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Effects of linguistic complexity and accommodations on estimates of ability for students with learning disabilities

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ABSTRACT

Many students with learning disabilities (SLD) participate in standardized assessments using test accommodations such as extended time, having the test items read aloud, or taking the test in a separate setting. Yet there are also aspects of the test items themselves, particularly the language demand, which may contribute to the effects of test accommodations. This study entailed an analysis of linguistic complexity (LC) and accommodation use for SLD in grade four on 2005 National Assessment of Educational Progress (NAEP) reading and mathematics items. The purpose of this study was to investigate (a) the effects of test item LC on reading and mathematics item difficulties for SLD; (b) the impact of accommodations (presentation, response, setting, or timing) on estimates of student ability, after controlling for LC effects; and (c) the impact of differential facet functioning (DFF), a person-by-item-descriptor interaction, on estimates of student ability, after controlling for LC and accommodations' effects. For both reading and mathematics, the higher an item's LC, the more difficult it was for SLD. After controlling for differences due to accommodations, LC was not a significant predictor of mathematics items' difficulties, but it remained a significant predictor for reading items. There was no effect of accommodations on mathematics item performance, but for reading items, students who received presentation and setting accommodations scored lower than those who did not. No significant LC-by-accommodation interactions were found for either subject area, indicating that the effect of LC did not depend on the type of accommodation received.

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1. Introduction

Students with a learning disability (SLD) comprise the largest group of students with disabilities in the United States (IDEA Child Count, U.S. Department of Education, 2008). In fact, SLD now make up over half of students receiving special education in K-12 settings (Fletcher, Lyon, Fuchs, & Barnes, 2007). One goal of current accountability reform is to ensure that schools, districts, and states work together to close the achievement gaps between all students, including students with learning disabilities and their non-disabled peers (e.g., *No Child Left Behind Act of 2001, 2002*). Students with learning disabilities face unique challenges in demonstrating their knowledge and skill on standardized assessments. Experts in the field have long cautioned that the text-based format of standardized assessments, often via paper and pencil, may result in inaccurate representations of what students know (McDonnell, McLaughlin, & Morison, 1997). For example, a student who has a reading disability may struggle to answer questions on a mathematics problem-solving task. The interpretation of the resultant test item score may be invalid because it confounds whether the performance represents the student's reading skill or mathematics problem solving ability (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education [NCME], 1999).¹ Furthermore, overall scores on standardized assessments may measure different skills for students with disabilities than for their peers without a disability (Abedi & Lord, 2001).

Previous research in the field has investigated the impact of factors such as student disability status, student English Language Proficiency, content area, LC of test items, and accommodation use. With a unique focus on SLD, the purpose of this project was to evaluate the effects of accommodations and test item LC on item scores on the 4th grade National Assessment of Educational Progress (NAEP). This work builds upon research that has investigated factors that influence NAEP item scores for children with disabilities as a whole and English Language Learner (ELL students) students more specifically (e.g., Abedi, Leon, & Kao, 2008a, 2008b; Middleton & Laitusis, 2007; Stone, 2009). This previous research found that high levels of LC, or language demand, can serve as a barrier for students with disabilities and ELL students on standardized assessments, including the NAEP. Yet this work has not yet been done for SLD, students who may face similar challenges in participating in standardized assessments. The purpose of this article was thus twofold: first, to investigate the potential effect of on item functioning for SLD and, second, to understand potential interactions of accommodation use and on item difficulty for this student population.

A student with a learning disability is characterized as one who achieves substantially below expectations on reading, mathematics, or written expression. These expectations can be based on a range of factors, including the student's age, exposure to quality instruction, and level of intelligence. According to the Individuals with Disabilities Education Act (IDEA, 1997, 2004) a learning disability is a disorder of one or more of the psychological processes involved in *understanding or using language* that manifests itself in a deficient ability to listen, speak, read, write, spell, or do mathematical calculations. This disorder includes conditions such as perceptual disabilities, brain injury or minimal brain dysfunction, dyslexia, and developmental aphasia (IDEA, 1997, 2004). Within the context of school, particularly reading and mathematics tasks, the eight areas of struggle that can lead to a diagnosis are reading comprehension, reading fluency, basic reading skills, written expression, mathematics calculation, mathematics problem solving, listening comprehension, and oral expression (IDEA, 1997, 2004).

¹ Central to the discussion of fair and appropriate accommodation use is the issue of test score validity. A *valid* interpretation of an accommodated score is one where the accommodation allowed students to access an assessment without changing the construct being assessed. Validity here refers to the *interpretation* of the score because it is in how the score is used, what it is assumed to represent in terms of student proficiency, where the validity construct comes into play. However, the term validity has been used in multiple ways in the research literature, muddying the discussion of this construct. In this paper, an accommodated score will be described as to its *accuracy*, whereas an accommodation will be described with degrees of *effect* and *fairness* to keep the distinction from validity clear. A fair accommodation must thus in some way "speak to the nature of the disability," addressing the barriers created by the interaction between the student's disability and the test item format (Fuchs, Fuchs, & Capizzi, 2005, p. 5). A valid interpretation of the accommodated score must therefore account for both the characteristics of the test and the test taker (Abedi et al., 2008a, 2008b; Middleton & Laitusis, 2007; Stone, 2009).

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