

Effects Between Motivational Goals, Academic Self-Concept and Academic Achievement: What is the Causal Ordering?

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Research has been conducted on a) relations between *academic self-concept* and *academic achievement*, which is well established in the literature, however there remains disagreement about the causal ordering of these constructs b) relations between *motivation* and *academic achievement* which show moderate-to-strong correlations and c) relations between *academic self-concept* and *motivational indicators* which show strong correlations. Of the studies that combine self-concept and motivation, few examine motivation from a goal perspective. The generalised hypothesis attached to this investigation is that variables drawn from self-concept and goal theories *taken together* will provide a fuller explanation of academic achievement than is possible with either self-concept or motivational goal variables alone. Hence, the purpose of this study was to examine with a longitudinal perspective, the relations between goal theory (mastery, performance and social), academic self-concept (maths and English) and academic achievement among seven-, eighth-, and ninth-grade students.

Relations Between Academic Self-concept and Academic Achievement

Studies have repeatedly shown moderate-to-strong correlations between academic achievement and academic self-concept. Moreover, as research on self-concept becomes more refined, a pattern on domain specificity has been confirmed. That is, substantial correlations have been found between matching areas of achievement (eg. English and maths achievement) with their respective self-concept (eg. English and maths self-concept), whereas substantially low correlations have been found between non-matching areas of academic self-concept and achievement (see for example Marsh, Trautwein, Lüdtke, Köller & Baumert, 2004). Although the relationship between academic self-concept and academic achievement is well established in the literature, there remains no firm agreement about the causal ordering (Skaalvik & Valas, 1999). In fact, a number of researchers purport that causal predominance remains an unresolved issue (Byrne, 1996; Pottebaum, Keith, & Ehly, 1986). A number of competing models have been proposed from both logical and theoretical grounds. These models of causation include: (a) Achievement affects self-concept (skill-development model), (b) self-concept affects achievement (self-enhancing model), (c) achievement and self-concept affect each other (reciprocal effects model), and (d) external variables affect both achievement and self-concept (see Skaalvik & Hagtvet, 1990; Valentine & DeBois, 2005).

Competing Models of Causation

Skill development model

The skill development model maintains that past achievement whether successful or unsuccessful influences the formation of self-concept but self-concept does not influence achievement. This model explains associations between self-concept and achievement as the result of students' self-beliefs increasing and

decreasing in response to altering successes and failures at school, rather than to any effects of self-beliefs on academic performance (Kohn, 1999). Practical implications for classroom teachers are school reforms devised based on this model, which support increasing standards and accountability for student learning (e.g., teacher feedback that is constructive so as to improve work, not necessarily focusing on making the student feel good about their work).

Self-enhancing model

The self-enhancement model maintains that an improvement in self-concept will lead to improved academic performance (Helmke & van Aken, 1995) and that achievement does not influence self-concept. Specifically, this model holds that positive self-beliefs promote increased levels of achievement. Critics of this model propose interventions and school reform that are aimed at improving students' self-concept will advance academic achievement (DuBois, 2001; Kahne, 1996).

Reciprocal effects model

The reciprocal effects model assumes self-beliefs predict increases in academic achievement (i.e., later achievement, after controlling for prior achievement), and, conversely, higher levels of achievement predict improvements in self-beliefs. Valentine and DuBois (2005) believe that among equally achieving students, having positive self-beliefs helps to promote subsequent gains in achievement relative to students with less favorable self-beliefs. A recent meta-analysis that synthesised findings from longitudinal studies of the relations between self-beliefs and achievement found support for the reciprocal effects model (Valentine, 2002; Valentine, DuBois, & Cooper, 2004).

A model comprising external variables

Valentine and DeBois (2005) acknowledge in their review of research on self-beliefs the importance of examining moderating variables in an effort to further explain how self-beliefs and academic achievement are related. They provide an example of how positive academic self-beliefs may increase academic motivation, which in turn may improve academic achievement. Valentine and DeBois (2005) encourage investigators to "include these variables more frequently when studying the relationship between self-beliefs and achievement" (p. 72).

Methodological Concerns

Many studies that examine causation of self-concept and academic achievement are problematic, as they have not applied necessary criteria. Byrne (1984), in a pertinent review of literature, noted that studies are unsuited to interpreting causal ordering unless they demonstrate a statistical relation between the constructs, establish precedence of time, and test causal models using sophisticated analyses such as confirmatory factor analyses. Marsh, Byrne & Yeung (1999) provide specific guidelines to analyzing the causal ordering of self-concept and achievement. Marsh et al. (1999) propose that both self-concept and achievement should be inferred by at least three items to the respective factor and that the factors should be measured on at least two occasions (i.e., a two-wave study). Measures collected over multiple occasions should control for method-halo effects by correlating uniquenesses between repeated measures. This study meets and exceeds most of these criteria. Specifically, this study expands three waves and establishes clear time precedence as each

wave was collected one academic year after the next. Sophisticated analyses are evident in the use of confirmatory factor analysis and structural equation modeling to examine both the measurement model and structural relations among the variables. All variables examined have been inferred by at least three items except for achievement since this was inferred by ranks only. Method-halo effects have been avoided by correlating uniquenesses between repeated measures.

Relations Between Academic Motivation and Academic Achievement

A number of studies have shown a moderate-to-strong relation between academic achievement and motivation (e.g., Skaalvik & Rankin, 1995). Within a goal theory framework of motivation there are two distinct motivational tendencies. One motivational tendency maintains that students who engage in a task in order to master a skill or activity in an attempt to seek competence pursue a mastery goal. The other motivational tendency maintains that students who engage in a task to attain favourable judgements of competence pursue a performance goal. There is little debate about the positive effects of mastery goals on measures of academic performance and achievement. However, performance goals demonstrate inconsistent relations with academic performance and achievement. Negative, null and positive effects of performance goals on academic outcomes are all evidenced in the literature (Kaplan & Middleton, 2002).

Social goals are another important class of goals that may influence academic performance (Dowson & McInerney, 2003). Unlike academic goals (i.e., mastery and performance goals), social goals are directly referenced to individuals or groups associated with the academic tasks, in addition to being referenced to the tasks themselves (Dowson, 1999). Social reasons for trying to achieve in academic situations are the dominant concerns for individuals pursuing social goals (McInerney, Roche, McInerney & Marsh, 1997; Urdan & Maehr, 1995). Few direct links between social goals and academic achievement have been established in the literature (Urden & Maehr, 1995). However, there is reason to suspect that social goals may be linked to achievement, either by supporting the positive effects of other goals on achievement, or ameliorating their negative effects (Barker, Dowson, McInerney, 2004a).

Relations Between Academic Self-concept, Academic Motivation and Academic Achievement

To date few studies endeavour to unify the numerous competing motivational constructs. There have been repeated calls for a comprehensive model to more fully explain the dynamic interactions among motivational variables (Bong, 1996). Although not as complete as the proposed comprehensive model, this study attempts to display greater depth and breadth by combining two related but independent motivational dimensions specifically, goal theory and academic self-concept. Curiously, there appears to be division between most researchers investigating motivation and those investigating self-concept (although see Skaalvik, 1997; Skaalvik, Valas & Sletta., 1994 and Skaalvik & Valas, 1999 as exceptions). Researchers of goal theory avoid the explicit discussion of self-concept instead refer exclusively to perceptions of ability. Self-concept researchers acknowledge the impact of motivation but avoid a goal theory framework as an explanation. We

endeavour to unify Goal theory and self-concept as they are interconnected and when combined can provide valuable insight into student achievement.

Studies have repeatedly shown strong relations between students' academic self-concept and a variety of motivational indicators. Some examples include students' ratings of effort (Skaalvik & Rankin, 1995), teachers' ratings of level of engagement, persistence in classroom activities (Skaalvik & Rankin, 1996), and measures of intrinsic motivation (Meece, Blumenfeld & Hoyle, 1988). Specific to the limited research on the relations between goal theory and self-perceived abilities, mastery goals and performance goals have been found not to correlate significantly with self-perceived abilities or that the relations are weak (Ames & Archer, 1988; Nicholls, 1989; Nicholls, Patashnick & Nolen, 1985). Of the significant correlations found between mastery goals and self-perceived abilities, most are positive (Meece et al., 1988; Schunk & Swartz, 1993), while inconsistent relations have been found between performance goals and self-perceived abilities. Performance goals were found to relate negatively in studies conducted by Ames and Archer (1988) and Schunk and Swartz (1993). In contrast, performance goals were found to positively correlate with self-perceived abilities in Nicholls' (1989) and Skaalvik's (1997) studies. This latter finding is consistent with an understanding that performance goals are not always 'bad' (i.e. maladaptive for self-perceptions and achievement), or at least not for all students, all of the time (Dowson & McInerney, 2003; Urdan, 1997).

Moreover, studies indicate that the effect of academic achievement on motivation is mediated through academic self-concept (Norwich, 1987; Skaalvik & Rankin, 1995, 1996). Ames' (1990) experimental research found after one year, students encouraged to foster mastery goals demonstrated stronger preferences for challenging tasks, greater propensities to apply effective cognitive strategies, enhanced intrinsic motivation, and higher self-concepts of ability. This study suggests, therefore, that manipulating mastery goals may result in more positive self-concepts and academic cognition. Among high school aged students, Mac Iver, Stipek and Daniels (1991) found a causal relationship between academic self-concept and intrinsic motivation. They showed that self-perceptions of ability predicted directional changes in intrinsic motivation. Skaalvik and Ranking (1996) also identified indirect and direct effects of persistence and engagement in classroom tasks (i.e. mastery goal-type behaviours) on achievement, with the indirect effect of mastery goals being mediated through self-concept of ability.

Purpose

In an attempt to respond to calls requesting unification of the extensive literature on academic motivation, researchers of this study have combined two substantial dimensions. To date, few researchers have explored relations between self-concept and goals (although see Anderman, Anderman, & Griesinger, 1999; Martin & Debus, 1998; Skaalvik, 1997; and Skaalvik et al, 1994; for some exceptions to this generalisation). Of these studies, most have been limited to an investigation of mastery and performance goals. Whereas this study includes social goals in the goal theory framework as together they provide a more thorough explanation as to the purposes for student engagement in academic tasks. For example some students may engage in

academic tasks for the purpose of seeking mastery, others may engage to demonstrate competence relative to others while some may engage in academic tasks for social approval. Previous studies have confirmed the inclusion of social goals in the goal theory framework (Barker, Dowson & McInerney, 2003, 2004b). Within this context, the purpose of the present study was to examine with a longitudinal perspective the relations between academic achievement, academic self-concept and achievement motivation. These variables were examined in the domains of English and mathematics among seventh, eighth, and ninth graders. Essentially a series of Structural Equations Models were tested to examine the effects of the variables in different orderings over the three waves. We wanted to assess the relative strength of the relationships and make some tentative inferences about causality. The extent to which these models fit the data in this study will be useful for future analyses that examine the causal link between the variables of this study.

Method

Participants

Participants in the study were 1 001 secondary school students in Years 7, 8 and 9 in the first year of data collection, which took place in November 2000. The second data collection took place one academic year later when the students attended Years 8, 9, and 10. In the final year of data collection, students were in Years 9, 10, and 11. The participants were from eleven high schools broadly representative of school settings in New South Wales, Australia. 52% (n = 521) of these students were female and 48% (n = 480) were males, with the mean age of students at Time 1 being 13.10 years, Time 2 being 14.20 years and at Time 3 15.2 years.

Measures

Academic Self-Description Questionnaire

Recent research on the multidimensionality of self-concept focuses on domain-specific self-concepts (Lau, Yeung, Jin & Low, 1999). Marsh's (1989) Self-Description Questionnaire (SDQ) measures students' self-concept in a variety of non-academic and academic domains. The SDQ comprises seven non-academic scales (e.g., physical appearance and physical ability) and three academic scales (e.g., maths, verbal and general school). Marsh and colleagues (Marsh, 1989; Marsh, Relich, & Smith, 1983) designed the Self-Description Questionnaire II in order to examine adolescents' multidimensional self-concept between the ages of 12 and 12 years (Gonzalez-Pienda et al., 2002). Based on the SDQ II, Marsh (1990) developed the Academic Self-Description Questionnaire II. The ASDQ II examines academic self-concepts in specific domains. Two scales from the ASDQ II were adopted for the purposes of this study. Five items measured English self-concept (eg. "I am good at English.") and 5 items measured math self-concept (eg. "I am good at maths."). These items, their numerical identifiers, and their alpha estimates of reliability at both Time 1 and Time 2, are recorded in Table 1. Students responded to the items in Table 1 on a five-point likert scale ranging from "strongly disagree" to "strongly agree".

Table 1

ASDQ II Items**English Self-concept Items** (T1: $\alpha = .87$; T2: $\alpha = .88$; T3: $\alpha = .89$)

ENGLSC1	I am good at English
ENGLSC2	I have always been good at English
ENGLSC3	Work in English is easy for me
ENGLSC4	I get good marks in English
ENGLSC5	I learn things quickly in English

Maths Self-concept Items (T1: $\alpha = .91$; T2: $\alpha = .92$; T3: $\alpha = .92$)

MATHSC6	I am good a mathematics
MATHSC7	I have always been good at mathematics
MATHSC8	Work in mathematics is easy for me
MATHSC9	I get good marks in mathematics
MATHSC10	I learn things quickly in mathematics

Note: Numbers in brackets refer to Cronbach's alpha reliability for each scale at Time 1 and Time 2.

General Achievement Goal Orientation Scale

The nature of students' motivation was evaluated using the General Achievement Goal Orientation Scale (GAGOS) developed by McInerney (1997). Constructed from McInerney's Inventory School Motivation (ISM) instrument (McInerney & Sinclair, 1991, 1992) and influenced by Maehr's Personal Investment Model (PIM) (Maehr, 1984; Maehr & Braskamp, 1986), the GAGOS has demonstrated sound psychometric properties (Barker, McInerney, & Dowson, 2002; Barker et al., 2003b; Barker et al., 2004c).

The GAGOS measures three general goal orientations (General Mastery, General Performance and General Social). Each of the three general orientations subsume at least two components. General Mastery subsumes task involvement (e.g., I am most motivated when I am good at something), and effort (e.g., I am most motivated when I see my work improving). General Performance subsumes competitiveness (e.g., I am most motivated when I am doing better than others), power (e.g., I am most motivated when I am noticed by others), competition (e.g., I am most motivated when I am doing better than others) and extrinsic motivation (e.g., I am most motivated when I get a good mark). General Social subsumes affiliation (e.g., I am most motivated when I work with others), and social concern (e.g., I am most motivated when I am helping others). Rather than inferring motivation, as is the approach in the ISM, the GAGOS intentionally denotes the term "motivated" at the beginning of each item stem (i.e., I am most motivated when...).

Respondents subsequently acknowledged whether they were most motivated in a mastery, performance or social goal situation.

The GAGOS comprises five items measuring General Mastery, eight items measuring General Performance, and five items measuring General Social orientation. These items, their numerical identifiers, and their alpha estimates of reliability at both Time 1 and Time 2 are recorded in Table 2. As with items from the ASDQ II, students responded to the items in Table 2 on a five-point likert scale ranging from “strongly disagree” to “strongly agree”.

Table 2.

Achievement Motivation Items

Mastery Goal (T1: $\alpha = .77$; T2: $\alpha = .75$; T3: $\alpha = .76$)

A27MAG	I am most motivated when I see my work improve
A32MAG	I am most motivated when I am good at something
A37MAG	I am most motivated when I solve a problem
A42MAG	I am most motivated when I am becoming better at my work
A50MAG	I am most motivated when I am confident that I can do my schoolwork

Performance Goal (T1: $\alpha = .82$; T2: $\alpha = .82$; T3: $\alpha = .81$)

A58PERG	I am most motivated when I get a reward
A62PERG	I am most motivated when I get good marks
A72PERG	I am most motivated when I am noticed by others
A78PERG	I am most motivated when I am competing with others
A83PERG	I am most motivated when I am in charge of a group
A90PERG	I am most motivated when I am praised
A95PERG	I am most motivated when I am doing better than others
A98PERG	I am most motivated when I become a leader

Social Goal (T1: $\alpha = .75$; T2: $\alpha = .75$; T3: $\alpha = .74$)

A35SOCG	I am most motivated when I work with others
A55SOCG	I am most motivated when I am in a group
A67SOCG	I am most motivated when I work with friends at school
A101SOCG	I am most motivated when I am helping others
A108SOCG	I am most motivated when I am showing concern for others

Note: Numbers in brackets refer to Cronbach’s alpha reliability for each scale at Time 1 and Time 2.

Analyses

Confirmatory Factor Analyses (CFAs: e.g., Hau, Kong & Marsh, 2000; Kaplan, 2000) using LISREL and Reliability Analyses using SPSS (Pedhazur & Pedazur-Schmelkin, 1991) were used to determine the psychometric properties of the combined GAGOS, ASDQ II and achievement data at Time 1, Time 2 and Time 3, for the full sample (see Barker, Dowson & McInerney, 2005). Longitudinal Structural Equation Modelling (LSEM) was then used to assess the relative strength of the relationships and make tentative judgments about causality. A full description of LSEM is beyond the scope of this paper, however, the reader may consult a number of knowledgeable reviews on the subject (e.g. Byrne, 1998; Kaplan, 2000). Briefly, however, is LSEM researchers postulate a priori longitudinal relation between observed variables (e.g. survey items) and unobserved latent variables (e.g. goals or self-concepts).

The goodness-of-fit of LSEM models is largely determined by how closely a matrix of hypothesised (model generated) variances and covariances matches a matrix of empirical (data generated) variances and covariances (Kelloway, 1998). A traditional measure for the discrepancy between these two variance/covariance matrixes is the Chi-square/degrees of freedom test statistic. In poorly fitting models this statistic is significant (indicating that the discrepancy between the hypothesised and empirical matrixes is large), and vice versa (see Kelloway, 1998; Mueller, 1996). Problematic for the Chi-square statistic, however, is its sensitivity to sample size (Loehlin, 1998). With very large samples, for example, it is possible to obtain a significant Chi-square/df ratio (indicating poor model fit) even with substantially 'good' models i.e. small absolute differences between the matrixes.

Given the difficulties associated with the Chi-square test, a number of alternative fit indices have been proposed. These include the Tucker-Lewis Index (TLI), the Comparative Fit Index (CFI), the Parsimony Relative Non-centrality Index (PRNI) and the Root Mean Square Error of Approximation (RMSEA) (Kelloway, 1998; Loehlin, 1998). The relative merit of these indices is hotly debated in the literature (Diamantopoulos & Siguaw, 2000; Marsh & Balla, 1992, 1994). However, a broad consensus exists that, if these indices are to be used, several of them should be used alongside each other in evaluating model fit (Diamantopoulos & Siguaw, 2000; Mueller, 1996). In this way, potential discrepancies in the performance of one or two indices may be balanced by a comparison with the others. Ideally, values for the TLI, CFI and PRNI should be as close to 1.00 as possible, although values greater than 0.90 are generally taken to indicate acceptable fit (Diamantopoulos & Siguaw, 2000; Marsh, Balla, & Hau, 1996). Conversely, values for the RMSEA should ideally be less than 0.05, although values between 0.05 and 0.08 indicate reasonable errors of approximation (Browne & Cudeck, 1993; Byrne, 1998).

Descriptions of Models Tested

Consistent with Marsh et al. (1999) guidelines, we commenced with a full forward SEM in which correlations among factors within the same wave, as well as paths from all constructs in each wave to all constructs in subsequent waves were freely estimated. All indices for this model provide a good fit to the data. We then tested models that were identical to the full forward model or 'parent' model, however certain parameters were restricted so as to examine various competing models. These various competing models are referred to as nested models as they are nested under their parent model. Nested models will always fit the data less well than parent models because they place additional (error laden) restrictions on the data. Consistent with this, the present study found that the nested models provided a poorer fit to the data although they provide valuable information about the effects of the variable on each other. Hence, nested models were used to evaluate the critical parameters between self-concept, goals and academic achievement in their competing causal orderings.

In order to test the potential causal ordering of goals and self-concept with respect to achievement, we essentially tested four nested models under the full forward model. Two causal orderings were examined in this study. The first ordering comprised Self-concept at Time 1 (T1), Goals at Time 2 (T2) and Achievement at Time 3 (T3). The second ordering tested Goals at Time 1, Self-concept at Time 2 and Achievement at Time 3. These competing models were examined across English and maths domains. We were also interested in direct effects, total effects and fully mediated models. A total of thirteen models were tested these included:

- a. Model 1 (M1): the full forward model with all parameters estimated.
- b. Model 2 (M2): Direct effects of English Self-concept T1 on English Achievement at T3.
- c. Model 3 (M3): Total effects of English Self-concept T1, Goals T2 and English Achievement T3.
- d. Model 4 (M4): Mediated model of English Self-concept T1, Goals T2 and English Achievement T3.
- e. Model 5 (M5): Direct effects of Maths Self-concept T1 on Maths Achievement at T3.
- f. Model 6 (M6): Total effects of Maths Self-concept T1, Goals T2 and Maths Achievement T3.
- g. Model 7 (M7): Mediated model of Maths Self-concept T1, Goals T2 and Maths Achievement T3.
- h. Model 8 (M8): Direct effects of Goals T1 on English Achievement at T3.
- i. Model 9 (M9): Total effects of Goals T1, English Self-concept T2, and English Achievement T3.
- j. Model 10 (M10): Mediated model of Goals T1, English Self-concept T2 and English Achievement T3.
- k. Model 11 (M11): Direct effects of Goals T1 on Maths Achievement at T3.
- l. Model 12 (M12): Total effects of Goals T1, Maths Self-concept T2 and Maths Achievement T3.

m. Model 13 (M13): Mediated model of Goals T1, Maths Self-concept T2 and Maths Achievement T3.

Results

Overall results of the thirteen models are presented in Table 3.

Table 3.

Model Fit Statistics

Model	χ^2	df	χ^2/df	TLI	CFI	PRNI	RMSEA	Model Description
M1	6658.59	1914	3.48	0.92	0.94	0.92	0.05	Full forward model
								Self-Concept T1
								English
M2	10045.32	2354	4.27	0.90	0.91	0.82	0.06	Direct Effect
M3	10003.37	2348	4.26	0.90	0.91	0.81	0.06	Total Effect
M4	10029.98	2349	4.27	0.90	0.91	0.81	0.06	Fully Mediated Effect
								Maths
M5	9998.82	2354	4.25	0.90	0.91	0.82	0.06	Direct Effect
M6	9945.41	2348	4.24	0.90	0.91	0.81	0.06	Total Effect
M7	10026.26	2349	4.27	0.90	0.91	0.81	0.06	Fully Mediated Effect
								Goals T1
								English
M8	10019.92	2352	4.26	0.90	0.91	0.82	0.06	Direct Effect
M9	9970.26	2350	4.24	0.90	0.91	0.82	0.06	Total Effect
M10	9991.34	2351	4.25	0.90	0.91	0.82	0.06	Fully Mediated Effect
								Maths
M11	9984.16	2349	4.25	0.90	0.91	0.81	0.06	Direct Effect
M12	10023.56	2350	4.27	0.90	0.91	0.81	0.06	Total Effect
M13	10056.96	2351	4.28	0.90	0.91	0.81	0.06	Fully Mediated Effect

The full forward model is a good fit to the data with all indices reaching criterion values. As expected, this model provides a significantly better fit to the data than the twelve nested models. However the twelve nested models were used to assess the relative strength of the relationships and make tentative judgments about causality. The twelve nested models fit comparatively to the data and all provide an adequate fit according to the indices in Table 3.

Goals T1, Self-concept T2 and Achievement T3 in the Domain of English

All paths from mastery, performance and social Goals T1 to English self-concept T2 were significant. The paths from mastery goals to English self-concept were positive whereas the paths from performance goals and social goals to English self-concept were negative. As expected, the path between English self-concept T2 and English achievement T3 was positive and highly significant. The total effect of mastery goals T1 on English achievement T3 was significant and positive however this effect was smaller than the indirect effect. The total effect of performance goals and social goals T1 on English achievement T3 was significant and negative however like mastery goals, this effect was smaller than the indirect effect of Goals T1 through English self-concept T2 to English achievement T3. Interestingly, the direct effect of Goals T1 to English achievement T3 was significant for mastery and social goals. Mastery goal T1 positively related to English achievement T3 whilst social goals negatively related to English achievement. The effect of performance goals T1 on English achievement T3 was negative but this path was not significant. Table 4 provides details of the effects of Goals T1 to English self-concept T2 and English achievement T3.

Table 4.

Direct and Indirect Effects of Goals and Self-Concept on English Achievement

	English Self-Concept Time 2			English Achievement Time 3		
	Coefficient	SE	T-value	Coefficient	SE	T-value
Mastery T1						
<i>Direct</i>	-	-	-	0.12	0.04	3.00
<i>Total Effect</i>	0.10	0.04	2.46	0.03	0.01	2.35
<i>Mediated</i>	0.13	0.04	3.39	-	-	-
Performance T1						
<i>Direct</i>	-	-	-	-0.08	0.04	-1.81
<i>Total Effect</i>	-0.14	0.04	-3.64	-0.04	0.01	-3.29
<i>Mediated</i>	-0.14	0.04	-3.65	-	-	-
Social T1						
<i>Direct</i>	-	-	-	-0.18	0.04	-4.37
<i>Total Effect</i>	-0.12	0.04	-3.36	-0.03	0.01	-3.09
<i>Mediated</i>	-0.12	0.04	-3.36	-	-	-
Self-concept T2						
<i>Total Effect</i>	-	-	-	0.27	0.04	7.30
<i>Mediated</i>	-	-	-	0.28	0.04	7.47

Note:

All effect sizes are based on a fully Standardised Solution.

Boldfaced figures represent significant paths at, at least, the 0.05 level.

Goals T1, Self-concept T2 and Achievement T3 in the Domain of Maths

Unlike the results detailed above, there were few significant paths from Goals T1 to Maths self-concept T2 however Maths self-concept T2 positively and significantly effected Maths achievement T3 for the total

effects and mediated models. Interestingly, direct paths from all three Goals T1 to Maths achievement T3 were significant. A similar pattern of results was found between Goals T1 and achievement T3 within English and maths domains. That is, mastery Goals T3 positively effected Maths achievement T3 while the reverse was true for performance and social Goals for Maths achievement T3. Table 5 provides details of the effects of Goals T1 to Maths self-concept T2 and Maths achievement T3.

Table 5.
Direct and Indirect Effects of Goals and Self-Concept on Maths Achievement

	Math Self-Concept Time 2			Maths Achievement Time 3		
	Coefficient	SE	T-value	Coefficient	SE	T-value
Mastery T1						
<i>Direct</i>	-	-	-	0.11	0.04	2.29
<i>Total Effect</i>	-0.06	0.04	-1.63	-0.01	0.01	-1.51
<i>Mediated</i>	-0.04	0.04	-1.18	-	-	-
Performance T1						
<i>Direct</i>	-	-	-	-0.12	0.04	-2.93
<i>Total Effect</i>	0.04	0.04	0.96	0.01	0.01	0.93
<i>Mediated</i>	0.04	0.04	0.95	-	-	-
Social T1						
<i>Direct</i>	-	-	-	-0.12	0.04	-3.07
<i>Total Effect</i>	-0.01	0.04	-0.26	0.00	0.01	-0.26
<i>Mediated</i>	-0.01	0.04	-0.26	-	-	-
Self-concept T2						
<i>Total Effect</i>	-	-	-	0.14	0.03	4.11
<i>Mediated</i>	-	-	-	0.14	0.03	4.11

Note:

All effect sizes are based on a fully Standardised Solution.

Boldfaced figures represent significant paths at, at least, the 0.05 level.

Self-concept T1, Goals T2 and Achievement T3 in the Domain of English and Maths

Only one path from English self-concept T1 to Goals T2 was significant. This path was from English self-concept to mastery goals and was positive. The effects of English self-concept T1 on performance and social goals were negative but not significant. The pattern of effects for Goals T2 on achievement T3 was consistent. That is, regardless of the domain (English or Maths achievement), mastery goals had a positive and more often significant effect on achievement T3 while performance and social Goals T2 had a negative effect, which was not always significant, on achievement. As expected, the direct effect between matching domains of self-concept T1 with their respective domain of achievement T3 was statistically significant and positive. Tables 6 and 7 provide details of the effects of Self-concept T1 to Goals T2 and achievement T3 for the domains of English and maths.

Table 6.
Direct and Indirect Effects of Self-Concept and Goals on Achievement for English

	English Self-Concept Time 1			English Achievement Time 3		
	Coefficient	SE	T-value	Coefficient	SE	T-value
Mastery T2						
<i>Total Effect</i>	0.12	0.04	2.80	0.15	0.04	3.76
<i>Mediated</i>	0.17	0.04	4.03	-0.07	0.04	-1.57
Performance T2						
<i>Total Effect</i>	-0.01	0.05	-0.13	-0.07	0.04	-1.66
<i>Mediated</i>	-0.04	0.05	-0.88	0.16	0.04	4.03
Social T2						
<i>Total Effect</i>	-0.04	0.04	-0.94	-0.07	0.04	-1.83
<i>Mediated</i>	-0.04	0.04	-1.03	-0.07	0.04	-1.80
Self-concept T1						
<i>Direct</i>	-	-	-	0.16	0.04	4.31
<i>Total Effect</i>	-	-	-	0.02	0.01	2.20

Note:

All effect sizes are based on a fully Standardised Solution.

Boldfaced figures represent significant paths at, at least, the 0.05 level.

Table 7.
Direct and Indirect Effects of Self-Concept and Goals on Achievement for Maths

	Maths Self-Concept Time 1			Maths Achievement Time 3		
	Coefficient	SE	T-value	Coefficient	SE	T-value
Mastery T2						
<i>Total Effect</i>	0.05	0.04	1.33	0.07	0.04	1.94
<i>Mediated</i>	0.11	0.04	2.80	0.08	0.04	2.20
Performance T2						
<i>Total Effect</i>	0.31	0.05	6.33	-0.10	0.04	-2.48
<i>Mediated</i>	0.28	0.05	5.81	-0.05	0.04	-1.25
Social T2						
<i>Total Effect</i>	-0.15	0.04	-4.02	-0.09	0.04	-2.25
<i>Mediated</i>	-0.17	0.04	-4.52	-0.10	0.04	-2.46
Self-concept T1						
<i>Direct</i>	-	-	-	0.23	0.03	6.80
<i>Total Effect</i>	-	-	-	-0.01	0.01	-0.96

Note:

All effect sizes are based on a fully Standardised Solution.

Boldfaced figures represent significant paths at, at least, the 0.05 level.

Discussion

The purpose of the present study was to unify two independent yet related constructs, self-concept and goal theory and examine their effects on academic achievement. To date, few studies have examined relations between self-concept and goals (Skaalvik & Valas, 1999). Of these studies, motivation was limited to the examination of academic goals (mastery and performance). This study extends the goal theory framework to include social goals. In this study, the full forward model provides a good fit to the data. Therefore the inclusion of social goals in the goal theory framework worked well. This is consistent with other studies (e.g., Dowson & McInerney, 2003), which suggest that social goals in addition to academic goals are important for students in educational settings. Since few studies have included social goals in their investigations, it is not clear what effect they have on a variety of educational outcomes (Urduan & Maehr, 1995). The results of this study consistently show that social goals have a negative effect on students' self-concept in both English and maths and also negatively effect academic achievement in same domains. This finding on social goals is notable given the context of the current debate concerning whether or not social goals are 'good' for achievement (Barker et al., 2004a). Students pursuing a social goal may be overly concerned about their peers and this preoccupation of peers may lead to the detriment of their own achievement and academic self-concept.

Unlike social goals, mastery goals consistently demonstrated positive effects on English and maths self-concept as well as positive effects on academic achievement in the same domains. These findings are congruent with previous research and confirm the positive effects of mastery goals on measures of academic performance and achievement (Kaplan & Middleton, 2002). These results could be explained by research that shows students approaching tasks with a mastery goal employ deep cognitive processing strategies such as linking new material with previous knowledge (Anderman & Maehr, 1994; Dowson & McInerney, 2003). These students may perceive themselves as more capable due to their effective employment of learning strategies and hence positively affect their academic self-concept and academic achievement.

Performance goals were more often found to relate negatively to English and maths self-concept as well as to English and maths achievement. Perhaps the focus on how well one is going relative to others proves damaging to an individual pursuing a performance goal. Instead of focusing on the task, a performance goal oriented individual is concerned with social comparisons and focusing on outperforming peers, which seems to negatively affect both their academic self-concept and academic achievement.

Some interesting tentative findings emerge concerning inferences about causality. It appears that for the domain of English there were more significant paths from goals to self-concept to achievement. For English, perceptions of self in English may be the key psychological mechanism *through* which goals affect English achievement. However, in the domain of mathematics, there were more significant paths from self-concept to goals to achievement. For maths, students' goals may be the key psychological mechanism through which maths self-concept affects maths achievement.

The practical implications of these findings for teachers are considered. First, in this study, we found that the causal chain flows differently depending on the domain. According to our results, a teacher in

English may benefit from fostering mastery goals in order to develop positive English self-concepts and increase subsequent achievement. This is because mastery goals are associated with deep levels of processing, and the employment of more effective learning strategies, hence their persistence and depth of understanding will positively influence the development of their English self-concept and affect subsequent English achievement. Whereas a teacher in mathematics may benefit from building positive maths self-concepts in order to foster positive goals (mastery goals) and increase subsequent achievement. Positive maths self-concepts have been shown to relate to students perseverance when confronted with challenging tasks (Berry & West, 1993; Bouffard, 2000). To maintain a positive self-concept in maths, these students expend effort, which is a mastery-type orientation, in order to complete challenging tasks. It is therefore likely that these students pursue a mastery goal, which may positively affect subsequent achievement because more effective strategies are employed to increase the chances of success.

Conclusion

This study offers promising directions for developing (a) a more refined understanding of the relations between self-concept and academic achievement; (b) a more refined understanding of relations between motivation and academic achievement (c) a more refined understanding of relations between self-concept and motivation and (d) developing effective educational interventions. It would be interesting to examine whether the causal findings from this study could be verified in future studies.

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Ms Katrina L. Barker is interested in researching student achievement motivation and completed an Honours thesis that examined the effects of motivational approaches on the recall of verbal information processed at deep and shallow levels. Her PhD extends on current research as academic achievement motivation is added to academic self-concept and academic achievement to explore the vexing question of the causal relations between variables.

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