



Impact of social and dimensional comparisons on student's mathematical and English subject-interest at the beginning of secondary school



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ABSTRACT

Recent studies have analyzed social and dimensional comparisons simultaneously in order to consider their impact on students' academic self-concept (e.g., Chiu, 2012). Thereby, social comparisons refer to comparisons with the achievement level of students' classmates, whereas dimensional comparisons comprise comparisons between students' individual achievements across different domains. This paper analyzes whether both achievement comparisons influence students' subject-interest in mathematics and English (as a first foreign language). The analyses are based on $N = 1390$ German fifth and sixth grade students who participated in the BiKS-8-14 longitudinal study. Using multi-level analyses, results indicate that students' competences influence their mathematical and English subject-interests, demonstrating the typical pattern of social and dimensional comparisons. Further, analyses reveal mediation effects by subject-specific grades and self-concepts. These findings also apply for the development of students' subject-interest from grade 5 to grade 6. Results are discussed with respect to their implications concerning theories of achievement comparisons and interest development.

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1. Introduction

Students' interest in school related topics has been proven to be a key factor in explaining students' extracurricular activities as well as their academic choices (Köller, Daniels, & Baumert, April 2000; Krapp, 2002b). Moreover, learning activities that are influenced by a person's interest have a higher probability of resulting in deep-level learning processes than learning activities with no relationship to a person's interests (Krapp, 2002b). However, a common finding indicates that students' academic interests decline during the school course (e.g., Dotterer, McHale, & Crouter, 2009). Therefore, it is important to know which variables influence the development of students' academic interests. Theoretical as well as empirical research emphasized that students' own competences are important predictors of their interests. To evaluate their ability within one domain, persons not only refer to their own domain-specific achievements, but they also compare their individual achievements with others as well as with their own achievements

in other domains (c.f. Marsh, 1986; Möller & Marsh, 2013). There are only a few studies which have analyzed these various ways in which students' interests are affected by their competences and the degree to which students' grades and self-concepts play a role in that relation. To identify these various influences, the present paper analyzes the impact of students' competences, grades and self-concepts on their subject-interests in mathematics and English (as a first foreign language in school (FL)), at the beginning of secondary school.

1.1. Subject-interest in mathematics and English (FL)

To conceptualize students' interest, we refer to the Person-Object-Conception of Interest by Krapp (2002a). According to this theoretical framework, an interest represents a particular relationship between a person and an object of interest. The person's relationship to an object of interest is characterized by emotional- and value-related aspects: The interest-related actions and contents have a subjective significance for the person, and he or she likes to spend time on them. Because of the high personal value of an interest, a person's interests are a central part of his or her identity (Krapp, 2000, 2002a). Based on the theoretical assumption

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that a person likes being engaged in interest-related activities, it is supposed that persons develop an interest especially in topics for which they regard themselves as being competent. Analyzing the impact of students' competences on their interests within a domain, research findings indicated a positive impact of students' competences on their interests (e.g., Baumert, Schnabel, & Lehrke, 1998; Deci & Ryan, 2000; La Guardia & Ryan, 2002), which is likely to be mediated by students' evaluation of their domain-specific abilities, i.e. self-concepts (e.g., Baumert et al., 1998; Denissen, Zarrett, & Eccles, 2007; Eccles & Wigfield, 2002). Moreover, interests can be categorized into situational and individual interests. Situational interests represent current engagements being created by a particular situation, whereas individual interests comprise a person's dispositional structure. Before developing a stable individual interest, persons experience a situational interest which depends on the degree of interest of a particular situation. If a current engagement in a particular situation persists, persons will likely develop an interest as a dispositional structure (Hidi & Renninger, 2006; Krapp, 2002b; Schiefele, 2009). The concept of students' subject-interests to which this paper refers comprises not only students' interests in terms of the topic of the school subject but rather in terms of the '(...) whole arrangement of teaching, learning and acting in the field of a certain school subject' (Krapp, 2002b, pp. 387, referring to Hoffmann, 2002). Thus, students' interests in mathematics and English (FL) represent a combination of individual interests in the topic of the school subject and the interestingness of situational aspects that are related to the particular instructions of these topics (Hoffmann, 2002).

1.2. Development of students' subject-interest – the role of achievement comparisons

A common finding of studies that analyze the development of students' academic interests is that students enter the school system with comparatively high academic interests. However, on average, these interests decline during the school course (e.g., Dotterer et al., 2009; Hidi, 2000; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002). A possible explanation for this finding is the process of interest differentiation. According to this thesis, young children show a universal interest for nearly all things, whereas adolescent students start to develop interests in particular domains (c.f. Daniels, 2008; Todt & Schreiber, 1998). The interest for other, non-matching domains, however, should decrease, since the perpetuation of a particular interest requires an ongoing engagement with the interest-related activities. It is assumed that dimensional achievement comparisons are the underlying mechanisms for the process of self-differentiation (Daniels, 2008). Accordingly, students compare their individual achievement within a particular domain with their own achievement in other domains. These dimensional comparisons were mainly researched within the *internal/external frame of reference* model (I/E-model, Marsh, 1986) that focusses on the formation of students' self-concepts. Research findings indicated that although students' academic achievement within a particular domain (school grades or competence measures) positively affects their corresponding self-concepts, it negatively affects students' self-concepts in other, non-matching domains (Möller, Pohlmann, Köller, & Marsh, 2009; Möller, Retelsdorf, Köller, & Marsh, 2011). Since dimensional comparisons serve as a source of information about students' abilities and weaknesses, they should help students to recognize domains in which they can specialize, and for which they could develop particular preferences and interests (Chiu, 2012; Möller & Marsh, 2013; Möller et al., 2009). Based on these assumptions, Köller et al. (April 2000) examined the influence of dimensional comparisons on students' subject-interests in mathematics and English (FL), taking students' grades and self-concepts

into account. Analyzing German students attending higher academic track schools from grade 10 to grade 12, the results indicated that students' grades impacted on their subject-interests following the typical I/E-model pattern. However, the negative effects of students' grades on their subject-interests in the respective other domain were totally mediated by students' self-concepts. Similarly, Pohlmann (2005) found a mediation effect of dimensional comparisons on student subject-interest via student self-concept when analyzing German students from grade 7 to grade 10. However, these studies only focus on internal, dimensional comparisons and their impact on students' subject-interests. Beyond dimensional comparisons, the theoretical assumptions of the I/E-Model comprise social comparisons with a student's reference group. Accordingly, students evaluate their abilities within a particular domain by not only referring to their own achievement within several domains but also by referring to the achievement level of others. The impact of social comparisons with students' scholastic reference group on their self-concept was mainly researched within the *big-fish-little-pond-effect* model (BFLPE; Marsh et al., 2008). The main research finding indicates that students within high achieving schools or classes develop a lower self-concept compared to equally achieving students who compare their individual achievement with a low achieving reference group (e.g., Dijkstra, Kuyper, van der Werf, Buunk, & van der Zee, 2008; Marsh & Hau, 2003; Nagengast & Marsh, 2012). With regard to students' subject-interests, it can be assumed that high achieving classes indicate to an average achieving student that he or she is not as competent as the others within that particular domain. Such a context is expected to decrease the chance that an average achieving student will show an interest within that domain (c.f. Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). Previous research has been conducted with regard to the mathematical subject-interest, focusing on students in both late junior and senior years. Corresponding studies emphasized a negative impact of average school achievement on student subject-interest in mathematics, which is mediated by their mathematical self-concept (Köller, 2004; Köller, Trautwein, Lüdtke, & Baumert, 2006; Trautwein et al., 2006). Moreover, a cross-sectional study by Trautwein et al. (2006) showed a partial mediation of the impact of class achievement on students' subject-interests via students' grades and self-concepts. These findings are in line with previous studies showing that students' grades seem to be the more salient achievement indicator than students' competences (e.g., Möller et al., 2009).

1.3. Social and dimensional comparisons – a combined model

Recent studies analyzing the impact of achievement comparisons on students' self-concepts extended the operationalization of the I/E-Model. Although the original theoretical approach includes the effects of social comparisons with students' reference group as external comparisons, empirical studies analyzing the I/E-Model generally do not account for the impact of aggregated school or class achievement on students' self-concepts (Chiu, 2012). Thus, to analyze the impact of internal, dimensional as well as external, social comparisons with students' scholastic reference group, recent studies analyzed the impact of both achievement comparisons on students' self-concepts simultaneously. In the cross-sectional study of Chiu (2012), the combined model was tested for eighth Graders' self-concepts in mathematics and science using data from the TIMSS 2003 study. Parker, Marsh, Lüdtke, and Trautwein (2013) analyzed students' self-concepts in mathematics and English (FL) in German upper secondary school. The findings of both studies indicated that social and dimensional comparisons influence students' self-concepts independently of each other. Thus, both achievement comparisons seem to serve

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