Learning and Individual Differences 19 (2009) 596–608

Contents lists available at ScienceDirect

Learning and Individual Differences

journal homepage: www.elsevier.com/locate/lindif

Subjective evaluations of intelligence and academic self-concept predict academic achievement: Evidence from a selective student population

Tatiana V. Kornilova, Sergey A. Kornilov *, Maria A. Chumakova

Department of Psychology, Moscow State University (Lomonosov University), Mokhovaya St., 11/5, 125009, Moscow, Russian Federation

ARTICLE INFO

Article history:
Received 12 November 2007
Received in revised form 7 August 2009
Accepted 10 August 2009

Keywords:
Achievement
Implicit theories
Intelligence
Subjective evaluations
Academic self-concept

ABSTRACT

The study examined the relationship between implicit theories, goal orientations, subjective and test estimates of intelligence, academic self-concept, and achievement in a selective student population ($N = 300$). There was no direct impact of implicit theories of intelligence and goal orientations on achievement. However, subjective evaluations of intelligence and academic self-concept had incremental predictive value over conventional intelligence when predicting achievement accounting for more than 50% of its variance. The obtained pattern of results is presented via structural equation models and interpreted within a dynamic regulative systems framework suggesting the importance of further studying complex sets of achievement predictors that include ability, personality and mediating constructs.

1. Introduction

A vast literature exists on predicting and explaining learning activity and academic achievement with numerous studies attempting to reveal the predictive value of cognitive abilities (e.g., Deary, Strand, Smith, & Fernandes, 2007; Harackiewicz, Barron, Tauer, & Elliot, 2002; see also Sternberg, Grigorenko, & Bundy, 2001 for a review), personality traits (e.g., Blickle, 1996; Bratko, Chamorro-Premuzic, & Saks, 2006; Chamorro-Premuzic & Furnham, 2003; see also De Raad & Schouwenburg, 1996) and mediating constructs (e.g., Chamorro-Premuzic & Furnham, 2006a,b; Elliot & McGregor, 2001) in both school and university domains. Implications of these survey and instructional studies vary from augmenting the existing measures used for educational placement (e.g., Stemler, Grigorenko, Jarvin, & Sternberg, 2003; Sternberg & Williams, 1997) to recommendations for teachers and students on how to improve achievement (e.g., Sternberg, Ferrari, Clinkenbeard, & Grigorenko, 1996; Sternberg, Torf, & Grigorenko, 1998).

In the academic motivation domain, the two last decades of educational and psychological research have been especially productive in terms of the development of the rationale for use of such constructs as self-concept or self-theories (Dweck, 1999, 2006; Markus & Wurf, 1987), self-esteem (Mruk, 2006; Koole & Pelham, 2003; Rodewalt & Tragakis, 2003), and self-efficacy (Bandura, 1986, 1997; Multon, Brown, & Lent, 1991); they are thought to be related to concepts like implicit theories (Dweck, 1999; Dweck & Leggett, 1988) and goal orientations (see Payn, Youngcourt, & Beaubien, 2007 for an overview).

Studies of cognitive predictors of achievement, on the other hand, have broadened conventional notions and measures of intelligence through the development of theories of multiple intelligences (e.g., R. Sternberg's theory of successful intelligence, Sternberg, 1999, 2003) and increased attention to the reliability and predictive validity of subjective estimates of intelligence (Chamorro-Premuzic & Furnham, 2006b; Furnham, 2001; Holling & Preckel, 2005; Visser, Ashton, & Vernon, 2008).

Although distinct, the components of the regulation of learning activity[1] mentioned above may function together in unity. For example, in Russian psychology, O. Tikhomirov's Sense Theory of Thinking (Tikhomirov, 1969, 1977, 1984/1988) suggests that self-concept components, motivation and goals together reflect the personality components of the regulation of thinking.

The current study examines the incremental predictive value of different components of a self-concept and self- and peer-estimated intelligence over conventional psychometric intelligence scores in the academic achievement of a selective[2] population of students. It also provides a theoretical model that integrates factors of self-concept

[1] Learning activity is a system of specific learning actions necessary for the accomplishment of the main stages of the process of knowledge, habit and skill acquisition, and the development of abilities to quickly acquire (i.e., master) new experience in the future (Smirnov, 2008). Within the activity theory framework, different ability, personality and mediating constructs are viewed as involved in the psychological "regulation" of (or influence) this learning activity and subsequent academic achievement.

[2] Students that study in highly competitive programs and are believed to have a restricted academic ability range that restricts the extent to which conventional intelligence measures may predict academic achievement.

* Corresponding author. Department of Psychology, Moscow State University, Mokhovaya St., 11/5, 125009, Moscow, Russian Federation. Tel.: +7 926 3036970.
E-mail addresses: tvkornilova@mail.ru (T.V. Kornilova), sa.kornilov@gmail.com (S.A. Kornilov), chumakova_mariya@inbox.ru (M.A. Chumakova).

1041-6080/$ – see front matter © 2009 Elsevier Inc. All rights reserved.
doi:10.1016/j.lindif.2009.08.001

and ability in explaining and predicting academic achievement. The following sections review previous research on the effects of self-beliefs and cognitive abilities on achievement and provide a theoretical rationale for viewing these components as functioning together in dynamic regulative systems.

1.1. Academic self-concept, implicit theories of intelligence, and goal orientations in academic achievement

In broad terms, self-concept is defined as a person's composite perception of himself or herself formed through experiences and continually reinforced by evaluative inferences (Bong & Clark, 1999; Bong & Skaalvik, 2003; Shavelson, Hubner, & Stanton, 1976).

After focusing on studying general self-concept for a long period of time (see Marsh, 1990a,b, for an overview), psychology switched to viewing self-concept as a multidimensional construct comprised of domain-specific components (Corbière, Fraccaroli, Mbekou, & Perron, 2006; Marsh, 1990a,b; Shavelson et al., 1976). Comprised of different components, these meaning systems directly or indirectly lead to individual differences in academic motivation and behavior (e.g., Ablard, 2002; Bong & Clark, 1999; Dweck, 1999; Leondari & Gialamas, 2002). Of particular interest to educational psychologists are those components of self-concept that are related to the learning domain. These components include (but are not limited to, as will be shown in the next section) academic self-concept and implicit theories of intelligence.

Conceptual definitions of academic self-concept include both cognitive (i.e., awareness and understanding of the self and its attributes, Bong & Clark, 1999) and affective components (i.e., feelings of self-worth, Covington, 1984) formed through the normative evaluation of perceived competence. Bong and Skaalvik (2003) consider such integration of cognition and affect as one of the key features of academic self-concept that distinguishes it from related and seemingly highly analogous constructs such as self-efficacy. Research also suggests (e.g., Bong & Clark, 1999; Corbière et al., 2006) that, although interrelated, these constructs should be viewed as distinct. Precisely, academic self-concept refers to individuals' self-concepts that are formed specifically toward an academic domain—as "knowledge and perceptions about themselves in achievement situations" (Bong & Skaalvik, 2003, p. 6), whereas self-efficacy beliefs are beliefs about the possibility of successfully performing a given academic task. In this case, academic self-concept is not only tapped at a higher level (e.g., of a subject), but is closely related to social comparisons and the information they provide.

Recent research on interrelations between academic self-concept and academic achievement concludes that the relations are reciprocal and mutually reinforcing rather than one-way and causal (Marsh, 1990b, Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005; Skaalvik & Hagtvet, 1990; Shavelson & Bolus, 1982; see also Hansford and Hattie's (1982) meta-analysis). Prior achievement experience forms future academic self-concept, which, in turn, is predictive of subsequent achievement even with prior achievement partialled out. This effect gets stronger when predicting high-stakes grades (r~.40) compared to low-stakes standardized tests (r~.30) (Marsh, 1987; Marsh et al., 2005). Along with direct self-fulfilling effects[3] and the predictive power that comes from the nature of this concept itself (i.e., the description and evaluation of oneself in achievement situations and the beliefs about one's academic ability have been shown to be highly predictive of achievement), having higher academic self-concept also leads to reduced test anxiety, lower aggressiveness likelihood, longer educational attainment and active pursuit of further academic challenges (Marsh & O'Mara, 2008; Marsh & Yeung, 1998; Taylor, Davis-Kean, & Malanchuk, 2007; Zeidner & Schleyer, 1999).

Another important component of self-concept that has been widely studied in academic motivation and achievement domains is that of implicit theories of intelligence (and personality) (e.g., Ablard, 2002; Blackwell, Trzesniewski, & Dweck, 2007; Dupeyrat & Mariné, 2005; Gonida, Kiosseoglou, & Leondari, 2006; Leondari & Gialamas, 2002; Spinath, Spinath, Riemann, & Angleitnerb, 2003). Implicit theories, as a concept developed within C. Dweck's (1999; Dweck & Leggett, 1988) social–cognitive theory of motivation distinguishes between individuals' beliefs about their abilities and personality traits as either fixed (entity theory) or malleable (incremental theory). These beliefs are sources of individual differences in certain cognitions and goal orientations, which affect achievement (Dweck, 1999; Elliot, McGregor, & Gable, 1999; Heyman & Dweck, 1992). Of particular interest is the connection between implicit theories of intelligence and a goal framework. Dweck's (1986, 1999) theory suggests that "entity" theorists perceive their abilities as fixed traits and tend to adopt performance goals seeking to gain favorable and avoid unfavorable judgments about their competence. Their "incremental" opposites, on the contrary, adopt mastery (or learning) goals, in which they seek to understand and master something new, and, thus, increase their competence. Entity theorists give up when facing challenges and generally try to avoid them, whereas incremental theorists are quite persistent in overcoming possible setbacks and often seek challenging situations that promote learning (Elliot & Dweck, 1988).

Studies conducted in the last decade, however, suggested that implicit theories do not affect achievement directly and neither do goal orientations. Their impact on achievement was shown to be rather mediational. For example, in their 2×2 achievement goal framework study, Elliot and McGregor (2001) argued that implicit theories are important antecedents of goal orientations (i.e., entity theory as an antecedent of mastery- and performance-avoidance goal orientations). Moreover, Kornilova, Smirnov, Chumakova, Kornilov, Novototskaya-Vlasova (2008) showed that implicit theories of intelligence and personality are closely related (representing an individual's more general incremental or entity beliefs about himself or herself) and correlate with goal orientations. Goal orientations, in turn, may influence achievement through mediating constructs, such as learning strategies (Ford, Smith, Weissbein, Gully, & Salas, 1998), effort expenditure (Dupeyrat & Mariné, 2005) and perceived competence (Leondari & Gialamas, 2002).

Although there have been studies of implicit theories and academic self-concept in specific populations such as ethnic minorities or students with mental disorders (e.g., Cokley & Patel, 2007; Cokley, Komarraju, King, Cunningham, & Muhammad, 2003; Da Fonseca et al, 2008), the relationship between these self-concept components and achievement has rarely been studied in highly-selective population as in the present study. Second, this study examines the relationships between implicit theories, goal orientations and achievement since there has been mixed evidence for both direct and indirect effects, and the selective nature of the sample may reveal different patterns of these relationships. Some studies showed that this selective status leads to a restricted range of achievement/ability indicators and increased importance and predictive value of personality and mediating constructs (e.g., Kornilova et al., 2008).

1.2. Self-, peer-estimated and psychometric intelligence predict academic performance

It is not surprising that conventional intelligence measures predict academic achievement as they have had a long history of validation specifically against achievement criteria (Deary et al., 2007; Mackintosh, 2006; Sternberg, 2003). Psychology has systematically studied the predictive value of intelligence measures in the educational domain and there is little doubt that this value is significant: Correlations between

[3] That is, a person acts in ways that would seem to confirm his or her initial perception of his or her level of ability. In self-estimated intelligence research, these effects have been associated with increased motivation, greater task persistence and more self-regulated learning (Peterson & Whiteman, 2007).