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Noncognitive skills in education: Emerging research and applications in a variety of international contexts☆

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Research has consistently demonstrated the critical role that noncognitive skills play in student academic achievement, retention, sense of well-being, and general life functioning (e.g., Burrus, MacCann, Kyllonen, & Roberts, 2011; Lipnevich, MacCann, & Roberts, in press; Poropat, 2009). Many studies have attempted to identify factors that are important for scholastic success and other meaningful educational outcomes, often with inconsistent results (e.g., Lipnevich et al., in press). Part of the reason for such inconsistency may be attributed to research inquiries coming from different domains of study and using disparate terminology to label relevant student-level factors (i.e., the "jingle–jangle fallacy", see Block, 1995). The characteristics that are the focus of this issue are differentiated from what are sometimes called cognitive skills or intelligence (i.e., knowledge, skills, and abilities). These constructs are commonly referred to as noncognitive factors in the psychology and economics literatures and a plethora of other names in education, policy, and other closely aligned disciplines, including psychosocial characteristics, socio-affective skills, personal skills, dispositions, twenty-first century skills, educational readiness factors, and many others. Among the important noncognitive constructs related to educational processes and outcomes are: conscientiousness (e.g., Chamorro-Premuzic & Furnham, 2003; Noftle & Robins, 2007; O'Connor & Paunonen, 2007; Wagerman & Funder, 2006), academic discipline (e.g., Duckworth & Seligman, 2003), social skills (e.g., Robbins, Allen, Casillas, Peterson, & Le, 2006), emotional control (e.g., Zeidner & Saklofske, 1996), study habits (e.g., Crede & Kuncel, 2008), and attitudes (e.g., Lipnevich, MacCann, Krumm, & Roberts, 2011).

1. The emergence of noncognitive skills in the twenty-first century

Noncognitive factors have always been the purview of research, but are now increasingly being taken seriously by the education community. Witness, for example, the emergence of new standard movements (e.g., Partnership for 21st Century Skills, 2006a, 2006b) and the growing role of noncognitive factors in large scale international assessments with an attendant impact on education and economic policy (e.g., PISA, Naemi et al., in press) and even legislation (e.g., Partnership for 21st Century Skills, 2008). In fact, in countries as diverse as the United States, United Kingdom, Finland, Korea, Israel, and Singapore, noncognitive skills have been elevated to playing a central role in national curricula. This movement has been fueled, in part, by a new understanding that these skills are critical in the global economy. A number of US states currently mandate that a range of noncognitive skills be part of a standard curriculum, with more states joining in as we prepare this issue. The prospect of this movement becoming part of national legislature is also a tangible possibility (Partnership for 21st Century Skills, 2008). Further, the results of a recent large-scale poll revealed that 99% of Americans are concerned with a deficiency in students' preparation in regard to their noncognitive skills (Partnership for 21st Century Skills, 2007). That is, people of all social classes, educational backgrounds, and political affiliations unanimously agree that the three Rs typically emphasized in most academic programs are no longer enough for students to compete and succeed in the current economy. This shared attitude will inevitably affect the future of educational standards development and attendant legislature.

This trend is consistent with emerging research. For instance, studies have shown that, as early as preschool, personality-related variables predict individual achievement in future schooling (see Abe, 2005). For children and adolescents, psychosocial factors such as self-efficacy, self-concept, and confidence predict reading, science, and mathematics achievement on several large-scale domestic and

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international assessments (Campbell, Voelkl, & Donahue, 1997; Connell, Spencer, & Aber, 1994; Lee, Redman, Goodman, & Bauer, 2007). These predictions remain salient after controlling for background variables such as socio-economic status, school attendance, and first language spoken in the home. Further, meta-analyses confirm that psychosocial factors incrementally predict both achievement and retention of students above and beyond the effects of cognitive test scores (Poropat, 2009; Robbins et al., 2004; Seipp, 1991). There is also evidence that these noncognitive skills, assessed during childhood and adolescence, play an even more crucial role when the outcome space is broadened to include factors other than grades, including absenteeism and disciplinary infractions (MacCann, Duckworth, & Roberts, 2009) or future labor-market indicators, such as chronic unemployment and low earnings (Heckman, Malofeeva, Pinto, & Savelyev, 2007; Heckman & Rubinstein, 2001; Lindqvist & Vestman, 2011). In short, noncognitive characteristics are practically important, policy relevant, and yet in need of a more compelling evidentiary base.

Acknowledging the critical role that noncognitive skills play in student life and academic success, the goal of the current issue is to focus researchers' and educators' attention on noncognitive skills of relevance to academic contexts, across the globe. This special issue contains a number of studies that examine these constructs as predictors of meaningful criteria for educational success and as direct outcomes of instructional interventions. We hope this issue will encourage researchers, practitioners, and legislators to continue efforts towards enhancing student noncognitive skills, as the studies that are part of this issue confirm that these skills matter greatly.

The studies described in this special issue examine the noncognitive characteristics of students of all ages — from preschool (Denham et al., 2012–this issue) to university (Dosseville, Laborde, & Scelles, 2012–this issue; Leroy, Grégoire, Gross, Magen, & Mikolajczak, 2012–this issue; Saklofske, Austin, Mastoras, Beaton, & Osborne, 2012–this issue). Samples studied include those from the United States, Germany, the Netherlands, Greece, Scotland, New Zealand, Belgium, and France. Below we present a taxonomy of noncognitive skills along with a brief overview of studies that were chosen for this special issue (see also Table 1).

2. A taxonomy of noncognitive factors

The surfeit of noncognitive factors can be broken into several (rather large) sub-categories: (a) attitudes and beliefs, (b) social and emotional qualities, (c) learning processes, and (d) personality traits (see Lipnevich et al., in press). We acknowledge that these categories are somewhat arbitrary and may vary from discipline to discipline, researcher to researcher, or depending on a government's mandate or key policy issue at the time. However, the suggested taxonomy serves as an organizing principle for understanding the many noncognitive characteristics that appear relevant to educational research, policy, and practice. We note that it is outside the scope of this commentary to present a detailed description of all possible noncognitive characteristics. Instead, we refer the reader existing sources that discuss a wide range of noncognitive constructs and unifying frameworks for their assessment, classification, and application (see e.g., Kyllonen, Lipnevich, Burrus, & Roberts, in press; Kyllonen, Walters, & Kaufman, 2005; Poropat, 2009; Robbins et al., 2004).

2.1. Attitudes and beliefs

There are a number of noncognitive constructs that describe student attitudes towards different academic disciplines (e.g., math, language), academic contexts (e.g., homework, tests) and school in general, and beliefs that students hold about themselves as learners as well as the nature of learning. Studies have demonstrated that individuals' attitudes and self-belief systems influence their behavior and subsequent academic success (e.g., Dweck & Leggett, 1988; Lipnevich, Krumm, MacCann, & Roberts, 2011; Liu, Hsieh, & Cho, 2006).

Two articles in the current issue examine noncognitive variables indexing student attitudes and beliefs. Smith, Smith, Gilmore, & Jameson (2012–this issue) discuss students' reading self-efficacy beliefs and enjoyment as *predictors* of reading achievement in a sample of eight and twelve-year-old children attending schools in New Zealand. They report differential developmental trajectories for reading enjoyment and self-efficacy. Conversely, Elffers, Oort and Karsten (2012–this issue) use student attitudes toward education as an *outcome* variable in their study. More specifically, Elffers et al. (2012–this issue) assess relationships between students' school experiences and their emotional engagement with school in a sample of vocational school students from the Netherlands. They operationalize emotional engagement through student sense of belonging to school, their perceived value of education, and attitudes towards education in general. These studies demonstrate that student attitudes and beliefs can be effectively used as both predictors and outcomes in various educational contexts.

2.2. Social and emotional qualities

Another broad category of noncognitive factors includes constructs that relate to students' approaches to dealing with their emotions and the emotions of others. Until recently, test anxiety was the single most studied construct in this category (e.g., Schutz & DeCuir, 2002; Sarason, 1984; Zeidner, 1998), with more and more studies examining relationships between academic emotions and achievement and the mechanisms through which emotions affect students' immediate engagement and subsequent academic performance (Pekrun, 2006). Researchers have investigated academic emotions with respect to specific contexts (e.g., school, class; Goetz, Hall, Frenzel, & Pekrun, 2006) and domains (e.g., mathematics, languages; Goetz, Frenzel, Pekrun, Hall, & Lüdtke, 2007; Goetz, Pekrun, Hall, & Haag, 2006), as well as their links to goal orientation and engagement (Pekrun, Elliot, & Maier, 2009). The current issue contains a number of studies that use a variety of approaches to investigate this category of noncognitive skills.

Dosseville, Laborde, and Scelles (2012–this issue) manipulated French student affective states and gaged effects of such manipulation on student performance. In their experiment, the researchers attempted to alter undergraduate students' affective states by playing music during learning and studying subsequent changes in performance. Similarly, Rivers, Brackett, & Reyes (2012–this issue) examined malleability of social and emotional qualities of 5th and 6th grade students in fifteen classrooms in three schools in the United States. They employed a pre- and post-test quasi-experimental design to test the impact of a 30-week social and emotional learning (SEL) curriculum (i.e., the RULER Feeling Words Curriculum) on social, emotional, and academic indicators of student performance. Both of these studies revealed that noncognitive skills can be changed and academic benefits may follow such changes.

Two articles included in the current issue discuss assessment of social and emotional skills of younger students — those attending preschool and elementary school. To this end, Lichtenfeld, Pekrun, Stupnisky, Reiss, & Murayama (2012–this issue) describe development and validation of an instrument assessing elementary school students' achievement emotions (Achievement Emotions Questionnaire — Elementary School, AEQ-E) across three types of academic settings (i.e., attending class, doing homework, and taking tests and exams). The researchers show that AEQ-E is a psychometrically sound measure that can be effectively used to gage academic emotions of elementary school children. Denham et al. (2012–this issue) take a different approach, developing social and emotional learning profiles of preschoolers' early school success. These researchers used direct

Table 1
Summary of studies included in this special issue of Learning and Individual Differences.

	Authors	Title	Sample	Country	Main variable	Outcome variables
1	Denham, S. A., Bassett, H. H., Mincic, M., Kalb, S. C., Way, E., Wyatt, T., & Segal, Y.	Social–emotional learning profiles of preschoolers' early school success: A person-centered approach	275 four-year-old children (preschool)	USA	Emotion knowledge, emotional and social behaviors, social problem-solving, and self regulation	Motivation to learn, participation in the classroom, and other indices of early school adjustment and academic success
2	Lichtenfeld, S., Pekrun, R., Stupnisky, R. H., Reiss, K., and Murayama, K.	Measuring students' emotions in the early years: The Achievement Emotions Questionnaire — Elementary School (AEQ-E)	Study 1: 594 second graders and 595 third graders; Study 2: 163 third-grade students	Germany and the USA	Enjoyment, anxiety, and boredom in three academic settings (i.e., attending class, doing homework, and taking tests and exams)	Mathematics grades
3	Smith, J. K., Smith, L. F., Gilmore, A., and Jameson, M.	Students' self-perception of reading ability, enjoyment of reading and reading achievement	480 year 4 (grade 3 in the United States) and 480 year 8 (grade 4 in the United States)	New Zealand	Self-efficacy in reading, reading enjoyment	Score on eight reading tasks
4	Polychroni, F., and Hatzichristou, C.	The role of goal orientations and goal structures in explaining classroom social and affective characteristics	1493 fifth and sixth grade students	Greece	Goal structures	Goal orientations, student relations, teacher–student relations, peer inclusion, and peer conflict
5	Rivers, S., Brackett, M. A., and Rey, M. R.	Enhancing academic performance and social and emotional competence with the RULER feeling words curriculum	273 5th and 6th grade students in fifteen classrooms in three schools	USA	Social and emotional competence, positive and negative affect	Grades for the final academic term, math, and work habits/social development
6	Goetz, T., Nett, U. E., Martiny, S. E., Hall, N. C., Pekrun, R., Dettmers, S., and Trautwein, U.	Students' emotions during homework: Structures, self-concept antecedents, and achievement outcomes	553 students, 8th and 11th grade	Germany	Enjoyment, pride, anxiety, anger, and boredom across academic domains (mathematics, physics, German, and English) and contexts (homework and classwork)	Academic self-concept and Midterm grades
7	MacCann, C., Lipnevich, A. A., Burrus, J., and Roberts, R. D.	The best years of our lives? Coping with stress predicts school grades, life satisfaction, and feelings about high school	354 high school students	USA	Coping styles	Grades, life satisfaction, positive and negative feelings about school
8	Elffers, L., Oort, F. J., and Karsten, S.	Making the connection: The role of social and academic school experiences in students' emotional engagement with school in post-secondary vocational education	909 students in vocational schools	The Netherlands	Perceived fit with the academic program; perceptions of the academic support; perceptions of the difficulty of the degree program; the proportion of autonomous work in the program	Attitudes towards education in general; students "sense of belonging in their particular school; students" valuing of their particular education.
9	Saklofske, D., Austin, E., Mastoras, S., Beaton, L., and Osborne, S.	Relationships of personality, affect, emotional intelligence and coping with student stress and academic success: Different patterns of association for stress and success	238 undergraduate students (outcome data available for a subset of 163 students)	Scotland	Personality, affect, trait emotional intelligence (EI) and coping style	Year-end average grade
10	Dosseville, F., Laborde, S., and Scelles, N.	Music during lectures: Will students learn better?	249 university students	France	Positive and negative affect	Performance on a test
11.	Leroy, V., Grégoire, J., Magen, E., Gross, J., and Mikolajczak, M.	Resisting the sirens of temptation while studying: Using reappraisal to increase focus, enthusiasm, and performance	Study 1: 51 university students Study 2: 66 university students	Belgium	Task and temptation reappraisal, divided attention, temptation perception	Enthusiasm for the task, performance on a task, susceptibility to temptation

assessments of emotion knowledge and self regulation, and observations of social–emotional behaviors of three- and four-year-old children. Approximately five months later, teachers rated children on social competence, school attitudes, and classroom participation. Denham et al. (2012–this issue) then describe the academic performance of students with these different social and emotional profiles. Their results are both intriguing and promising.

Finally, Goetz et al., (2012–this issue) examined a number of discrete emotions (e.g., pride, anxiety, anger, and boredom) that 8th and 11th grade students from Germany experienced while completing homework (homework emotions), and contrasted these emotions with those experienced during class (classroom emotions) for a number of academic disciplines.

2.3. Learning processes

Classes of learning processes that students engage in when completing academic tasks comprise one more category in the taxonomy of noncognitive characteristics. Among constructs that are included into this category are organizational skills, study

habits, and learning and test-taking strategies (e.g., Crede & Kuncel, 2008; Liu, 2009). Students' metacognitive skills, general goal orientation (e.g., Flavell, 1979; Stankov & Lee, 2008), and time management practices are also circumscribed by this category (see Liu, Rijmen, MacCann, & Roberts, 2009). Polychroni & Hatzichristou (2012–this issue) explore noncognitive characteristics that fall under the category of learning processes. The researchers examine personal and contextual goals that middle school children from Greece set and their role in explaining social relationships (peer, teacher–student, and home–school). Hence, the authors employ noncognitive characteristics as both predictors and outcomes in their investigation. Further, Leroy, Grégoire, Magen, Gross, & Mikolajczak (2012–this issue) in their series of two studies demonstrate that students' cognitive reappraisal of task and temptations may serve as a useful tool for increasing students' task performance and enthusiasm. These studies highlight the complex interplay of affect and cognition during the learning processes inculcated within typical academic contexts.

2.4. Personality traits

Finally, broad personality domains and narrow personality facets comprise the last category in our proposed taxonomy of noncognitive factors. For decades, the widely accepted conceptualization of personality is the five-factor (or Big Five) model (e.g., Costa & McCrae, 1992; Tupes & Christal, 1992). The five factors comprising this model are: (a) openness to experience defined as the tendency to be open to new feelings, thoughts, and values; (b) conscientiousness, the tendency to be organized, achievement-focused, disciplined, and industrious; (c) extraversion, defined as the tendency to be friendly, cheerful, social, and energetic; (d) agreeableness, the tendency to be sympathetic, kind, trusting, and co-operative; and (e) emotional stability, the tendency to be resilient to negative emotions such as anxiety and depression. These broad personality traits are known to predict academic achievement (Kyllonen et al., in press; Poropat, 2009). The current issue includes two manuscripts that examine personality characteristics and their relationship to academic outcomes. In particular, MacCann, Lipnevich, Burrus, and Roberts (2012–this issue) examine whether students' coping strategies incrementally predict a number of important academic outcomes over and above personality factors. Saklofske, Austin, Mastoras, Beaton, and Osborne (2012–this issue) also consider coping styles, but in conjunction with personality, affect, and trait emotional intelligence.

3. Introduction to the special issue

In closing, we would like to note that our understanding of noncognitive factors influencing academic outcomes allows educators to identify students that are more or less likely to do well in specific academic programs. Further, our knowledge of the relations among a range of noncognitive constructs and valued outcomes can be used to develop effective interventions and/or shape educational policy. These interventions can be successful in enhancing students' noncognitive characteristics, and, consequently, their achievement and satisfaction with life. These interventions may also help to prepare students for meeting the demands of the future workforce and navigating their way through an ever-changing global village (and economy). It is in service of these broad aims that the current special issue of *Learning and Individual Differences* is devoted. We trust that the reader finds the articles that we have selected both informative and engaging. And if they stimulate further research — exploring noncognitive factors in education across still further countries — all the better.

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