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Learning by listening to lectures is a challenge for college students with developmental language impairment

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ABSTRACT

Background: Increasing numbers of students with developmental language impairment (LI) are pursuing post-secondary education.
Objective: To determine whether college students with LI find spoken lectures to be a challenging learning context.
Method: Study participants were college students, 34 with LI and 34 with normal language development (ND). Each took a baseline test of general topic knowledge, watched and listened to a 30 min lecture, and took a posttest on specific information from the lecture. Forty additional college students served as control participants. They completed the tests that covered the lecture information without being exposed to the lectures.
Results: With baseline performance controlled, students with LI performed more poorly than students with ND on multiple choice and fill-in-the-blank questions that tapped the lecture material. Nevertheless, students with LI out-performed the control participants whose scores were at floor. A self-rating of attention to the lecture predicted learning performance for both study groups; performance on a sentence repetition test, a measure that taps both prior linguistic knowledge and operations in short-term memory, was an additional predictor for participants with LI.
Conclusion: College students with LI learn less from listening to lectures than other students. Working memory deficits, especially those that reflect weaknesses in the central executive and the episodic buffer, may contribute to the problem.

1. Introduction

1.1. Background

Developmental language impairment (LI, also known as specific language impairment or primary language impairment) is typically diagnosed in childhood but it can limit academic outcomes and other psycho-social functions well into the adult years (Clegg, Hollis, Mawhood, & Rutter, 2005; Elbro, Dalby, & Maarbjerg, 2011; Whitwhouse, Watt, Line, & Bishop, 2009). For example, people from a community-based sample who were identified with LI at age 5 years continued to achieve well below academic grade level at 19 and they were 10.7 times more likely than unaffected same-age peers to meet criteria for learning disabilities in reading and math (Young et al., 2002).

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Nevertheless, comparisons between outcome studies conducted in the 1990s and the 2000s reveal a hopeful change, an increase in the number of people with LI who earn secondary degrees and who continue into post-secondary education (Durkin, Simkin, Knox, & Conti-Ramsden, 2009). This change is part of a more general trend towards an increased presence of students with disabilities on college campuses (Newman et al., 2011). The trend is likely to be specific to countries where reforms in educational policies have led to better supports in secondary classrooms and better transition planning for post-secondary options. In England, for example, recent decades have brought a shift away from special schools to mainstream placements for students with special education needs, a greater emphasis on access to the National Curriculum for students with special needs, and more professionals, mentors, and advisors to support students with special needs (Lindsay, Dockrell, Joffe, Cruice, & Chiat 2008). The United States is another example. As of 2004, U.S. federal law requires that Individualized Education Plans for students who are 16 years or older include goals for transitioning to post-secondary training, education, employment, and independent living (U.S. Department of Education, 2004).

Despite these advances, students with LI who enter post-secondary studies will likely face real challenges. In a recent nation-wide survey of university students in the U.S., those with learning disabilities (on this survey, a broadly-defined category that would include students with LI) reported more difficulty with assignments, more skill-based and non-academic obstacles to success, and less satisfaction with their university experience than other students (McGregor et al., 2016b: Robinson, Sterling, Skinner, & Robinson, 1997). Two types of media predominate in the typical post-secondary course, textbooks and lectures (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006). The purpose of the current study was to examine the challenges that lectures present for post-secondary students with LI.

The functional impact of LI on the processing of classroom lectures has been examined previously. Ward-Lonergan, Liles, and Anderson (1998) asked junior high school students with and without LI to listen to two video-taped lectures about a fictitious country and then verbally answer literal and inferential questions about the content of the lectures. On both lectures and both question types, the students with LI recalled less information than the students without LI and the effect size was moderate.

Do older students with LI, those who manage their disability well enough to gain admission to college, continue to exhibit such difficulties during lectures? Existing survey data suggest this is likely. On one survey, two-thirds of students with dyslexia, a related and sometimes co-morbid disorder, reported barriers to learning during lectures having largely to do with the speed of the lecture presentation (Fuller, Healey, Bradley, & Hall, 2004). One quantitative study is also relevant. Einstein, Morris, and Smith (1985), experiment 2) divided students into groups with higher or lower grade point averages (GPAs), presented them with a video-taped lecture, then asked them to write down as much of the lecture content as they could recall. The recall probe was administered to half of the participants 5 min after the lecture and to the other half one week later. The expected performance gap between students with low and high GPAs was obtained at both time points, and that gap was steady over time; therefore, compared to the more successful students, the less successful students encoded less from the lecture but were no more likely to forget the information that they had encoded.

The current study builds this evidence base in a number of ways. First, we sorted the students by diagnosis (i.e., LI or ND), rather than GPA. Second, because we wished to isolate learning in the moment from limitations in knowledge that had accrued over time, we administered a test of baseline knowledge before the lecture task and factored the scores out of our statistical model. Third, because we were interested in isolating potential deficits in spoken language processing from deficits in reading and writing, we used lectures with minimal textual support and we did not allow the students to take notes. This is a rare procedure in the literature on learning from lectures; very few published studies have isolated learning via listening from learning via note-taking.

There are practical advantages in examining learning from lectures in the absence of note-taking. Students with LI write more slowly than other students (Dockrell et al., 2009); therefore, they might have someone else take notes for them, a standard accommodation at the post-secondary level (Kurth & Mellard, 2006). Alternatively, they might prefer to take notes via keyboard rather than longhand, but taking notes in longhand is a better aid to memory encoding (Mueller & Oppenheimer, 2014). Finally, those students with LI who do take notes longhand may have difficulty prioritizing ideas while writing (Dockrell et al., 2009). In fact, note-taking could interfere with learning in that, in real lecture contexts, the cognitive resources required to attend simultaneously to multiple modalities may be too great for students with LI and related disabilities (Beacham & Alty, 2006). This is not to say that review of notes would not be useful for students with LI; it is (Boyle & Rivera, 2012). What we argue here is that many students with LI are not well-positioned to benefit from note-taking as a memory encoding strategy. Therefore, as an initial step toward understanding the challenges faced by students with LI in the college classroom, it is important to determine what they glean by merely listening to lectures.

1.2. Theoretical framework

At the most general level, to learn from a lecture, the student must comprehend and remember the material. People with LI have problems with both listening comprehension (Montgomery, 2000; Plante, Ramage, & Magloire, 2006; Ward-Lonergan et al., 1998) and memory (Isaki & Plante, 1997; Isaki, Spaulding, & Plante, 2008; McGregor et al., 2013; McGregor, Arbisi-Kelm, & Eden, 2016a; Sheng, Byrd, McGregor, Zimmerman, & Bludau, 2015).

Theoretical models of working memory offer a more nuanced understanding of how weaknesses in comprehension and memory might detract from learning, especially for learners with LI. Working memory is a limited-capacity system for processing and temporarily storing information (Baddeley & Hitch, 1974). Processing involves the construction of