
Relationships Among Perceived Competence, Intrinsic Value and Mastery Goal Orientation in English and Maths

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Abstract

A large and burgeoning literature has established that mastery goal orientations yield positive cognitive and behavioural educational outcomes. Less research has focused on the psychological antecedents of adopting mastery goals. The present study draws upon prominent psychological theories of achievement motivation, specifically the expectancy-value theory of Eccles, Wigfield and colleagues (Wigfield and Eccles 2002), to explore possible antecedents of students' mastery goals. Based on this theoretical framework, our study focused on children's perceptions of their competencies in English and maths and how these related to intrinsic value and mastery goals for English and maths. Questionnaires were used to gather data about Year 6 (N=60) participants' perceived competence, intrinsic value and mastery goal orientation, and correlational analyses established the direction and strength of the relationships between the perceptions. Participants were targeted for follow-up interviews (n=17) according to a matrix of low and high competence perceptions and mastery goals, with students selected from within each of six focal groups. Interview responses were reported according to emergent themes, from which we describe how the constructs under consideration relate to one another and highlight implications for educational practice.

Introduction

Motivation theory has had an enormous presence and widening influence in educational research and practice, over the last decade in particular (Alexander 2000,

Maehr and Meyer 1997). Within this field, a large and growing literature has studied students' goal orientations related to learning. Here, individuals' goals are conceptualised as the purpose of task engagement (Maehr 1989), and are viewed as important precursors to a host of processes and outcomes that are relevant to achievement (see Ames 1992, Dweck 1991, Harackiewicz, Barron and Elliot 1998, Urdan 1997 for reviews).

Goal theory research was initially based on two achievement goals: *mastery goals* (also referred to as task-involvement or learning goals), focused on the development of competence and task mastery; and *performance goals* (also referred to as ego-involvement or ability goals), focused on the demonstration of competence relative to others (Ames and Archer 1987). Performance goals have more recently been divided into *performance-approach* and *performance-avoidance* goals (Elliot 1997, Elliot and Church 1997, Elliot and Harackiewicz 1996, Harackiewicz et al. 2002). Performance-approach goals focus on the attainment of competence relative to others, and performance-avoidance goals focus on avoiding the demonstration of incompetence relative to others. More recently still, a fourth *mastery avoidance* goal has been proposed (Elliot and McGregor 2001, Pintrich 2000a, 2000b), where individuals are focused on striving to avoid incompetence based on either their own standards of attainment, or the absolute requirements of the task. This mastery avoidance goal is still relatively new to the goal theory field and is being established as a valid and useful construct. The four achievement goals are therefore differentiated by two dimensions of competence valence (approaching success or avoiding failure) and competence definition (self/task-referenced or normatively based: see Elliot and McGregor 2001).

It has been widely demonstrated that mastery goals lead to positive educational outcomes, including deep processing (e.g. Anderman, Griesinger and Westerfield 1998, Anderman and Young 1994, Miller, Greene, Montalvo, Ravindran and Nichols 1996, Pintrich and Garcia 1991, Pintrich and Schrauben 1992, Pintrich, Smith, Garcia and McKeachie 1993), persistence (Bouffard, Boisvert, Vezeau and Larouche 1995, Miller, Behrens, Greene and Newman 1993, Miller et al. 1996, Pintrich and Schrauben 1992, Pintrich et al. 1993) and effort (Mac Iver, Stipek and Daniels 1991, Meece and Holt 1993, Miller et al. 1996). However, there has been less research focused on the *antecedents* of goal adoption (exceptions being Dweck 1991, Maehr and Midgley 1991) and, in particular, little work looking to other motivational theories as organising frameworks to explore possible antecedents of goal adoption.

Goal theory has developed significantly in recent years, which is reflected in revisions to the instruments used to assess students' goals. This is true of the mastery goal subscale of the Patterns of Adaptive Learning Scales ('PALS': Midgley et al. 2000)

instrument adopted in the present study. That scale formerly included items tapping intrinsic value (Midgley et al. 2000, p. 3). They were removed from the 2000 revised scale so that it would focus more directly on goals as orienting frameworks within which students function, rather than specific behaviours or interests that students exhibit or teachers encourage (Midgley et al. 2000, p. 3). This was to reflect current conceptualisations of goals as *organising schema* (Midgley et al. 2000, p. 3). These changes were concurrent with calls for clarification of the range of motivational constructs used in the motivation literature (Alexander 2000).

Given the centrality of competence to the definition of achievement goals (Elliot and McGregor 2001), and the earlier intertwining of intrinsic value with mastery goals (Midgley et al. 2000), it is likely that students' perceived competence and intrinsic value relate to the adoption of mastery goals. Perceived competence and intrinsic value are key constructs within the Eccles, Wigfield and colleagues' expectancy-value theory of achievement motivation (Wigfield and Eccles 2000), which therefore provides a useful framework for this study. Their model delineates processes to explain individuals' achievement-related choices and behaviours, based on their research which demonstrates that competence beliefs and values are the most proximal predictors of achievement-related outcomes (e.g. Eccles (Parsons) et al. 1983, Eccles 1984, Eccles, Adler and Meece 1984, Ethington 1991, Meece, Wigfield and Eccles 1990). These findings have also been supported by other researchers (e.g. Bong 2001, Watt 2002). As in the present study, much of this work has been focused on the specific academic domains of English and maths.

Perceived competence refers to subjective judgements concerning one's ability to perform effectively in a given area (Ames and Ames 1984). Perceived competence has also been considered a key construct within other theoretical perspectives predicting achievement-related outcomes. Marsh and colleagues have demonstrated that students' self-concept of ability, akin to perceived competence, predicts coursework selection, and also predicts academic achievement in maths and English (Marsh and Yeung 1998). *Values* within the expectancy-value framework consist of intrinsic value, attainment or importance value, utility value or usefulness, and cost. Intrinsic value is defined as 'the enjoyment one gains from doing the task' (Wigfield and Eccles 2000, p. 72). Expectancy-value theorists describe *intrinsic value* as similar to intrinsic motivation as defined by Harter (1981) and by Deci and colleagues (Deci and Ryan 1985, Deci, Vallerand, Pelletier and Ryan 1991), although these constructs have developed from different intellectual roots (Eccles and Wigfield 1995, Wigfield and Eccles 2000). Eccles and colleagues have widely demonstrated the impact of intrinsic value on choice outcomes, and similarly Harter and colleagues have established the influence of intrinsic motivation on a range of positive learning outcomes (e.g. Harter, Whitesell and Kowalski 1992, Harter 1999). Attainment value is defined as the

importance of doing well on a given task; utility value refers to how a task fits into an individual's future plans; and cost to how the decision to engage in one activity limits access to other activities, effort required, and emotional cost (Wigfield and Eccles 2000).

Our study assessed *perceived competence* and *intrinsic value* as likely correlates of mastery goals. Intrinsic value is the expectancy-value theory value that is most likely to relate to mastery goals, having frequently been assessed as part of scales that measure mastery goals. It is therefore timely to empirically evaluate the distinctiveness of intrinsic value and mastery goal constructs following their theoretical clarification, and to assess their interrelationship. The present study includes both these measures, in order to assess the extent to which these may either overlap or provide related information.

Given that perceived competence, intrinsic value and mastery goals have been found to be critical predictors of achievement-related outcomes, and the plausible interrelationships between the three constructs despite their origins in different literatures, it is important to understand the processes through which they are related. It has been argued that the most important determinant of a child's motivation for learning is 'the self-as-perceived' (Maehr and Meyer 1997, p. 387). Eccles, Wigfield and colleagues' expectancy-value theory of achievement motivation posits that perceived competence influences intrinsic value (Wigfield and Eccles 2000), for which their most recent analyses provide support in the maths domain (Wigfield and Eccles 2002, p. 105). Both perceived competence and intrinsic value then predict achievement-related choices and behaviours. The work of Harter and colleagues (Harter, Whitesell and Kowalski 1992, Harter 1999) also reflects the view that competence evaluation leads to affective reactions such as intrinsic value, that in turn influence motivational orientations. The complex interrelationships of these constructs have been acknowledged (Wigfield 1994) and research is needed to investigate the processes by which perceptions of competence, intrinsic value and mastery goals are connected.

Our theoretical framework is based on the model of Eccles, Wigfield and colleagues, which suggests that perceived competence and intrinsic value influence mastery goals, as well as perceived competence indirectly influencing mastery goals via intrinsic value. Similarly, the model of Harter and colleagues reflects the view that perceived competence leads to affective reactions, which influence motivational orientation. For example, if a child believes s/he is competent in English, s/he likes English and hence is more likely to adopt mastery goals in English tasks, having a desire to want to learn more. Conversely, if a child believes s/he has low competence in English, s/he dislikes English and will be less likely to adopt a mastery goal for

engaging in English tasks. Our study focused on the three factors of perceived competence, intrinsic value and mastery goals and their interrelationships, with a qualitative phase subsequently exploring sources of students' perceptions, expected bases for which included social comparative processes, socialisers' influences and performance cues. This mixed-methods design permitted us first to assess empirically the strength of the relationships between perceived competence, intrinsic value and mastery goals, including their empirical distinctiveness; and second, to collect rich interview data tapping participants' experiences and sources of their perceptions, which supplemented and extended the survey data. Including two academic domains, English and maths, allowed us to assess the extent to which patterns were similar across domains.

Sources of students' academic perceptions

Influences of significant others The 'self' is a social construction according to Cooley (1902), and he labelled this phenomenon the 'looking glass self'. By this term, he was inferring that the child comes to see the self in the way s/he perceives that others see it. Mead (1934) extended this perspective, arguing that in childhood children tend to coordinate the collective opinions of others into an evaluation of the self, which she termed the 'generalised other'. Contemporary theorists have extended the ideas of these early scholars of the 'self', and have outlined social processes through which the child comes to perceive the self, such as comparisons with others, adopting the opinions of significant others (Harter 1990), and performance feedback. The importance of others' perceptions as a source of self-perceptions has been highlighted by research suggesting that, as early as the sixth grade, social information such as the comparison of grades and feedback from significant others replaces even effort as the basis for students' perceptions of competence (Blumenfield, Pintrich and Hamilton 1987).

The influences of significant others include peer, parent and teacher beliefs about one's competence. Peers have been shown to have a major influence (Oldfather and Dahl 1994), with classmates frequently providing positive and negative feedback about ability, which may come in the form of verbal comments particularly after test results are made available. Parents may convey beliefs about their child's competencies through the messages they give regarding the difficulty and importance of achievement tasks (Eccles, Adler and Kaczala 1982), and longitudinal studies have demonstrated parents exert a powerful influence on children's subsequent perceptions of competence (e.g. Frome and Eccles 1998, Jacobs and Eccles 1992). Students' perceptions of competence have been found to become more highly correlated with teacher ratings of student ability in the fifth and sixth grades (Harter 1982). This could be due to increased teacher input and feedback, or older children becoming more familiar with the way their ability is determined within the school

system. Expectations that teachers either overtly or covertly communicate can have a powerful influence on the child's personal beliefs about competencies and hence achievements (Boggiano and Pittman 1992).

Social comparative processes Social comparative processes involve comparing one's ability with that of others. Instructional changes as students progress through school make normative comparisons more salient (Stipek and Daniels 1988, p. 352), for example the increased emphasis on grading and ability grouping. Students also face the demands of a school culture that increasingly reinforces extrinsic motivation through the practices of grading and the issuing of marks (Harter, Whitesell and Kowalski 1992). Grades act as indicators for students to determine their relative performance on standardised tests and assignments, and students may perceive that teachers have greater control over evaluative outcomes than they themselves have. This may lead to weaker relations between perceptions of competence and actual achievement within a given domain. The ELLA (English Language Literacy Assessment) and Basic Skills Tests are examples of standardised testing procedures recently introduced in New South Wales (NSW) Australian schools. The NSW Higher School Certificate grading and reporting up until 2000 is another local example of purely normative criteria for the assessment of academic competencies. While this system has now improved with clear criteria for success provided to Year 12 students along with ranking information, the NSW education system still promotes social comparison as a means to evaluate one's academic competence. Within the NSW context, then, we would expect social comparisons to be important determinants of perceived competence.

Performance cues Performance cues describe feedback the child receives in the form of marks, grades and previous performance. Perceptions of competence in the fifth and sixth grades depend heavily on grades and marks given to students by teachers (Blumenfield, Pintrich and Hamilton 1987). Grades have been shown to have a negative impact on children's conceptual learning, and also undermine intrinsic motivation (Grolnick and Ryan 1989). Administering grades and ranks in the classroom is not favourable if the goal is for children to be cognitively engaged, develop thorough understandings of vital concepts and adopt mastery goals for learning.

The present study

Why is it important to foster students' perceived competence, intrinsic values and mastery goals? Schunk (1989, p. 55) contended that mastery-oriented students feel that a particular activity is worth doing for its own sake even if nothing else were to come if it. Additional advantages of being mastery oriented include the development of stronger conceptual understanding of task material, greater attention to the task at

hand and greater learning outcomes. Students with mastery goals are intrinsically motivated to strive to develop competence by learning as much as they can about a subject, focusing on their development of skill and competence relative to the task (Harackiewicz, Barron and Elliot 1998, Kaplan and Middleton 2002, Midgley, Kaplan and Middleton 2001). Conversely, students who are extrinsically motivated to achieve their goals may strive to outperform peers in their schoolwork and focus on demonstrating their ability relative to others (referred to as *performance-approach* goals in the goal theory literature), or focus on avoiding the demonstration of their lack of ability relative to others (known as *performance-avoidance* goals). Generally, it has been found that students with high perceptions of competence are more likely to continue performing well and also to initiate behaviours that enhance their ability (Maehr 1984). In contrast, students with low perceptions of competence are more likely to feel discouraged in their attempts to perform and so may not invest the effort needed to improve their ability. Expectancy-value researchers have also widely demonstrated that intrinsic value positively influences academic choices for participation, and indeed it was measured as part of the mastery goal construct until recently (Midgley et al. 2000). While these findings intuitively make sense, the mental processes and feelings that connect perceptions of competence to the adoption of mastery goals are not clear and need to be examined. Intrinsic values may provide part of this link. Our qualitative study component elicited rich descriptions of students' perceived competence, intrinsic value and mastery goals, in order to explore the contingencies among these constructs.

The initial survey phase provided general patterns of relationships between perceptions of competence, intrinsic value and mastery goals, and permitted the selection of interviewees. This phase was important in clarifying the distinction between intrinsic values and mastery goals, and also in establishing the strength of the relationships between the factors. We assessed perceptions in relation to both English and maths, since these are core academic subjects all students undertake. Both domains were included to permit assessment of whether findings were domain-specific, or likely to be generalisable across academic domain. Year 6 students were chosen since by this age perceptions of competence are highly correlated with performance ratings (Harter 1982), which may indicate students are better able to make realistic judgements about their competence (Fredricks and Eccles 2002, Harter 1982, Nicholls 1979, Paris and Byrnes 1989).

The qualitative interview phase provided further exploration of the complex relationships between students' perceptions. Interviewees were selected according to a matrix of high versus low competence perceptions and intrinsic motivation (following Watt 1998, 2002), with three focal groups of: (1) high perceived competence and high mastery goals, (2) low perceived competence and high mastery

goals, and (3) high perceived competence and low mastery goals. This phase built on the quantitative data by focusing more intensively on extreme groups (Kagan, Snidman and Arcus 1998). Our focal interview groups were of particular relevance to explore (1) how high competence perceptions may foster high levels of mastery goals, (2) how some students' high mastery goals are derived despite low perceived competence, and (3) why some other students having high competence perceptions have low mastery goals. This 'extreme groups' design therefore facilitated identification of sources other than perceived competence that heighten mastery goals (through comparing the first two groups), as well as possible interferences that may result in students who have high competence perceptions having low mastery goals (through comparing the first and last groups), thereby teasing out and clarifying processes that relate mastery goals and perceived competence. The interviewee selection design was applied to each of English and maths to obtain qualitative data from both academic domains.

Methodology

Design

The present study first determined the strength of the interrelationships between competence perceptions, intrinsic value and mastery goals, using correlational analyses. Second, an interview phase focused on students from three focal conditions, extending and enriching the survey data by teasing out complex interactions among the key variables.

Participants

Participants ($N=60$) were Year 6 students, in three coeducational government schools in the Metropolitan East region of Sydney, representing a 61 per cent response rate of the total 98 students. The schools were situated in a middle-class socioeconomic status region, and students were predominantly of Anglo-Australian ethnic background. The interviewees ($n=17$) were a subset of the larger sample and ranged across the three schools.

Materials

The questionnaire The survey administered for this study had two sections, with the first half asking questions about English and the second asking parallel questions about maths. The survey contained three different subscales which are summarised in Appendix A. The perceived competence and intrinsic value subscales were from Eccles and colleagues (Eccles et al. 1983, Wigfield and Eccles 2000, 2002), while the mastery goals subscale was from Midgley et al. (2000), from their revised PALS (Patterns of Adaptive Learning Scales) instrument. All three subscales have been

found to be reliable and valid in previous studies, with high Cronbach alpha measures of internal consistency, and confirmatory factor analyses exhibiting good fit statistics¹ (e.g. Eccles et al. 1983, Midgley et al. 2000, Eccles and Wigfield 1995).

The interview Interview questions were tailored to expand on those in the survey. Questions related specifically to the development of students' perceptions of competence in maths/English, how they thought these perceptions of high/low competence related to their mastery goals, and how they thought teachers could promote greater intrinsic value and mastery goals (see sample interview protocol in Appendix B). Question 1a asked about sources of students' perceptions of competence, while 1b to 1e asked about influences of significant others including social comparisons, and 1f to 1h asked about the influence of performance cues on perceptions of competence. Question 1i investigated sources of students' motivation for learning, while question 2 asked students to explain the relationship between their perceptions of competence and their mastery goal orientation. Question 3a explored teacher influences on mastery goals, and question 3b invited students to suggest teacher strategies for fostering intrinsic value and mastery goals.

Procedures and methods of data gathering

Following university and departmental ethical approval, and informed parental consent, surveys were administered to intact class groups during regular class time by the researcher. The survey response format was explained and modelled, then students quietly completed individual surveys. Following analyses of survey data, thirty-minute semi-structured interviews were conducted by the researcher, where participants were selected based on a matrix of perceived competence and mastery goals (see Table 1).² A triad split was performed on each of perceived competence and mastery goals, with participants selected based on those scoring in three particular 'cells' of this matrix.³ These cells were high/high, high/low and low/high combinations of perceived competence and mastery goals,⁴ as graphically depicted in Table 1. From each of the six focal groups, three participants were randomly selected so that 17 interviewees comprised the total interview sample.⁵

Analyses

Survey data Factor analyses of English and maths items established convergent and divergent construct validity, using image factoring and varimax rotation. Cronbach alpha measures of internal consistency subsequently assessed subscale reliabilities. Skewness and kurtosis were expressed in standard deviation units to assess significant ($p < .05$) departures from normality, in which case Spearman non-parametric correlations would be used to assess relationships between key constructs, rather than Pearson parametric correlations.

		Perceived competence		
		low	medium	high
Mastery goals	low			Group: 3E 3M
	medium			
	high	Group: 2E 2M		Group: 1E 1M

Table 1: Matrix showing selection for interviewees in each of English and maths

Interview data Interview data analysis involved identifying emergent themes from the interviews. Data coding followed procedures for data analysis outlined by Miles and Huberman (1994) described as ‘pattern coding’, which is a commonly recommended and implemented method for qualitative analysis (e.g. Krippendorff 1980, Miles and Huberman 1994, Strauss and Corbin 1998, Weber 1990). Pattern coding refers to identifying a number of sets or themes to cover consistencies in the data, as reflected in frequency counts (see Table 4). These generalisations were discussed in relation to findings from prior research (Miles and Huberman 1994). To identify different patterns in the responses of the participants from the focal condition groups in each academic domain (high perceived competence and mastery goals, low perceived competence and high mastery goals, and high perceived competence and low mastery goals), responses within each group were listed under the headings ‘sources of and thoughts on *perceived competence*’, ‘sources of and thoughts on *mastery goals*’ and ‘sources of and thoughts on *intrinsic value*’. For each theme present in the interview data in each focal group, a tally was noted alongside it, which indicated the number of interviewees for whom it was relevant. This visual summary made clear the similarities and regularities of themes within each group.

Results

Establishing construct validity and reliability

Exploratory factor analyses validated the hypothesised three constructs for English, although one item in the perceived competence scale cross-loaded equally with the

intrinsic value construct, and weakly on both in any case, so was consequently discarded from further analyses.⁶ This three-factor solution explained 72.31 per cent of the variance, converging in five iterations, and three eigenvalues were greater than unity (eigenvalues were 4.06, 2.75 and 1.14). For maths, only two factors were found instead of the expected three, with items for perceived competence and intrinsic value all loading on the one factor. A three-factor solution produced multiple cross-loadings and was not supported by the latent root or scree-plot criteria. This two-factor solution explained 72.03 per cent of the variance, converging in four iterations, and two eigenvalues were greater than unity (eigenvalues were 5.11 and 2.82). Cronbach alpha measures of reliability for all five factors showed good internal consistency. English alpha coefficients were: perceived competence $\alpha=0.77$, mastery goals $\alpha=0.86$, intrinsic value $\alpha=0.90$. Maths reliabilities were: perceived competence/intrinsic value $\alpha=0.93$, mastery goals $\alpha=0.87$. Summary statistics for all constructs are shown in Table 2.

	English			Maths	
	Perceived competence	Intrinsic value	Mastery goals	Perceived competence/ intrinsic value	Mastery goals
Mean	4.78	4.31	4.21 ^a	5.03	4.42 ^a
Standard deviation	1.04	1.47	0.78 ^a	1.36	0.70 ^a

^a Note: Intrinsic motivation was scored using a 5-point scale, while other constructs were scored using 7-point scales.

Table 2: Means and standard deviations for English and maths constructs

Assessing normality of distributions

Dividing skewness and kurtosis statistics by their respective standard errors expressed skewness and kurtosis in standard deviation units, which revealed five absolute values exceeding two (i.e. $p < .05$). Statistically significantly negatively skewed distributions were found for English mastery goals (skew/SE=-3.83), maths mastery goals (skew/SE=-3.37) and perceived maths competence/intrinsic value (skew/SE=-2.65). Significant kurtosis was found for English mastery goals (kurtosis/SE=2.33) and maths mastery goals (kurtosis/SE=-7.57). Because of these significant departures from normality, Spearman non-parametric correlations were employed to investigate relationships between constructs.

Correlational findings

Statistically significant ($p < 0.05$) correlations were found between perceived competence and intrinsic value for English, perceived competence for English and perceived competence/intrinsic value for maths, mastery goals for English and perceived competence/intrinsic value for maths, mastery goals for English and mastery goals for maths, and intrinsic value for English and mastery goals for maths. Apart from the strong correlation between mastery goals for maths and English, correlations were moderate in strength (see Table 3).

	English			Maths	
	Perceived competence	Mastery goals	Intrinsic value	Perceived competence/ intrinsic value	Mastery goals
English					
Perceived competence	-				
Mastery goals	0.09	-			
Intrinsic value	0.38**	0.16	-		
Maths					
Perceived competence/ intrinsic value	0.27*	0.31*	-0.24	-	
Mastery goals	0.10	0.71**	0.27*	0.25	-

* $p < .05$, ** $p < .01$

Table 3: Spearman correlations between English and maths constructs

Interview findings

Table 4 presents interviewee responses relating to each of perceived competence, intrinsic value and mastery goals separately for participants from each of the six focal interview groups. Key themes and contingencies between the three constructs are discussed below, with the table intended to provide further details for the interested reader.

High self-perceptions of competence and high mastery goals (groups 1E and 1M) Students with high perceptions of competence and high mastery goals all indicated a strong liking for the subject about which they were being interviewed (see Table 4). They received positive feedback from teachers, friends and parents. This led

to good feelings associated with the subject, increased interest level, and hence a desire to improve even more, practice more challenging questions, and become even better at the subject. Typical comments illustrating these contingencies included 'I want to learn it 'cos I'm good at it. I enjoy it. I love it!' (group IE).

Competition was not the motivating factor here, but comparisons were. Students indicated they either wanted to 'keep up' with the high achieving group in the class and/or beat their personal best. Interestingly, all students indicated their rank in the class. Students in the maths focal group mentioned they enjoyed being able to know exactly how they were going, how they could improve further and how they could fix up their mistakes, and that these factors were revealed to them by the way maths was assessed. They also mentioned that their interest in maths sometimes changed. If the material was not challenging enough or began to get repetitive their interest in maths decreased. In illustration of this relationship, one participant stated: 'If it's not challenging I don't want to do it. Not if it's the same thing on the whole page. If it's challenging, it's fun and I want to do more' (group 1M).

Low self-perceptions of competence and high mastery goals (groups 2E and 2M) Students with low perceptions of competence and high mastery goals had feelings of dislike associated with the subject. Insults or negative comments from classmates or parents were reasons for this dislike, but were also strong motivating factors to improve, explaining their high levels of motivation. Illustrative responses were: 'They make me feel like I have to improve and do better. I know I have to improve' (group 2E); 'The feedback I get makes me feel like I want to learn less but I need to learn more. I know I need to learn more. I'm less motivated to at first and then I know I need to learn more to be a lawyer' (group 2E); and 'I want to learn more to keep up with them. I feel awful at first but ... and I don't really like learning maths at all, but then I do ... to improve' (group 2M). The embarrassment of being the target of insults and the belief that they were not as competent as they should be for future goals made these students determined to increase their competence. Participants mentioned that after receiving feedback they felt they did not want to do the subject or improve at it because they just did not like it. Then, after some thought, they realised the importance of improving in the subject for 'the future' and to meet their own goals.

High self-perceptions of competence and low mastery goals (groups 3E and 3M) All interviewees with high perceptions of competence and low mastery goals indicated they liked the given subject because they were good at it. For example, 'Well the subjects that I'm better at, I enjoy more. I'm better at English, you know, spelling, writing stories, public speaking, that sort of thing. I'm not as good at maths

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Sources of and thoughts on:	Group 1M (high perception of competence and high mastery goals)	Group 2M (low perception of competence and high mastery goals)	Group 3M (high perception of competence and low mastery goals)
Perceived competence	<p>Maths Low English ability – 3 Positive feedback: classmates – 3 parents – 3 teacher – 3 Rank in the class – 2 Pride in ability – 3 Participation in ‘out-of-school’ maths – 2 Father is a mathematician – 3 Maths tutor outside school gives encouragement – 2</p>	<p>Maths Higher ability in English – 3 Negative feedback: parents – 1 teacher – 1 Rank in the class – 2 Uses friends as an indicator of where their ability level should be – 2</p>	<p>Maths Positive feedback – 3 Rank in the class – 3 Works with peers of equal ability – 2</p>
Mastery goals	<p>Desire to improve ability – 3 Comparison as a motivating force – 3 Desire to beat personal best – 2 Interest level declines with decreasing challenge of questions – 2 Parental assistance – 3 Parental encouragement – 2</p>	<p>Desire to improve ability – 3 Negative comments promote desire to improve – 3 Decreased motivation at first instance of feedback, then increased motivation – 3 Importance of English for the future (higher and tertiary education) – 1 Encouragement from friends – 3 Encouragement from parents – 2 Parents’ low ability/lack of understanding in maths – 2 Lack of individual teacher assistance – 2 Practicality of maths for real-life situations – 2</p>	<p>Not needing to improve any further at present – 3 Lack of teacher feedback – 2 Desire for more teacher feedback – 2 Lack of challenge – 3 Class work repetitive – 3 Parental assistance – 3 Parents with high ability in Maths – 3 Desire for new equipment and resources in class – 3</p>
Intrinsic value	<p>High ability – 3 Enjoy knowing they can fix up mistakes – 2 Likes reporting/assessment criteria used in preference for those used in English – 3</p>	<p>Stronger liking for English – 3 Dislike for maths – 3 Sees maths as more threatening than English since exact marks are given – 3 Insults from classmates – 3 Dislikes calling out marks in front of class – 3</p>	<p>High ability – 3 Lower ability in English and therefore less liking for English – 2 Prefers ‘out-of-school’ maths for its higher challenge – 3 Maths tutor outside school gives encouragement – 3</p>

so I don't like it' (group 3E), and 'I enjoy it 'cos I'm good at it. It's also part of everyday life. It helps with getting a job later on in life' (group 3M). However, low intrinsic motivation levels stemmed from lack of teacher feedback, challenge and being extended in the subject. For example, 'We need to do harder things all the time and not just repeat the same activities' (group 3E), and 'She needs to make it harder, more challenging. Give it more of a challenge' (group 3M). Positive feedback from parents, classmates and teachers upheld these students' high perceptions of their abilities and all students noted that these compliments made them feel that they did not need to keep improving, as illustrated by the comment: 'I feel like I want to learn more but then I feel like I don't really need to learn more 'cos I'm already good' (group 3E), and 'They make me feel more confident. Yes, they make me feel good but I feel like I don't need to improve because I'm really good anyway and class work is just too boring' (group 3E). Class work was repetitive and boring for these students, so they were losing interest in the subject. These students, through obvious lack of stimulation, had a strong desire for challenge.

Discussion

The quantitative phase of the study investigated interrelations between self-perceptions of competence, mastery goals and intrinsic value. Surprisingly, there was little evidence for a relationship between perceived competence and mastery goals. In contrast to Eccles and Wigfield's theoretical model, which suggested strong correlations between perceived competence and mastery goals, non-significant correlations were found for this relationship within each of maths and English. There was one statistically significant correlation across domains, with a moderate relationship between mastery goals in English and the combined perceived competence/intrinsic value factor in maths. Given that there was no corresponding cross-domain correlation between mastery goals in maths and perceived competence in English, however, it is likely that the significant cross-domain correlation was due to intrinsic value items comprising part of the combined maths perceived competence/intrinsic value factor. In addition to suggesting a relationship between perceived competence and mastery goals, expectancy-value theory and Harter's work would suggest that perceived competence relates to mastery goals via intrinsic value. Surprisingly, there was no such relationship between intrinsic value and mastery goals in English. Similarly, in maths there was no significant relationship between combined perceived competence/intrinsic value and mastery goals. Based on general patterns of relationship across the full sample, then, it appears that neither perceived competence nor intrinsic value relate to the adoption of mastery goals. Subsequent intensive interviews with students from targeted subgroups investigated relationships between these key constructs within particular subgroups of theoretical interest.

Consistent with expectancy-value theory and Harter's work, perceived competence and intrinsic value were related within both maths and English. For maths, items measuring intrinsic value and perceived competence loaded on the one factor, while they were empirically distinct yet correlated for English. We theorise that this difference in factorial structure may be due to the reporting and assessment criteria used in maths compared with those used in English. Maths results are usually given as a numeric mark out of a possible total, relative to others in the class. This type of feedback is likely to create an immediate positive or negative affective reaction for students regarding their maths ability (Watt, in press 2004). Hence, we might expect intrinsic value and perceived competence to be closely intertwined for maths. In contrast, assessment for English is usually reported through the writing of comments by the teacher. For example, 'Great work! You have included all the necessary parts of a narrative' or 'Please revise the spelling list for this week'. Such comments may be less likely to provoke an affective response than normative feedback, implying that intrinsic value may develop separately from perceptions of competence in English.

Such an interpretation was borne out by comments from the qualitative interview phase of the study, which provided rich elaboration of data from the quantitative survey phase. Responses were given by interviewees across all six groups, which illustrated perceived differences between assessment and reporting methods used in maths and English, and their impact on participants' competence perceptions and intrinsic value. Sample statements from English interviewees included:

I think the marks given in maths tell us how good we are straight away and we don't have to work it out for ourselves so it makes me like maths a lot more. I get told by my marks that I'm good at it. In English I have to work it out by myself more and there isn't really an opportunity to compare myself to others because you can't really compare comments. (group 1E)

There are right or wrong answers in maths. You specifically know how you are going in maths so you know how you are going more so it makes you feel good or bad about it straight away. I guess you don't find out as much for English but I think I can work it out over time. (group 2E)

We don't really compare because you can't really compare in English. (group 3E).

Similarly, comments from maths interviewees included:

You don't really know where you are in English. Nothing is exactly correct. It's not one of my favourite things ... We don't get many comments, just things like: 'Good work for finishing quickly' and just things like that ... getting exact marks in maths makes me like it more 'cos I know how I'm going but English is just iffy – I don't know how I'm going so I don't know what I need to fix up or how well I'm really going compared to others. (group 1M)

English is better because you don't get to know where you are in the class and it doesn't seem as scary this way. (group 2M)

I just like maths 'cos I know I'm good at it and I always know how I'm going and whether the answer is right or wrong ... English isn't my forté. I still enjoy English but not as much. (group 3M)

Expectancy-value theory posits a relationship between perceived competence and intrinsic value. These two factors combined for maths, which supports previous findings that these constructs interrelate. For English, perceived competence and intrinsic value were moderately and statistically significantly correlated, as expectancy-value theory would predict. There was a moderate positive relationship between English perceived competence and maths perceived competence/intrinsic value, although assessment of cross-domain relationships was clouded by the combined perceived competence/intrinsic value factor for maths, and may well have been more reflective of a relationship between perceived competence in the two domains.

Inclusion of both mastery goals and intrinsic value measures permitted assessment of construct independence. In both academic domains these two constructs factored separately, providing evidence for empirical distinctiveness. Interestingly, intrinsic value factored with perceived competence for maths, suggesting these two factors may not be distinguishable in the maths domain for this age group, which may relate to assessment and reporting procedures common in maths. Replication of this factor structure with a larger sample would be necessary to enhance confidence in this effect. The non-significant correlation between mastery goals and intrinsic value in English provided further evidence of factorial independence, as did the non-significant correlation between mastery goals and perceived competence/intrinsic value in maths. Across domains, however, moderate positive correlations were evident between English mastery goals and maths perceived competence/intrinsic value, as well as between maths mastery goals and English intrinsic value. It is

somewhat surprising that relationships between mastery goals and intrinsic value would be evident *across* but not *within* domains. A strong positive correlation between mastery goals in maths and English indicated that students who were high on mastery goals in English were also high on mastery goals in maths, perhaps suggesting that mastery goals may be consistent across academic domains and more reflective of general orientation to learning.

Relationships between perceived competence, intrinsic value and mastery goal constructs were low in all instances except the high correlation between maths and English mastery goals. Attenuated distributions for maths and English mastery goals may help explain the low correlations. Although there was a full range of scores along the 7-point scale for competence ratings, there were more restricted response ranges for mastery goals, with no respondents scoring in the lower end of the scale. This attenuation may be a possible consequence of unmotivated students not wanting to take part in the study, thereby being unrepresented in the data, and could also be due in part to 5-point Likert scales, in contrast to 7-point scales for intrinsic value and perceived competence. Alternatively, general patterns of relationship may mask strong relationships contingent upon particular contexts, as our interview phase would appear to suggest.

Contributions from the quantitative phase of the study therefore showed that intrinsic values related to self-perceptions of competence, as expectancy-value theory would predict, but that mastery goals did not relate to competence perceptions, as Harter's theoretical framework would predict. Intrinsic value and mastery goals were found to be empirically distinct in both academic domains, and did not correlate within either English or maths. These findings suggest that intrinsic value and mastery goals measure different aspects of the child's perceptions, and future research should continue to explore differences between the two constructs. Different factoring of intrinsic value and perceived competence across domains showed the two constructs were not empirically distinguishable for maths, although they were for English. Although we would hesitate on the basis of one relatively small-scale study to claim that maths intrinsic value and perceived competence are indistinguishable from one another, future research could fruitfully further explore domain differences in construct definition and interrelationships for perceived competence, mastery goals and intrinsic value at different developmental stages.

Consistent with the findings of Harter and her colleagues (Harter and Connell 1984, Harter 1990, 1992, 1999), the children we interviewed utilised comparisons with others' abilities as a barometer to measure and evaluate their own abilities. Our study supported the proposition that for students in the sixth grade, feedback from significant others formed the basis of competence perceptions. Parents were found to

have a positive effect on children's competence perceptions, with assistance from them mentioned in the majority of cases, although their influence did not appear as prominent as Harter (1999) proposed, with peers being mentioned more frequently. Comparisons with and feedback from peers had important effects on competence perceptions, with both positive and negative feedback from classmates clearly having beneficial or devastating effects on students' self-image and liking for a given subject. Children also incorporated teacher feedback into a general concept of their English and maths abilities. Students' competence perceptions and mastery goals were influenced more if they believed this feedback to be genuine and context-based. Even students with high competence perceptions desired teacher feedback, encouragement and an indication of how they could improve further.

Our findings highlighted how the issuing of grades and marks does not occur in isolation from social factors. Most students mentioned the effects of comments made by the teacher or by peers about their performance. Students face the demands of a school culture that increasingly reinforces extrinsic motivation through the grading process (Harter, Whitesell and Kowalski 1992) and this links to social comparisons as a source of students' competence perceptions, and to direct feedback from others, which in turn impacts on perceptions of competence. This school culture is largely brought about through the use of normative assessment procedures. If criterion-referenced assessment practices were used in place of these normative practices, there might be less overlap between the impact of performance cues and social influences on the development of children's competence perceptions.

In interview responses, intrinsic value as well as an appropriately challenging context appeared to play a major role in relating students' self-perceptions of academic competence to their willingness to improve and practice, and mastery goals to learn. Future research with a larger sample could examine such possible moderation models using path analytic techniques.

Why do some students with low competence perceptions have high mastery goals?

Students with low competence perceptions and high mastery goals (groups 2E and 2M) did not enjoy the subject in which they had low competence perceptions, and did not feel intrinsically motivated to learn it in the initial stages following performance feedback. However, they later felt compelled to improve their abilities for the sake of meeting their own goals and for success in the future. Encouragement from classmates, parents and teachers also increased student motivation for learning. Interestingly, the mastery goals of students in this group appeared to be fostered by high avoidance orientations. Although interviewees with low competence perceptions were still motivated to learn, their desire to learn was more to avoid doing badly, and

to improve for high-school and tertiary education. The internalisation of extrinsic motivation is emphasised in Ryan and Deci's self-determination theory (Ryan and Deci 2000), which explicates processes by which initially external motivations become internalised. Following internalisation of external motivations, students became more motivated to learn. Students in this group may fit descriptions of being *mastery avoidant* – the new achievement goal that has been recently proposed in the goal theory literature. From interview responses, these students would appear to fit the definition of wishing to avoid demonstrating incompetence relative to their own goals.

All interviewees with low perceptions of competence in one subject made reference to the other subject, and their higher ability perceptions and performance in it. This could be explained by participants wanting to protect their self-image and focus on what they were good at, described as *ego-protection* by Covington (1984). Alternatively, Marsh's *internal/external frame of reference model* could apply, where perceptions of competence could be influenced both by external and internal comparisons (Marsh 1986). *External comparisons* occur when students compare their abilities with their classmates', while *internal comparisons* occur when students compare their perceived abilities in one domain with their perceived abilities in another (Skaalvik and Rankin 1995). In our study, internal comparisons may account for students who perform better at maths than English perceiving themselves to have low ability in English. Students who perform well in English but better in maths may perceive they are not competent in English. However, even those who believed they were good at the subject about which they were being interviewed referred to their abilities in the other subject. This could be a possible Hawthorne effect, where a person's knowledge of the study's purpose affects his/her response (Burns 1998). In this study, the surveys were completed before the interviews and interviewees were consequently aware that the study focused on English and maths. This could have led students in the interview to comment on their abilities in the other subject, either from sensitisation to considering their perceptions related to maths and English from the survey, or from a belief that such comparative data were what the interviewer wanted to hear. Supporting evidence for this interpretation comes from the fact that no student made reference to any other scholastic domain, although it should be noted that maths and English are the domains most emphasised within NSW primary schools.

Negative effects of social comparisons emerged as a distinctive feature for this group. In contrast to students in groups 1M and 1E who had high competence perceptions and mastery goals, students in groups 2M and 2E with low competence perceptions and high mastery goals mentioned damaging effects of social comparisons. In English, comments such as disliking reading in front of the class were made; while in maths,

there were frequent comments related to dislike of having marks read out in front of the class, or being provided with information about ranking in class. These feelings appeared more pronounced for maths than for English, with students feeling that the assessment and reporting procedures used in maths negatively impacted on their perceptions of maths competence.

Why do some students with high competence perceptions have low mastery goals?

It was the group of students with high competence perceptions and low mastery goals (groups 3E and 3M) who were not being stimulated or challenged in class. Boredom and repetitive class work were impediments to the link between competence perceptions and mastery goals, and this gave students the feeling of not needing to improve their abilities any further. Lack of appropriate teaching practice meant feelings associated with the subject had become stale and motivation levels had dropped, resulting in a group of students who had lost interest in the subject in which they had once felt intrinsically motivated to learn.

What factors facilitate high mastery goals and perceived competence for students with high competence perceptions?

In order to arrive at ways of facilitating high mastery goals for students with high competence perceptions, our design permitted us to contrast the factors impeding high mastery goals with the factors that facilitated high mastery goals. Students in groups 1E and 1M were those receiving constructive and positive feedback from teachers and classmates and were also those being challenged. This group stood in contrast to students in groups 3E and 3M who were not given constructive and positive feedback, or challenging tasks. It is likely therefore that mastery goals may increase in the presence of positive and constructive feedback and appropriately challenging tasks.

Contrasting groups 2E and 2M (low perceived competence and high mastery goals) with groups 1E and 1M (high perceived competence and mastery goals) permitted identification of factors facilitating high perceptions of competence for students who had high mastery goals. The main contrast that emerged between these groups was that groups 2E and 2M were negatively influenced by explicit social comparisons, whereas students in groups 1E and 1M enjoyed competition and were motivated by social comparisons. This was particularly evident in maths and occurred less frequently in English, which appeared to relate to more normatively based assessment and reporting practices in the maths domain. Future research could fruitfully investigate the types of comparative processes these students employ. For example, are students with high competence perceptions comparing their abilities with different types of reference groups than students with low competence perceptions, as suggested by Watt (1998, 2002).

Conclusions

Our study has made three main contributions, related to differences in scale structures for maths and English, general patterns of relationships between scales, and relationships and contingencies among key constructs for particular subgroups of students from interviews with the different groups. First, the factorial independence of perceived competence and intrinsic value in English but not in maths, in combination with interviewee comments, suggests that normative assessment procedures used in maths may lead to competence evaluation and affect becoming intertwined with this age group. In contrast, criterion-based assessment more often used in English may result in competence perceptions developing more independently of intrinsic values. Future research could further explore this factorial structure with a larger sample across additional academic domains and different developmental stages. Intrinsic values and mastery goals were factorially distinct for both English and maths however, empirically supporting theoretical distinctions recently made between these constructs (Midgley et al. 2000).

General patterns of relationships between the scales would suggest that neither perceived competence nor intrinsic value related to mastery goals, in contrast to the mediation model proposed by Harter and colleagues. However, interviews conducted with students from particular subgroups revealed interesting patterns of relationships among the key constructs, contingent on particular circumstances. Responses from the group having high mastery goals and competence perceptions appeared to uphold the expected pattern of relationships among the three constructs, where high perceived competence led to high intrinsic value or liking, which in turn fostered mastery goals. The group having high mastery goals and low perceived competence revealed that low intrinsic value or dislike of the subject due to their perceived low competence, in combination with high extrinsic motivations, promoted what appeared to resemble a mastery-avoidance goal orientation (Elliot and McGregor 2001). The final group having high perceived competence and low mastery goals appeared to have high intrinsic value for the subject based on their high perceived competence, but these did not translate into mastery goals, due to a lack of feeling any need to improve from lack of challenge and being extended in the subject. Consistent with general patterns of relationships, then, responses from the interview groups supported notions of perceived competence informing intrinsic values. Supplementing findings from general patterns of relationships, it appears that perceived competence and intrinsic value only foster mastery goals in contexts where students feel appropriately challenged and feel the need to improve. There is a need for future research with a larger sample to empirically assess the possible moderating rather than mediating role of contexts perceived as challenging in relating perceived competence and intrinsic value to mastery goals.

Although our findings do not translate into immediate classroom practice in all instances, there are a number of implications, particularly from our interview responses, for teacher action to enhance students' self-perceptions of competence and mastery goals for learning. First, it is important that students have genuine and constructive feedback regarding their competencies. Second, it is important that they develop appropriate aspirations on an individual level, rather than focusing on outperforming others. Third, it is disheartening for students to be in an environment where the same tasks are repeated over and over so that some students believe they cannot ever do them and others feel unmotivated and unchallenged from repetition. There is a need for provision of challenging and stimulating tasks catering for all ability levels. Fourth, it is the teacher's responsibility to minimise the humiliation that can occur with poor performance and also the impression some students have of not needing to learn any more. This may be partly achieved by substituting alternatives to norm-referenced assessment practices, such as criterion, ipsative, and group-based assessment tasks, especially in maths. These practices may foster an environment where students' achievements are better valued and encouragement is appreciated. Fifth, parents can be involved and asked to encourage their children, while also encouraging them to encourage their peers in learning. These are realistic goals that should enhance students' perceptions of their own abilities, greater enjoyment of learning, a more positive classroom context and increased mastery goals for learning.

Notes

- ¹ Confirmatory factor analyses have been conducted within the set of expectancy-value constructs, and within the set of personal goal orientations, but not across intrinsic value and mastery goal orientation.
- ² Note that a combined perceived competence/intrinsic value factor was used for maths for reasons provided in the results section.
- ³ Cut-offs for triad splits were 4.5 and 5.0 for English perceived competence, 4.0 and 4.8 for English mastery goals, 4.7 and 5.8 for maths perceived competence/intrinsic value, and 4.3 and 5.0 for maths mastery goals. Note that mastery goals were scored from 1 through 5, while perceived competence and intrinsic value were scored from 1 through 7. 'Low' and 'high' were therefore relative to others in the sample. In particular, 'low' groups were not necessarily low in a negative sense on the scale, since cut-offs fell above the scale midpoint in each case.
- ⁴ Numbers within each focus condition were: high perceived competence and mastery goals: 1E=14 and 1M=12, low perceived competence and high mastery goals: 2E=8 and 2M=8, high perceived competence and low mastery goals: 3E=12 and 3M=4.
- ⁵ Note that one interviewee was interviewed twice who fell into the high 'perceived competence' and high 'mastery goal' cell for English, and also in the high 'perceived competence/intrinsic value' and low 'mastery goal' cell for maths.

- ⁶ This item was ‘Compared to most of your other activities, how good at English are you?’ from Eccles et al. (1983) perceived competence subscale.

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Construct	Stem	Anchors
Perceived competence	How good at English/maths are you?	1 (not at all) – 7 (very good)
	Compared to most of your other activities, how good at English/maths are you?	1 (not as good) – 7 (a lot better)
	If you were to list all the students in your grade from the worst to the best in English/maths, where would you put yourself?	1 (one of the worst) – 7 (the best)
Intrinsic value	How much do you like doing English/maths work?	1 (a little) – 7 (a lot)
	Compared to your other subjects, how much do you like doing English/maths?	1 (not as much) – 7 (a lot more)
	In general, I find working on English/maths tasks:	1 (very boring) – 7 (very interesting)
Mastery goals	It's important to me that I learn a lot of new things in English/maths this year	1 (not at all true) – 3 (somewhat true) – 5 (very true)
	One of my goals in English/maths is to learn as much as I can	
	One of my goals in English/maths is to master a lot of new skills this year	
	It's important to me that I thoroughly understand my work in English/maths this year	
	It's important to me that I improve my skills in English/maths this year	

Appendix A: Survey items for perceived competence, intrinsic value and mastery goals

1. In the survey you did earlier this term, you showed that you feel you have high ability and are really interested in English. I'm interested in talking to you about why you feel this way about English.
 - (a) Why do you feel this way about your English ability?
Prompt: What makes you think you have high English ability?
[*Get general response and then ask them to respond to the following questions.*]
 - (b) What *people* affect how you feel about your English ability?
 - (c) What effect do you think your *classmates* have on your belief of having high ability in English? *Prompt:* Do you compare your English ability with theirs?
[*Ask next two questions (d and e) if not mentioned in (b).*]
 - (d) What effect do you think *your teacher* has on your belief of having high ability in English?
 - (e) What effect do you think *your parents* have on your belief of having high ability in English?
 - (f) What sort of *marks* do you get in English?
 - (g) What sort of *feedback* do you get in English?
 - (h) How do these *marks/feedback* affect *what you think* of your ability in English?
Prompt: Do they make you feel you have high ability in English?
 - (i) Why do you want to learn English?
2. So you feel you have high ability in English. *Does this affect how you feel about wanting to learn in English?*
Prompt: Do you want to learn more in English because you feel you are good at it?
Why?/Why not?/Why else are you interested in English?
3. (a) *How does your teacher encourage you to want to learn more in English?*
Prompt: How do they make learning English interesting so that you will want to learn more?
 - (b) *What is something extra/different your teacher could do* to make learning English more interesting so that you will want to learn more?

Appendix B: Sample interview protocol for group 1E (English, high competence, high mastery)
