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Specific subtype of fluency disorder affecting French speaking children: A phonological analysis

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ABSTRACT

Purpose: Clinicians working with fluency disorders sometimes see children whose word repetitions are mostly located at the end of words and do not induce physical tension. Prior studies on the topic have proposed several names for these disfluencies including "end word repetitions", "final sound repetitions" and "atypical disfluency". The purpose of this study was to use phonological analysis to explore the patterns of this poorly recognized fluency disorder in order to better understand its specific speech characteristics.
Methods: We analyzed a spontaneous language sample of 8 French speaking children. Audio and video recordings allowed us to study general communication issues as well as linguistic and acoustical data.
Results: We did not detect speech rupture or coarticulation failures between the syllable onset and rhyme. The problem resides primarily on the rhyme production with a voicing interruption in the middle of the syllable nucleus or a repetition of the rhyme (nucleus alone or nucleus and coda), regardless of the position in the word or phrase.
Conclusion: The present study provides data suggesting that there exist major differences in syllable production between the disfluencies produced by our 8 children and stuttered disfluencies. Consequently, we believe that this fluency disorder should be recognized as distinct from stuttering.

1. Introduction

Speech pathologists working with fluency disorders sometimes see children who present specific speech characteristics distinct from stuttering, specifically, disfluencies not present in the initial position of words and sentences (as in stuttering) and that remain relatively relaxed, without visible or audible tensions. The children with these disfluencies seem unaware of their pathology, such as in the case reports described in the literature by McAllister and Kingston (2005), MacMillan, Kokolakis, Sheedy, and Packman (2014), Rudmin (1984), and Van Borsel, Van Coster, and Van Lierde (1996) and therefore do not fear speech or adopt avoidance behaviors. Existing research on this form of presentation is scant and imprecise in its nomenclature, referring to "final" or "end" word disfluencies. Some researchers claim that these disfluencies are related to stuttering (e.g. Lebrun & Van Borsel, 1990; Stansfield, 1995) while others suggest there is a distinction between the two

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pathologies (MacMillan et al., 2014). This study aims to conduct a systematic, rigorous, analysis of this communication disorder in order to assist with its diagnosis and classification.

Existing research on this type of disfluency is primarily based on case-studies of patients with a neurological or genetic condition (Bijleveld, Lebrun, & Van Dongen, 1994; Lebrun & Van Borsel, 1990; Van Borsel et al., 1996), or a social skills communication disorder such as autism spectrum disorder (Scaler Scott, Tetnowski, Flaitz, & Yaruss, 2014; Scaler Scott & Sisskin, 2007; Sisskin & Wasilus, 2014; Sisskin, 2006; Sisskin & Scaler-Scott, 2007), mostly presenting a co-morbidity of stuttering.

Van Borsel et al. (1996) presented the disfluencies of a 9 year old Dutch speaker with a history of brain injury. They collected speech samples in different communication settings: spontaneous interaction, monologue, word repetition, reading and singing. Other than during repetition and singing, the disfluencies were present in all situations. They found that the repetition located at the end of lexical words was the primary type of disfluency, and that it affected mostly polysyllabic words. The majority of disfluencies were whole syllable repetitions on polysyllabic words but also repetitions of the nucleus and coda on monosyllabic words. Van Borsel et al. (1996) considered that the reiteration of the final part of the sentence could possibly be a type of palilalia, which is an acquired disorder of speech characterized by compulsive reiteration of utterances in a context of increasing rate and decreasing loudness (Boiler, Albert, & Denes, 1975). However, in the case of their disfluent subject, they argue that the word repetitions did not follow this pattern. Subsequent to this study, other case studies of final word repetitions suggested a link to cerebral lesion. However, the fact that locations of the lesions vary between studies (see Van Borsel, Geirnaert, & Coster, 2005, for detailed descriptions) indicates that no single region of the brain is implicated in the condition. According to the authors, there exists insufficient evidence to provide solid theories about whether the pathogenisis of final word repetitions is developmental or neurogenic.

Disfluencies concerning the final part of words have also been reported in cases of genetic syndromes, such as developed by Van Borsel and Tetnowski (2007) who reported in their review of literature cases of patients with the X fragile syndrome, Prader-Willi and Gilles de la Tourette. Lebrun and Van Borsel (1990) also described a case of final word repetitions in a 17-year-old girl with Down's syndrome. In these cases, the speakers presented typical stuttering-like disfluencies and other speech and language impairments as well. Reference to this disfluency disorder has also been presented in different studies concerning autism spectrum (Scaler Scott & Sisskin, 2007; Sisskin & Wasilus, 2014; Sisskin, 2006). Sisskin and colleagues described the speech of children with Asperger syndrome as stuttering-like disfluencies combined with "atypical disfluencies", which they refer to as final part of word repetitions that can be in middle-phrase position ("*Thomas the Tank-ank Engine is a train-ain that is sold in stores-ores everywhere.*").

Very few reports of children presenting these disfluencies without neurogenic or genetic syndromes can be found in the literature. Several decades ago, Camarata (1989), Mowrer (1987) and Rudmin (1984) presented isolated cases of children producing final consonant repetitions. More recently, Van Borsel et al. (2005) described a 12-year-old boy with repetitions of the final part of words, but with typical disfluencies of stuttering (word-initial repetitions, revisions, interjections). Van Borsel and colleagues noted that the speech of this boy had two characteristics: the disfluencies were more frequent on the lexical words than on function words and were more frequent on polysyllabic words than on monosyllabic words. They also found that the repetitions were more frequent at the end of a phrase than in the initial or medial position. Lebrun and Van Borsel (1990) described an 8-year-old boy presenting a tachylalic speech pattern where word-final disfluencies were associated with numerous phrase, word and sound repetitions, blocks and prolongations, often accompanied by facial tension. They noted that, in most cases, the consonants were involved and only the last sound of the word was repeated, whether the word ended by a consonant or by a cluster. McAllister and Kingston (2005) presented cases of two boys with normal intelligence and no neurological impairment. One was a 7-year-old boy who first developed a typical stutter at age 6 (initial syllable and whole word repetitions), after which the pathology spontaneously disappeared. A later assessment indicated a new pattern of disfluencies, with word-end repetitions. The second boy, age 6, also presented these non-stutterlike disfluencies since age 5. According to the authors, both children followed an individual but highly predictive set of rules. One of the subjects produced essentially repeated fragments consisting of the nucleus of the word followed by the coda (scientist-ist), the other mainly repeating the last syllabic element of the word (nucleus 'army-/i/' or coda "off-/f/"). The authors differentiated between broken words "involving cessation of airflow or phonation within a word (e.g., *I can te-ll*) from final part word repetitions, involving the reiteration of some portion of the end of the word." (p. 259). As in other studies, the children were unaware of their disfluencies and did not present any muscle tension or avoidance strategies.

More recently, MacMillan et al. (2014) studied a larger population, without cerebral injury, developmental neurological disorder, or genetic problems such as Asperger syndrome. Among the 12 children studied, 10 presented both stuttering and end of word disfluencies. They suggested that while the two conditions were associated, end of word disfluencies were distinct from stuttering.

Besides a few reports about therapeutic outcomes, no study has been specifically oriented towards rehabilitation of these disfluencies. Sisskin and Wasilus (2014) described a therapy protocol that was successful in reducing word-final repetition and phrase final repetition, labeled "atypical disfluencies", of a 7 year old boy with Asperger syndrome. They oriented therapy essentially towards self-monitoring, stuttering modification therapy and communication improvement. Following an 8-week treatment, the child significantly improved his speech. The authors suggested that traditional stuttering treatment can thus be successful in reducing atypical disfluencies in a child presenting Asperger syndrome. Van Borsel et al., 2005 also presented in their case-study a successful management program for a 12 year-old boy. They testified that therapy resulted in complete elimination of these repetitions. Concerning outcomes, according to the literature reporting end of word