



# Achievement goals and emotions: The mediational roles of perceived progress, control, and value

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**Background.** The link between achievement goals and achievement emotions is well established; however, research exploring potential mediators of this relationship is lacking. The control-value theory of achievement emotions (Pekrun, 2006, *Educational Psychology Review*, 18, 315) posits that perceptions of control and value mediate the relationship between achievement goals and achievement emotions, whereas the bidirectional theory of affect (Linnenbrink & Pintrich, 2002, *Educational Psychologist*, 37, 69) proposes that perceived progress mediates this relationship.

**Aims.** The present study empirically evaluated three hypothesized mediators of the effects of achievement goals on learning-related emotions as proposed in the control-value theory and the bidirectional theory of affect.

**Sample.** Undergraduate students ( $N = 273$ ) from humanities, social science, and STEM disciplines participated.

**Methods.** Participants completed web-based questionnaires evaluating academic achievement goals, perceptions of control, perceived task value, and achievement emotions.

**Results.** Results provided empirical support primarily for perceived progress as a mediator of mastery-approach goal effects on positive emotions (enjoyment, hope), showing indirect effects of mastery- and performance-approach goals on outcome-related emotions (hope, anxiety) via perceived control. Indirect effects of mastery- and performance-approach goals were further observed on anxiety via perceived value, with higher value levels predicting greater anxiety.

**Conclusions.** Study findings partially support Linnenbrink and Pintrich's (2002, *Educational Psychologist*, 37, 69) bidirectional theory of affect while underscoring the potential for indirect effects of goals on emotions through perceived control as proposed by Pekrun (2006, *Educational Psychology Review*, 18, 315).

Over the last decade, there has been a discernible increase in interest and research on emotions in education (e.g., Linnenbrink-Garcia & Pekrun, 2011; Linnenbrink & Pintrich, 2002; Meyer & Turner, 2002; Pekrun, Goetz, Titz, & Perry, 2002; Pekrun & Linnenbrink-Garcia, 2014; Schutz & Davis, 2000; Turner, Husman, & Schallert, 2002). Research shows that not only do students experience a variety of emotions in academic settings (Pekrun, 1992; Spangler, Pekrun, Kramer, & Hofmann, 2002), but that these emotions are

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consistently related to important learning-related variables including academic achievement (e.g., Pekrun, Elliot, & Maier, 2009; Pekrun, Hall, Goetz, & Perry, 2014), self-regulated learning (e.g., Goetz, Hall, Frenzel, & Pekrun, 2006; Mega, Ronconi, & De Beni, 2014; Muis, Pekrun, *et al.*, 2015), as well as perceived control and value (e.g., Bieg, Goetz, & Hubbard, 2013; Frenzel, Pekrun, & Goetz, 2007; Muis, Psaradellis, Lajoie, Di Leo, & Chevrier, 2015; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). Most notably, recent work has explored the relations between students' achievement goals and their emotions (for reviews, see Huang, 2011; Linnenbrink-Garcia & Barger, 2014), with theoretical models having been proposed to explain these relationships including the control-value theory of achievement emotions (Pekrun, 2006) and the bidirectional model of affect (Linnenbrink & Pintrich, 2002).

Extant research has previously examined the direct effects of students' achievement goals on their emotional experiences, for example, showing students' mastery goals to predict greater enjoyment and performance-avoidance goals to predict higher anxiety (e.g., Daniels *et al.*, 2009; Pekrun *et al.*, 2009). However, despite increasing research following from theories of achievement goals (e.g., Linnenbrink & Pintrich, 2002) and emotions (e.g., Pekrun, 1992), 'the presumed mediating processes (rate of progress, control-value appraisals) have not been examined for either of the two theoretical models' (Linnenbrink-Garcia & Barger, 2014, p. 152). To address this research gap, the present study directly evaluated these two theoretical frameworks in which specific mediators of the relationship between students' achievement goals and their achievement-related emotions are proposed. More specifically, Linnenbrink and Pintrich (2002) suggest that students' perceived progress towards their goals may mediate the relationship between achievement goals and corresponding emotions, whereas Pekrun (2006) proposes that perceptions of control and value should instead mediate this relationship. Despite the prominence of these theories in emotion research, these assertions have to date not been empirically addressed. As such, the present study examined the mediating roles of perceived progress, control, and value, in accordance with Pekrun's (2006) control-value theory and Linnenbrink and Pintrich's (2002) bidirectional model of affect, to determine which variables best account for the relationship between students' general achievement goal orientations and their achievement emotions in the academic domain.

### **Achievement goal theory**

Achievement goals have been commonly defined as a 'future-focused cognitive representation that guides behaviour to a competence-related end state that the individual is committed to either approach or avoid' (Hulleman, Schrager, Bodmann, & Harackiewicz, 2010, p. 423). Related classification schemes have typically consisted of two (e.g., Dweck & Leggett, 1988), three (e.g., Pintrich, Conley, & Kempler, 2003), four (e.g., Elliot & McGregor, 2001), or six types of achievement goal orientations (Elliot, Murayama, & Pekrun, 2011). The trichotomous framework was adopted for the present study, which focuses on mastery-approach (mastery), performance-approach, and performance-avoidance goals (see Pintrich *et al.*, 2003). Students who adopt mastery goals tend to hold intra-individual standards for their performance in that they compare their performance relative to internal self-set standards. In contrast, students who adopt performance-approach or performance-avoidance goals tend to set interindividual standards for their performance in comparing their performance relative to others (see Hulleman *et al.*, 2010). Whereas mastery goals and performance-approach goals involve

striving to attain positive outcomes (Elliot, 1999), performance-avoidance goals instead reflect striving to avoid negative outcomes.

Each of these achievement goals predicts unique outcomes. For instance, mastery goals are associated with various adaptive outcomes including deep learning strategies, low boredom, and greater persistence, effort, self-efficacy, intrinsic motivation, and interest (Daniels *et al.*, 2009; Grant & Dweck, 2003; Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Liem, Lau, & Nie, 2008; Vrugt & Oort, 2008). In contrast, performance-avoidance goals are generally maladaptive in predicting lower intrinsic motivation, greater learned helplessness, more disorganized studying, unwillingness to seek help, and higher anxiety (e.g., Diseth & Kobbeltvedt, 2010; Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Elliot & McGregor, 1999; Pekrun *et al.*, 2009; Ryan, Pintrich, & Midgley, 2001; Skaalvik, 1997). Performance-approach goals are typically associated with both adaptive outcomes, namely better academic performance, as well as maladaptive outcomes such as lower help-seeking as well as greater anxiety, anger, cheating, and self-handicapping (e.g., Daniels *et al.*, 2009; Darnon, Butera, & Harackiewicz, 2007; Elliot & McGregor, 1999; Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002; Karabenick, 2003; Midgley, Arunkumar, & Urdan, 1996; Murdock, Miller, & Kohlhardt, 2004; Pekrun *et al.*, 2009; Ryan & Pintrich, 1997). Taken together, students' achievement goals predict a variety of learning-related outcomes, including their achievement emotions.

### **Achievement emotions**

There has recently been an increase in interest among researchers in the role of emotions in education (e.g., Goetz, Frenzel, Pekrun, & Hall, 2006; Schutz & Pekrun, 2007). Given the academic focus of the present study, we investigated emotions relevant to learning and performance in achievement settings that are typically referred to as 'achievement emotions'. Achievement emotions are important antecedents and outcomes of relevant learning-related thoughts and behaviours including achievement goals (e.g., Daniels *et al.*, 2009; Pekrun *et al.*, 2009), academic achievement (e.g., Frenzel, Thrash, Pekrun, & Goetz, 2007; Goetz, Frenzel, Pekrun, Hall, & Ludtke, 2007), elaboration, and self-regulated learning (e.g., Muis, Pekrun, *et al.*, 2015; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; Pekrun *et al.*, 2010). From a theoretical perspective, two theories are of particular relevance for the present study in addressing the relationship between achievement goals and emotions in achievement contexts: Pekrun's (2006) control-value theory of emotions and Linnenbrink and Pintrich's (2002) bidirectional model of goal orientations and affect.

### **The control-value theory of achievement emotions**

Pekrun's (2006) control-value theory focuses on students' perceived *control* and subjective *value* over achievement activities as salient psychosocial predictors of their emotional and academic development. More specifically, the control-value theory posits that environmental factors predict students' achievement goals and two types of cognitive appraisals: perceptions of personal control over salient environmental outcomes and the perceived value or importance attached to those outcomes that, in turn, predict achievement emotions, such as enjoyment, hope, anxiety, and boredom. Achievement emotions are, in turn, predicted to impact subsequent learning and achievement-related behaviours including persistence and performance. With respect

to prior research on the relationship between these cognitive appraisals and emotions, findings suggest that higher levels of perceived control and value predict positive emotions such as pride, contentment, and enjoyment as well as negatively predict negative emotions such as anxiety, anger, hopelessness, shame, and boredom (e.g., Bieg *et al.*, 2013; Frenzel, Pekrun, *et al.*, 2007; Goetz, Frenzel, Stoeger, & Hall, 2010; Goetz, Pekrun, Hall, & Haag, 2006; Ruthig *et al.*, 2008).

With respect to relations between goal orientations and emotions, Pekrun's (2006) model further hypothesizes that because students with mastery goals focus their attention on improvement and competence, they are likely to feel in control of learning activities and perceive the activity to be of personal value. Thus, mastery goals are hypothesized to facilitate positive emotions related to learning-related activities (e.g., enjoyment) and inhibit negative activity-related emotions (e.g., boredom). Similarly, performance-approach goal orientations are posited to predict higher levels of perceived control and value concerning achievement outcomes (placing importance on success) and, in turn, positive emotions related to one's achievement (e.g., hope). However, given that students with performance-approach goals tend to be concerned with performing better than others, their control appraisals are also likely to be situation-specific (i.e., based on whether or not they are outperforming others) resulting in students' control appraisals being more weakly related to performance-approach goals than to mastery-approach goals. Finally, students endorsing performance-avoidance goals are hypothesized to have lower levels of perceived personal control, corresponding to their focus on potential failure experiences, and place considerable importance on performance outcomes (not failing) leading to negative outcome-related emotions such as anxiety.

These assumptions are partially supported by recent studies showing mastery-approach goals to predict better learning-related emotions (e.g., greater enjoyment, hope, pride; lower anger, boredom, hopelessness), performance-approach goals to positively predict positive emotions (e.g., enjoyment, hope, pride), and performance-avoidance goals to predict poorer emotional adjustment (e.g., greater boredom, anger, anxiety, shame, hopelessness; lower pride, hope; see Daniels *et al.*, 2009; Pekrun, Elliot, & Maier, 2006; Pekrun *et al.*, 2009). However, despite the aforementioned research exploring the relationship between achievement goals and students' emotions, as well as how perceptions of control and value predict achievement emotions, how students' perceptions of control and value mediate the effects of dispositional achievement goals on students' emotions has yet to be explored (cf. mediational analyses on goals, appraisals, and achievement; Plante, O'Keefe, & Theoret, 2012).

### **The bidirectional model of affect**

A second theoretical perspective addressing potential mediators of the relationship between students' achievement goals and their emotions is Linnenbrink and Pintrich's (2002) bidirectional model of affect in which an asymmetric, reciprocal relationship is proposed. These authors hypothesize that achievement goals influence emotions, and vice versa, with the effects of goals on emotions assumed to be more prominent. Of relevance to the present study, this model further proposes that students' perceived progress towards their goals may mediate the relationship between students' achievement goal orientations and emotions. This assertion follows from the control-process model of self-regulation which proposes that progress towards one's goals results in

positive affect (e.g., excitement), whereas impeded progress leads to negative emotions (e.g., sadness; Carver & Scheier, 1990).<sup>1</sup>

More specifically, students who endorse mastery goals should perceive themselves as making sufficient progress due to self-set goals (e.g., improvement) that are typically more attainable than competitive or criterion goals (e.g., performing best in the class), and as a result experience positive emotions such as happiness even following failure (interpreted as useful feedback for personal improvement; Linnenbrink & Pintrich, 2002). In contrast, students who adopt performance-approach goals are generally expected to believe they are not progressing well. Although some may succeed in outperforming their peers or achieving top grades, the zero-sum nature of classroom competition necessitates that many more will not, resulting in negative affect. Finally, students who adopt performance-avoidance goals should also typically perceive themselves as not progressing well, resulting in lower positive and greater negative emotions, due to efforts to avoid performing most poorly being readily thwarted by personally uncontrollable factors such as grading methods and the performance of others.

Although the rationales for these predictions are theoretically sound, there remains little research investigating the relations between students' achievement goals, perceived progress, and emotions. Although related, research by Elliot, Sheldon, and Church (1997) found, avoidance strivings to predict lower perceived progress and, in turn, lower well-being (high positive affect, low negative affect) research evaluating both approach and avoidance goal orientations in relation to discrete emotional experiences in academic achievement settings (e.g., enjoyment, anxiety) has yet to be conducted. Accordingly, the present study examined whether students' perceptions of progress towards their academic goals, or their global perceptions of academic control and value, mediated the effects of mastery-approach, performance-approach, and performance-avoidant achievement goal orientations on their emotions as experienced in the academic domain.

### **The present study**

The purpose of the present study was to empirically evaluate two theories, each proposing specific cognitive appraisals as mediators of the relationship between achievement goals and emotions. First, Pekrun's (2006) control-value theory of achievement emotions hypothesized that perceptions of personal control and value should mediate relations between achievement goals and achievement emotions. In detail, mastery-approach goals are hypothesized to positively predict perceptions of control and value (Hypothesis 1a, 1b), with positive effects on control and value similarly predicted for performance-approach goals (Hypothesis 2a, 2b). In contrast, performance-avoidance goals are assumed to predict lower perceptions of control (Hypothesis 3a) and higher levels of perceived value concerning achievement (Hypothesis 3b). Further, perceived control is hypothesized to predict more positive emotions (enjoyment and hope; Hypothesis 4a) and lower negative emotions (anxiety and boredom; Hypothesis 4b), as are perceptions of value (Hypothesis 5a, 5b). With respect to mediational hypotheses by Linnenbrink and Pintrich (2002), these authors suggest that students' perceived progress may instead serve as a mediator between

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<sup>1</sup> It is important to note that in Carver and Scheier's (1990) control-process model of self-regulation, perceived progress is further differentiated according to progress towards a desired outcome as opposed to a progress away from an undesirable outcome.

achievement goals and emotions. Specifically, whereas mastery goals are hypothesized to positively predict perceived progress (Hypothesis 6), both performance-approach goals (Hypothesis 7) and performance-avoidance goals (Hypothesis 8) are expected to predict lower perceived progress. In turn, this model hypothesizes that greater perceived progress should lead to more positive emotions (Hypothesis 9a) and lower negative emotions (Hypothesis 9b).<sup>2</sup>

## Methods

### Participants and procedure

A sample of 273 undergraduate students ( $N = 223$  females) enrolled at a research-intensive university were recruited for the present online study via classified advertisements and in-class announcements. The mean age of participants was 20.62 ( $SD = 2.97$ ), their average self-reported grade point average (GPA) was 3.27 ( $SD = 0.54$ ), the ethnic composition of the sample was primarily Caucasian (63.7%; e.g., 11.7% Chinese, 7.3% South Asian), and most were in their first year (16.1%), second year (28.9%), or third year of study (25.3%). Concerning programme affiliations, whereas most students were enrolled in social science disciplines (50%; e.g., education, anthropology, psychology, economics, management), participants were also enrolled in STEM programs (18%; e.g., engineering, physiology, chemistry) as well as humanities disciplines (10%; e.g., English, history, international studies). Following review of an online consent form, participants completed a web-based questionnaire consisting of demographic items and self-report measures of motivation and emotions in the same order as presented below. Participants were compensated financially (e.g., \$5) or provided course credit for their participation.

### Measures

#### Achievement goal orientations

To assess students' general academic achievement goal orientations, a domain-general version of the Achievement Goal Questionnaire Revised (AGQ-R; Elliot & Murayama, 2008) was administered (no specific course was specified in the preamble). Nine items assessing the trichotomous goal orientation framework of the AGQ were administered, with responses provided on a scale of 1 (*not at all true of me*) to 7 (*very true of me*). Three items were used to measure each of the three goals. A sample mastery-approach goal is 'My goal is to learn as much as possible' ( $M = 5.51$ ,  $SD = 0.99$ ,  $\alpha = .76$ ), a sample performance-approach goal is 'I am striving to do well compared to others' ( $M = 5.07$ ,  $SD = 1.35$ ,  $\alpha = .87$ ), and a sample performance-avoidance goal is 'My goal is to avoid performing poorly compared to others' ( $M = 4.74$ ,  $SD = 1.60$ ,  $\alpha = .91$ ).

<sup>2</sup> To evaluate an alternative hypothesis by Linnenbrink and Pintrich (2002) that perceived progress moderates the effects of achievement goals on emotions, 16 hierarchical regressions on each emotion were conducted including achievement goals and perceived progress as predictors in Step 1 and a goal  $\times$  progress interaction in Step 2 (all variables mean-centred, each interaction evaluated separately to maximize power). Results showed one significant interaction ( $\beta = .19$ ,  $p < .01$ ) with perceived progress negatively predicting anxiety only for students with lower levels of mastery-approach goals. This finding provides partial support for hypothesized interactions by Linnenbrink and Pintrich (2002) in that perceived progress did not impact emotional experiences for mastery-oriented students (both positive and negative feedback perceived as beneficial) and underscores the relatively greater importance of perceived progress as a mediator of mastery goal effects on positive emotions (hope, enjoyment).



*Perceived control*

A 5-item subscale of the Primary Academic Control scale (Perry, Hladkyj, Pekrun, & Pelletier, 2001) was used to measure participants' general perceptions of personal control over their academic performance ( $M = 5.35$ ,  $SD = 1.03$ ,  $\alpha = .79$ ). Participants indicated their agreement with statements such as 'I have a great deal of control over my academic performance' on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*).

*Perceived value*

Perceived value was assessed using a domain-general version of a seven-point, 5-item scale from Eccles and Wigfield (1995) evaluating intrinsic value (interest), attainment value (personal importance and meaningfulness), and utility value (usefulness). Sample items included 'How much do you like learning? (1 = *not at all*, 7 = *very much*)' and 'For me, being good at school is (1 = *not at all important*, 7 = *very important*)'. All value items were summed to create a single multidimensional value scale ( $M = 5.63$ ,  $SD = 1.10$ ,  $\alpha = .86$ ), a practice consistent with recent value research (cf. Bong, 2001; Husman, Pitt Derryberry, Michael Crowson, & Lomax, 2004; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002) as well as Pekrun's model in which differential relations for specific value types are not hypothesized.

*Perceived progress*

Perceived progress was assessed by asking students to list three academic goals and indicate on a scale of 1 (*not at all*) to 7 (*very much*) if they believed they were making sufficient progress towards their goals (see Louro, Pieters, & Zeelenberg, 2007;  $M = 4.89$ ,  $SD = 1.08$ ,  $\alpha = .64$ ).

*Achievement emotions*

The learning-related emotion scales of the Achievement Emotions Questionnaire (Pekrun *et al.*, 2011) were used to assess achievement emotions. The following four emotions were assessed: enjoyment (ten items; e.g., 'I look forward to studying',  $M = 3.21$ ,  $SD = 0.64$ ,  $\alpha = .80$ ), hope (six items; e.g., 'I have an optimistic view toward studying',  $M = 3.32$ ,  $SD = 0.68$ ,  $\alpha = .79$ ), boredom (eleven items; e.g., 'Studying for the exam bores me',  $M = 2.74$ ,  $SD = 0.85$ ,  $\alpha = .92$ ), and anxiety (eleven items; e.g., 'I get tense and nervous while studying',  $M = 2.85$ ,  $SD = 0.82$ ,  $\alpha = .87$ ). Participants responded on a scale of 1 (*not at all*) to 5 (*very much*). These four emotions were selected due to being commonly experienced by students in higher education settings (Pekrun & Stephens, 2010) and evaluate both positive and negative emotions with respect to learning activities (enjoyment, boredom) as well as outcomes (hope, anxiety; see Pekrun *et al.*, 2006).

## Results

### **Correlational analyses**

See Table 1 for the correlations between study variables. Consistent with Linnenbrink and Pintrich (2002), mastery goals correlated positively with perceived progress. Contrary to predictions, performance-avoidance goals were unrelated to perceived progress and performance-approach goals were positively, albeit weakly, related to perceived

**Table 1.** Zero-order correlations

	1	2	3	4	5	6	7	8	9	10	11	12
1. Year of study	—											
2. Prior grade point average	.10	—										
3. Mastery-approach	.05	.14*	—									
4. Performance-approach	-.03	.17**	.37**	—								
5. Performance-avoidance	-.01	.03	.23**	.66**	—							
6. Perceived progress	.04	.14*	.35**	.12*	.04	—						
7. Value	-.12	.16*	.49**	.53**	.37**	.08	—					
8. Control	-.18**	.18**	.23**	.18**	.02	.07	.20**	—				
9. Enjoyment	-.05	.05	.47**	.22**	.11	.33**	.29**	.18**	—			
10. Hope	-.03	.18**	.40**	.35**	.19**	.29**	.27**	.29**	.63**	—		
11. Anxiety	.02	-.11	-.04	.05	.14*	-.15*	.16*	-.21*	-.03	-.38**	—	
12. Boredom	.02	-.15*	-.37**	-.05	.01	-.19**	-.21**	-.12*	-.42**	-.43**	.36**	—

Note. \* $p < .01$ , \*\* $p < .001$ .



progress. Concerning perceived progress and emotions, observed correlations were in line with Linnenbrink and Pintrich (2002) in showing perceived progress to correspond with greater enjoyment and hope, and correlate negatively with anxiety and boredom. In line with Pekrun (2006), mastery-approach and performance-approach goals were positively correlated with perceived value and control. Unanticipated correlations also showed performance-avoidance goals to correlate positively with value and not significantly with perceived control, and perceived value to correlate positively with anxiety. As hypothesized, perceived value correlated positively with enjoyment and hope, and negatively with boredom, with perceived control correlating positively with enjoyment and hope, and negatively with anxiety and boredom.

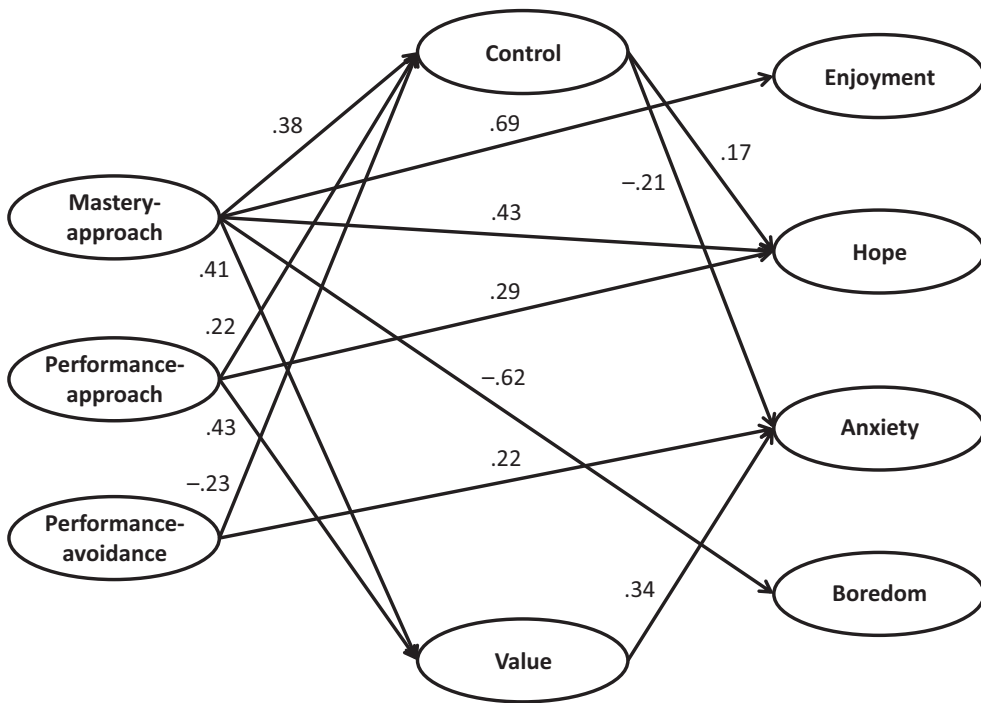
### **Structural equation models**

Two structural equation models were evaluated using AMOS software (Arbuckle, 2006), with Model 1 evaluating the effects of achievement goals (mastery-approach, performance-approach, performance-avoidance) on emotions (enjoyment, hope, boredom, anxiety) as mediated by perceived control and value as per Pekrun's (2006) control-value theory. In contrast, Model 2 evaluated indirect effects of achievement goals on emotions via perceived progress to evaluate the alternative mediational assertion of Linnenbrink and Pintrich's (2002) bidirectional model. Direct paths from goal orientations to emotions were included to evaluate more conservative, fully recursive models in which indirect effects on emotions were estimated controlling for direct effects. Correlations among the latent mediating variables (control, value), and among the emotion variables, were also modelled to account for relations between these constructs (cf. Bandalos, Finney, & Geske, 2003; Daniels *et al.*, 2009; Ntoumanis, Biddle, & Haddock, 1999).

Given significant correlations between year of study and prior GPA, and the sample being predominantly female, both models were evaluated with gender, year of study, and prior GPA as covariates. Parcelling was used for indicators of the emotion variables for model parsimony (see Bandalos, 2002), with three parcels created via random selection for each the four emotion measures as warranted by exploratory factor analyses showing substantial loadings on a single factor for each set of emotions items (enjoyment: .49–.74; hope: .56–.79; boredom: .52–.87; anxiety: .49–.80; see Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, & Schoemann, 2013). Finally, mediation analyses were conducted based on 2,000 bootstrapped samples with bias-corrected and accelerated 95% confidence intervals (CIs) (Preacher & Hayes, 2008).

#### *Model 1*

As outlined in Figure 1, the model evaluating perceptions of control and value as mediators of the relationships between goal orientations and emotions fit the data well (CFI = 0.92, RMSEA = 0.06,  $\chi^2(442) = 849.52$ ,  $p < .02$ ), with both direct and indirect paths being observed. Significant direct effects showed mastery goals to predict greater enjoyment, hope, and boredom, and also showed performance-approach goals to positively predict hope and performance-avoidance goals to positively predict anxiety. In addition, both mastery and performance-approach goals positively predicted perceived control and value, and performance-avoidance goals negatively predicted perceived control. Perceived control was further found to predict lower anxiety and positively predict hope. Additionally, higher levels of perceived value predicted higher anxiety levels. Despite the SEM analysis showing indirect effects of achievement goals on



**Figure 1.** Results for Model 1 (control-value theory of achievement emotions). *Note.* All paths displayed are significant at  $p < .05$ . Only significant paths are presented. Gender, year of study, and prior grade point average were included as covariates.

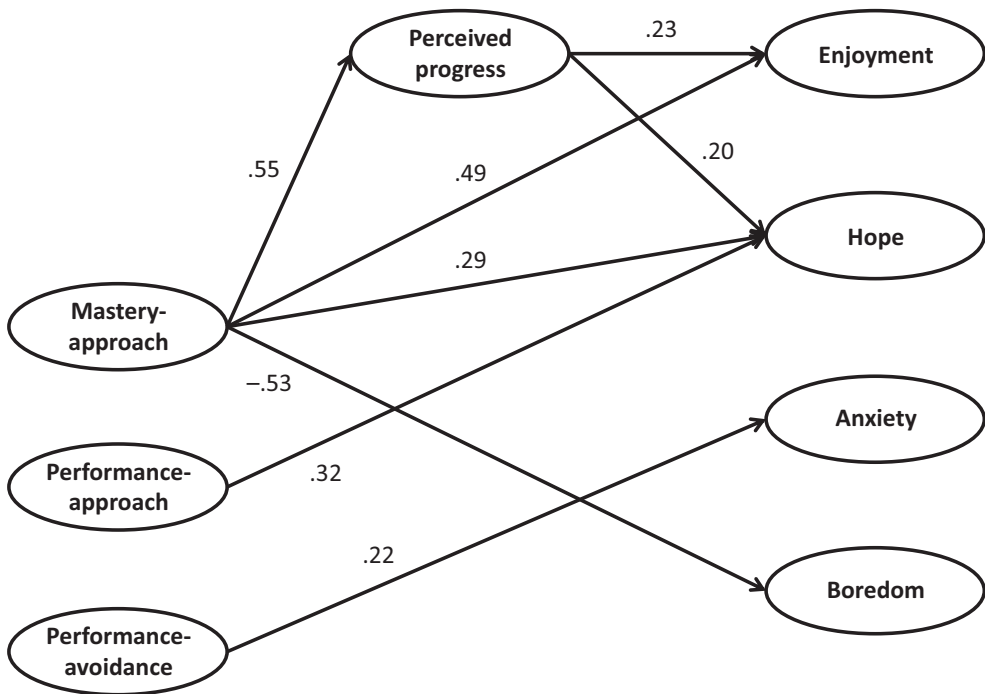
emotions via perceived control and value, bootstrap analyses did not show mediation via either appraisal variable to reach significance.

*Model 2*

As presented in Figure 2, the model evaluating perceived progress as an alternative mediator of the relationships between goal orientations and emotions also demonstrated good fit (CFI = 0.95, RMSEA = 0.05,  $\chi^2(281) = 479.86, p < .001$ ). Direct relationships were observed, with results showing positive effects of mastery-approach goals on enjoyment, hope, and boredom, performance-approach goals to positively predict hope, and performance-avoidance goals to positively predict anxiety. Indirect effects were additionally observed, such that mastery goals positively predicted perceived progress that, in turn, positively predicted enjoyment and hope. Bootstrap analyses showed perceived progress to significantly mediate the relationship between mastery-approach goals and enjoyment ( $\beta = .13, SE = .07; 95\% CI = 0.02-0.60$ ) as well as hope ( $\beta = .11, SE = .06; 95\% CI = 0.03-0.36$ ) providing additional empirical support for the indirect effects of mastery goals on positive emotions via perceived progress.

**Discussion**

The purpose of the present study was to empirically evaluate two theoretical perspectives with respect to potential mediators of the relationship between students' achievement



**Figure 2.** Results for Model 2 (bidirectional model of affect). Note. All paths displayed are significant at  $p < .05$ . Only significant paths are presented. Gender, year of study, and prior grade point average were included as covariates.

goals and their emotions. Model 1 investigated Pekrun's (2006) control-value theory in examining perceptions of personal control and value as mediators of goal–emotion relations, with Model 2 evaluating Linnenbrink and Pintrich's (2002) bidirectional model of affect in exploring perceived progress as a mediational variable. As outlined below, results from structural equation models and bootstrapping analyses provide partial empirical support for both theoretical perspectives, showing indirect effects of specific achievement goals via each of the mediators, and perceived progress to significantly mediate goal–emotion relations.

### ***Pekrun's (2006) control-value theory***

According to Pekrun's (2006) control-value theory, students' goal orientations should correspond to cognitive appraisals of control and value that, in turn, predict the types of emotions students experience. The results of the present study provide partial support for Pekrun's (2006) model in showing mastery-approach goals to directly predict better learning-related emotions (higher enjoyment, lower boredom), with performance-approach goals predicting greater hope and performance-avoidance goals predicting more anxiety (outcome-related emotions). With respect to hypothesized indirect effects, both mastery-approach and performance-approach goals positively predicted perceived control (Hypothesis 1a, 2a), resulting in better outcome-related emotions (hope, anxiety; Hypothesis 4a, 4b). Conversely, performance-avoidance goals negatively predicted perceived control (Hypothesis 3a), leading to poorer outcome-related emotions. Taken

together, students' achievement goals predicted their perceptions of control in the hypothesized directions, leading to corresponding emotional benefits (mastery-approach, performance-approach) as well as deficits (performance-avoidance) in relation to achievement emotions.

Additionally, unanticipated direct and indirect paths were observed in our analysis of Pekrun's (2006) model. First, mastery goals were found to directly predict greater feelings of hope, suggesting that the emotional benefits of a focus on learning may extend beyond learning-related emotions to emotions concerning achievement outcomes. As such, the indirect benefits of mastery goals for hope and anxiety described above additionally suggest that mastery-oriented students are likely to feel even better about their grades due to positive effects of mastery goals on perceived control (Hypothesis 1a). Consistent with scattered findings showing mastery goals to predict better outcome-related emotions (e.g., Pekrun *et al.*, 2009), these findings therefore suggest that the psychological benefits of a focus on learning may not be limited to emotions specific to the learning process (enjoyment, boredom), but also extend to emotions concerning achievement outcomes (hope, anxiety). However, as indicated by unanticipated results of bootstrap analyses showing perceived control to not significantly mediate goal-emotion relations, it is important to note that the effects of mastery and performance-approach goals on students' emotions were primarily direct in nature.

An additional set of unexpected results showed that although mastery and performance-approach goals predicted greater perceived value concerning learning and achievement (as proposed in Hypothesis 1b, 2b), perceptions of value, in turn, predicted *higher* levels of anxiety (as opposed to lower levels; Hypothesis 5b) these findings thus suggest that whereas performance-approach goals may contribute to higher levels of anxiety due to greater perceived value, mastery goals instead have ambivalent effects on outcome-related emotions (positive effects via control, negative effects via value). Although a negative relationship between value and anxiety was hypothesized, a positive relationship between these variables has been observed in prior research (e.g., Goetz, Pekrun, *et al.*, 2006; Wigfield & Meece, 1988). As such, whereas indirect effects involving perceived control provide partial support for Pekrun's (2006) assertion that cognitive appraisals mediate goal-value relations, these findings are notably mixed due to positive effects of value on anxiety as well as multiple direct paths and bootstrapping results showing limited mediation effects.

### **Linnenbrink and Pintrich's (2002) bidirectional model**

As an alternative hypothesis concerning potential mediators of goal-emotion relations, Linnenbrink and Pintrich (2002) proposed that the effects of students' achievement goals on their emotions should be mediated by perceived progress towards their academic goals. The present findings provide partial support for this assertion with mastery-approach goals found to positively predict perceived progress (Hypothesis 6) that, in turn, led to more positive emotions (Hypothesis 9a). More specifically, bootstrap analyses showed perceived progress to be a significant mediator of the link between mastery goals and enjoyment as well as hope, suggesting that the emotional benefits of a focus on personal learning goals may be partially due to students perceiving greater progress towards their goals. Additionally, given that the same direct effects in Model 1 were observed in Model 2 (mastery goals to positive emotions, performance-approach goals to hope, performance-avoidance goals to anxiety), that these paths were generally weaker in the second model further suggests that perceived progress is a more salient mediator of

the effects of achievement goals, namely mastery-approach goals, on students' emotions than perceived control or value.

Concerning findings not consistent with Linnenbrink and Pintrich's (2002) model, whereas it was anticipated that performance-approach goals would have positive effects on both positive and negative emotions, this goal orientation was not related to negative emotions in the structural equation model. Although this result is consistent with some previous work (i.e., Brodish & Devine, 2009; Elliot & McGregor, 1999; Study 1 and 2; Pekrun *et al.*, 2006, 2009), it is nonetheless contrary to other studies that show performance-approach goals to positively predict negative emotions (i.e., Daniels *et al.*, 2009; McGregor & Elliot, 2002; Neff, Hsieh, & Dejitterat, 2005; Sideridis, 2005; Zusho, Pintrich, & Cortina, 2005). In addition, perceived progress was not found to be a significant mediator of the effects of performance-approach or performance-avoidance goals on any of the emotions examined in the study.

Although this lack of significant mediation effects for performance-avoidance and performance-approach goals is contrary to Linnenbrink and Pintrich's (2002) initial predictions (Hypothesis 7, 8), it is nonetheless consistent with Model 1 in showing mastery-approach goals to typically have stronger relations with both the mediators and emotions than performance goals. This finding also provides empirical support for more recent assertions by Linnenbrink (2007) as well as Linnenbrink-Garcia and Barger (2014) that self-threatening goal orientations should lead to greater anxiety regardless of perceived progress, with our results similarly showing only a direct positive path from performance-avoidance goals to anxiety.

### **Study limitations and implications**

Taken together, the results of this study provide partial support for mediational hypotheses from each the two theories examined and underscore the overall importance of students' cognitive appraisals as mediators of the effects of achievement goals on emotions. However, two methodological limitations should be considered when interpreting the study findings. First, the present study is cross-sectional in nature precluding substantive causal assertions, as well as analyses of reverse directionality, that are afforded by longitudinal analyses. Accordingly, future research employing multiple assessments and cross-lagged structural equation models (cf. Pekrun *et al.*, 2014) are recommended to evaluate the proposed effects on emotions over time and provide empirical support for the hypothesized directionality of achievement goals and the proposed mediators [cf. cross-sectional research by Plante *et al.* (2012) on the directionality of expectancy-value cognitions and achievement goals].

Second, as the measures employed were domain-general in nature, it is possible that greater specificity in the study variables in terms of topic of study may have allowed for the more subtle indirect effects to be observed (e.g., perceived progress may be differentially determined in statistics vs. psychology courses). Although our measures were more generally formulated to facilitate the recruitment of students beyond a typical convenience sample (e.g., students in the second or third year, natural science students), the generalizability of our measures may have contributed to direct effects being most prominent in the SEM analyses. Similarly, as the open-ended component of the perceived progress measure did not require participants to describe specific personal goals corresponding to specific domains or orientations (e.g., learning vs. achievement), heterogeneity in the resulting responses may have contributed to relatively lower internal

reliability for this measure and lack of significant relations (e.g., performance orientations).

In sum, the present study provides empirical support for specific elements of Pekrun's (2006) control-value theory and Linnenbrink and Pintrich's (2002) bidirectional model of affect with respect to appraisal-related mediators of the link between students' achievement goals and emotions. In addition to replicating prior research showing achievement goal orientations to directly predict emotions, SEM analyses revealed indirect effects of each goal orientation on outcome-related emotions via perceived control, and of approach goals on anxiety via perceived value. Most importantly, our findings showed the effects of mastery-approach goals on positive emotions to be significantly mediated by perceived progress. However, given the overall lack of significant bootstrapping analyses and primarily direct effects of students' goals on their emotions, further research exploring additional mediating variables is warranted. Whereas this study provides encouraging evidence in partial support of cognitive appraisals as mediating variables, these findings also suggest that other psychosocial variables, including higher-order constructs such as self-regulation (e.g., of emotions: Tyson, 2008; learning: Muis & Franco, 2009), are also likely contributors to the effects of students' goals on their emotional experiences.

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