

# The causal ordering of self-concept and academic motivation and its effect on academic achievement

---

**Jasmine Green**

SELF Research Centre, University of Western Sydney, Australia [ja.green@uws.edu.au](mailto:ja.green@uws.edu.au)

**Genevieve Nelson**

SELF Research Centre, University of Western Sydney, Australia

**Andrew J. Martin**

SELF Research Centre, University of Western Sydney, Australia

**Herb Marsh**

SELF Research Centre, University of Western Sydney, Australia

*Critical questions in educational psychology research to be addressed in this paper concern the casual relationship between academic self-concept, academic motivation and its effect on academic achievement. Do changes in academic self-concept and academic motivation lead to changes in subsequent academic achievement? Various studies have attempted to answer this question by examining the causal relations between academic self-concept and academic achievement as well as academic motivation and academic achievement. Less integral to research however has been the investigation of the relationship between both academic self-concept and academic motivation and their combined effects on academic achievement. For this reason, this paper aims to elucidate further the relationships among self-concept, motivation and academic achievement by proposing a longitudinal design by which self-concept and motivation are measured from a multidimensional perspective. The theoretical and practical implications of this important question will be discussed.*

Self-concept, academic motivation, causal ordering, academic achievement

## INTRODUCTION

Of the many factors that contribute to academic achievement, the constructs under focus in this study are self-concept and academic motivation. An abundance of research has examined the relations between academic achievement and academic motivation and academic achievement and academic self-concept. Less integral to research however has been the investigation of the combined effects of motivation and self-concept on academic achievement. Although the literature suggest motivation and self-concept are related to one another, few studies have simultaneously examined the effects of both of these factors to assess the relative salience of each to academic achievement. Thus, this paper seeks to address the issue of causal relations between self-concept, motivation and their combined effects on achievement by implementing a longitudinal design by which self-concept and motivation are measured from a multidimensional perspective. In order to situate this proposed research in a theoretical context it is necessary to investigate findings from literature concerning the causal ordering of these variables.

## SELF-CONCEPT: A MULTIDIMENSIONAL CONSTRUCT

As individuals mature, the emergence of new cognitive capacities allows adolescents' self-conceptions to become increasingly more abstract and psychological. In fact, various researchers

contend that self-conceptions tend to become more differentiated, complex and better organised as individuals progress from childhood to adulthood (for example, Byrne and Shavelson, 1996; Harter, 1999; Marsh, 1989). This observed developmental trend is good reason to suggest that our understanding of academic achievement and well being will be further enhanced by giving consideration to self-concept.

For this reason, research into self-concept has attracted considerable attention over the past few decades. Early research conceived self-concept to be a unidimensional construct emphasising a single, global measure of self-concept (see Byrne, 1984; Wylie, 1979). The usefulness of unidimensional perspectives has since been severely criticised (Wylie, 1979). Whereas earliest research studied global self-concept, recent studies have begun to shift in focus to the measurement of multiple facets of self-concept. In fact, Shavelson, Hubner and Stanton (1976) developed a theoretical model of a multidimensional, hierarchical self-concept in which general self appears at the apex and is divided into academic and non-academic components that are further divided into more specific components. This 'landmark' review of the theoretical construction of self-concept has had a profound influence on future self-concept research, which has consequently led to considerable advances in the quality of self-concept research due to much stronger theoretical models, better measurement instruments, and improved methodology.

Subsequent research (Marsh, Byrne and Shavelson, 1988; see Marsh and Craven, 1997 for review) has been very important in demonstrating the existence of separate dimensions of self-concept as well as the increasing differentiation and complexity of self-concept with age (for example, Marsh, 1989). A wealth of research continues to support the multidimensionality of self-concept (for example, Marsh and Yeung, 1998), however, support for the proposed hierarchy of self-concept appears to be weak (for example, Byrne, 1996a; Marsh, 1990a). Despite the lack of support for the hierarchical nature of self-concept, research has repeatedly demonstrated the importance of considering the multidimensional nature of self-concept in educational settings. Indeed, this proposed research will adopt the multidimensional model of self-concept as measured by the Self-Description Questionnaire II-Short (SDQII-S; Marsh, 1992).

### **CAUSAL ORDERING OF ACADEMIC SELF-CONCEPT AND ACADEMIC ACHIEVEMENT**

Self-concept was defined as "a person's perception of himself ... formed through his experience with his environment" (Shavelson et al., 1976, p.411). Hence, it was reasonable to consider that a positive self-concept would be valued as a desirable or critical goal across many educational settings (Australian Educational Council, 1989; Brookover and Lezotte, 1979). In support of deeming self-concept as an important educational factor, research has shown that higher levels of self-concept are linked to various education outcomes such as academic effort, coursework selections, educational aspirations and academic achievement (for example, Marsh, 1990a; Marsh and Craven, 1997; Marsh and Hau, 2003). Although the relationship between academic self-concept and achievement is well established in the research literature, there is little agreement about the causal ordering of these constructs. That is, does academic performance influence academic self-concept, or does academic self-concept influence performance? To date, this is perhaps the most critical question in academic self-concept research. Of the few researchers who have attempted to examine causal relations between academic achievement and self-concept, most have estimated correlations based on cross-sectional studies (for an overview, see Byrne, 1996a, 1996b; Skaalvik, 1997). Clearly, more sophisticated research designs are needed to clarify the causal relations between self-concept and achievement.

Based on the available literature, it is plausible to suggest that there are three distinct models regarding the causal ordering between self-concept and academic achievement. They are the self-enhancement model, the skill development model and the reciprocal effects model.

### **The Self-Enhancement Model vs. The Skill Development Model**

Research has contrasted the self-enhancement model and skill development model posited by Calsyn and Kenny (1977). The self-enhancement model postulates that self-concept variables are primarily causes of academic achievement. If the direction of causality were from academic self-concept to achievement, then self-concept interventions would be justified in devoting effort to enhancing students' self-conceptions rather than fostering achievement. Many of the self-concept enhancement programs rely on this assumption as the justification for such interventions (Calsyn and Kenny, 1977; Marsh, Hau and Kong, 2002; Marsh et al., 2005).

Conversely, if the direction of causality is from achievement to self-concept, then a skill development model may be a more plausible explanation. This model implies that academic self-concept emerges principally as a consequence of academic achievement. This model assumes that the most effective way to enhance self-concept is to develop stronger academic skills (Calsyn and Kenny, 1977; Marsh et al., 2002; Marsh et al., 2005). Since self-concept and academic achievement do not lend themselves to experimental manipulation, longitudinal studies in which self-concept and achievement are measured on at least two occasions have proven to be the most popular and effective method available to test these competing models (Marsh, Bryne and Yeung, 1999).

In a review and critique of existing research, Marsh (1990a, 1990b), argued that a majority of this research was methodologically unsound and inconsistent with self-concept theory. Despite the lack of support for either the skill development or self-enhancement model in the literature (see Marsh and Yeung, 1997), Marsh and colleagues (see Marsh, Byrne and Yeung, 1999) were able to propose further methodological guidelines for future causal ordering studies. These guidelines were based on a structural equation modelling (SEM) statistical approach, which allowed researchers to establish more clearly the nature of the relation between academic achievement and academic self-concept. They included the following.

1. The use of reliable, domain specific instruments that contain at least three indicators for each latent construct must be inferred.
2. Methods must be in place to control for halo effects that will occur when measuring the same indicators on multiple occasions, thus positively distorting estimates of stability. This can be understood through examining models both with and without correlated uniqueness included in the model.
3. Measures of self-concept and achievement must be obtained at least twice, with close to a year separating each measurement phase.
4. Statistical analysis should begin with Confirmatory Factor Analysis to help determine measurement issues, then move onto structural equation models based on a wide variety of theoretical models and possible idiosyncrasies.
5. There is a need for a large and diverse sample size to justify the use of structural equation modelling.
6. Self-concept measures should also consist of adequately formed domain specific measures (for example, math self-concept in addition to a global academic self-concept).
7. Research should be extended to include possible mediating variables between self-concept and achievement.
8. In examining mediating variable, care must be taken to distinguish between mediating variables (indicative of an underlying process) and moderating variables (general group differences).

9. Possibly consider a differentiation between cognitive components of self-concept factors and affective components of self-concept factors.
10. Evidence to suggest variation in the affects of self-concept and previous achievements through childhood to late adolescence, as well as developmental issues must also be considered, and controlled for using a multi-cohort-multi-occasion design.

Only with appropriate longitudinal designs that follow these guidelines will researchers be able to properly infer the causal ordering between self-concept and academic achievement. Few studies have been found to fully satisfy these methodological criteria (for review see Marsh and Yeung, 1997; Marsh et al., 1999) however, since the establishment of these recommendations some researchers have begun to address the causal ordering debate in longitudinal studies by means of more sophisticated designs. Thus, the proposed study will use these recommendations as a guide for its research design.

### **The Reciprocal Effect Model**

A compromise between the skill development and self-enhancement controversy is the reciprocal effects model, which implies that self-concept and academic achievement are reciprocally related and mutually reinforcing. That is, prior self-concept affects subsequent achievement and prior achievement affects subsequent self-concept (Guay, Marsh and Boivin, 2003). This model has major implications for the importance placed on academic self-concept as a means of facilitating other desirable educational outcomes, as well as being an important outcome variable. If students' academic self-concepts are enhanced without improving academic achievement then the gains in self-concept are likely to be short-lived. The same can be said for improving academic performance without fostering students' academic self-concept (Marsh, Hau and Kong, 2002). If only one construct is concentrated on in an education setting then both are likely to suffer.

The first study to provide clear support for the reciprocal effects model was conducted by Marsh (1990a). In this study, he tested the causal ordering of academic self-concept and academic achievement with four waves of data (last 3 years of high school and 1 year after high school graduation) based on standardised test scores, school grades, and academic self-concept. These results showed reasonably sound support for the reciprocal effects model in which the largest paths were from prior academic self-concept to subsequent school grades. A later study by Marsh and Yeung (1997) also found strong support for the reciprocal effects model. This study was important because of its domain specific approach whereby the relationship between academic achievement (school grades) and self-concept was examined at specific subject levels (for example, math self-concept and math achievement) rather than using a subject general self-concept measure. They found that all paths from achievement to self-concept were significant (supporting the skill development model) and a vast majority of paths were significant for the self-enhancement model (self-concept to achievement). In their review (see Marsh and Yeung, 1997) they concluded that research provided reasonably consistent support for the reciprocal effects model (see also Valentine, Dubois and Cooper, 2004) with only a few notable exceptions. For example, Byrne (1986a) found no cross-lagged effects, Shavelson and Blous (1982) who reported only self-concept effects, and Newman (1984) who reported only achievement effects (but in 1988, Marsh reanalysed this data and found some evidence for self-concept effects).

Despite the centrality of this causal ordering question, few educational psychologists have pursued it with appropriate longitudinal design and analyses. Stronger research is warranted in multi-wave, multi variable causal ordering studies. Taken together, recent theorising points future research in two directions. The first is to undertake a multidimensional approach to the study of self-concept. The second is to clarify the causal relationship between self-concept and achievement using Marsh et al.'s (1999) guidelines for valid causal ordering research. Hence, the overarching aim of

this study is to apply these recent developments in design and statistical analyses to address the critical – but under-investigated – issue in motivation research and to develop an all encompassing framework in which we can evaluate the combined and unique effects of both self-concept and motivation on each other and subsequent academic achievement.

### **ACADEMIC MOTIVATION: HOW DOES IT FIT INTO THE RECIPROCAL EFFECTS MODEL?**

Implicit within the assumptions of self-concept research are its motivational properties (Byrne, 1984; Craven and Marsh, 2004; Hattie, 1992). This is particularly the case when examining the self-enhancement component of the reciprocal effects model, which shows that prior self-concept leads to improvements in subsequent academic achievement beyond what can be explained in terms of prior achievement (Marsh et al., 1999). According to the OECD, motivation and self-concept are “closely tied to students’ economic success and long-term health and wellbeing” (OECD, 2003, p.9). To date, however, few studies endeavour to unify the numerous competing motivational constructs.

Relations between students’ academic motivation and school-related outcomes such as academic achievement have been routinely established in the literature (see Ames, 1992; McInerney, 2001; Pintrich and Maehr, 1995; Wentzel, 1991). However, as is the case in self-concept research, this so called ‘association’ has been predominately examined using research designs that are cross-sectional in nature. Simply establishing a relation between motivation and achievement does little to help disentangle the causal direction of these variables. To address this concern, various studies have begun investigating this casual relations question using longitudinal designs. For example, a longitudinal study investigating the causal predominance between mathematics attitudes and achievement in mathematics found that prior mathematics achievement significantly predicted later mathematics attitude across Grades 7 to 12. However, prior attitude, did not predict later mathematics achievement, suggesting an imbalanced reciprocal relationship (skill development model) (Ma and Xu, 2004). Other attempts to specify casual models have found mixed results depending on the motivational construct under investigation. For example, Schmidt and Padilla (2003) found that self-esteem was not a significant predictor of grades or extracurricular involvement, whereas family challenge (authoritative parenting style) was positively associated with school grades (but not extracurricular involvement. Other constructs such as expectancies and values (Eccles et al., 1983), intrinsic motivation (Gottfried, Fleming and Gottfried, 1994) and relatedness to significant others (Furrer and Skinner, 2003) have been found to be significant predictors of school-related outcomes.

Curiously, there appears to a lack of causal ordering research that simultaneously examines academic motivational constructs and self-concept and their effect on achievement. As a way to align self-concept research more closely to mainstream motivation research, two major studies have attempted to integrate motivation and self-concept into their reciprocal effects model; both using ‘interest’ as their motivational construct. A recent study by Marsh et al., (2005), reported on longitudinal data from two nationally representative samples of German seventh-grade students. As found in previous self-concept research, the reciprocal effect model was supported. More specifically, Marsh and colleagues found that prior self-concept significantly affected subsequent math interest, school grades, and test scores, whereas prior math interest had only a small effect on subsequent math self-concept.

Skaalvik and Valis’ (1999) study of Norwegian elementary and middle school students also included a measure of motivation (interest and investment) into their study of reciprocal effects. Interestingly, the results supported the skill development model for all cohorts (the view that achievement affects self-concept). Moreover, in the two oldest cohorts, the results revealed that

motivation was also affected directly by achievement. Generally, there was no evidence to suggest that self-concept affected subsequent motivation or achievement.

Given that these findings are inconsistent it is critically important to integrate self-concept with motivational literature in future studies. To date, few studies endeavour to unify the numerous competing motivational theories available in the literature and a more comprehensive model is needed to explain fully the dynamic interactions and relationships among motivational variables and academic achievement.

### **Toward a Multidimensional Perspective of Motivation**

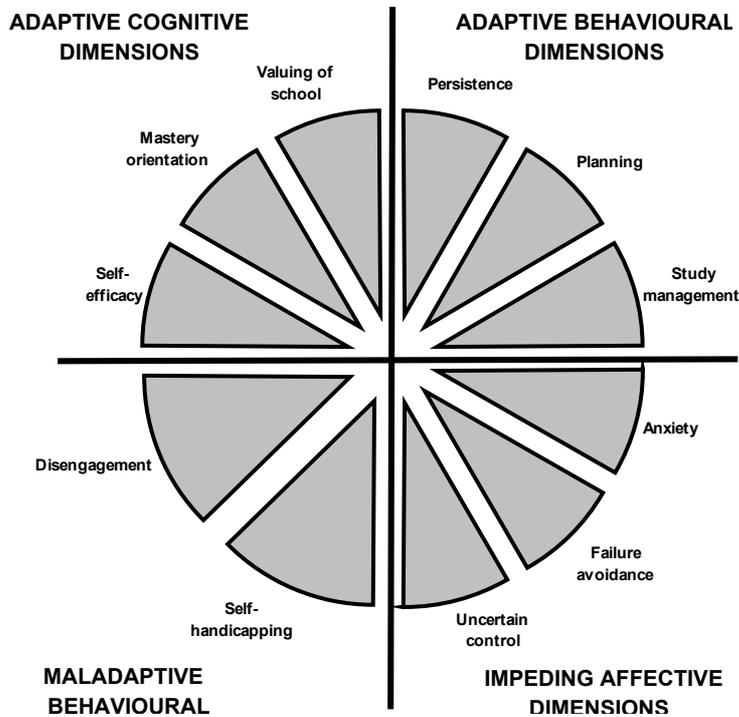
As mentioned earlier, the conceptualisation of academic motivation and self-concept in the psychological literature encompasses a diverse array of theoretical viewpoints. Thus far, motivation research has shown a tendency to adopt single or unidimensional theories of motivation and engagement in order to understand student behaviour in the classroom. Accordingly, studies that successfully tie various theoretical perspectives together into a coherent framework are relatively few. Despite this, various researchers are beginning to acknowledge the importance of adopting a more multidimensional and integrative approach to the field of motivation (Dörnyei, 2000) in order to examine how the wide variety of motivational constructs and theories relate to one another (Murphy and Alexander, 2000; Pintrich, 2003). In a bid to adopt a more holistic approach to motivation and engagement, the current study utilises the Student Motivation and Engagement Wheel, which was developed to integrate a number of theoretical perspectives and articulate a framework that is readily accessible to practitioners, parents, and students.

The model comprises 11 facets of motivation and engagement and it is this integrative framework that makes this model successful at capturing the complexity and breadth of dimensions that underpin academic motivation and engagement. Although a detailed account of the wheel is beyond the scope of this present investigation, as fully discussed in Martin (2001, 2002, 2003), there are four major dimensions to the model: adaptive cognitive dimensions, adaptive behavioural dimensions, impeding cognitive dimensions and maladaptive behavioural dimensions. The following is provided as a general overview of the theoretical orientations and associated constructs.

The Wheel draws on theory and related research for each of its four main dimensions. The adaptive cognitive dimensions of student motivation encompass (a) *self-efficacy* (Bandura, 1997), (b) expectancy-value theory to include *valuing of school* (Eccles et al., 1983; Wigfield, 1994), and (c) goal theory (viz. mastery orientation) and self-determination theory (viz. intrinsic motivation) to incorporate *mastery orientation* (Elliott and Dweck, 1988; Kaplan and Maehr, 2002; Nicholls, 1989; Ryan and Deci, 2000). The adaptive behavioural dimension of the Wheel accommodates the following theory and research, (a) choice theory to include *persistence* (Glasser, 1998), and (b) self-regulation theory to include *study management* and *planning* (Zimmerman, 2001). In terms of the impeding and maladaptive dimension the Wheel draws on research and theorizing on (a) *anxiety* (Sarason and Sarason, 1990; Spielberger, 1985), (b) *uncertain control* is drawn from control and attribution theories (Connell, 1985; Weiner, 1994), and (c) need achievement theory, goal theory, and self-worth motivation theory together form *failure avoidance*, *self-handicapping* and *disengagement* (Atkinson, 1957; Covington, 1992; Elliot and Sheldon, 1997; McClelland, 1965). The Student Motivation and Engagement Wheel is presented in Figure 1.

The Student Motivation and Engagement Scale (SMES) (Martin, 2001, 2003) has been developed to measure each facet of the Student Motivation and Engagement Wheel. Martin (2001, 2002, 2003) has shown that the Student Motivation and Engagement Scale was a valid and reliable measure of academic motivation and engagement. For example, Martin (2001, 2002, 2003b) used

LISREL procedures to confirm a strong factor structure of the Student Motivation and Engagement Scale. He has also shown that the Student Motivation and Engagement Scale was a reliable instrument with approximately normally distributed dimensions. In addition, this scale has been validated and significantly associated with literacy, numeracy, and achievement in mathematics and English as well as being sensitive to age and gender related differences in motivation. Hence, this study will utilise this multidimensional model of academic motivation and engagement (SMES) in combination with the multidimensional model underpinning the SDQII-S (Marsh, 1992).



**Figure 1. The Student Motivation and Engagement Wheel<sup>1</sup>**

### THE PRESENT INVESTIGATION

In introducing the proposed study, it is important to note that research surrounding academic motivation and self-concept and their effects on achievement appear to be mixed. In the self-concept literature there is strong support for a reciprocal effects model however in the academic motivation literature, there has been much less emphasis on the causal ordering of motivation and achievement. It is important to extend previous self-concept and motivational research by evaluating the size and direction of causal effects of these two constructs on each other and their relative contributions to indicators of academic achievement. Hence, the overarching aim of this study is to examine with a longitudinal perspective, the relations among achievement, self-concept, and motivation among high school students. In this study, we propose to examine the causal relations between academic self-concept, academic motivation and academic achievement in a two-wave study spanning two years. Central methodology features of this study are based on recommendations formulated by Marsh et al (1999). Thus, we used:

- a) multiple indicators to assess academic motivation, academic self-concept and academic achievement;

<sup>1</sup> Adapted from Martin, A. (2003). *How to Motivate Your Child for School and Beyond*. Sydney: Bantam.

- b) a general Structural Equation Model (SEM) that estimates stability coefficients and cross-lag effects to determine causal flow among constructs;
- c) SEM models with correlated uniquenesses;
- d) a sufficiently large and diverse sample; and
- e) a multicohort-multioccasion (MCMO) design with two waves of data collected one year apart in each of the cohorts. This multicohort-multioccasion design allows comparisons between academic achievement and academic self-concept, academic motivation from Grades 7 to 11.

In sum, research implementing these guidelines will be instrumental in providing a more comprehensive and dynamic framework within which to investigate linkages between self-concept, motivation and achievement over time.

## METHOD

### Proposed Participants and Procedures

The proposed research involves a sample of approximately 4,000 high school students from eight Australian high schools in Years 7 to year 11. This large-scale study will include a representative cross section of schools including; government selective, Government comprehensive, Catholic systemic, and Independent secondary schools. A mix of single sex and coeducational schools has also been included within this selection of schools.

A teacher in a normally scheduled class will administer questionnaires. There will be a second administration of the instruments at the same point in the following year. With each year, the sample will be refreshed with a new Year 7 cohort. This longitudinal study will be conducted in two stages: the first one during Term 3 and the second stage during the same time of year the following year.

## Measures

### *The Student Motivation and Engagement Scale*

The Student Motivation and Engagement Scale (Martin, 2003b, 2001) is an instrument that is designed to measure high school students' motivation and engagement through six adaptive dimensions, three impeding cognitive-affective dimensions and two maladaptive behavioural dimensions. More specifically, each adaptive dimension falls into one of two groups: cognitions and behaviours. Adaptive cognitions include self-efficacy, mastery orientation, and valuing of subject. Adaptive behaviours include persistence, planning, and study management. Impeding cognitive-affective dimensions are anxiety, failure avoidance, and uncertain control. Maladaptive behavioural dimensions are self-handicapping and disengagement. Each of the 11 factors comprises four items, resulting in a 44-item instrument. To each item, students rate themselves on a scale of 1 for 'Strongly Disagree' to 7 for 'Strongly Agree'.

### *The Self-Description Questionnaire II (Short) – SDQII-S*

The SDQII-S is based on the Shavelson model of self-concept (Marsh and Shavelson, 1985; Shavelson et al., 1976) and the multiple dimensions of self-concept defined by that model. The original extended version of this questionnaire is a well-developed instrument that accurately assesses the multiple and distinct dimensions of the self-concept in different facets of daily activity (Marsh, 1992; Byrne, 1996b). The SDQII-S is adapted from the original extended version and retains the original eleven scales, including three areas of academic self-concept, two areas of

physical self-concept, three areas of relationship self-concept, and also scales for emotional stability, honesty-trustworthiness and general self-concept.

The SDQII-S is a self-concept measure that is specifically designed to measure the multiple dimensions of the self-concept for adolescents in Grades 7 through to 12. The short version of the self-description questionnaire contains 11 scales of self-concept defined by responses to 51 items. It employs a six-point Likert scale whereby respondents are asked to indicate false, mostly false, more false than true, more true than false, mostly true or true in response to various statements. The psychometric properties for both versions of the Self-Description Questionnaire are strong (Byrne, 1996b).

As the students will be asked to complete the SMES as well as an achievement measure, the shorter version of the SDQII was chosen for practical reasons, and to minimise the time required to administer the questionnaire battery.

### ***The Wide Range Achievement Test (WRAT3) – Wilkinson***

The Wide Range Achievement Test 3 is primarily designed to measure basic skills in arithmetic and spelling. The words students must spell are standard English words that appear in the ordinary course of a student's literacy-based academic life – obviously depending on the student's age and year level at school. The arithmetic tasks (counting, reading number symbols, solving arithmetic problems) are ones presented to students in the ordinary course of their mathematics instruction – again, obviously depending on the student's age and year level at school.

A psychological test or an achievement measure must meet a set of standards before it can be accepted as a worthwhile instrument in practice. These standards for the WRAT3 are well established in the Standard for Educational and Psychological Testing (1985). In international studies, the WRAT3 has good reliability, minimal item bias, and acceptable content and construct validity (see Standard for Educational and Psychological Testing, 1985, p.174). Notwithstanding this, the predominant use of the WRAT in Australia has been for practice and diagnosis rather than for research and validation purposes.

The WRAT3 is a widely tested standardised achievement measure designed to measure reading, spelling and arithmetic abilities of people from 5 to 74 years of age. Due to the need to administer the test in a group setting in a restricted period of a maximum of 50 minutes, the reading section (assessing correct verbal pronunciation) will not be administered to the students. The spelling (40 questions) and mathematics (35 questions) tests will take no longer than 45 minutes to administer.

### **Proposed Statistical Analysis**

Consistent with the conceptual framework and the aims of the study, a multi-cohort-multi-occasion (MCMO) experimental design (Marsh, Craven and Debus, 1998) will be implemented in each of the eight schools. The current study intends to employ such a design by measuring the multiple domains of the SDQII-S and SMES using a longitudinal sample of high school students across pre-determined year levels (Years 7 to 12). This methodological and statistical technique provides simultaneous multi-cohort comparisons (cross-sectional comparisons of different age cohorts) and longitudinal comparisons of the same students on multiple occasions. Two grade cohorts will be followed over a period of two years affording the project the opportunity to examine both actual changes over time as well as any additional grade- and cohort-related changes. A MCMO design provides a stronger basis for assessing developmental differences than a cross-sectional comparison collected on a single occasion or a longitudinal comparison based on responses by a single age cohort collected on multiple occasions.

The causal modelling component of the study will consist of firstly an evaluation of the psychometric properties of each instrument over each occasion (internal consistency, reliability, stability over time, factor structure and invariance across groups using Confirmatory Factor Analysis (CFA) – with and without correlated uniquenesses and Structural Equation Models (SEM). Secondly, alternate SEMs will be used to test the causal impact of the motivational and self-concept constructs on academic achievement.

### **SIGNIFICANCE OF THE PROPOSED STUDY AND IMPLICATIONS FOR PRACTICE**

Although substantial research underpins the field of motivation and self-concept, few studies adopt a multidimensional perspective while utilising a longitudinal design that investigates these constructs from a causal ordering perspective. The findings of the proposed study will be particularly noteworthy because previous research of this nature has not been conducted on a systematic basis nor has it been approached from the perspective of an integrated, multidimensional framework. More specifically, the findings of this study will be based on a large sample size as well as a representative number of schools across Australia. A study that is significant in scope and size makes it possible to utilise sophisticated statistical analysis such as MCMO modelling. This study will demonstrate the utility of combining within a single study the rigour of the longitudinal and MCMO design to examine the causal ordering of achievement, self-concept and motivation. The conduct of sophisticated analysis such as those proposed in this research lays important foundations for further research of this nature. The theoretical emphasis on multidimensionality of self-concept and motivation is also embodied within this study

The motivational and self-concept framework that is the centre-piece of this research has direct relevance to and implications for schools and the question of how self-concept and academic motivation are causally linked to academic achievement has diverse theoretical and practical implications for researchers and educators who are interested in understanding student behaviour – particularly during high school years. The enhancement of self-concept and motivation is widely valued as a positive outcome of high school education. Parents, educators and researchers are continually searching for promising practices that will improve students' academic motivation and subsequently, performance. By adding to the existing knowledge base, the results of this study hope better to inform educational interventions aimed at enhancing students' self-concept and academic motivation; interventions that have long suffered from the ambiguity of their casual relationships. It is anticipated that this research will shed light on the much-debated issue of causality between these related constructs. If the reciprocal effects model is supported then academic self-concept, academic motivation and academic achievement are reciprocally related and mutually reinforcing. Put simply, improved academic self-concepts and motivation will lead to better academic achievement, and improved achievement will lead to better academic self-concept and academic motivation. Clearly, further theoretical and empirical research, implementing Marsh et al.'s (1999) guidelines are needed to clarify the causal relation between these ever important constructs.

### **REFERENCES**

- Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84(3), 261-271.
- Atkinson, J.W. (1957). Motivational determinants of risk taking. *Psychological Review*, 64, 359-372.
- Australian Education Council. (1989). *The Common and Agreed National Goal of Schooling*. Canberra: AGPS.
- Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York: Freeman.

- Brookover, W.B. and Lezotte, L.A. (1979). *Changes in Schools Characteristics Coincident with Changes in Student Achievement*. East Lansing, MI: Michigan State University.
- Byrne, B.M. (1984). The general/academic self-concept nomological network: A review of construct validation research. *Review of Educational Research*, 54, 427-456.
- Byrne, B.M. (1986). Self-concept/academic achievement relations: An investigation of dimensionality, stability, and causality. *Canadian Journal of Behavioural Science*, 18, 173-186.
- Byrne, B.M. (1996a). On the structure of self-concept for pre-, early, and late adolescents: A test of the Shavelson, Hubner, and Stanton (1976) model. *Journal of Personality and Social Psychology*, 70(3), 599-613.
- Byrne, B.M. (1996b). *Measuring Self-Concept Across the Life Span: Issues and Instrumentation*. Washington DC: American Psychological Association.
- Byrne, B. and Shavelson, R. (1996). On the structure of self-concept for pre-, early-, and late-adolescents: A test of the Shavelson, Hubner, and Stanton (1976) model. *Journal of Personality and Social Psychology*, 70, 599-613.
- Calsyn, R. and Kenny, D. (1977). Self-concept of ability and perceived evaluations by others: Cause or effect of academic achievement? *Journal of Educational Psychology*, 69, 136-145.
- Connell, J.P. (1985). A new multidimensional measure of children's perceptions of control. *Child Development*, 56, 1018-1041.
- Covington, M.V. (1992). *Making the grade: A self-worth perspective on motivation and school reform*. Cambridge: Cambridge University Press.
- Craven, R.G. and Marsh, H.W. (2004). The Challenge for Counsellors: Understanding and addressing indigenous secondary students' aspirations, self-concepts and barriers to achieving their aspirations. *Australian Journal of Guidance and Counselling*, 14(1), 16-33.
- Dörnyei, Z. (2000). Motivation in action: Towards a process oriented conceptualisation of student motivation. *British Journal of Educational Psychology*, 70, 519-538.
- Eccles, J., Adler, T., Futterman, R., Goff, S., Kaczala, C., Meece, J. and Midgley, C. (1983). Expectancies, values, and academic behaviours. In J. Spence (Ed.), *Achievement and Achievement Motives* (pp.78-147). San Francisco: Freeman.
- Elliot, E.S. and Dweck, C.S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54, 5-12.
- Elliot, A.J. and Sheldon, K.M. (1997). Avoidance achievement motivation: A personal goals analysis. *Journal of Personality and Social Psychology*, 73, 171-185.
- Furrer, C. and Skinner, E. (2003). Sense of relatedness as a factor in children's academic engagement and performance. *Journal of Educational Psychology*, 95(1), 148-162.
- Glasser, W. (1998). *The Quality School: Managing Students Without Coercion*. New York: Harper Perennial.
- Gottfried, A.E., Fleming, J.S. and Gottfried, A.W. (1994). Role of parental motivation practices in children's academic intrinsic motivation and achievement. *Journal of Educational Psychology*, 86(1), 104-113.
- Guay, F., Marsh, H.W. and Boivin, M. (2003). Academic self-concept and academic achievement: Developmental perspectives on their causal ordering. *Journal of Educational Psychology*, 95(1), 124-136.
- Harter, S. (1999). *The Construction of Self: A Developmental Perspective*. New York: Guilford.
- Hattie, J. (1992). *Self-Concept*. New Jersey: Lawrence Erlbaum Associates.
- Kaplan, A. and Maehr, M.L. (2002). Adolescents' achievement goals. Situating motivation in sociocultural contexts. In F. Pajares and T. Urda (Eds). *Academic Motivation of Adolescents*. Connecticut: Information Age Publishing.
- Ma, X. and Xu, J. (2004). Determining the causal ordering between attitude toward mathematics and achievement in mathematics. *American Journal of Education*, 110(3), 256-280.

- Marsh, H.W. (1989). Age and sex effects in multiple dimensions of self-concept: Preadolescence to early adulthood. *Journal of Educational Psychology, 81*, 417-430.
- Marsh, H.W. (1990a). Causal ordering of academic self-concept and academic achievement: A Multiwave, longitudinal panel analysis. *Journal of Educational Psychology, 82*(4), 646-656.
- Marsh, H. W. (1990b). A multidimensional, hierarchical self-concept: Theoretical and empirical justification. *Educational Psychology Review, 2*, 77-172.
- Marsh, H.W. (1992). *Self-Description Questionnaire-2 (Short)*. Australia: University of Western Sydney.
- Marsh, H.W., Byrne, B.M. and Shavelson, R. (1988). A multifaceted academic self-concept: Its hierarchical structure and its relation to academic achievement. *Journal of Educational Psychology, 80*, 366-380.
- Marsh, H.W., Byrne, B.M. and Yeung, S.Y. (1999). Causal ordering of academic self-concept and achievement: Reanalysis of a pioneering study and revised recommendations. *Educational Psychologist, 34*(3), 155-167.
- Marsh, H.W. and Craven, R. (1997). Academic self-concept: Beyond the dustbowl. In G. Phye (Ed.), *Handbook of Classroom Assessment: Learning, Achievement, and Adjustment*. Orlando, FL: Academic.
- Marsh, H.W., Craven, R. and Debus, R. (1998). Structure, stability, and development of young children's self-concept: A multicohort-multioccasion study. *Child Development, 69*, 1030-1053.
- Marsh, H.W. and Hattie, J. (1996). Theoretical perspectives on the structure of self-concept. In Bracken, B.A. (Eds.). *Handbook of Self-Concept: Developmental, Social and Clinical Considerations*, (pp. 38-90). USA: John Wiley.
- Marsh, H.W. and Hau, K. (2003). Big-fish-little-pond-effect on academic self-concept. A cross-cultural (26 country) test of the negative effects of academically selective schools. *American Psychologist, 58*(5), 364-376.
- Marsh, H.W., Hau, K.T. and Kong, C.K. (2002). Multilevel causal ordering of academic self-concept and achievement: Influence of language of instruction (English compared with Chinese) for Hong Kong student. *American Research Journal, 39*(3), 727-763.
- Marsh, H.W. and Shavelson, R. (1985). Self-concept: Its multifaceted hierarchical structure. *Educational Psychologist, 20*, 107-125.
- Marsh, H.W., Trautwein, U., Ludtke, O., Koller, O. and Baumert, J. (2005). Academic self-concept, interest, grades and standardized test scores: Reciprocal effects models of causal ordering. *Child Development, 76*(2), 397-416.
- Marsh, H.W. and Yeung, A.S. (1997). The causal effects of academic self-concept on academic achievement: Structural equation models of longitudinal data. *Journal of Educational Psychology, 89*, 41-54.
- Marsh, H.W. and Yeung, A.S. (1998). Longitudinal structural equation models of academic self-concept and achievement: Gender differences in the development of math and English constructs. *American Education Research Journal, 35*(4), 705-738.
- Martin, A.J. (2001). The Student Motivation Scale: A tool for measuring and enhancing motivation. *Australian Journal of Guidance and Counselling, 11*, 1-20.
- Martin, A.J. (2002). Motivation and academic resilience: Developing a model of student enhancement. *Australian Journal of Education, 47*, 88-106.
- Martin, A.J. (2003). The Student Motivation Scale: Further testing of an instrument that measures school students' motivation. *Australian Journal of Education, 47*, 88-106.
- Martin, A.J. (2005). Examining a multidimensional model of student motivation and engagement using a construct validation approach. Submitted for publication.
- McClelland, D.C. (1965). Toward a theory of motive acquisition. *American Psychologist, 20*, 321-333.

- McInerney, D.M. (2001). Relationships between motivational goals, sense of self, self-concept and academic achievement: A comparative study with Aboriginal and non-Aboriginal students. Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA.
- Murphy, P.K. and Alexander, P.A. (2000). A motivated exploration of motivation terminology. *Contemporary Educational Psychology*, 25, 3-53.
- Newman, R.S. (1984). Achievement and self-evaluations in mathematics. *Journal of Educational Psychology*, 76, 857-873.
- Nicholls, J.G. (1989). *The Competitive Ethos and Democratic Education*. Cambridge: Harvard University Press.
- OECD (2003). *Student Engagement at School: A Sense of Belonging and Participation*. Paris: OECD.
- Pintrich, P.R. (2003). A Motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology*, 95, 667-686.
- Pintrich, P.R. and Maehr, M.L. (Eds.). (1995). *Advances in Motivation and Achievement* (Vol. 9). Greenwich, CT: JAI.
- Ryan, R.M. and Deci, E.L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55, 68-78.
- Sarason, I.G. and Sarason, B.R. (1990). Test anxiety. In H. Leitenberg (Ed). *Handbook of Social and Evaluation Anxiety* (pp.475-495). New York: Plenum Press.
- Schmidt, J.A. and Padilla, B. (2003). Self-esteem and family challenge: An investigation of their effects on achievement. *Journal of Youth and Adolescence*, 32(1), 37-46.
- Shavelson, R.J. and Bolus, R. (1982). Self-concept: The interplay of theory and methods. *Journal of Educational Psychology*, 74, 3-17.
- Shavelson, R.J., Hubner, J.J. and Stanton, G.C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research*, 46(3), 407-441.
- Skaalvik, E.M. (1997). Issues in research on self-concept. In M.Maehr and P.Pintrich (Eds). *Advances in Motivation and Achievement* (Vol.10, pp.51-97). Greenwich, CT: JAI Press.
- Skaalvik, E.M. and Valas, H. (1999). Relations among achievement, self-concept, and motivation in mathematics and language arts: A Longitudinal study. *The Journal of Experimental Education*, 67(2), 135-149.
- Spielberger, C.D. (1985). Assessment of state and trait anxiety: Conceptual and methodological issues. *Southern Psychologist*, 2, 6-16.
- Strube, M.J. (1986). An analysis of the Self-Handicapping Scale. *Basic Applied Social Psychology*, 7, 211-224.
- Valentine, J.C., DuBois, D.L. and Cooper, H. (2004). The relations between self-beliefs and academic achievement: A systematic review. *Educational Psychologist*, 39, 111-133.
- Weiner. P. (1994). Integrating social and personal theories of achievement striving. *Review of Educational Research*, 64, 557-573.
- Wentzel, K.R. (1991). Social and academic goals at school: Motivation and achievement in context. In M.L. Maehr and P.R. Pintrich (Eds.), *Advances in Motivation and Achievement. A Research Annual* (Vol.7, pp.185-212). Greenwich, CT: JAI Press.
- Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review*, 6, 49-78.
- Wylie, R.C. (1979). *The Self-Concept*. (Vol.20). Lincoln: University of Nebraska Press.
- Zimmerman, B.J. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B.J. Zimmerman and D.H. Schunk (Eds). *Self-Regulated Learning and Academic Achievement: Theoretical Perspectives* (pp.1-38). Mahwah, NJ: Erlbaum.