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Math and verbal academic self-concept: Subject-specificity across four distinctive groups of high ability adolescents

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ABSTRACT

Academic self-concept has a pronounced role in high ability students' academic achievement. Current conceptions of self-concept are multidimensional, hierarchical, and influenced by internal valuations and external comparisons. This research utilized the NELS:88 dataset; the sample consisted of high ability students who had participated in their schools' gifted program in eighth-grade and in tenth-grade and were enrolled in advanced placement (AP) courses. This study examined subject-specificity of Marsh's (1986) Internal/External Frame of Reference Model across four groups of high ability students: a) AP math and AP English classes, b) AP math classes only, c) AP English classes only, and d) neither AP math nor AP English classes. Unexpected path findings suggest certain aspects of the I/E model are malleable depending upon group placement. Implications are discussed in the context of the larger social comparison literature.

1. Introduction

Globally, self-concept refers to a person's self-perceptions. More specifically, Lister and Roberts (2011, citing Byrne, 1984, p. 449) state, "self-concept refers to our 'attitudes, feelings, and knowledge about our abilities, skills, appearance, and social acceptability" (p. 130). Over time, conceptualizations of self-concept have evolved into a complex view of how individuals perceive themselves—namely, that self-concept is multidimensional and hierarchical in nature, and that it is formed through internal valuations and external comparisons (Harter, 1989; Marsh, 1986, 1990; Shavelson, Hubner, & Stanton, 1976).

For many high ability students, notions of multidimensionality and hierarchy come together through saliency. Here, we are using the term saliency as a way to describe noteworthy characteristics of self-concept that can change in relevancy and meaningfulness to students depending on environment and contextual comparisons. That is, certain dimensions of self-concept can become more or less important across different settings and under certain conditions. For example, according to the Big-Fish-Little-Pond-Effect (BFLP) (Marsh, 1987), academic self-concept of high ability students is particularly impacted by educational context, because it has been shown that high ability students fare better in more heterogeneous classrooms where external comparisons with peers are more favorable in terms of ability comparisons (e.g., Marsh, 1987; Marsh, Chessor, Craven, & Roche, 1995).

Conversely, when placed in more homogenous classrooms among similar-ability peers, high ability students may actually experience lowered academic self-concepts because external comparisons are not as favorable (McCoach & Siegle, 2002). Furthermore, viewed through the lens of social comparison processes (Marsh, Trautwein, Lüdtke, & Köller, 2008), many high ability students may be especially vulnerable or protected depending upon the educational environment. This is largely because academic comparisons are so important for self-concept development in high ability students (Marsh, 1989, 1991, 1994).

In the present study, we examined the interplay between academic self-concept saliency and changing educational context as a function of advanced placement (AP) course enrollment among a nationally-representative sample of high ability tenth-graders. We believe it is important to study these relationships among high ability adolescents for at least three reasons.

First, it has been shown by much research that academic self-concept plays an important role in academic and adjustment-related outcomes among high ability adolescents (e.g., Dickhauser, 2005; Lyon, 1993; Marsh, 1986, 1990; Plucker & Stocking, 2001; Valentine, DuBois, & Cooper, 2004). Therefore, understanding how self-concept saliency changes as a function of AP course enrollment may help AP teachers structure their classrooms in ways that are supportive of healthy self-concept development among their students.

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Second, as viewed through Marsh's (1986) Internal/External (I/E) Frame of Reference Model, academic self-concept is assumed to form through dimensional comparisons—internally, through self-evaluation processing, and externally, through performance comparisons with others. As discussed previously with respect to the BFLP-Effect, educational context may play a particularly important role in how these dimensional comparisons form among high ability students, especially as schools and districts increasingly utilize AP course programming to educate many of these same students (Curry, MacDonald, & Morgan, 1999; Davis & Rimm, 1989; Henderson, Winitzky, & Kauchak, 1996). It is assumed that the educational context varies considerably between AP and regular education classes. Especially since interpersonal interactions between students and teachers differ, enriched curriculum is most likely present in AP courses, and differing ability comparisons among students may lead to different self-concept formation outcomes (Hertberg-Davis & Callahan, 2008).

Lastly, from an empirical perspective, academic self-concept comparisons have not been examined across AP and non-AP courses. Increasingly, as schools and districts turn to AP courses as the primary way to educate their high ability students, educators will need to gain a better understanding of how these approaches impact academic and well-being outcomes among these same students (Hertberg-Davis & Callahan, 2008).

1.1. Academic self-concept as the Internal/External Frame of Reference Model

Over the previous two decades, the Internal/External Frame of Reference Model has become the prevailing model of academic self-concept (Marsh, 1986, 1994; Marsh, Byrne, & Shavelson, 1988). This model has proved surprisingly robust across many settings and as a predictor of numerous academic outcomes (for a review of the literature, see Marsh, Trautwein, Lüdtke, Koller, & Baumert, 2005 or Möller, Pohlmann, Köller, & Marsh, 2009), especially among high ability students (e.g., Rinn, McQueen, Clark, & Rumsey, 2008).

Longitudinal studies by Marsh (1990) and Valentine et al. (2004), for example, have shown that one's academic self-concept influences future academic achievement, even after controlling for the effects of previous academic achievement. As related specifically to high ability students, McCoach and Siegle (2002) note that high ability adolescents tend to have higher academic self-concepts in comparison with their non-identified peers, and that as much as a third of academic achievement is accounted for by academic self-concept (e.g., Lyon, 1993).

According to the Internal/External Frame of Reference Model, high ability students are often assumed to have higher academic self-concepts than their non-identified peers due to previous successful academic experiences (internal), as well as favorable performance feedback by parents, teachers and peers across academic tasks, domains, and settings (external). Conversely, other researchers have found that comparatively, students who are not identified as having high ability because they have not been labeled as gifted or talented, and do not participate in any type of AP classes often have higher general social self-concepts as compared to high ability students (Cornell et al., 1990; Ross & Parker, 1980).

Both of these findings have relevance for the present study for several reasons. First, some researchers (Marsh, Trautwein, Lüdtke, Koller, & Baumert, 2005; Marsh et al., 2008; Trautwein, Ludtke, Koller, & Baummert, 2006) have suggested that high ability students may suffer from unrealistically high social (i.e., parental, teacher, peer) performance expectations, and exaggerated social pressures to excel. Second, diversity in differential standards of classroom assessment is likely to be found in regular versus AP courses (Hertberg-Davis & Callahan, 2008). Collectively, all of these factors will not only have important influences on academic self-concept formation, but will also most likely differ across AP and non-AP classrooms.

1.2. Using AP course programming to educate high ability students

Initially, AP and International Baccalaureate (IB) programming was introduced as a way to allow college-bound students to earn early college credit towards their degree, rather than as a true form of differentiated education for gifted students. Over time, however, both AP and IB courses have been embraced by educators as a cost-effective way to educate gifted and high ability students, because as Hertberg-Davis and Callahan (2008) note, "Overwhelmingly, students in AP and IB courses indicated that the learning environments were supportive and generally superior to general education courses and preferred AP and IB classroom environments" (p. 204). Reasons cited were, among others, preference for working with students of similar ability and motivation levels, positive relationships with AP and IB teachers, and overall, a more positive educational experience as compared with their regular education courses.

Viewed through the lens of normative social comparisons invoked through the BFLP-Effect, there is reason to believe that self-concept comparisons may vary more strongly among high ability students, particularly when these students interact in different educational settings such as may be found in AP and non-AP classes (Marsh et al., 2008). This is especially true if students are enrolled in both AP and non-AP courses during a typical week, or across an academic year.

Furthermore, building on the work of Hertberg-Davis and Callahan (2008), we also assume that for many of the reasons cited above (e.g., working with students of similar ability and motivation level), the differing educational contexts found in AP and non-AP courses will also likely differentially impact academic self-concept formation in many high-ability students. Understanding how these relationships work together becomes crucial as AP courses become the mainstay of gifted education across most districts nationwide.

1.3. The present study

In the present study, we examined how academic self-concept saliency varies as a function of AP course enrollment across four distinct groups of high-ability adolescents who were enrolled in AP math and AP English classes, enrolled in AP math classes only, enrolled in AP English classes only, or enrolled in neither AP math nor AP English classes. Specifically, we were guided by three research questions as they pertain to achievement and self-concept relationships under Marsh's conception of academic self-concept: a) does domain-specific achievement (math/verbal) predict domain-specific self-concept (math/verbal), b) does achievement in one domain (math/verbal) predict opposite-domain self-concept (math/verbal), and c) is domain-specific achievement (math and verbal) correlated, while domain-specific self-concept (math/verbal) is not; all as a function of different AP course enrollments? Given the lack of previous research examining differences across AP course enrollments, we hypothesized that relationships would occur across the four groups as originally hypothesized by Marsh (1986) (see Fig. 1 and Table 1).

2. Method

2.1. Participants and procedure

High ability in this research is used broadly since AP course enrollment alone is not always an indicator of high ability. Rather, students with high ability demonstrate a particular capability to perform at considerably higher levels when compared with peers of the same age, environment, or experience in at least one subject area (Renzulli, 1975). Archived data from a larger dataset collected as part of the National Educational Longitudinal Study of 1988 (NELS:88) were used in the present study. NELS:88 was sponsored by the National Center for Education Statistics (NCES, 1992). Initial data were collected in Spring 1988, including follow-up interviews with adolescents, parents,

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