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Academic self-concept and emotion relations: Domain specificity and age effects

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ABSTRACT

The present study investigated the relations between academic self-concepts and the emotions of enjoyment, pride, anxiety, anger, and boredom as experienced in mathematics, physics, German, and English classes ($N = 1710$; grades 8 and 11). In line with our hypotheses derived from appraisal-based emotion theories and self-efficacy research, within-domain relations between self-concepts and emotions were relatively strong and notably stronger within quantitative domains (mathematics and physics) than verbal domains (German and English). Also consistent with our hypotheses, stronger relations between self-concepts and emotions were observed among older students. Self-concept and emotion relations further differed as a function of the specific emotion assessed, with pride showing the strongest and boredom the weakest relations with academic self-concepts in the four domains assessed. Methodological and educational implications as well as directions for future research are discussed.

1. Introduction

In recent years, considerable research has explored the role of self-concept and emotions in the academic domain (Linnenbrink, 2006; Marsh, Craven, & McInerney, 2003) due to their demonstrated importance with respect to self-regulated learning, achievement motivation, course enrollment, and career-related decision-making (see Bong & Skaalvik, 2003; Efklides & Volet, 2005; Schutz & Pekrun, 2007; Skaalvik & Skaalvik, 2008). However, it is both interesting and surprising that empirical research on academic self-concepts on the one hand, and emotions on the other, have remained largely independent. As a consequence of limited research in which academic self-concepts and students' emotions are investigated in a single study, few empirical findings exist concerning the *interrelations* between academic self-concept and emotional experiences (e.g., academic enjoyment, anger, and boredom). Thus, critical research questions concerning the extent to which students' emotional experiences can be inferred from perceived competencies in the academic domain, and vice versa, remain a largely unexplored yet potentially productive avenue for future research in educational psychology.

Investigating self-concept/emotions interrelations is thus important in order to provide empirical evidence on the conceptual overlap between these ubiquitous yet independently evaluated constructs in educational psychology research. In addition to theoretical considerations, knowledge concerning self-concept/emotions relations and how they are moderated by subject area (e.g., mathematics vs. English), grade level, and emotion type (e.g., enjoyment vs. pride) could also serve to inform and improve research practices. For example, if self-concept and emotions are very strongly interrelated and empirically indistinguishable, it may be more efficient to simply investigate only one of these constructs in a given study. Moreover, if strong interrelations are found for some emotions (e.g., anxiety) and not others (e.g., boredom), only the more differentiated emotions could be assessed in addition to academic self-concepts. Knowledge of how these relations are moderated by different subject domains and age is also important with respect to generalizability and future research. For example, as most contemporary educational studies on psychosocial constructs are conducted within specific academic subject areas (e.g., mathematics) and grade levels, knowledge of how subject domain and age moderate the relations between academic self-concept and emotions should contribute to more accurate hypotheses (e.g., for mathematics vs. English classes), and more efficient recruitment procedures (e.g., for conducting power analyses to determine appropriate sample size for specific age groups; cf., Cohen, 1988, 1992).

Theoretical assumptions with respect to self-concept/emotion relations can be derived from both appraisal-based emotion theories (e.g., Scherer, Schorr, & Johnstone, 2001) as well as empirical research on the self-efficacy construct (Bandura, 1977, 1989, 1997). Accordingly, the present study hypotheses were formulated

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based on the proposed relations outlined in these approaches, with the primary assumption being that significant self-concept/emotion relations should be observed. However, following from previous empirical findings suggesting that the strength of self-concept/emotion relations may be significantly affected by subject area, grade level, and emotion type, each of these factors were also evaluated in the present study as potential variables moderating the strength of self-concept/emotion relations.

More specifically, given the largely domain-specific organization of academic self-concepts and emotions (Bong, 2001; Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007), we explored the extent to which self-concept/emotion relations were moderated by subject area (i.e., quantitative domains of mathematics and physics, vs. verbal domains of German and English). Consistent with previous empirical research on academic emotion relations (Goetz et al., 2007), the moderating influence of age on self-concept/emotion relations was also evaluated with respect to different age groups (8th vs. 11th grade). Finally, we analyzed how specific discrete emotions differ in the magnitude of their relations with academic self-concept as would be expected based on the assumptions of popular categorization schemas in emotion research (i.e., outcome vs. activity focus). To summarize, the present study analyzed the general strength of relations between academic self-concept and emotions and further explored the degree to which these relations differed as a function of subject domain, grade level, and emotion type.

1.1. Academic self-concept and emotions – conceptual definitions

In their classic and highly influential review, Shavelson, Hubner, and Stanton (1976) broadly defined *self-concept* as a person's self-perceptions formed through experience with and interpretations of one's environment (see also Marsh & O'Mara, 2008). These self-perceptions are influenced especially by evaluations of significant others, reinforcements, and attributions for one's own behavior. With respect to *emotions*, numerous definitions have been proposed (see Kleinginna & Kleinginna, 1981; Lewis & Haviland-Jones, 2000). Prominent definitions to which numerous studies refer entail a componential perspective (Damasio, 2004; Scherer, 1984) in which emotions are viewed as multi-component, coordinated processes of psychological subsystems including affective, cognitive, motivational, expressive, and peripheral physiological processes. Affective processes (e.g., nervous feelings in the case of anxiety) are assumed to be central to emotions, and to be physiologically bound to limbic subsystems (Fellous & LeDoux, 2005). In contrast to the necessary and sufficient nature of the affective component, other components are considered supplemental yet important for further differentiating and describing emotional experiences (e.g., by describing peripheral physiological processes like heart rate, or expressive aspects such as smiling).

Most important for the present study is that from a structural perspective, both self-concept and emotions can be seen as being multidimensional and hierarchical in nature (see Goetz, Hall, Frenzel, & Pekrun, 2006; Marsh & Ayotte, 2003; Marsh & Shavelson, 1985). With respect to *multidimensionality*, relations involving self-concept and emotions can be evaluated comparatively across domains, for instance, in academic as opposed to non-academic settings (see Shavelson et al., 1976). Concerning their *hierarchical* nature, relations with self-concept and emotions may also be explored at differing degrees of specificity or generality within a given domain. For example, self-concept and emotions related to the academic domain can be readily assessed with respect to more specific academic subdomains such as mathematics, science, and English classes, or even specific areas within a given subdomains (e.g. mathematics: geometry, algebra, statistics).

In the present study, both the multidimensional and hierarchical structure of self-concept and emotions was accounted for by exploring their interrelations across different academic domains at a specific level of generalization (i.e., subject areas), namely mathematics, physics, German, and English. When analyzing relations between constructs, it is important to consider, and ideally, equate the level of generalization for each construct assessed (see Brunswik, 1952; Goetz et al., 2006). For example, analyzing relations between a global self-concept measure (e.g., self-concept in the academic domain) and emotions within a specific subject area (e.g., enjoyment in mathematics) should result in weaker relations than when both constructs are assessed at the same level of generalization. The same is true for the aspect of multidimensionality that occurs as a consequence of increasingly specific levels of analysis (e.g., general academic self-concept vs. math- or English-related self-concept). For example, a students' self-concept related to mathematics should be more strongly related to feelings of pride concerning one's math proficiency than to pride related to their performance in English class.

Another important distinction in emotion research concerns the temporal generality of emotional experiences as reflected by the trait/state differentiation of emotion constructs (Cattell & Scheier, 1961; Spielberger, 1972). In this approach, trait emotions are seen as habitual, recurring emotions typically experienced by an individual whereas state emotions are viewed as emotions experienced at a specific point in time. It is important to note that the fundamental characteristic separating trait from state emotions is *temporal* as opposed to situational generality, as trait emotions can also be assessed in a situation-specific manner (e.g., trait mathematics anxiety). In self-concept research, the trait/state distinction has rarely been discussed, with self-concept having almost exclusively been investigated as a trait construct despite the possibility of trait- vs. state-oriented assessments (e.g., "I have always done well in mathematics" vs. "I can do well in mathematics at this moment"). Consistent with predominantly trait-based operationalizations in previous self-concept research, both self-concept and emotions were evaluated as trait constructs in the present study so as to equate these variables with respect to not only multidimensionality and hierarchical level of generalization, but also temporal generality.

1.2. Academic self-concept and emotion relations

The manner in which self-concept and emotions constructs are interrelated has been addressed in the context of appraisal-based emotion theories (Scherer et al., 2001) as well as self-efficacy research (Bandura, 1977, 1989). As self-concept and self-efficacy represent largely overlapping constructs (Bong & Skaalvik, 2003), the relations observed between self-efficacy and emotion measures may provide some insight into potential relations between self-concept and emotion measures. More specifically, because both self-concept and self-efficacy reflect greater perceptions of personal control (Pekrun, 2006), and higher perceived control shows a clear pattern of relations with emotional experiences (Ruthig et al., 2008), it is reasonable to assume that academic emotions should show similar relations with self-concept as with self-efficacy.

Appraisal-based emotion theories (see Scherer et al., 2001) argue that cognitive appraisals such as perceptions of personal competence or control are clearly related to the emotions experienced in that situation (e.g., enjoyment, anxiety). As academic self-concepts involve beliefs related to one's perceptions of academic control (e.g., physics; see Marsh, 1993; Shavelson et al., 1976), they are assumed to correspond with emotional experiences in the academic domain. High levels of perceived control are assumed to coincide with greater action-outcome expectancies and adaptive