



Using the theory of successful intelligence as a basis for augmenting AP exams in Psychology and Statistics

Steven E. Stemler^{a,*}, Elena L. Grigorenko^b, Linda Jarvin^c,
Robert J. Sternberg^c

^a *Department of Psychology, Wesleyan University, 207 High Street, Middletown, CT 06459, USA*

^b *Department of Psychology and Child Study Center, 2 Hillhouse Avenue, New Haven, CT 06520, USA*

^c *Tufts University, Ballou Hall, Medford, MA 02155, USA*

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Abstract

Sternberg's theory of successful intelligence was used to create augmented exams in Advanced Placement Psychology and Statistics. Participants included 1895 high school students from 19 states and 56 schools throughout the U.S. The psychometric results support the validity of creating examinations that assess memory, analytical, creative, and practical skills in the context of content-specific knowledge. In addition, Q-factor analyses revealed a set of empirically distinguishable profiles of achievement, supporting the assertion that individuals exhibit different patterns of strengths and weaknesses in cognitive processing skills. Finally, an examination of ethnic group differences in achievement shows that measuring a broad range of cognitive skills tends to reduce ethnic differences in achievement. Future studies aimed at replicating these findings are warranted.

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* Corresponding author. Fax: +1 860 685 2761.

E-mail address: sstemler@wesleyan.edu (S.E. Stemler).

1. Introduction

Each year, millions of students across the country take high-stakes achievement tests that will have an important influence on their academic and professional future (Heubert & Hauser, 1999); yet, many of these tests are not aligned with modern theories of student learning and cognitive processing. As a result, students with strengths in cognitive skills not assessed by these tests may have their future opportunities curtailed (Sternberg, 1997). For example, many students with strong creative or practical skills but weaker memory and analytical skills never have the opportunity to reach the highest levels of education, where they might thrive, because the tests that are used as gatekeepers tend to emphasize a more limited range of skills (e.g., memory and analytical skills) than might be optimal. Yet, a narrow range of skills, such as memory and analytical skills, taken alone is not sufficient to succeed in the professional world. Instead, a balance of a wider range of cognitive skills is important, regardless of one's professional domain.

Broadening the range of cognitive skills assessed is important not only at the individual level. It has potentially important implications at the group level as well. Sternberg and colleagues (Sternberg and The Rainbow Project Collaborators, 2005b; Sternberg, Torff, & Grigorenko, 1998a, 1998b; Sternberg et al., 2004) have shown that when assessments are designed to measure a broad range of cognitive skills, the achievement gap typically observed between White students and underrepresented minority students (Chubb & Loveless, 2002; Jencks & Phillips, 1998) appears to be reduced substantially.

In recent years, designers of large-scale testing programs, recognizing the important social, economic, and ethical consequences associated with standardized testing, have become increasingly interested in linking educational assessment to modern theories of cognitive processing skills (Embretson & Reise, 2000; Irvine & Kyllonen, 2002). To the extent that high-stakes exams draw on sound traditions of research in psychological theory and educational assessment, the results will be more construct valid and defensible.

Therefore, in the spirit of infusing cognitive theory into educational assessment, the aim of the current study was to create a series of augmented exams for the College Board's Advanced Placement (AP) program that would be explicitly based on one validated theory of cognitive processing (Sternberg, 1985, 1997, 1999), the theory of successful intelligence. We were particularly interested in examining individual and ethnic group differences in cognitive processing skills within the context of AP Psychology and Statistics.

Of course, this is not the only theory that could serve as a basis for such an assessment. There are many others (Alexander, Jetton, & Kulikowich, 1995; Carroll, 1993; Cattell, 1971; Ceci, 1996; Gardner, 1983; Luria, 1973) that might also serve as a basis for augmentation of existing tests. Perhaps future studies will compare alternative theories as a basis for such augmentation. We chose the theory of successful intelligence, in particular, because (a) it has been validated through converging operations in a number of different studies, (b) it has rather clear implications for operationalization in the context of item construction for AP exams, (c) past studies had shown incremental validity for theory in the context of assessment, and (d) we are familiar with the theory and its implications.

2. Background

To set the context for the study, we begin with a brief description of the AP program. We then present our theoretical framework for the study and briefly review the literature related

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