The notion of self-concept

The notion of self-concept was first introduced by Carl Rogers and Abraham Maslow—how people perceive themselves as pertaining to their capabilities, attitude, values, and uniqueness (Pastorin & Doyle-Portillo, 2013). Subsequently, the establishment of Self-Perception Theory (i. e., individuals use their overt behavior to make inferences about or justify their inner feelings Bem, 1972), paved a way for the emergence of several competing theories of self-perception in the area.

Researchers have offered many models and ideas in relation to student's perceptions of their age-relatedacademicabilities and experiences. With regards to students' academic learning, a wide range of concepts (e. g., self-efficacy, self-concept) are used to elucidate students' self-perceptions of their performances associated with their academic achievement.

Self-efficacy refers to domain-general self-concept which reveals student's evaluation of his or her academic competence in different subjects (e. g., I am good at most school subjects); whereas self-concept refers to domain-specific self-concept which reflects student's judgement of his her ability in a specific academic subject area, such asmathematics/ English (e. g., I am good at mathematics/English, Craven ; Marsh, 2008).

However, in the present discussion, domain-specific academic self-concept is the center of discussion. In educationalpsychology, self-concept is conceptualized as an individuals' general perceived ability andmotivationto learn and stand out academically (Guay, Marsh, & Boivin, 2003; Marsh et al., 2005). It also described the students' subjective beliefs concerning their

strengths and weaknesses in different school subjects as well (Wolff, Helm, et al., 2018).

Shavelson et al. (1976) theorized that academic self-concept is multilayered, suggesting students may perhaps recognize competence for particular domains. That is, students' self-concept could differ relative to specific subject domains, for instance, math self-concept could be defined as the students' confidence that they can succeed in math, and verbal self-concept referred learners beliefs that they can excel in reading performance (Marsh ; Martin, 2011; Marsh ; Redmayne, 1994).

In the present dissertation, borrowed from Marsh et al. (2005) academic self-concept refers to the student's perceived academic competence to specific subjects (e. g., verbal or math). On the other hand, academic achievement literally refers to student's level of competence, control, or self-confidence in a particular domain, and success in educational attainment is closely tied to academic self-concept (Schiefele, Schaffner, Möller, ; Wigfield, 2012).

Academic self-concept formation basically rooted in social comparisons, i. e., students use the achievement of relevant others (in school, usually their classmates) as a frame of reference to evaluate or judge their own achievement level (Seaton, Marsh, ; Craven, 2010). A plethora of literature has addressed the relationship between academic self-concept and achievement. Studies have been elucidated the substantial influence of academic self-concepts on achievement (Huang, 2011; Marsh et al., 2005; Valentine, DuBois, ; Cooper, 2004).

For example, when students are self-confident in their achievement to be academically effective, their self-concept will impact their interest, making them happier about learning. At the point when children demonstrate premium or fervor for learning they will probably turn out to be internally motivated to learn, which will prompt them to push for objectives of scholastic magnificence (Frenzel, Pekrun, ; Goetz, 2007; Pinxten, Marsh, De Fraine, Van Den Noortgate, ; Van Damme, 2014; Rittmayer ; Beier, 2009).

For teachers and parents, the establishment of a strong academic self-concept should be the first priority over the promotion of the longevity of academic achievement (Marsh et al., 2005). As the knowledge of students perceptions of their own academic competencies, feelings, and experiences are significant for their perceptions will impact how they in turn worth academics. And, students' significance of academics will eventually decide how well or ineffectively they perform academically (Peterson & Miller, 2004).

To this end, the overall achievement motivation relations are highlighted; however, it is imperative to understand the complex developmental relationships between academic self-concept and achievement. Hence, in the upcoming sections of this dissertation, first, three major theoretical explanations (i. e., REM, I/EM, and RI/EM) between academic self-concept and achievement discussed with their empirical evidence.

Second, relevant domain specific moderators (ethnic background and sex of students) that affect the relationships of academic self-concept and

achievement would be addressed in different school subjects (verbal and math). Finally, the research gaps of the present thesis were identified to.

Within Domain Developmental Relations Between Academic Self-Concept and Achievement

Reciprocal effect model: The REM is a reconciliation of the two classical opposing " either or" views, that is, either earlier achievement determines later academic self-concept via social comparison process (skill development model) or prior academic self-concept determines subsequent achievement directly or via academic choice behavior, higher aspirations, effort, and investment (self-enhancement model).

However, the REM merging the two models and claimed that earlier academic achievement affects later academic self-concept, and in the same vein, prior academic self-concept affects subsequent academic achievement (Marsh & Craven, 2006). Abundant of studies reported the close relation between academic self-concept and achievement for primaryeducation(e. g., Guay et al., 2003; Helmke & Van Aken, G, 1995), for secondary school education (e. g., Marsh et al., 2005; Retelsdorf, Köller, & Möller, 2014), for complete overview see (Huang, 2011; Marsh & Martin, 2011; Valentine, DuBois, & Cooper, 2004).

Overall, studies reveal that the REMs find strong support when the corresponding academic self-concept and achievement is domain specific (e. g., math or verbal), and when educational progress is determined by grades and teachers feedback (Huang, 2011; Valentine et al., 2004).

However, despite studies increasingly endorsing REM, the results concerning the direction, strength, and significance have been mixed. Apparently, although totally balanced academic self-concept and competence relations are desired, these are seldom found in the literature. In primary education, reciprocal relations were obtained inconsistently, especially for very young children (see, Chapman & Tunmer, 1997; Skaalvik & Valås, 1999), which could be partly attribute to the prematurity of children's self-concept, as academic self-concept become more firmly established and stable with age (Chen et al., 2013).

In secondary education, most individual studies have included only one of the indicators of achievement (i. e., mostly grade, and seldom test scores), and actually none have juxtaposed the two in relation to developmental perspective at a latent level using longitudinal data in a heterogeneous sample of secondary school students (Marsh et al., 2017; Sewasew, Schroeders, Schiefer, Weirich, ; Artelt, 2018). Overall, investigation of the REM with rigorous statistical analysis—particularly applied the current state of the art i. e., using item response theory for achievement measure and maintaining longitudinal and multi-group measurement invariance testing are barely found in the literature.

Across Domain Developmental Relations Between Academic Self-Concept and Achievement

Internal/External frame of reference: The development of academic self-concepts is grounded on a number of judgement procedures comparing a certain target with a certain standard (Wolff, Nagy, Helm, ; Möller, 2018). For

instance, the I/EM hypothesizes that students form their self-concept in an academic domain (e. g., math or verbal) by comparing their own achievement (target) concurrently to an external standard (e. g., the achievement of their classroom friends, social comparison, Festinger, 1954) along with to an internal standard (e. g., their own achievement in other domains, dimensional comparison, Möller ; Marsh, 2013).

Stating in a developmental perspective of I/EM assumptions, negative cross-domain effects between verbal/math achievement on contrasting subsequent academic self-concepts (internal frame of reference effects), and positive within-domain effects between verbal/math achievement and the corresponding subsequent self-concept (external frame of reference effects).

In light of the most comprehensive meta-analysis (i. e., Möller et al., 2009), integrated the results of 68 data sets with more than 125, 000 participants providing strong evidence for the I/EM. Besides, concerning the achievement measures, the I/EM relations were found both when achievements (i. e., math and verbal) were measured with grades, and when this was done with standardized test results (Möller et al., 2009; Wolff, Nagy, et al., 2018).

Despite there has been growing support for predications based on the I/EM by many different methodological approaches: experimental studies (Möller ; Köller, 2001; Müller-Kalthoff et al., 2017; Pohlmann ; Möller, 2009; Wolff, Helm, et al., 2018), cross-sectional (Lohbeck ; Möller, 2017; Marsh ; Hau, 2004; Pinxten et al., 2015), and longitudinal field studies (Chen et al., 2013; Möller et al., 2011; Möller, Zimmermann, ; Köller, 2014; Niepel et al., 2014; Wolff et al., 2018).

Moreover, the I/EM has been extended to different domains than math and verbal (Jansen, Schroeders, Lüdtke, ; Marsh, 2015; Möller, Streblow, Pohlmann, ; Köller, 2006). None withstanding this large body of research, with few exceptions (e. g., Wolff, Helm, et al., 2018) the I/E has rarely been examined in primary school longitudinally—predominantly ones that have also estimated the reciprocal relations of academic self-concept and achievement.

Within and Across Domain Developmental Relations Between Academic Self-Concept and Achievement

Reciprocal Internal/External Model: This model is the latest one, which unifies dimensional comparison (i. e., students compare their performance across two different domains, usually math and verbal), temporal comparison (i. e., students relate their current performance to prior performance in the same domain), and social comparison (i. e., students evaluate their performance in comparison to others).

For example, students develop a higher academic self-concept if they judge their achievement superior in comparison (i. e., down comparison from a better-off target to a worse-off standard) with their classmates (social comparison, Festinger, 1954), with their prior achievement (temporal comparison, Albert, 1977), and with their achievement in other subjects (dimensional comparison, Möller ; Marsh, 2013), and vice versa (Wolff et al., 2018).

Integrating the I/EM and the REM complements the comparisons of each individual model and gives a full picture of the underlying processes (Marsh ;

Köller, 2004): the REM lacks the cross-domain perspective, while the I/EM disregards the developmental aspect and the self-enhancement effects. Remarkably, the RI/EM has only been tested with secondary school students in European countries. For German students, studies reported among others positive reciprocal effects of academic self-concept and achievement (grades) within a domain and negative effects of achievement on subsequent self-concepts across domains (see Möller et al., 2011; Niepel et al., 2014).

Similarly, Möller et al. (2014) found positive longitudinal effects of achievement and self-concept within domains using grades and test-scores and negative effects of achievement on subsequent academic self-concept across domains. However, taking into account prior achievement the effects of academic self-concept on subsequent achievement across domains were near zero. In a sample of Taiwan students, Chen et al. (2013) longitudinally studied two cohorts of secondary school students and found reciprocal relations between math and Chinese. However, no negative cross-domain effects from prior achievement to subsequent academic self-concept were present.

A latest longitudinal study with primary school students (Grade 4 and 5) in Germany (Wolff et al., 2018), replicated the typical pattern of I/EM results: strong positive paths from achievement (grades) to matching self-concepts (social comparison process) and moderate negative paths from achievement to non-matching self-concepts (dimensional comparison process).

Moreover, in the longitudinal run, the authors found small positive effects from achievement to matching self-concepts (showing temporal evaluation

processes within the subjects), and non-significant effects to non-matching self-concepts proved to be nonsignificant (signifying temporal comparison processes within the one domain do not affect self-concept formation in other domain). However, their study confined to grades as achievement measure, and the generalization of the RI/EM to test scores as achievement indicator is still pending in a primary school setting.

Overall, a differing relation between academic self-concept and competence forprimary and secondaryschool students is confirmed by a wide review of the literature. And, a number of reasons could be forwarded for these diverging results: a) different operationalization of academic achievement (grades vs. test-scores), b) the breadth of the definition of academic self-concept, for example, academic enjoyment and competence beliefs (Else-Quest, Hyde, ; Linn, 2010; Pinxten et al., 2014), as well as academic confidence (Else-Quest et al., 2010;

Ganley ; Lubienski, 2016) as part of self-concept, c) different methodological approaches, that is linear regression with manifest indicators vs. latent variable modeling (Marsh et al., 2005; von Maurice, Dörfler, ; Artelt, 2014), d) the average ability level of the sample (e. g., academic track only, see also (Marsh et al., 2017), and e) design of the study, that is, cross sectional vs. longitudinal (Else-Quest et al., 2010; Marsh et al., 2005).