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The effect of syntactic structure upon speech initiation times of stuttering and nonstuttering speakers

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Abstract

Past research has shown that adults who stutter tend to be slower than adults who do not stutter at initiating various speech-like movements, nonsense syllables, words, short phrases, and simple sentences. The present study sought to extend this research by examining the effect that syntactic structure has upon stutterers' and nonstutterers' ability to initiate sentences. Eleven persons who stutter (mean age = 22.2 years) and 11 nonstuttering controls (mean age = 23.3 years) read, rehearsed, and then reproduced a series of 96 sentences within a simple reaction time paradigm. The sentences were presented in four blocks of 24 sentences, and each block contained one version of each of the 24 base sentences. Versions of the base sentences varied, from simple to complex, along four levels of syntactic complexity. Results indicated that speech initiation times (SITs) were significantly longer for participants who stutter than they were for nonstuttering controls for three of the four sentence types. There was no significant difference in SITs across the four sentence types for either group. Among the stuttering participants, there was no significant correlation between stuttering severity and overall initiation time for the sentences. Consistent with other studies, the present findings suggest that persons who stutter are slower than persons who do not stutter at planning and/or initiating motor movements associated with speech production.

Educational objectives: The reader will be able to (1) describe how persons who stutter typically perform during various reaction time tasks, (2) explain the rationale for examining the effect of syntactic complexity upon speech initiation time, (3) discuss how the speech

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initiation times of persons who stutter compare to those of persons who do not stutter during the production of various types of sentences, (4) identify future research needs in this area.

Keywords: Stuttering; Reaction time; Syntax; Fluency; Language

Numerous studies have been conducted to examine the role of the motor system in stuttering. In many of these studies, researchers have used so-called simple reaction time tasks to compare stuttering and nonstuttering speakers in their ability to initiate various responses to linguistic and non-linguistic stimuli. Overall, the findings from this body of research suggest that persons who stutter tend to take more time than persons who do not stutter to initiate such responses. For example, findings from some studies suggest that persons who stutter are slower than persons who do not stutter at initiating simple, speech-related behaviors such as lip closing gestures and V, CV, VCV syllables (Adams & Hayden, 1976; Bakker & Brutten, 1989; Bishop, Williams, & Cooper, 1991; Cross & Luper, 1979; Cross, Shadden, & Luper, 1979; Dembowski & Watson, 1991; Horii, 1984; Maske-Cash & Curlee, 1995; McFarlane & Prins, 1978; Prosek, Montgomery, Walden, & Schwartz, 1979; Starkweather, Franklin, & Smigo, 1984; Starkweather, Hirschman, & Tannenbaum, 1976; Watson & Alfonso, 1987; Williams & Bishop, 1992; and see Adams, Freeman, & Conture, 1984, for a review). Findings from other studies suggest that persons who stutter are slower than persons who do not stutter at initiating words, phrases, and short sentences in response to auditory and/or visual cues to begin speaking (Reich, Till, & Goldsmith, 1981; Watson et al., 1991). Further, some researchers have reported that the between-group discrepancy in response initiation time seems to increase with the length of the target response (Peters, Hulstijn, & Starkweather, 1989).

Although such studies offer insight into the ability of persons who stutter to rapidly initiate vocal and non-vocal behaviors, they are somewhat limited because, for virtually all of the studies, the target responses required of participants have been much simpler than those typically produced during conversation. Accordingly, it is difficult to determine the extent to which findings from this body of research generalize to the longer, more complex sentences that adolescent and adult speakers routinely produce during daily activities. In those studies where researchers have examined initiation times using linguistically based responses (e.g., Bishop et al., 1991; Maske-Cash & Curlee, 1995; Peters et al., 1989; Reich et al., 1981; Watson et al., 1991), factors such as response length and syntactic structure have not been controlled or systematically manipulated in relation to one another. Results from studies with nonstuttering adults (e.g., Ferreira, 1991; Sternberg, Monsell, Knoll, & Wright, 1978) suggest that speakers' response initiation times are sensitive to these factors. Thus, based on the research to date, it is difficult to determine the extent to which linguistic factors contribute to the response initiation profiles seen in persons who stutter.