



Can I master it and does it matter? An intraindividual analysis on control–value antecedents of trait and state academic emotions



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ABSTRACT

The present study explored the relations between cognitive appraisal antecedents and academic emotions as stated in Pekrun's control–value theory (2006). The appraisals of control and value, and the interaction of the two as predictors of emotions, were studied while using both trait and state (via experience sampling) assessments in one sample. Control and value appraisals, and the discrete emotions of pride, anxiety, and boredom, were assessed in four subject domains in a sample of $N = 120$ students in grades 8 and 11. Multilevel analyses showed that control, value, and their interaction predict the respective emotions in the expected direction while using an intraindividual approach in analyzing the data. Furthermore, results revealed that appraisal–emotion relationships are quite similar in trait and state data. Implications for future research are outlined regarding the use of intraindividual approaches and for educational practice with respect to the promotion of control and value appraisals.

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Emotions in achievement contexts, referred to as academic emotions, have long been neglected despite a growing body of research that clearly documents their importance with regard to learning (for example, self-regulated learning: Op't Eynde, De Corte, & Verschaffel, 2007), academic achievement (e.g., Pekrun, Goetz, Titz, & Perry, 2002), lifelong learning (Goetz, Zirngibl, Pekrun, & Hall, 2003), and career choices (Wigfield, Battle, Keller, & Eccles, 2002). Irrespective of these findings, research on academic emotions did not begin to receive much empirical attention until the early 1990s, with the exception of test anxiety (Zeidner, 2007) and Weiner's attributional theory of academic emotions (Weiner, 1985). One important aspect of research on academic emotions is the investigation of their possible antecedents. In addition to the scientific importance of conducting this research, it is especially relevant from a practical perspective as knowledge concerning the antecedents of students' emotional experiences is required to inform the development of effective intervention programs and instructional techniques.

In the research literature, there are various theoretical perspectives on emotions, each with specific ideas about how emotions emerge (Gross & Barrett, 2011). The appraisal perspective is a fundamental approach that explains the variability in peoples' emotional reactions in

identical situations due to different evaluations of the situation. In the context of learning and achievement, subjective control and value are assumed to be particularly important appraisal antecedents as stated in the control–value theory of achievement emotions (Pekrun, 2006). According to this theory, it is assumed that a person's subjective evaluations of control and value influence their subsequent emotions. In order to understand how appraisals influence peoples' emotions, it is important to study appraisal–emotion relationships from an intraindividual perspective, meaning how the different appraisals within a person are related to the emotions experienced by this person.

In research on academic emotions, students are typically asked to give trait self-reports of their emotions (global or 'in general' ratings), which can be problematic as there is empirical evidence that trait assessments, unlike state assessments, are prone to retrospective biases (Robinson & Clore, 2002). Thus, it is recommended that the results of trait assessments of emotions be interpreted with caution as it remains unclear the extent to which they reflect actual emotions or rather beliefs about emotions.

The goal of the present study is twofold. First, the assumptions of the control–value theory regarding appraisal–emotion relationships will be tested using an intraindividual approach (multiple measurement points per person both in trait and state assessments). Second, we compare the two assessment methods of trait and state with regard to potential structural differences in the relations between appraisals and emotions in one sample.

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1. Theoretical background

1.1. Control and value appraisal antecedents of emotions

In the academic context, Pekrun's control–value theory of achievement emotions represents a prominent appraisal theory that describes control and value as especially important appraisal antecedents of emotions (Pekrun, 2000, 2006). According to Pekrun's control–value theory (Pekrun, 2000, 2006), control refers to the appraisal of the possibility to personally influence activities and outcomes and may include perceptions such as competence beliefs and causal attributions. Value refers to one's appraisal of the significance or importance of an outcome.

In accordance with the theory's assumptions, empirical findings consistently demonstrate that control is positively related to positive emotions such as enjoyment or pride and negatively related to negative emotions such as anger and anxiety (e.g., Frenzel, Pekrun, & Goetz, 2007; Goetz, Pekrun, Hall, & Haag, 2006). For value appraisals, the relation is different. According to the theory, high value appraisals intensify positive as well as negative emotions. This means that if the outcome of a task or activity is evaluated as particularly important, stronger positive and negative emotions should be experienced compared to when value is low with the sole exception of boredom. Lower levels of boredom are expected to be experienced when a task or outcome is perceived as high in value (Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010). Studies consistently find the expected positive association between value and positive emotions, however, the correlation between value and negative emotions has been found to be both positive (e.g., Pekrun, 2000) as well as negative (negative correlations but positive associations when using structural equation modeling: Goetz et al., 2006).

Beyond the independent effects of control and value on emotions, the control–value theory explicitly proposes that control and value should interact to produce a combined effect when predicting achievement emotions (Pekrun, 2006). Depending on the subjective value of the activity or outcome, the magnitude of the effect of perceived control on emotions is expected to differ. Alternatively, the effect of perceived value on emotions would be expected to differ as a function of the level of perceived control. For example, compared to students who have low control and low value appraisals, students with low control appraisals but high value appraisals for an outcome (e.g., an important final exam) will likely experience more anxiety. However, it seems as if interaction effects have been largely neglected in previous research on appraisal–emotion relations despite their importance (see Nagengast et al., 2011; Trautwein et al., 2012 with respect to motivational constructs). Only one recently published experience sampling study by Goetz, Frenzel, Stoeger, and Hall (2010) explored the influence of an interactive effect in predicting positive state emotions. Findings from this study indicated that the relation between control appraisals and enjoyment, pride, and contentment, was stronger in situations where high value appraisals were reported.

1.2. Trait and state – Different ways of assessing academic emotions

In the present study, a methodologically-centered definition will be used such that trait emotions are considered to be global emotion reports that entail judgments over lengthy periods of time, whereas state emotion assessments are direct or 'on-line' assessments of the current situation (see Robinson & Clore, 2002). Trait emotions are derived from memory and potentially impacted by subjective beliefs, whereas for state emotions, memory biases are assumed to play a less significant role (see Kahneman, 2011; Robinson & Clore, 2002).

Empirically, the distinction between trait and state assessments is reflected in differences between the means of trait and state emotions in which traits are consistently rated higher than states; a finding often referred to as 'intensity bias' (see Buehler & McFarland, 2001; Robinson & Clore, 2002). However, beyond mean-level analyses, it is important to also investigate the structural similarities and differences

of trait and state emotions in order to clarify how these two assessment methods differ.

1.3. Using an intraindividual approach to study appraisal–emotion relationships

It is vital to use an intraindividual approach when studying how the appraisals of control and value are connected to emotions. An intraindividual approach involves investigating the variation of variables *within* persons. This approach is explicitly encouraged in Pekrun's control–value theory (2006), however, the majority of previous studies employing trait emotion assessments have done so using an interindividual approach such that the variation of variables *between* individuals was analyzed. This is likely the result of only assessing appraisals and emotions once per person. Unfortunately, evaluating interindividual differences can become problematic when attempting to draw conclusions about intraindividual functioning. This is referred to as an ecological fallacy and involves interpreting data on a lower or intraindividual level that are in fact aggregated on a higher level (Hox, 2010; Krapp, 2002; Valsiner, 1986). For example, it was found that at the group level anxiety and motivation to learn were uncorrelated, however, when analyzed at the intraindividual level, motivation to learn and anxiety were positively related for some students and negatively related for others (Pekrun et al., 2002; for a classic example see Robinson, 1950). As this example highlights, analyses conducted at the interindividual or population level do not necessarily provide accurate information regarding intraindividual functioning. To draw a valid conclusion from the population level to the individual level stringent conditions must be met, however, in psychological research this rarely occurs (for a discussion see Molenaar & Campbell, 2009).

At present, there are a few studies on the control–value theory that utilize an intraindividual approach. These studies have focused solely on measuring state emotions and are limited regarding the range of subject domains addressed (mathematics: Ahmed, van der Werf, Minnaert, & Kuyper, 2010) and emotions examined (positive emotions: Goetz et al., 2010; boredom: Pekrun et al., 2010). We believe that it is imperative to adopt an intraindividual approach with state and trait data, which requires multiple trait as well as state assessments per person.

1.4. Aim of the present study

The aim of the present study was to investigate the validity of the control–value theory for trait and state emotions within a single sample while using an intraindividual approach (multiple trait and state measures within persons). In the present study, trait questionnaire measures of appraisals and emotions were assessed four times from each student in four different subject domains in order to capture a broad sample of emotional experiences and related appraisals in the school context. Additionally, state measures from the same students were assessed in the same four domains during school lessons using an experience sampling method. Through the use of an intraindividual approach, we examined the influences of control and value appraisals as well as their combined interactive effect. The selection of emotions was based on the two dimensions of valence and activation as highlighted in Watson and Tellegen's (1985) circumplex model. We focused specifically on pride and anxiety as typical positive and negative activating academic emotions. Furthermore, boredom was chosen as it is a frequently experienced negative deactivating emotion in academic contexts (Larson & Richards, 1991). We did not measure positive deactivating emotions (such as relief and relaxation) in our study as they are typically experienced after an event (rather than during the event) and therefore are not especially suitable for state assessments. In summary, beyond testing the assumptions of the control–value theory through the use of an intraindividual approach, we also aimed to investigate the structural similarities of the appraisal–emotion

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