

Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ)

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ABSTRACT

Aside from test anxiety scales, measurement instruments assessing students' achievement emotions are largely lacking. This article reports on the construction, reliability, internal validity, and external validity of the Achievement Emotions Questionnaire (AEQ) which is designed to assess various achievement emotions experienced by students in academic settings. The instrument contains 24 scales measuring enjoyment, hope, pride, relief, anger, anxiety, shame, hopelessness, and boredom during class, while studying, and when taking tests and exams. Scale construction used a rational–empirical strategy based on Pekrun's (2006) control-value theory of achievement emotions and prior exploratory research. The instrument was tested in a study using a sample of university students ($N = 389$). Findings indicate that the scales are reliable, internally valid as demonstrated by confirmatory factor analysis, and externally valid in terms of relationships with students' control-value appraisals, learning, and academic performance. The results provide further support for the control-value theory and help to elucidate the structure and role of emotions in educational settings. Directions for future research and implications for educational practice are discussed.

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1. Introduction

Academic settings abound with achievement emotions such as enjoyment of learning, hope, pride, anger, anxiety, shame, hopelessness, or boredom. These emotions are critically important for students' motivation, learning, performance, identity development, and health (Schutz & Pekrun, 2007). Accordingly, theoretically-grounded measurement instruments are needed to analyze their functions and origins, and to assess these emotions in educational practice. To date, there is a lack of such instruments, with the single exception of test anxiety questionnaires. In response to this deficit, we developed a self-report instrument measuring various achievement emotions that students commonly experience in academic settings (Achievement Emotions Questionnaire, AEQ). Previous publications referring to this instrument have reported data using preliminary versions or selected scales only (Acee et al., 2010; Daniels et al., 2009; Mouratidis, Vansteenkiste, Lens, & Auweele, 2009; Pekrun, Elliot, & Maier, 2006, 2009; Pekrun, Goetz, Daniels, Stupnisky, & Perry, 2010; Pekrun, Goetz, Perry, Kramer, &

Hochstadt, 2004). The present research involves the first comprehensive investigation of the AEQ, including all scales of the instrument within one analysis. This investigation makes it possible to examine the psychometric quality of the instrument, to analyze the overall structure and role of achievement emotions as experienced by students in academic settings, and to further test hypotheses of the control-value theory of achievement emotions (Pekrun, 2006; Pekrun, Frenzel, Goetz, & Perry, 2007).

Construction of the AEQ was informed by the models for assessing achievement emotions that are provided by the measurement of test anxiety. Specifically, whereas early instruments such as the Test Anxiety Questionnaire (TAQ; Mandler & Sarason, 1952) deemed test anxiety to be a unidimensional construct, conceptions developed since then make it possible to differentiate various components of the construct, with affective, cognitive, and physiological components being central to contemporary measures (Zeidner, 2007). The advances in the measurement of test anxiety enabled researchers to successfully uncover the structures, functions, and origins of this emotion (for overviews, see Hembree, 1988; Zeidner, 1998, 2007).

In line with current test anxiety measurement and conceptions of emotion more generally, the AEQ is based on a multi-component definition of achievement emotion. In contrast to test anxiety

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measures, however, the AEQ assesses a broader range of major achievement emotions. The 24 scales of the instrument tap into nine different emotions occurring in three different academic achievement settings. In the following sections, we first outline the theoretical conception underlying the AEQ and its validation. Next, we describe the construction of the instrument. We then report an empirical analysis targeting item and scale statistics, reliability, internal validity, and external validity of the instrument.

1.1. Conceptual framework: the control-value theory of achievement emotions

As a framework for defining emotions, constructing scales, and validating the instrument, the control-value theory of achievement emotions was used (Pekrun, 2006; Pekrun et al., 2007). The control-value theory provides an integrative approach for analyzing various emotions experienced in achievement contexts, including academic settings as well as achievement situations in other life domains (e.g., sports, professional activities). The theory builds on assumptions from expectancy-value theories of emotions (Pekrun, 1992a; Turner & Schallert, 2001), transactional approaches (Lazarus & Folkman, 1984), attributional theories (Weiner, 1985), and models of the performance effects of emotions (Fredrickson, 2001; Pekrun, 1992b; Pekrun, Goetz, Titz, & Perry, 2002; Zeidner, 1998, 2007). It expands these views by integrating propositions from different theories and by focusing on both outcome-related and activity-related achievement emotions.

1.1.1. Definition and component structures of emotion

In line with contemporary component process models of emotions (Scherer, 2009), the control-value theory views emotions as sets of interrelated psychological processes, whereby affective, cognitive, motivational, and physiological components are of primary importance. For example, anxiety can comprise uneasy and tense feelings (affective), worries (cognitive), impulses to escape from the situation (motivational), and peripheral activation (physiological). This view is consistent with leading-edge conceptions of test anxiety, but extends these conceptions in an important way. Although most current test anxiety instruments assess affective, physiological, and cognitive components of anxiety, they neglect the motivational component. Items pertaining to this component were originally part of Mandler and Sarason's (1952) TAQ, but later motivational components were omitted. These components are included in the current conception.

From a measurement perspective, the multi-component conception of emotions adopted in the control-value theory implies that emotions are best modeled as hierarchically organized structures, with the components comprising an emotion being first-order factors and the emotion itself being represented by a second-order factor. For example, test anxiety would be conceived as being represented by one second-order factor for the emotion test anxiety, and four primary factors for the affective, cognitive, motivational, and physiological components of test anxiety that are nested within the second-order factor (Fig. 1; see Hodapp & Benson (1997) for a similar approach). Empirically, such hierarchical factor models should prove superior to single-factor models postulating just one factor representing the emotion.

1.1.2. Definition of achievement emotion

Achievement emotions are defined as emotions that are directly linked to achievement activities or achievement outcomes. In past research, studies on achievement emotions focused on emotions related to achievement outcomes, including both *prospective outcome emotions*, such as hope and anxiety linked to possible success and failure, respectively, and *retrospective outcome emotions* like pride and shame linked to prior success and failure, respectively

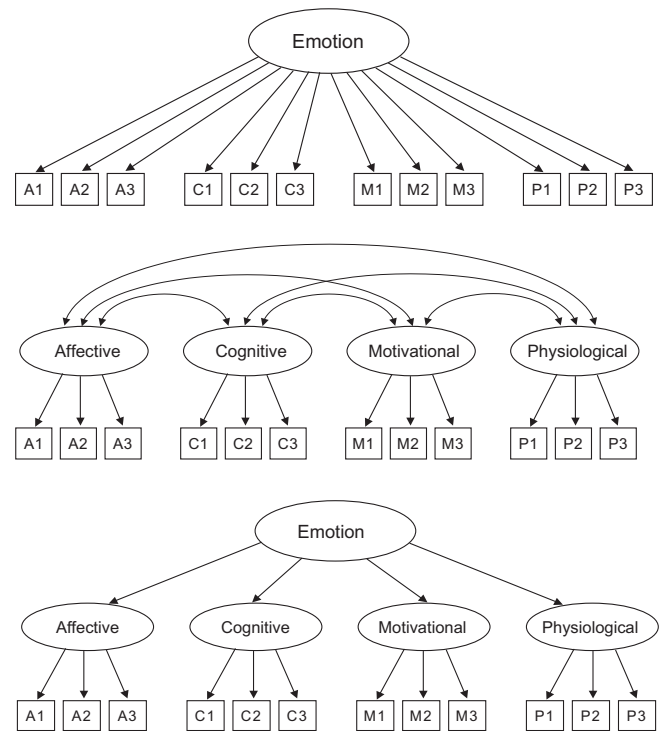


Fig. 1. Models for component structures of achievement emotions. Upper part: Model 1A (one-factor model). Middle part: Model 1B (four component factors model). Lower part: Model 1C (hierarchical model). A1–A3, C1–C3, M1–M3, P1–P3 denote affective, cognitive, motivational, and physiological items, respectively.

(Weiner, 1985; Zeidner, 1998). The definition proposed by the control-value theory implies that *activity emotions* pertaining to current achievement-related activities are also considered as achievement emotions. Examples are students' enjoyment of learning, boredom experienced during classroom instruction, or anger at the task demands of academic learning (Pekrun, 2006; Pekrun et al., 2010).

In Pekrun's (2006; Pekrun et al., 2002) three-dimensional taxonomy of achievement emotions, the differentiation of activity versus outcome emotions pertains to the *object focus* of these emotions. In addition, as with emotions more generally, achievement emotions can be grouped according to their *valence* and to the degree of *activation* implied. In terms of valence, positive emotions can be distinguished from negative emotions, such as pleasant enjoyment versus unpleasant anxiety. In terms of activation, physiologically activating emotions can be differentiated from deactivating emotions, such as activating hope versus deactivating hopelessness. By using the dimensions valence and activation, the taxonomy is consistent with circumplex models of affect that arrange affective states in a two-dimensional (valence \times activation) space (Feldman Barrett & Russell, 1998; Linnenbrink, 2007).

1.1.3. Situational context and temporal specificity

Achievement emotions occur in different academic settings, such as attending class, studying, and taking tests and exams. These settings differ in relation to their functions and social structures. By implication, emotions can vary across these settings as well. For example, enjoyment of classroom instruction may be different from enjoying the challenge of an exam—some students may be excited when going to class, others when writing exams. Therefore, measures of achievement emotions should distinguish between emotions experienced in these different settings.

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