



The relation between interests and grades: Path analyses in primary school age[☆]



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ABSTRACT

Within the school context substantial correlations between interests and grades are well documented, but the causal ordering still remains unclear. The paper examines how the relation between interests and grades over several measurement waves in elementary school age can be characterized, whether gender differences in the pattern of effects can be shown, and whether the effects are school-subject-specific. The present analysis follows $N = 1.199$ students in the 3rd Grade over a year and a half. It can be shown that grading determines the level of future interests but not vice versa. Thereby, the pattern of results concerning interests and grades is similar for boys and girls. The effects of grades on subsequent interests are mostly school-subject-specific.

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1. Theoretical background

Interests in school subjects are related to academic achievement. Referring to an often cited meta-analysis conducted by Schiefele, Krapp, and Winteler (1992), an overall correlation of $r = .30$ between interests and academic achievement can be assumed – varying slightly between the subjects under investigation and the indicators for achievement used. Since empirical evidence concerning the causal order of effects is largely missing, this study highlights the relation between subject-specific interests and grades – as an indicator of academic achievement – in elementary school from a longitudinal perspective.

1.1. Relations between interests and academic achievement

From a theoretical point of view, interests can be regarded as an important determinant of academic achievement: higher interests can lead to academic engagement, typically associated with positive affect and persistent engagement in related tasks, which in turn can lead to learning gains and condense in improved achievement test scores or school grades. Borrowing theoretical conceptualizations from the literature on academic self-concepts, this kind of unidirectional effect of interests on academic achievement can be described as *self-enhancement model* (see Calsyn & Kenny, 1977, for self-concept and achievement).

However, a different conceptualization of the relation between interest and academic achievement stems from the idea that learning gains lead to better test results or grades and to other forms of positive feedback, which might in turn foster the

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perception of self-efficacy and promote the development of corresponding interests (see Köller, Baumert, & Schnabel, 2001; Lent, Brown, & Hackett, 1994). The unidirectional effect of achievement on interests refers to the *skill-development model* (Calsyn & Kenny, 1977), which was also formulated in the discussion of the relation between interests and self-concept.

Dealing with the self-enhancement- and the skill-development-models, Marsh (1990, 1993) formulated an alternative *reciprocal effects model* (see also Green, Nelson, Martin, & Marsh, 2006; Marsh & Yeung, 1997), which includes effects from self-concept to subsequent achievement as well as reverse effects from achievement to self-concept.

There is a lot of discussion and empirical research about the causal interrelation between self-concept and achievement, giving support to the reciprocal effects model (e.g., the meta-analysis by Valentine, DuBois, & Cooper, 2004). In interest research – compared to self-concept research – there has been much less activity aiming at the causal interrelations with achievement. As described above, effects from interests to achievement as well as effects from achievement to subsequent interests are well justified from a theoretical point of view. The empirical evidence about the causal ordering of school subject interests and school achievement – measured by achievement tests as rather objective indicators of competence or by grades which might be more important for self-perception of competence – is still limited. Meaningful empirical analyses dealing with causal effects between interests in school subjects and indicators of academic achievement require longitudinal data with sufficient sample sizes (see e.g., Köller, Trautwein, Lüdtke, & Baumert, 2006; Marsh, 1990). In 1998 Schiefele complained that most studies were cross-sectional and that so little well-founded evidence concerning causal relations was available. This picture is currently changing, as longitudinal data are more and more available. Based on the data of the BIJU study (Bildungsverläufe und psychosoziale Entwicklung im Jugendalter; Learning Processes, Educational Careers, and Psychosocial Development in Adolescence and Young Adulthood), Köller et al. (2006) integrated self-concept, interests, course choices, grades, and achievement test scores in mathematics in a complex model. In a sample of students in Grade 10 and 12 they found a positive effect of interests on gains in achievement tests. Marsh, Trautwein, Lüdtke, Köller, and Baumert (2005) referred to BIJU-data of a younger cohort (two measurement points in Grade 7) and data of TIMSS (Third International Mathematics and Science Study; Grades 7 and 8). Using structural equation models that integrated self-concept, interests, grades, and achievement test scores, for none of the two studies effects from interests on subsequent achievement could be proven, nor vice versa.

When Marsh et al. (2005) reduced the model to interests and grades in supplemental analyses they showed that the effect of interests at time 1 on grades at time 2 is higher than the effect of grades at time 1 on interests at time 2, but the effects still remain quite small. Besides, there are more studies that show effects of achievement on interests. Baumert, Schnabel, and Lehrke (1998) reanalyzed several studies on students' achievement and interest in mathematics. Thereby they showed that – controlling for prior competence level – interest in mathematics had no causal effect on subsequent achievement test scores (for grades weak but significant effects can be shown), whereas achievement had a stronger effect on interest development. However, also reciprocal effects were demonstrated in the 1990s. A study by Yoon, Eccles, and Wigfield (1996) found hints for a weak reciprocal relation between intrinsic value (defined as interests and liking) and academic achievement (grades and teacher performance rating of the students) over a two-year-period in a sample of sixth graders for mathematics. Also, Marsh and Yeung (1997) confirmed the reciprocal effects model for mathematics, science and English.

Altogether, the empirical results for the causal ordering of interests and achievement are still somewhat heterogeneous (see also Marsh & Yeung, 1997). So far there has been mixed evidence concerning either the interests-to-achievement model or the achievement-to-interests model or the model of reciprocal effects between interests and achievement.

1.2. Effect of age on the relation between interests and achievement

Looking at the literature on self-concept and achievement in more detail, it also seems worthwhile for modeling the relation between interest and achievement to take into account the idea of a changing relationship over time. Köller et al. (2001) discussed the idea that the direction of effects between self-concept and achievement may vary depending on the developmental stage of the subjects under study. Depending on the age of the respondents as well as on the corresponding contexts (esp. the amount of opportunities for self-regulated learning activities given in the context), the causal effects might change over time (for the developmental perspective see also Guay, Marsh, & Boivin, 2003; Marsh, 2003). “To summarize, the developmental perspective suggests that young children have very positive self-concepts that may appear to be biased in relation to external indicators of self-concept but that these very high self-concepts tend to become less positive and more differentiated as they grow older. In addition, it appears that this developmental pattern may lead to a skill-development effect for younger children, but as children's self-concept becomes more closely aligned with external indicators, a reciprocal-effects model may be obtained” (Guay et al., 2003, p. 126). Corresponding to the developmental perspective, Skaalvik and Hagtvet (1990) found evidence for reciprocal effects in higher school grades but evidence for the skill-development model in lower grades. In the study conducted by Guay et al. (2003) the reciprocal effects model fits best in three different age cohorts (starting in Grades 2, 3, and 4).

A similar developmental pattern can be considered for the relation between interests and achievement. In their formulation of a four-phase model of interest development Hidi and Renninger (2006) distinguished two stages of early situational interests – which are mainly externally supported – from two stages of later individual interests – which are, to a higher degree, self-generated and based on self-regulated activity. A changing pattern between interests and achievement was demonstrated by Köller et al. (2001) on the basis of BIJU-data. Findings from structural equation modeling show effects from the results of a standardized achievement test in mathematics in Grade 7 on interest in Grade 10 (but not from interest

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