The relationship between academic self-concept and achievement: A multicohort–multioccasion study

Ssu-Kuang Chen [a,1], Yu-Chen Yeh [a,2], Fang-Ming Hwang [b,*], Sunny S. J. Lin [a,3]

[a] Institute of Education, National Chiao Tung University, 1001 Ta-Hsueh Rd, Hsinchu 300, Taiwan, ROC
[b] Department of Education, National Chiayi University, No. 85, Wenlong Village, Minxiong Township, Chiayi County 621, Taiwan, ROC

ARTICLE INFO

ABSTRACT

Marsh and Köller (2004) combined the reciprocal-effects model and the internal/external frame-of-reference model into a unified model of relationships between academic self-concept and achievement. However, this model has only been examined with German adolescents. We decided to test this model with two-wave data drawn from a national survey of Taiwanese students. We found that reciprocal effects exist for both math and Chinese for the high-school students. However, the causal relationship of academic self-concepts and achievement for pre-adolescents seems to vary depending on school subject. Moreover, the causal effects from academic achievement decline with age, whereas those from academic self-concepts increase with age, suggesting a developmental trend. The negative cross-domain effect from prior achievement to subsequent academic self-concept is not strong in the unified model.

1. Introduction

In educational psychology, academic self-concept is a significant construct that has stimulated extensive research. A positive academic self-concept is beneficial, particularly for motivating individuals to improve their academic performance (Marsh, 2007). Both the reciprocal-effects model (Marsh, Byrne, & Yeung, 1999) and the internal/external frame of reference (I/E) model (Marsh, 1986) depict the relationship between academic self-concept and achievement. The former model proposes that academic achievement and self-concept reciprocally influence each other, while the latter model claims that achievement positively affects an individual's academic self-concept in the same domain but negatively affects self-concepts in other domains. Marsh and Köller (2004) unified the two models to simultaneously address the causal relationships between academic self-concept and achievement across distinct domains. In the present article, we use "the unification model" (Chien, Jen, & Chang, 2008) to describe this model.

Research on the reciprocal-effects model and the I/E model has been performed in different countries and in cross-national comparisons (Chiu & Klassen, 2009; Lee, 2009; Marsh & Hau, 2004; Marsh, Hau, & Kong, 2002; Marsh, Kong, & Hau, 2001). However, the unification model has only been studied in German adolescents (Marsh & Köller, 2004). Students from East Asian countries have been found to have poorer mathematics self-concepts but higher standardized mathematics test scores compared to those in Western countries (Kung, 2009; Wilkins, 2004). To provide external validity and to gain insight into the causal relationships of academic self-concepts and achievement within domains or cross-domains, the present study evaluated the unification model using a research design that combined the advantages of cross-sectional and longitudinal research within the same study (Marsh et al., 1999). The sample included 5th grade preadolescents and 10th grade adolescents in Taiwan, with data collected in 2 consecutive years for each group.

2. Theoretical background

2.1. Causal ordering of academic achievement and self-concept

In a classic article concerning the causal ordering of academic achievement and self-concept, Calsyn and Kenny (1977) compared the self-enhancement model and the skill-development model (see also Scheirer & Kraut, 1979; Skaalvik, 1997). According to the self-enhancement model, academic self-concept is a determinant of academic achievement, and enhancing academic self-concept improves academic performance. In contrast, the skill-development model suggests that academic self-concept is a consequence of achievement, and the best way to enhance academic self-concept is to improve achievement skills. Both the self-enhancement and skill-development models are based on either-or logic (Marsh, 2007). A compromise between the self-enhancement model and the

skill-development model is the reciprocal-effects model: prior academic self-concept affects subsequent achievement and prior achievement affects subsequent academic self-concept. Research studies have provided support for the reciprocal-effects model (Marsh & Yeung, 1997; Marsh et al., 1999).

The causal relationship of academic self-concept and achievement differs with age. According to Marsh (1990b), the academic self-concepts of young children are not highly associated with external indicators, such as grades or teachers' ratings. However, as they grow older, children learn their relative strengths and weaknesses such that domain self-concepts become more differentiated and more highly correlated with external indicators. In an evaluation of domain self-concept, Marsh, Craven, and Debus (1998) reported that the reliability, stability, and factor structure of academic self-concept scales improved as children grew older, indicating that academic self-concepts become more firmly established and stable with age. Skaalvik and Hagtvet (1990) also advocated that the relationship between achievement and academic self-concept likely becomes reciprocal when ability perceptions are well developed. Researchers supporting this developmental perspective include Skaalvik (1997) and Chapman and Tunmer (1997). Chapman, Tunmer, and Prochnow (2000) noted that academic self-concept is developed based on previous experiences with learning; not all young children's academic self-concepts are pre-determinants of subsequent achievement.

To examine the developmental perspective, Guay, Marsh, and Boivin (2003) conducted a multicohort–multioccasion study based on samples from Grades 2, 3, and 4 and found support for the reciprocal-effects model over different age cohorts. In contrast to previous research (Chapman & Tunmer, 1997; Skaalvik, 1997), Guay et al. (2003) reported the existence of a link from prior academic self-concept to subsequent achievement for young elementary children. Another study of elementary school students found a reciprocal relationship between academic achievement and self-concept, although the effect of academic achievement on academic self-concept was stronger than the effect of academic self-concept on academic achievement (Muijs, 1997). Helmke and van Aken (1995) also supported the reciprocal-effects model when either test scores, school marks, or a mixture of the two were used as achievement indicators for elementary-school students.

Although there is strong support for the generalizability of reciprocal effects to pre-adolescents and adolescents (Kurtz-Costes & Schneider, 1994; Marsh, 2007; Marsh, Trautwein, Lüdtke, Köller, & Bauert, 2005), Skaalvik and Valas (1999) provided support only for the skill-development model based on three cohorts (Grades 3, 6, and 8). Byrne (1998) found support for the skill-development model among high-school students for both general academic and mathematics achievement and self-concept.

2.2. Internal/external frame of reference (I/E model)

According to the I/E model, academic self-concept in a particular domain is formed in relation to two comparison processes or frames of reference. One is the external reference in which students compare their self-perceived performances in a particular domain with the perceived performances of other students in the same domain. If they perceive themselves as able compared to other students, then they should have a high academic self-concept in that domain. The other comparison process is an internal reference in which students compare their own performances in one particular domain with their own performances in another domain. For example, students who are more capable in mathematics than in verbal are likely to have higher mathematics self-concepts. The joint operation of these processes, depending on their relative weights, results in the small or nonexistent correlation between mathematics and verbal self-concepts.

The I/E model was extended in many ways. Möller and Savyon (2003) included non-academic domains in the model and found that academic achievement negatively influences such non-academic self-concepts as honesty. Goetz, Frenzel, Hall, and Pekrun (2008) used an extended I/E model to argue that the achievement effect on academic enjoyment in specific domains is mediated by domain self-concept. There is also support for the generalizability of the I/E model where verbal self-concept is for a native language other than English (e.g., Norwegian: Skaalvik & Rankin, 1995; Chinese: Marsh et al., 2001; Yeung & Lee, 1999; German: Brunner, Lüdtke, & Trautwein, 2008) and where academic self-concept is for a domain other than mathematics (Marsh et al., 2001; Möller, Streblow, Pohlmann, & Köller, 2006).

Studies investigating various age groups and employing different measures of achievement have consistently confirmed the I/E model (Marsh, 1990a). Möller, Pohlmann, Köller, and Marsh (2009), who performed a meta-analysis based on 69 data sets from past studies, found considerable support for the I/E model, and the I/E model was found to be valid for different genders. When the generalizability of the I/E model was examined longitudinally, it was found to be stable over time (Marsh et al., 2001). Experimental studies that manipulated the feedback to an individual's mathematics and verbal performances also supported the existence of internal comparison (Möller & Husemann, 2006; Möller & Köller, 2001; Pohlmann & Möller, 2009).

2.3. Unification of the reciprocal-effects model and the I/E model

Marsh and Köller (2004) combined the reciprocal-effects model and the I/E model into a unified model that incorporates the strengths of each model. In the past, tests of the I/E model have typically been based on a single wave of data, which focuses on the influences of mathematics and verbal achievement on mathematics and verbal self-concepts, particularly the negative effect of achievement in one domain on self-concept in the other. However, the reciprocal-effects model has typically been studied based on a single academic domain. Even for studies that evaluated causal models for more than one domain, separate analyses were conducted for each domain (Marsh & Yeung, 1997; Shavelson & Bolus, 1982). Therefore, the potential limitations of each model have been compensated by reconciling the reciprocal-effects model and the I/E model.

A test of the unification model presented in Fig. 1 would determine whether the cross-domain effect existed across two time periods (i.e., whether prior achievement in a domain influenced the subsequent academic self-concept in another domain) when controlling for covariance due to correlations of the subsequent academic self-concept with the prior academic self-concept and achievement within the domain. In addition, a test of this model would determine the extent of reciprocal effects while controlling for the correlations among self-concept and achievement between domains in one time period and the influence of the self-concept or achievement in the other domain. According to Marsh and Köller (2004), the influence of prior self-concept in one domain to subsequent achievement in another domain is very weak (close to zero) or negative.

3. The present study

The goal of the present study was to determine whether the unification model applied to a 5th grade preadolescent cohort and 10th grade adolescent cohort of students in Taiwan, and to determine the difference in the causal relationships between academic achievement and academic self-concept for the two cohorts. In Taiwan, the academic self-concepts of 5th grade students and 10th grade students are at different stages of formation. Students in 5th grade experience little academic pressure, while 10th grade students have taken a competitive high school entrance exam and have begun to prepare for a college entrance exam that they will take in two years. Comparing these two groups provided insights into how students develop