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How you think about your intelligence determines how you feel in school: The role of theories of intelligence on academic emotions

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ABSTRACT

Research on implicit theories of intelligence and studies dealing with academic emotions has proceeded in parallel with little cross-over of ideas. This research aims to examine the potential synergies that may exist between these two strands of research by examining whether implicit theories of intelligence can function as a predictor of academic emotions when situated within Pekrun's (2006) control-value theory of achievement emotions. Filipino secondary school students (N = 1147) participated in the study. Hierarchical regression analyses were employed to investigate the predictive effects of implicit theories of intelligence on academic emotions after controlling for the variance accounted for by demographic variables, social environmental factors, and achievement goals which have been identified as important antecedents in previous research. Results indicated that holding an entity theory of intelligence positively predicted negative emotions such as anger, anxiety, shame, hopelessness, and boredom. However, it was not significantly related to the positive emotions of enjoyment, hope, and pride. The usefulness of these findings for integrating theorizing in the implicit theories of intelligence and academic emotions literature is discussed.

1. Introduction

The theoretical and empirical literatures dealing with academic emotions (Pekrun, 2006, 2009) and that dealing with implicit theories of intelligence (Dweck, 2011) have proceeded in parallel with little cross-over of ideas. The rationale behind the present study is to examine the potential synergies that may exist between these two paradigms. It would appear plausible that individual differences in implicit theories of intelligence could be a possible antecedent of various academic emotions. Marrying the two theories could assist implicit theories of intelligence researchers to understand the emotional consequences of adopting different views towards one's IQ and could give emotions researchers more insight into the antecedents of different emotions experienced in school. Therefore, the aim of this study is to investigate the relationship between implicit theories of intelligence and academic emotions.

1.1. Academic emotions

In this study we focus on achievement emotions, which refer to emotions linked to achievement-related activities and achievement outcomes (Pekrun, 2006, 2009). Since the emphasis is on the academic domain in this research, we use the term academic emotions.

Pekrun, Goetz, Titz, and Perry (2002) identified the occurrence of different types of academic emotions which could be organized into a valence (positive vs. negative) × activation (activating vs. deactivating) circumplex. Crossing these two dimensions results in: positive activating emotions, positive deactivating emotions, negative activating emotions, and negative deactivating emotions. In terms of valence, positive emotions can be differentiated from negative emotions such as pleasant enjoyment experienced during studying versus unpleasant anxiety felt before an exam. In terms of activation, physiologically activating emotions that facilitate excitement can be distinguished from deactivating emotions that induce relaxation. Positive activating emotions include: enjoyment, hope, and pride. Negative activating emotions include: anger, anxiety, and shame, while negative deactivating emotions include: boredom and hopelessness. An example of a positive deactivating emotion would be relief but it is rarely measured, because it is usually only relevant within a test-taking context and not in a general learning situation.

1.2. Implicit theories of intelligence

Dweck (1999) has proposed that students differ in the degree to which they see intelligence as fixed or malleable. Those who view intelligence as fixed think that intelligence is not, or only marginally affected by effort (entity theory of intelligence). In contrast, those

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who view intelligence as malleable see it as changeable through learning and effort (incremental theory of intelligence). Individual differences in implicit theories lead people to create distinctive frameworks or meaning systems for interpreting and responding to success and failure. Implicit theories have been construed as a unidimensional construct with entity and incremental theories on opposite poles of a continuum (see Dweck & Molden, 2005 for a review).

Numerous studies have shown that students with an entity theory are more likely to feel the need to validate their intelligence through their performance. They are more concerned with how much ability they have and with showing others that they are smart. In contrast, students with an incremental theory are more interested in learning the material and developing their skills (Dweck, 2011).

Implicit theories of intelligence have been documented to exert a huge influence on performance outcomes such as academic achievement (Blackwell, Trzesniewski, & Dweck, 2007) and a variety of cognitive-motivational constructs such as achievement goals (Dweck & Molden, 2005), beliefs in effort (Blackwell et al., 2007), attributions (Hong, Chiu, Dweck, Lin, & Wan, 1999), and self-regulation (Molden & Dweck, 2006) among others. In general, these studies document the maladaptive consequences of adopting an entity theory of intelligence and the positive benefits that accrue as a result of having an incremental theory. However, the relationship between implicit theories and academic emotions has not been previously explored.

1.3. Linking theories of intelligence to academic emotions

Pekrun's (2009) control-value theory of achievement emotions is a useful framework that can link implicit theories of intelligence and academic emotions research. This framework posits that the degree of control one has over the academic task (control-related appraisals) and the value that one places on the task (value-related appraisals) will determine the kinds of emotions that will be generated in school. Control-related appraisals refer to the perceived degree of controllability of achievement-related actions and outcomes. Value-related appraisals, on the other hand, refer to the perceived importance of achievement-related activities and outcomes for the students.

Perceiving that one is in control of the outcomes (high control-related appraisal) and valuing of the task (high value-related appraisal) lead to the experience of positive emotions. On the other hand, low control and low value related appraisals lead to negative emotions.

Implicit theories of intelligence can be mapped directly onto the control-value theory, more specifically to the control-related appraisals component of the framework. Much research has shown that students with an incremental theory think that success is controllable (see Dweck, 1999; 2011; Dweck & Molden, 2005). For example, students who hold an incremental theory are more likely to see effort as a pathway to success while those with an entity theory are more likely to see effort as a form of deficient ability (Blackwell et al., 2007). When they encounter setbacks, incremental theorists are also more likely to have adaptive attributions believing that the reasons for their failure mainly involve a lack of effort or wrong study strategies. On the other hand, entity theorists are more likely to perceive that success is uncontrollable. They are likely to think that setbacks due to low innate ability or to uncontrollable external factors such as luck.

Implicit theories lead people to have different ideas about competence. As Dweck and Molden (2005, p. 128) eloquently put it, "Self-theories change the very meaning of competence. In one system, the entity system, competence is something *people simply have and display right away*. If it does not emerge at once, they lose interest or become distressed. In the other, the incremental system, competence is something that grows over *time through effort*." As such, control-related appraisals will vary as a function of implicit theories with incremental theorists viewing success as more controllable compared to entity theorists. Thus, individual differences in implicit theories will likely lead to the experience of different types of emotions.

1.4. Other predictors of emotions: social environment and achievement goals

In this study, we focus on implicit theories as the focal construct. However, previous studies have also identified achievement goals and the social environment as antecedents of academic emotions (see Pekrun, 2006; Pekrun et al., 2002 for reviews). Therefore, we also included them in this study as covariates. We wanted to examine the unique contribution of implicit theories of intelligence after taking into account the variance accounted for by achievement goals and social environmental factors.

Achievement goals refer to the reasons or purposes of task engagement (Maehr & Zusho, 2009). It is grounded in a distinction between mastery goals and performance goals. Students who pursue mastery goals want to develop academic competence, while those who pursue performance goals want to demonstrate their competence to others through social comparisons. Later, the approach-avoidance dimensions were added to the initial distinction between mastery and performance goals (Elliot, 2005). In this study, however, we limit our examination to mastery-approach and performance-approach goals (which we will later refer to as mastery goals and performance goals) given that the main construct of interest is implicit theories of intelligence. Research on academic emotions and achievement goals have shown that mastery goals generally predict positive emotions and negatively predict negative emotions. Performance goals were found to positively predict hope and pride, but failed to predict the other types of academic emotions, thus showing a more ambiguous pattern (Pekrun, Elliot, & Maier, 2006, 2009).

In Pekrun's control-value theory, the social environment has also been identified as an important antecedent. The motivational quality of the environment has been posited to be important in determining the types of emotions students feel. It is widely acknowledged that positive parental support and teacher support would be positively related to the experience of positive academic emotions and negatively related to the experience of negative academic emotions (Pekrun et al., 2002). Therefore, in this study we likewise controlled for these social environmental factors.

1.5. The present study

Based on the theoretical links proposed above, we posited the following hypotheses:

H1. Entity theory will negatively predict positive academic emotions.

H2. Entity theory will positively predict negative academic activating emotions.

H3. Entity theory will positively predict negative academic deactivating emotions.

These associations are expected to hold even after controlling for the effects of demographic variables and other well-known antecedents such as the social environment, and achievement goals.

2. Methodology

2.1. Participants

The study involved 1147 secondary school students (216 1st, 387 2nd students, 374 3rd, and 170 4th year students) from four secondary

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schools in Metro Manila, Philippines.[1] There were 622 males and 524 females. One student failed to identify the gender. The average age was 14.20 years old.

2.2. Instruments

2.2.1. Parental support

A short version of the parent-support scale from the Rochester Assessment Package for Schools (RAPS, Wellborn & Connell, 1987) was used consisting of 7 items, measuring dimensions such as parental involvement, autonomy support, and the provision of structure. Items were combined to form a parental support scale.

2.2.2. Teacher support

A short version of the teacher support scale from RAPS was used consisting of 6 items tapping into dimensions such as autonomy support, structure, and involvement. These items were combined to form a teacher support scale.

2.2.3. Achievement goals

Mastery and performance goals were measured using the relevant subscales of the Goal Orientation and Learning Strategies (GOALS-S; Dowson & McInerney, 2004; see also King & Watkins, 2011 for the Philippine validation).

2.2.4. Entity theory of intelligence

The short version of Dweck's (1999) scale was used to measure entity theory of intelligence (e.g. "You have a certain amount of intelligence, and you really can't do much to change it."). Note that the theories of intelligence have usually been measured using a unidimensional scale such that a higher scores would indicate a greater endorsement of the entity theory of intelligence, and concomitantly a lower endorsement of an incremental theory of intelligence (see also Blackwell et al., 2007; Robins & Pals, 2002 for a similar approach).

2.2.5. Academic emotions

A short version of the Academic Emotions Questionnaire-Learning (AEQ-L; Pekrun et al., 2002) which has been previously validated in the Philippine setting was used (King, 2010). Emotions measured included enjoyment, hope, pride, anger, anxiety, shame, boredom, and hopelessness.

All the instruments used were measured on a 6-point Likert scale with higher scores indicating a greater degree of endorsement for the designated construct. Questionnaires were all administered in English since it was the medium of instruction for Filipino students from the elementary to the tertiary level.

2.3. Statistical analyses

We conducted a series of hierarchical regressions to determine the relationship between implicit theories and academic emotions. Positive activating emotions (enjoyment, hope, and pride), negative activating emotions (anger, anxiety, shame), and negative deactivating emotions (boredom and hopelessness) were used as the criterion variables.

At the first step of the equation, gender and year level were entered as covariates. At step 2, we entered parent and teacher support (social environment) which are considered distal antecedents of emotions. At step 3, we entered mastery and performance goals into the equation. At step 4, implicit theories of intelligence were entered. We wanted to see whether an entity theory of intelligence could still predict academic emotions even after controlling for the effects associated with the more commonly researched antecedents, thus we entered it at the last step.

3. Results

3.1. Preliminary analyses

Descriptive statistics and reliability coefficients are shown in Table 1 together with the correlations among the relevant variables. The internal consistency of the scales was generally acceptable.

Confirmatory factor analyses (CFA) for the different subscales were also conducted to validate the psychometric properties of the scales. All scales showed good fit indices: entity theory (RMSEA = .06, CFI = 1.00; TLI = .99); social environment (RMSEA = .08 TLI = .92; CFI = .96); achievement goals (RMSEA = .07; CFI = .94; TLI = .91) and academic emotions (RMSEA = .08; CFI = .92; TLI = .90).[2] All factor loadings were significant at the $p < .001$ level.

3.2. Regression analyses

Hierarchical regression analyses were then conducted. Results indicated that entity theories of intelligence predicted additional variance for both negative activating emotions (anger, anxiety, and shame) and negative deactivating emotions (boredom and hopelessness) even after controlling for the effects of the demographic variables, the social environment, and achievement goals (see Table 2). Interestingly, entity theories of intelligence did not predict any of the positive emotions.

Gender and year level were found to be unrelated to most academic emotions. However, females were less likely to experience anger and boredom compared to male students. At step 2, when parental and teacher support were entered a significant amount of variance was explained in each of the criterion variables. In general, parental and teacher support positively predicted positive academic emotions and negatively predicted negative emotions. At step 3, when mastery and performance goals were added, we found mastery goals positively predicting positive academic emotions and negatively predicting negative emotions. Performance goals were more complex. They positively predicted positive activating emotions and also certain negative emotions.

Most importantly, entity theories of intelligence positively predicted all the negative emotions both activating and deactivating but did not predict any of the positive emotions at step 4 of the equation.

4. Discussion

Research on theories of intelligence and academic emotions have generally taken place in relative isolation of each other. This study aims to address this lack of conceptual and empirical integration by situating it within Pekrun's (2006, 2009) control-value theory. Results showed that entity theories of intelligence were able to predict additional variance in academic emotions even after controlling for the effects of more commonly researched antecedents.

Control-value theory posits control and value appraisals as proximal determinants of academic emotions and the social environment as distal antecedents (Pekrun, 2006). Implicit theories, on the other hand, are directly implicated in the control appraisals since an entity theory of intelligence is associated with a perception of lower level of control.

[1] First year high school is equivalent to Year 9 (freshmen) in the American high school system, while 2nd, 3rd, and 4th year are equivalent to Years 10, 11, and 12 respectively.

[2] RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker–Lewis index. RMSEA values that are equal to or lower than .08 and CFI, TLI values of greater than or equal to .90 are deemed acceptable. For the entity theory CFA, two of the factor loadings were constrained to be equal. This procedure was necessary because the scale only had three items. For the achievement goal CFA, some of the errors were correlated due to the large modification indices associated with them.

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Table 1
Descriptive statistics, internal consistency reliability, and zero-order correlations among the variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Parent support	–	.501***	.172***	.037	−.239***	.163***	.116***	.148***	−.382***	−.212***	−.268***	−.421***	−.302***
2. Teacher support		–	.161***	−.048	−.283***	.151***	.115***	.070*	−.403***	−.175***	−.233***	−.467***	−.326***
3. Mastery			–	.427***	.064*	.560***	.496***	.421***	−.276***	−.012	.015	−.224***	−.066*
4. Performance				–	.151***	.397***	.355***	.383***	−.118***	.066*	.144***	−.079**	.074*
5. Entity theory					–	.063*	.063*	.043	.274***	.255***	.308***	.339***	.397***
6. Enjoyment						–	.650***	.483***	−.306***	−.013	.022	−.291***	−.041
7. Hope							–	.540***	−.207***	.011	.022	−.149***	−.034
8. Pride								–	−.133***	.039	.034	−.145***	−.032
9. Anger									–	.471***	.370***	.695***	.421***
10. Anxiety										–	.586***	.413***	.444***
11. Shame											–	.389***	.528***
12. Boredom												–	.515***
13. Hopelessness													–
Mean	4.55	4.31	4.76	4.16	3.55	4.74	4.50	4.60	2.51	3.17	2.43	3.30	3.10
SD	0.96	0.87	0.77	1.01	1.36	0.99	1.06	1.04	1.32	1.29	1.37	1.34	1.38
Cronbach's alpha	0.74	0.61	0.81	0.81	0.81	0.75	0.83	0.61	0.88	0.62	0.68	0.83	0.74

Note.
* $p<.05$.
** $p<.01$.
*** $p<.001$.

We included demographic variables such as gender and year level in the first step of the regression equation. Whereas they were not significantly related to most of the academic emotions, we found that being female was negatively related to boredom and anger. These gender effects, however, were relatively small but they seem to support to support the larger literature on the more positive motivational outcomes associated with being female (Martin, 2003).

In terms of the social environment, parental and teacher support were found to be positive predictors of positive emotions and negative predictors of negative emotions which are consistent with theoretical expectations. With regard to achievement goals, results are in line with previous studies which have documented the multitude of benefits associated with the pursuit of mastery goals (see Hulleman, Schrager, Bodmann, & Harackiewicz, 2010 for a review). The effects of performance goals were much more complex. They served as positive predictors of positive academic emotions. However, they also served as positive predictors of anxiety, shame, and hopelessness. This corroborates the findings in the literature showing the mixed pattern of results usually associated with performance goals (Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). Thus far, there is still no consensus

Table 2
Summary of hierarchical regressions predicting different emotions (standardized beta coefficients are shown).

	Positive activating emotions			Negative activating emotions			Negative deactivating emotions	
	Enjoyment	Hope	Pride	Anger	Anxiety	Shame	Boredom	Hopelessness
	β	β	β	β	β	β	β	β
Step 1								
Gender	.058	.021	.034	−.212***	.001	−.037	−.220***	−.057
Year level	−.041	.001	−.013	−.014	−.019	−.057	−.022	−.065
Step 2								
Gender	.013	−.014	.007	−.106***	.057	.033	−.098***	.035
Year level	−.053	−.008	−.020	.013	−.005	−.040	.010	−.042
Parental support	.115**	.078*	.148***	−.230***	−.171***	−.204***	−.240***	−.186***
Teacher support	.095**	.081*	−.003	−.255***	−.098**	−.130***	−.315***	−.232***
Step 3								
Gender	−.034	−.056	−.028	−.089**	.056	.028	−.088**	.036
Year level	−.006	.035	.030	−.001	.006	−.019	.000	−.031
Parental support	.048	.018	.094**	−.208***	−.176***	−.216***	−.225***	−.189***
Teacher support	.068*	.057	−.011	−.243***	−.092**	−.120***	−.308***	−.222***
Mastery goals	.454***	.408***	.298***	−.166***	−.005	.007	−.105***	−.036
Performance goals	.198***	.184***	.252***	−.050	.069*	.138***	−.040	.079*
Step 4								
Gender	−.034	−.056	−.028	−.088***	.057	.029	−.087**	.037
Year level	−.002	.039	.031	.020	.029	.007	.026	.005
Parental support	.053	.023	.096**	−.181***	−.146***	−.183***	−.192***	−.143***
Teacher support	.075**	.064*	−.010	−.205***	−.050	−.073*	−.261***	−.157***
Mastery goals	.451***	.405***	.297***	−.181***	−.021	−.011	−.123***	−.061*
Performance goals	.195***	.181***	.251***	−.068*	.049	.117***	−.062*	.050
Entity theory of intelligence	.036	.034	.008	.188***	.207***	.230***	.233***	.318***
Step 1 change in R^2	.005	.000	.001	.046***	.000	.005	.050***	.008**
Step 2 change in R^2	.031***	.018***	.021***	.165***	.053***	.080***	.216***	.122***
Step 3 change in R^2	.311***	.254***	.209***	.036***	.012**	.019***	.016***	.005*
Step 4 change in R^2	.001	.001	.000	.031***	.037***	.046***	.047***	.088***
Total R^2	.347	.273	.231	.277***	.102***	.150***	.329	.224***

Note.
* $p<.05$.
** $p<.01$.
*** $p<.001$.

among achievement goal theorists on whether performance goals are adaptive or not. Future research is needed to clarify under what circumstances performance goals could be adaptive and in what conditions they can be maladaptive.

In terms of the implicit theories of intelligence, our hypotheses were largely supported. However, entity theory of intelligence failed to predict any of the positive academic emotions which disconfirmed H1. It did account for a significant amount of variance in all of the negative academic emotions, both activating and deactivating even after taking into account the variance associated with demographic variables, the social environment and achievement goals thus confirming both H2 and H3. This indicates that having an entity theory of intelligence will lead to the feeling of negative emotions in school.

Implicit theories provide a meaning-system framework that influences the control-related appraisals of students. For those who have an entity theory, there is lower sense of control over the academic task is lower. This is because they presume that intelligence is fixed and is not under one's direct control. In contrast, incremental theorists think that personal effort can improve outcomes. Thus they have a higher sense of control over school work which may buffer them against negative academic emotions.

The finding that entity theory positively predicted all the negative academic emotions is interesting. Previous studies have linked entity theory to a variety of maladaptive performance (e.g. low academic achievement) and cognitive-motivational outcomes (see Dweck, 2011; Dweck & Molden, 2005 for reviews). However, to the best of our knowledge, there has been no previous study that linked implicit theories to the discrete academic emotions that students feel in school although there have been previous studies that linked it to overall affect (e.g. Robins & Pals, 2002) and anxiety (e.g. Martocchio, 1994).

This study contributes to the literature in this regard by showing that entity theories also have negative emotional consequences. It seems that holding an entity theory is especially detrimental as it would lead students to experience negative emotions. Conversely, it seems that being an incremental theorist would buffer a person against experiencing negative academic emotions.

5. Limitations and directions for future research

A limitation of our study is its correlational nature which cannot reveal causal connections. An experimental design would be needed to establish causality. Second, we looked at entity theory as a predictor of academic emotions. However, our single time point study is a limitation. A prospective longitudinal design is necessary to determine the temporal precedence among the variables. Third, we relied solely on self-reports in this study which is known to have certain limitations (Fulmer & Frijters, 2009). Future research could use other methodologies aside from self-reports. Fourth, we only recruited Filipino participants. The generalizability of our results to other cultural contexts also needs to be explored in future research.

6. Implications

In terms of theory, our study highlighted the synergy between theorizing on implicit theories of intelligence and that on academic emotions. Our results contribute to the implicit theories of intelligence literature by documenting how an entity theory of intelligence is not only detrimental for cognitive-motivational and performance outcomes as has been amply shown in previous studies but that they are also detrimental for students' emotional experiences in school. Our study likewise contributes to the academic emotion literature by relating implicit theories of intelligence to academic emotions, thus broadening current theorizing which has not focused on this construct.

This study also has practical implications. Although individual differences in implicit theories are relatively stable, intervention studies have shown that they can be modified (Blackwell et al., 2007). Thus, programs that aim to teach students that their intelligence is malleable may be especially beneficial. Research has also shown that the type of feedback given by teachers and the way they praise their students can influence students' implicit theories (Mueller & Dweck, 1998). For example, instead of praising students for their ability (which makes entity theory more salient), teachers can focus more on praising the students for diligence and effort.

7. Conclusion

Overall, our study shows that how students think about their intelligence is associated with how they feel in school. More specifically, students who think that intelligence is fixed are more likely to feel various types of negative emotions such as anger, anxiety, shame, hopelessness, and boredom. Educators and practitioners would do well to help students see their intelligence as something that can be improved through hard work.

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