self" and its development as one of its key values and goals (DfEE, 1999, p. 148). Research suggests the relationship between academic achievement and self-concept is a positive one and I want to investigate the relationship that exists between these two variables, in my placement school. I have decided to focus on academic self-concept in particular, as opposed to total self-concept, because Burns (1982) discusses how the relationship between self-concept and academic achievement is most distinct when measures of academic self-concept are used instead of simply self-concept. Ireson and Hallam's (2009) research supports this viewpoint. I would like to investigate whether academic self-concept affects academic achievement or if it is academic achievement that affects pupils' academic self-concept. However, due to the limited time available for research and the small scale of this study it was not possible to conduct the necessary longitudinal research to try and establish the causality of the relationship. This has led to my research focusing on the relationship between the two variables with my research question being, 'What is the relationship between pupils' academic self-concept and their academic achievement?' My hypothesis is that there is a positive relationship between academic self-concept and academic achievement.

## **Literature Review**

Burns (1982) believes that when pupils arrive at school they have already begun to form their self-concept. From their home life experience pupils have already begun to form a picture of themselves and this is the creation and formation of their self-concept. It is then the school that significantly influences and develops the pupil's self-concept (ibid). The large focus on evaluation and assessment for learning in today's education system causes a pupil's self-concept to develop at a fast rate (ibid). Academic self-concept develops particularly swiftly because of the constant emphasis on learning in schools. Burns believes academic self-concept has many influences largely, parents, teachers, peers and the work set in lessons (ibid). Academic self-concept is a major component of a person's overall self-concept and the relationship between self-concept and academic achievement is most distinct when measures of academic self-concept are used (ibid).

A substantial body of research concludes that there is a positive relationship between self-concept and academic achievement. Muijs' (1997) paper is one of many research studies that support this view. The large study measured the relationship between academic self-concept and achievement of 1001 primary school children across 51 schools in Belgium. Muijs gathered pupils' academic self-concept through use of a questionnaire whilst their academic achievement was measured by a spelling test, a reading test and standardised end of term test results. A strong significant correlation between academic self-concept and academic achievement was discovered and both variables were found to be strong predictors of each other (ibid).

Similarly, Marsh, Parker and Smith (1983) tested the correlational relationship between pupils' academic achievement and academic self-concept. They sampled three groups of children and academic self-concept and academic achievement were found to be positively correlated for each group. The third sample group had the strongest correlation with a Pearson correlation coefficient of .74. In this third sample group there were 125 children from three schools with a mean age of 11.6 years (ibid). Likewise, in their longitudinal study of 556 adolescents, Calsyn and Kenny (1977) found positive correlation between self-concept of ability and the students' grade point average (GPA) score. GPA was the measure of academic achievement used as it represented an average of the students' academic levels in school. Calsyn and Kenny found the relationship to be positively correlated as the Pearson correlation coefficient was .56 (ibid).

In his review of self-concept literature, Purkey (1970) believes there is a significant relationship between a pupils' academic self-concept and their academic achievement. One of the main research articles that Purkey uses to support his view is Brookover *et al*'s 1964 study (Brookover, Patterson and Thomas, 1964). Brookover *et al* sampled 1,050 pupils in an urban school and the mean age of the children was 12. The Self-Concept of Ability Scale was used to measure pupils' academic self-concept and the children's GPA scores were used as the measure of academic attainment. Brookover *et al* found that the relationship between pupils' academic self-concept and academic achievement was significant and positively correlated. The authors concluded that this relationship was still found to be considerable even when measured I.Q. was controlled (*ibid*).

Marsh, a leading academic in the field of self-concept, developed and refined the theoretical model of self-concept (Marsh, 2006). The methodology of self-concept research varies greatly; up until the mid 1980s a large amount of research produced inconsistent results due to weak methodology. Therefore, it can be difficult to compare studies accurately and reliably. In an attempt to rectify these shortcomings and with an aim to create a psychometrically sound measurement instrument with a solid theoretical basis, Marsh and his colleagues developed the Self Description Questionnaires (SDQ) (*ibid*). The SDQ measures pupils' self-concept and there are three types of questionnaires depending on the age of the students being sampled; I used the Self Description Questionnaire I (SDQ-I) which is designed for preadolescents (*ibid*). Marsh developed the SDQ-I in response to Shavelson, Hubner and Stanton's (1976) view that self-concept is hierarchical and multifaceted. The SDQ-I is made up of eight scales which when combined reflect the child's total self-concept. Three of the eight scales measure a child's academic self-concept; these scales are reading self-concept, mathematics self-concept and general school self-concept. In his SDQ-I manual, Marsh has collated the results of several studies that examine the relationship between the SDQ-I scales and various measures of academic achievement (Marsh, 1990). The results showed positive correlation between reading self-concept and achievement measures with the median correlation coefficient being .40 (*ibid*). Likewise, there was also a positive relationship between mathematics self-concept and pupils' achievement measures; the median correlation coefficient being .32 (*ibid*). The correlation between the general school self-concept scale and academic achievement was weaker than the other two measures but it was still significant and the median correlation coefficient was .21 (*ibid*, 1990). The positive correlation between these self-concept scales and academic achievement illustrates the crucial relationship between academic achievement and academic self-concept (*ibid*).

Following on from Marsh's research, many other studies show that academic achievement has the highest correlation with the academic dimension of self-concept that most closely matches the academic activity. For example, Marsh, Parker and Smith (1983) demonstrate that correlation was highest when reading self-concept was correlated to pupils' attainment in reading. Likewise, Marsh, Relich and Smith (1983) found that pupils' achievement in mathematics was most significantly correlated with pupils' mathematics self-concept ( $r = .55$ ). Accordingly, there was a substantially weaker relationship revealed when pupils' mathematics achievement was correlated to their reading self-concept ( $r = .21$ ) (ibid).

It is clear that there is a persistent positive relationship between academic self-concept and academic achievement. However, correlation does not reveal causation and Marsh believes the "causal ordering of academic achievement is, perhaps, the most vexing question in academic self-concept research" (Marsh, 2006, p. 25). The direction of the relationship has been the subject of much longitudinal research. Do changes in academic self-concept cause changes in academic achievement or is it the other way around? The direction of causality has very important implications for educators. In their longitudinal study, Calsyn and Kenny (1977) analysed their data to compare the self-enhancement model with the skill development approach. Self enhancement theorists believe that increasing self-concept will increase academic achievement (Burns, 1982; Calsyn & Kenny, 1977). The skill development model adopts the opposite approach and believes that increasing academic achievement in pupils will lead to an increase in their self-concept (ibid). Calsyn and Kenny (1977) found that academic achievement is causally predominant over academic self-concept thus supporting the skill development model. Similarly, Muijs (1997) concluded that both academic achievement and academic self-concept were strong predictors of each other but through using regression analysis and path analysis he concluded achievement to be causally predominant over academic self-concept. In spite of this, other studies have found results in support of the self enhancement model. For example, Lawrence (1971) found that providing counselling to pupils with special educational needs in an attempt to increase their self-concept led to gains in their reading attainment.

However, the general consensus regarding causal ordering is that the reciprocal effects model of academic self-concept (REM), most accurately explains the relationship (Marsh, 2006; Marsh & Martin, 2011). Marsh created the REM and the model proposes that the relationship between academic self-concept and achievement is a reciprocal one; both variables are related and mutually

reinforcing (ibid). A large body of research, such as Pinxten, De Fraine, Van Damme and D'Haenens' (2010) study and Marsh and Martin's (2011) study, supports the REM.

## **Methodology**

The study was carried out at the start of Lent term 2012 and involved Year Four pupils (aged eight and nine). In order to investigate the relationship between academic self-concept and academic achievement I measured pupils' self-concept using a questionnaire (SDQ-I) which recorded answers numerically. Afterwards, I used statistical analysis to assess whether there was a significant relationship between the variables and then interviewed pupils to help explain the discovered relationships. In my research I adopted a mixed methods strategy; I used both quantitative and qualitative methods (Denscombe, 2007). Furthermore, my research design was sequential; I used a quantitative approach followed by qualitative research with the quantitative approach being the dominant method (ibid).

My quantitative method was the Self Description Questionnaire I (SDQ-I). This questionnaire allowed me to effectively measure pupils' academic self-concept (Marsh, 1990; Marsh, 2006); also it allowed me to specifically focus on the measurement of pupils' academic self-concept, more so than other measurement tools such as the Self-Concept of Ability Scale (Barisa & Alberg, 1991). Moreover, it is an established instrument that is regarded as extremely effective at measuring self-concept and there is a lot of supporting information and research regarding the questionnaire (Marsh, 1990; Marsh, 2006). This meant there was a lot of explanation on how to use it and then a substantial body of research to which I could compare my results.

The SDQ-I, is an eight scale instrument that measures a child's overall self-concept by measuring seven aspects of a child's self-concept as well as their sense of general self worth (Marsh, 1990; Marsh, 2006; Wylie, 1989). Of the eight scales, four address and measure non academic self-concept; the physical abilities scale, the physical appearance scale, the peer relations scale and the parent relations scale (Marsh, 1990). I decided these scales were not relevant to my study and the issues they covered were too sensitive so I removed them from the questionnaire. I focused on the three scales that measure academic self-concept; the reading scale, the mathematics scale and the general school scale. I also included the scale that measured the child's sense of general worth (ibid). I used the reading scale as a measure of the children's self-concept regarding literacy. Each scale is made up of eight questions and it is scored using a Likert scale; pupils record their strength

of feeling towards a given statement with one being false and five being true. The higher the number chosen, the higher the level of agreement. Each scale is made up of eight questions and there are an additional 12 negatively worded questions to disrupt positive response bias (ibid). However, since I was using only three scales I only included the related seven negatively worded questions. I also changed the wording of three of the seven questions; I changed 'dumb' to 'bad' as I felt 'bad' was a more easily understood word. See appendix one for a blank copy of the questionnaire. I wanted to use a whole class sample but was only able to survey 24 pupils as four did not bring back their consent forms. The children completed the SDQ-I across one afternoon.

My qualitative research method took the form of a semi-structured interview with select members of the class. I interviewed a representative sample of the class; I chose boys and girls of varying abilities (Bell, 2005). Neuman (2011) discusses the importance of a representative sample in order to generalise the results for the entire population, the population being the whole class. My quantitative results also informed whom I collected qualitative data from, for the results of the SDQ-I see appendix two. For example, I chose to interview children who had lower academic levels but higher self-concept scores, children whose academic scores matched their levels and children who had higher achievement levels but a lower self-concept.

When I performed the semi-structured interview I prepared a small number of open ended direct questions along with a list of conversation prompts (Lewis, 2000). This enabled me to make sure I covered everything and it gave me a frame of reference whilst allowing conversation to flow. It also meant that there were plenty of opportunities for the interviewees to express themselves in detail (Bell, 2005). Lewis highlights the importance of an appropriate setting when interviewing children; I decided to interview the children in a space just outside their classroom so that it was a familiar environment, allowing them to be relaxed and comfortable (Lewis, 2000). I did not want to influence the pupils in the interviews so I made my questions and prompts open and expressed clearly at the beginning of the interview that there were no correct answers (Bell, 2005). I also refrained from nodding in agreement when they were talking in an attempt not to lead pupils in their answers (Bell, 2005; Lewis, 2000). I conducted the interviews on a one to one basis to avoid any pupils dominating the conversation and influencing others; on a practical level it also made the conversation easier to follow and transcribe afterwards (Lewis, 2000). I made brief notes during the semi-structured interviews but I also recorded the interviews using an application called 'iTalk' on my iPod Touch. This allowed me to maintain eye contact during the interviews so that the pupils

could see I was interested in what they were saying and I believe this encouraged the pupils to talk more, see appendix three for interview transcripts (ibid). They are partial transcriptions of the interviews as I did not feel the whole interviews were relevant. The full recordings are available for scrutiny if required.

I felt it was appropriate to bring together both research methods for this study as the qualitative data provided more depth to my research and was used to help explain the quantitative results (Denscombe, 2007). This approach helped improve the accuracy of my study as it allowed me to check my quantitative findings against my qualitative results and I was able to gain a better understanding of the academic self-concept and academic achievement relationship. Additionally, this approach also helped reduce bias in my study, particularly in my semi-structured interviews (ibid).

The measure used to assess academic achievement was the pupils' levels in numeracy and literacy. The attainment levels were decided by the class teacher and based on the pupils' work from the start of the school year until December 2011. The National Curriculum details the expectations of pupils' achievement levels (DfEE, 1999). By the time the children are 11 and finish primary school they are expected to be a level four. In Year Four a level 3a or above is considered high ability. Below a 3a, such as a 3b, is considered average ability and anything below a 3c is considered low ability (ibid). This was not the same gauge of academic ability as used in Muijs' (1997) study but for the purposes of my study it is the measure of academic achievement used. I used this measure because it is an effective and accurate way of measuring a child's academic achievement and it allows for the academic ability of each child to be expressed numerically.

### **Ethical considerations of the research**

Before beginning my research, I completed an ethics checklist that was checked and signed by my partnership tutor to ensure that all the ethical implications of conducting a research study of this nature were carefully considered, see appendix four. Bell (2005) stresses the importance of this process; by doing this it ensured that my research fulfilled the university's ethical considerations.

Since the participants were under 18 a signature of the adult responsible for each child was required. I made certain that I had 'informed consent' for my research by sending each child home with a consent letter so that the pupil could gain permission to participate in the research project,



see appendix five for a copy of the consent letter (Cohen, 2007). Cohen discusses that in order for consent to be informed, the participant must be able to make a competent and informed decision based on full information and knowledge of the study (ibid). Therefore, I ensured the consent letter was clear, detailed and informative so that it provided the adult with all the necessary information regarding the proposed research project. As mentioned by Bell (2005), the confidentiality and anonymity of the pupils and the school during the research and in the final written assignment is of utmost importance. Therefore to ensure confidentiality, only I have access to the full data gathered. Furthermore, Hitchcock (1995) states that in the final written assignment “the researcher must use pseudonyms to protect the anonymity of the school, parents, teachers and pupils involved” (p. 51). Consequently, pseudonyms have been used for the names of all the children, the class teacher and the school in this study; in all parts of this paper, including appendices, every name is assumed.

It is vital to gain the consent of the institution from where the research is collected to ensure professional integrity (Cohen, 2007; Hitchcock, 1995). I agree with the emphasis Cohen (2007) places on this ethical aspect and I gained permission from the head teacher and class teacher to conduct research in the school. I then gained their approval of my Self Description Questionnaire questions and of the questions and prompts used in my semi-structured interview.

Cohen discusses that researchers must “take into account the effects of the research on participants, and act in such a way as to preserve their dignity as human beings” (ibid, p. 58). This was a priority for me and I made sure I demonstrated “consideration to the feelings and sensitivities” (ibid, p. 71) of the pupils involved and was respectful of their interests and rights (Cohen, 2007; Hitchcock, 1995). I informed pupils that they did not have to participate if they did not want to. I told them that they did not have to answer any questions they were uncomfortable with and I explained that I was not looking for any specific answers but was simply concerned with what they were thinking (ibid). Similarly, I discussed with the pupils the level of confidentiality and anonymity involved. After gathering the data, I debriefed pupils in order to thank them and also to check they were happy and at ease (Howitt & Cramer, 2000). Following Howitt and Cramer’s advice, I also explained in the debriefing how I would use my results; I explained this in the debriefing so that it did not influence pupils’ answers (ibid). Finally, Denscombe (2007) advises that data should be kept no longer than is necessary, hence at the end of the academic year all my data will be securely destroyed.

## Results and critical evaluation of key findings of the research

Statistical analysis was used to establish the relationship between pupils' academic self-concept and their academic performance. The computer software SPSS (version 16.0 for Windows) and Microsoft Excel were utilised. Firstly, pupils' responses to the SDQ-I were collated together and tabulated, see appendix two. In order for the correlation between academic self-concept and academic achievement to take place the children's levels had to be made numerical. Therefore, level 1c was changed to 1.1, 1b was changed to 1.2 and 1a to 1.3. The same change was made for levels two, three and four. The quantitative analysis was then possible and had two components. Firstly the Pearson Product Moment correlations were calculated to determine the strength of any relationship between the measured variables. Secondly, several two-way analyses of variances were examined. The qualitative data were utilised to help explain the correlational relationships. See Table 1 for the correlation data.

		Reading Self-concept	Mathematics Self-concept	General School Self-concept	Total Academic Self-concept	Literacy Achievement Levels	Numeracy Achievement Levels	General Self-concept
Reading Self-concept	Pearson Correlation Sig. (2-tailed) N	1 24						
Mathematics Self-concept	Pearson Correlation Sig. (2-tailed) N	.195 .361 24	1 24					
General School Self-concept	Pearson Correlation Sig. (2-tailed) N	.458* .024 24	.555** .005 24	1 24				
Total Academic Self-concept	Pearson Correlation Sig. (2-tailed) N	.672** .000 24	.801** .000 24	.847** .000 24	1 24			
Literacy Achievement Levels	Pearson Correlation Sig. (2-tailed) N	.439* .032 24	.161 .451 24	.081 .705 24	.288 .172 24	1 24		
Numeracy Achievement Levels	Pearson Correlation Sig. (2-tailed) N	.260 .220 24	.470 .020 24	.488* .016 24	.530** .008 24	.494* .014 24	1 24	
General Self-concept	Pearson Correlation Sig. (2-tailed) N	.502* .012 24	.140 .515 24	.611** .002 24	.503* .012 24	.020 .928 24	.303 .149 24	1 24

\*Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

**Table 1. The correlation and significance levels between the academic self-concept variables (reading self-concept, mathematics self-concept and general school self-concept), total academic self-concept, pupils' academic achievement (literacy and numeracy levels) and pupils' general self-concept.**

In the SDQ-I, academic self-concept is the combination of three scales; a reading self-concept, a mathematics self-concept and general school self-concept. The reading and the mathematics self-

concept scales reflect the children's self-concepts regarding their ability, enjoyment and interest in reading and mathematics respectively (Marsh, 1990). Likewise, the general school scale measures the pupils' self-concept regarding their ability, enjoyment and interest in all school subjects (ibid). Looking at the individual scales; there was a moderate and positive correlation and a significant relationship between pupils' literacy achievement and their reading self-concept ( $r = .44, p < .03$ ) and pupils' mathematics achievement and their numeracy self-concept ( $r = 0.47, p < .02$ ). This result supports Marsh's (1990) and Marsh, Relich and Smith's (1983) research which explains that the academic achievement measure has the highest correlation with the academic self-concept that most closely matches the academic activity.

Answering the main question, it was found that there was a moderate and positive correlation between academic self-concept and pupils' numeracy levels ( $r = .530, p < .01$ ); the relationship was statistically significant. The analysis shows that pupils who have a higher academic self-concept tend to have higher numeracy levels and vice versa. I cannot determine causality from the correlation coefficient. In addition, the coefficient of determination ( $r^2$ ) was found to be 28%. Therefore, 28% of the variance in pupils' academic self-concept can be accounted for by the variance in pupils' numeracy levels; this is a sizeable amount. This result supports the results found by Marsh (1990) and Muijs (1997). Conversely, the relationship found between pupils' academic self-concept and their literacy levels did not reach statistical significance ( $p = .17$ ). The relationship was found to be positively correlated yet the correlation was small and weak ( $r = .28$ ). Likewise, the coefficient of determination was equally small;  $r^2 = 8\%$ . This is substantially smaller than the coefficient of determination found between academic self-concept and numeracy levels. The statistical analysis suggests that pupils' academic self-concept was not affected by their literacy achievement and that their literacy achievement was not affecting their academic self-concept. This finding is different from Marsh's (1990) results where a positively correlated and significant relationship between pupils' reading achievement and academic self-concept was found. I cannot determine the causality of the relationship but my qualitative research was used to help explain why such a result exists.

Having discovered there was a positive and significant relationship between academic self-concept and pupils' numeracy achievement I interviewed selected pupils from the class. I wanted to try to find out why a significant relationship existed. Furthermore, during the interviews I also wanted to

learn why there was such weak correlation and a non-significant relationship between pupils' academic self-concept and their literacy achievement. See appendix three for interview transcripts.

I learned from interviewing the children that they all had an accurate view of their numeracy abilities. When pupils have a precise view of their achievement levels it helps their academic self-concept to become more informed, accurate and more closely related to their achievement level (Burns, 1982; Marsh, 1990; Marsh, 2006; Purkey, 1970). Burns (1982) discusses that the high level of focus on evaluation and academic attainment in education naturally causes children to become self evaluative. Through my interviews I learned that the children's self evaluations along with teacher feedback and peer comparisons have led to the children becoming well acquainted with how well they are performing (*ibid*).

When interviewed, Andrew showed that pupils gain information on their academic performance from their ability to answer questions in class. A view supported by Laura as she justified her opinion of her numeracy attainment by saying, "Well I judge myself on how easily I can answer the questions in class; if it comes to you easily then you can decide you're quite good at it." This reasoning of numeracy performance is also used by Jim, shown when he said, "I can also answer most of the questions in the lessons." Continually, Jim also used his ability to complete the tasks set as a gauge of how well he is performing, "Well I know my times tables and I am good at using a number line and grid methods and things like that."

Furthermore, my data showed that a key element pupils use to gauge their academic performance is feedback from the class teacher in the form of marked work. Martin said that he knows he is good at maths because of the teacher feedback: "The work that gets given back to me helps me decide and affects my confidence, like the comments help me know how I'm doing." Fiona expressed a similar opinion when asked how she knows her achievement is middling: "My work when it gets marked basically, like when I get smiles on my work then that makes me feel I'm in the middle and moving up." This shows that the teacher's comments are evaluative and informative for the learners (Gipps & Pickering, 2010).

Finally, Laura believed peer comparison helped her gauge her academic achievement. This is shown when she said she thinks she is quite good as maths: "But then again when I think of Martin and Sam then I'm not as good as them." From working in the class I know that the pupils worked in frequently changing, mixed ability pairs for numeracy and I feel this has had an impact on how

they viewed themselves. Mixed ability pairs meant pupils were constantly comparing themselves to others and who they were sat next to that week affected how they viewed themselves. Jim highlighted this comparison when he said, “Although I am not as good as others in the class, like Chris; he’s really good.” This supports Marsh’s (2006) Big-Fish-Little-Pond effect model which theorises that pupils compare their own academic ability to that of their peers and this comparison is used as a basis for the formation of their individual academic self-concept.

Furthermore, it was clear from the interviews that all the pupils enjoyed mathematics. I feel this enjoyment has helped cause the children to become more motivated in numeracy and has led to the pupils having a high academic self-concept. Based on Marsh’s reciprocal effects model this will then feed into their academic attainment making the correlation between the two variables stronger (Marsh, 2006; Marsh & Martin, 2011). Cattell, Sealy and Sweeney’s (1966) study supports the idea that pupils’ motivation affects academic self-concept as they found that 23 to 27 per cent of the total variance in school achievement could be explained by pupils’ motivation. This positivity towards numeracy can be seen in the pupils’ interview transcripts. Laura said, “I do enjoy it a lot.” She later went on to say it is one of her favourite subjects. This view is supported by Andrew who also described it as his “favourite subject” and Jim’s opinion matches his peers’ as he found numeracy “fun and exciting.” Fiona provided a passionate explanation of her numeracy enjoyment when she answered “I really enjoy maths” and “as soon as I get into maths I start concentrating right away and I write and I write and I never stop and my brain starts going and calculates in my head.” Through spending time in the class I observed the passion the class teacher had for mathematics and I feel this helps explain the children’s enthusiasm for numeracy. Martin supported this idea; in his interview he explained that he was “a bit weary of maths in Year Three and didn’t really like it much but now having Mr Black and him being a maths expert and how much he likes maths has pulled me in.”

Therefore, the interviews suggest that pupils have an accurate view of their numeracy ability. The research indicates this is because of the ease in mathematics to know if your work is correct, teacher feedback and peer comparisons in class. This accurate awareness of ability coupled with children’s enjoyment, possibly as a result of the teacher’s enthusiasm, helps explain the positive correlation between academic self-concept and pupils’ numeracy achievement.

Despite the significant relationship between academic self-concept and numeracy levels, the relationship between academic self-concept and literacy achievement was non-significant and there was a weak correlation. Unfortunately, the pupil interviews did not yield as much information to explain this relationship. However, the interviews did suggest that pupils are not as aware of their literacy levels which might go towards explaining the weak relationship. In maths the answers are clear and their answers are either right or wrong. This is not the case in literacy as answers are more subject to interpretation. I believe the pupils are not fully aware of their literacy ability and this is supported by Laura when she said “Although I’m not really kind of sure about how good I am at literacy.” Therefore pupils’ academic self-concept is not being accurately informed by their literacy levels which may help explain the non-significant relationship.

During the research the pupils’ general self-concept was measured. The general self scale measures the child’s perception of themselves as affective and capable individuals, proud of and satisfied with the way they are (Marsh, 1990). General self-concept does not form part of academic self-concept but was measured in case it could provide interesting correlations with, and an insight into, pupils’ academic self-concept. Interesting correlations were found between pupils’ general self-concept and other measured variables.

There were positive correlations and significant relationships between pupils’ general self-concept and reading self-concept ( $r = .5, p < .01$ ), general self-concept and general school self-concept ( $r = .6, p < .002$ ) and general self-concept and total academic self-concept ( $r = .5, p < .01$ ). However, the relationship between general self-concept and mathematics self-concept was weak and non-significant ( $r = .14, p < .515$ ). These results suggest how the children view themselves as individuals is affected by how they view themselves in literacy combined with their attitude towards school. However, the view of how they view themselves in mathematics does not affect pupils’ general view of themselves. This is surprising considering the positive correlation between pupils’ academic self-concept and their numeracy achievement. Furthermore, another noteworthy result is that pupils’ general school self-concept has an extremely weak and non-significant relationship with academic achievement, i.e. literacy levels ( $r = .02, p < .93$ ) and numeracy levels ( $r = .303, p < .15$ ).

Although the relationship between general self-concept and academic achievement is expected to be lower because academic self-concept has not been measured, this is still a very interesting result

with implications for the class teacher (Burns, 1982). The quantitative data suggests that the pupils' sense of self is based on their perceived performance in school but not on the reality of how they are actually performing i.e. their reading and numeracy levels. This result contradicts the previous results between academic self-concept and numeracy levels which concluded that pupils have a sound understanding of their attainment. The qualitative data failed to provide any explanation of the relationship between general self and the other variables and I would recommend this area of study for further research.

The next stage of quantitative analysis was regression analysis, see table two. Multiple regression was used to determine the power of numeracy and literacy scores to predict pupils' rating of their academic self-concept as measured by the SDQ-I scale, whilst controlling for the influence of sex differences. Preliminary analyses were carried out to determine that the strict assumptions of normality, linearity, multicollinearity and homoscedascity were not violated. Using the *enter* method sex, numeracy and literacy scores were used as predictor variables and academic self-concept score as dependent. A significant model emerged ( $F = 3.55 p < .03$ ; Adjusted  $R$  square .35). An effect size was calculated using Cohens  $f^2$ ; the result was  $f^2 = 0.54$  which, according to Cohen, is a large effect. The only predictor variable which reached significance was numeracy (standardised beta = .700  $p < .01$ ). Therefore, the pupils' sex and literacy scores were not found to predict overall academic self-concept. However, pupils' numeracy scores *were* found to be an effective predictor of academic self-concept. This analysis supports previously mentioned results. This result regarding pupils' sex does not support Ireson and Hallam's (2009) study as they found a significant relationship between gender and academic self-concept.

Predictor variable	B	SE B	$\beta$	T	P
Numeracy	21.426	7.574	.675	2.829	.010
Literacy	-6.017	8.379	-.189	-.718	.481
Sex	-11.158	8.012	-.323	-1.393	.179

**Table 2. The Relationship between self-reported academic self-concept and three independent variables (sex, literacy scores and numeracy scores): Summary of multiple regression statistics for the predictor variables.**

Notes:

Dependent variable = total academic self-concept.

B = beta coefficient, SE B = standard error.  $\beta$  = standardised beta coefficient, t = t-test statistic,

p = significance value.

### **Critical reflection on the research methodology**

One of the main strengths of this study is the mixed method approach that was used (Lewis, 2000). The SDQ-I proved an effective tool that reliably measured pupils' academic self-concept and provided the study with quantitative data. The semi-structured interviews supplied qualitative data to help explain the statistical analysis of the quantitative results. Together, the mixed method approach helped explain the relationship between pupils' academic self-concept and their academic achievement.

I believe my sample size was the most I could manage during my placement as time constraints meant I was not able to go into another class to sample more pupils. But these limitations have meant that the sample size of 24 children was incredibly small compared to other studies. I was also unable to ensure that the sample was representative of the population because participation in the research depended on who returned their consent forms. As Neuman (2011) discusses, my small sample size means it is difficult for me to make accurate generalisations on the wider population based on my results. Likewise, Taber (2007) explains that a large sample size is needed in order to effectively use inferential statistics. Therefore, the lack of relationship between academic self-concept and pupils' literacy scores suggests a lack of validity in the research approach because other studies found a positive relationship (Sarantakos, 2005; Taber, 2007). Sarantakos' (2005) discussion implies that had I a bigger sample size then my results would have been more likely to reflect the expected result.

Only teacher assessment of the pupils' achievement in literacy and numeracy was used to measure pupils' academic achievement. A teacher's assessment can involve bias and it may have been more accurate to use a variety of summative assessment measures (Pinxten et al., 2010). Similarly, time constraints meant I was not able to perform a longitudinal study to discover causation between variables and so my results only show correlation (Marsh, 2006; Purkey, 1970). Consequently, there are many other factors that affect a pupils' academic self-concept that I did not consider, such



as socioeconomic status and relationship with parents (Calsyn & Kenny, 1977). This is also a research area for future study.

I feel the validity of my qualitative research methodology could also have been improved. Sarantakos (2005) discusses the need to restrict the relationship between the researcher and the researched and Hitchcock (1995) emphasises the requirement of the researcher to remain “value free” (p. 43) when conducting qualitative research. However, this was not possible because having taught the class several times before conducting the research I h children. Although this could be viewed positively as it may have allowed children to feel comfortable and talk more freely to me.

I had also influenced the situation I was trying to investigate. I was finding pupils’ views on numeracy and literacy yet I had affected their views because I had taught them those subjects (ibid). I believe this has lowered the validity of my data and if I conducted the study again I would gather the research at the start of the placement, before I build a rapport with the class. Also, I have only included partial transcriptions of my interviews. I understand that bias is a possibility when only partially presenting the data but I have applied the same analytical rigour to the analysis of my qualitative data as I did to my quantitative data. If I performed the research again I would change the questions asked in my semi-structured interviews because the qualitative data failed to provide an explanation of the weak and non-significant relationship between pupils’ academic self-concept and literacy achievement and pupils’ general self-concept and academic achievement. Lastly, I am aware that the reliability and validity of the SDQ-I may have been lowered as I chose not to use all the measurement scales and reworded three questions.

### **Implications for my own professional development**

Despite limitations and flaws in my data and research methodology, I have learned the importance of listening to pupils and aim to always find out pupils’ perspectives in my future teaching career. The importance of respecting and listening to pupils is emphasised in The United Nations Convention on the Rights of the Child, specifically article 12 (Castle, 2002). This is an internationally and legally binding instrument that is designed to protect the human rights of every child.

Marsh (2006) emphasises the importance of a positive academic self-concept yet a teacher might not have time to conduct a self-concept questionnaire with the class. But by talking to the pupils

the teacher can begin to understand the pupils' views of themselves regarding their ability and will then be able to intervene where appropriate. A teacher's ideas to increase self-concept could be ineffective with certain children as Flutter and Rudduck (2004) discuss that key classroom phrases can be misunderstood by children. However, by engaging with children and listening to their viewpoints these misconceptions can be addressed. Increasing pupils' self-concept relies on pupils regularly assessing their own achievement. Through talking and listening to pupils a teacher will learn who needs more advice on how to self assess so that their individual academic self-concept can grow (ibid). Consequently, I intend to always listen to pupils in order to maximise their personal and academic development. Marsh's (2006) reciprocal effects model theorises that the relationship between academic self-concept and academic achievement is reciprocal. Hence, increasing a pupils' academic self-concept can increase their academic performance. Therefore, in my future practice I will aim to make sure each pupil I teach has a positive self image that is continuously growing. One way research has shown this can be achieved is through the attitude the teacher conveys; I will convey a positive, respectful and supportive attitude towards all children (Purkey, 1970). I will make it clear that I value each child and have positive expectations of them. These intentions are congruent with the aims of the National Curriculum (DfEE, 1999). Furthermore, I aspire to create a supportive classroom atmosphere that challenges pupils, encourages maximum effort and values success (Purkey, 1970).

Finally, this study showed that pupils' general self-concept is not influenced by their academic performance. I found this result worrying as it suggests pupils are unaware of their academic performance and so will not aim to increase their effort to increase their performance when needed. This could have a detrimental effect on their academic attainment and so I would aim to raise pupils' awareness and understanding of their performance levels and emphasise the importance of academic achievement. Giving children regular mini summative assessments that are then analysed in a formative way with the results being fed back to pupils might be one way to achieve this.

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