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The duration component of the stress effect in stuttering

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Abstract

The purpose of the present study was to investigate whether there is a relationship between stuttering on stressed syllables and the duration of these syllables. Sixteen adults who stutter read a text consisting of 226 syllables. The relative stress of each syllable was rated, and syllables were categorized into long- and short-stressed syllables, unstressed syllables and intermediate syllables lying in-between. In order to isolate effects caused by within-word position from those caused by linguistic stress, syllables in initial and in subsequent positions were analyzed separately. In both word position categories stressed syllables were stuttered more often than unstressed syllables. Stuttering frequency of intermediate syllables seems to be in-between stressed and unstressed syllables, just as their stress level is rated in-between. Results regarding the duration of stressed syllables do not allow final conclusions.

Educational objectives: The reader will learn about and be able to describe (1) language factors related with stuttering events, (2) the stress effect in adults who stutter, and (3) methods to control for its confounding variables.

Keywords: Stuttering; Linguistic stress; Accent; Syllabic stress; Auditory control

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1. Introduction

The syllable is the unit which contains linguistic stress or accent. Syllabic stress seems to be characterized by an overall increase of articulatory effort (Fowler, 1995). In detail, stress is realized by increasing duration, loudness, fundamental frequency, and accuracy of articulation of syllables (Lehiste, 1970). Already in 1938, Brown reported a *stress effect* in stuttering. Stuttering events occurred more often on stressed than on unstressed syllables in poly-syllabic words. In Brown's study, more than 90% of stuttering events occurred on initial sounds of words. This well-known feature of stuttering is called the *word-initial effect*. In English, as well as in German, the majority of syllables containing stress is in the first position of words. Therefore, word-initial position and stress are confounded, requiring the isolation of their effects. This can be done, for example, by analyzing stuttering frequency of first and subsequent syllables of words separately. Indeed, Brown found the stress effect in other than the first syllables of words as well.

Since Brown's early work, several studies have dealt with stuttering and linguistic stress. Although different paradigms (e.g., the reading of word lists or connected speech) and definitions of stressed syllables (e.g., primary stress in poly-syllabic words or peaks in a stress rating along a continuum) were used, it was consistently found that stuttering occurred more often on stressed than on unstressed syllables (Bergmann, 1986; Hahn, 1942; Klouda & Cooper, 1988; MacKay, 1970; Prins, Hubbard, & Krause, 1991; Wingate, 1984). In two studies using two-syllable words, it was found that stuttering events are more strongly associated with word-initial position than with stress (Hubbard, 1998; Weiner, 1984). This means that the first unstressed syllable of a poly-syllabic word is more likely to be stuttered than a stressed syllable in later positions of the same word.

The authors cited above, proposed several explanations of the stress effect, covering pure psychological, motor control, and linguistic factors. However, there is a lack of detailed descriptions of processes that might lead to the occurrence of individual stuttering events during the production of stressed syllables. A concrete conception is necessary and may result from a more detailed investigation of the stress effect.

Such an investigation was the goal of this study and began with the definition of stress. As was noted above, stress is realized by variations in several parameters of speech production. On average, stressed syllables have longer duration than unstressed syllables, but this is not true in every case. For instance, the italicized syllables in "*pit*fall" and "*peat*bog" are both stressed, but the stressed syllable in the first word is spoken with a shorter duration than in the second word. The same vowel is used, so the example does not show an intrinsic duration effect. Stress can, therefore, be associated with a long or short duration of a syllable, and short-stressed syllables may have duration comparable to those of unstressed syllables. Consequently, it is clear that the concept "stress," as used in the literature on stuttering, incompletely describes the physical parameters characterizing an individual stressed syllable.