

**Word-finding behaviours in narration for typically developing French speakers of  
school-age**

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### **Abstract**

**Background.** Research in word-finding difficulties is sparse, especially in languages other than English. As a result, the factors associated with the frequency of word-finding behaviours are poorly understood, particularly in discourse.

**Aims.** This exploratory study is the first to (1) collect data relative to the expected frequency of word-finding behaviours in narration for French speakers aged 7 to 12 years old with typical development ; and (2) to identify the factors associated with the frequency of word-finding behaviours in narration. We hypothesized that sociodemographic characteristics, language abilities and characteristics of the spoken productions could be linked to word-finding behaviours.

**Methods & Procedures.** The participants consisted of 61 French-speaking children aged 7 to 12 years old ( $M = 9;09$  years,  $SD = 1;06$  years) with typical development. Children were asked to complete a receptive vocabulary task, a nonword repetition task and two narrative tasks. The children's narrative samples were coded using a discourse analysis of word-finding behaviours as described by German (1991).

**Outcomes & Results.** Participants produced 39% of T-Units with least one word-finding behaviour, which included relatively frequent use of repetitions and word reformulations. Regression analyses revealed that the participants' gender was the only significant variable associated with the frequency of word-finding behaviours in narration. Boys produced a higher percentage of T-Units with at least one word-finding behaviour. Post hoc analyses

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suggested that gender differences reflected differences in repetitions and word reformulations. Boys and girls did not differ on any other language measures collected.

**Conclusions & Implications.** Speech-language pathologists may want to take into account a child's gender when assessing word-finding difficulties in narration. Additional studies are needed to understand whether this finding extends to other word-finding tasks and to children with word-finding difficulties.

### **What this paper adds.**

Studies in English have identified that analyses of word-finding behaviours in discourse can be used to correctly identify children with word-finding difficulties. Studies are needed in other languages to determine if this observation holds true across languages. Moreover, the factors that are associated with the frequency of word-finding behaviours in discourse are poorly understood.

The frequency of word-finding difficulties in narration was higher in our study of French-speaking children than in previous studies of English. Gender was the only factor that was associated with the frequency of word-finding difficulties.

The language and task used to assess word-finding skills as well as the child's gender may be important to take into account when assessing word-finding difficulties based on word-finding behaviours.

### Introduction

Diane J. German, one of the most prolific authors on child word finding, defines word finding difficulties as “a discrepancy between knowing a word and being able to access that same word for spontaneous usage” (German et al., 2012). Word finding (WF) difficulties can occur as part of a developmental language disorder (Bishop et al., 2017) or on their own (German et al., 2012; Dockrell et al., 1998), although the latter may be rarer (Dockrell et al., 1998). It is estimated that 23% of children who require support for their speech or language also experience WF difficulties (Dockrell et al., 1998). For these children, WF difficulties can be associated with low self-esteem, and social or academic difficulties (Best et al., 2018; German, 2015; Newman et al., 2018). Although WF difficulties appear to be relatively common among children with communication needs, signs of WF difficulties in everyday conversation, called WF behaviours, are not unique to these children. According to German (1991), WF behaviours are signs that a child is having trouble retrieving the right word and they include substitutions, word reformulations, insertions (e.g., “I can’t remember the right word”), repetitions, empty words (e.g., “*well*”, “*oh*” or “*watcha-ma-call-it*”), time fillers (e.g., “*uh*” and “*um*”), and delays. There are few studies of WF behaviours and the factors that influence them in typically developing school-aged children, especially children who speak French. This lack of knowledge has led to challenges in the conceptualization of WF difficulties and to the identification of these difficulties by speech-language pathologists, especially when assessments in a functional setting are preferred. Previous research has shown that children with typical development also produce WF behaviours, especially repetitions and, to a lesser extent, word reformulations (Bourassa Bédard & Trudeau, 2021; German, 1991). The presence of

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WF behaviours across children adds to the challenge of identifying WF difficulties. The current study aims to contribute new findings to this area of research. First, this study will document the frequency of WF behaviours in discourse for French-speaking children. Second, this study aims to better understand what factors are associated with the frequency of WF behaviours and how. Describing the norm for typically developing children in a functional setting constitutes the first step to establishing diagnostic criteria and thus improving the conceptualization and assessment of WF difficulties. Without a sound description of behaviours that characterize WF difficulties, it is difficult to determine what WF difficulties are, how they manifest, and how to assess WF, opening the door to over or under-identification. Furthermore, if there exists significant variability in WF behaviours produced by typically developing children, it is important to determine the source of this variability regardless of the language spoken as it may help illustrate the potential contribution of different processes in typical behavior. We will first review the current best practices in the assessment of children with WF difficulties, which typically includes an assessment of WF behaviours. We will then look at the factors that influence them in children with typical development. We will also draw parallels with the factors that influence the production of disfluencies, as they share some similarities with WF behaviours.

### **Assessing WF difficulties**

Current research encourages the use of multiple contexts to assess WF difficulties, such as caregiver questionnaires, single-word naming, and discourse tasks (Bragard et al., 2010; German, 2009; Paul et al., 2018). Discourse tasks are important because they are more representative of a child's language abilities in an everyday setting and are needed for

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socialization and academic success (Gillam et al., 2018). Discourse measures may also reveal difficulties, compensation strategies, and changes in WF that are difficult to capture in single-word naming (German, 2015). Research on WF in discourse is sparse, but many measures have been proposed to assess WF difficulties, such as lexical diversity (number of different words; Degani et al., 2019) and the frequency of WF behaviours (German, 1991). To our knowledge, there are no studies that have examined whether lexical diversity is a valid measure to identify children with WF difficulties.

In contrast, a few studies have considered WF behaviours as potential indicators of WF difficulties. For example, German (1991) argues that children experiencing WF difficulties produce more T-Units, a clause and its subordinates, with WF behaviours than children with typical development. These behaviours include insertions (e.g., “I can’t find the word”), repetitions of one or more words, word reformulations or revisions, substitutions, long delays or pauses, time fillers or interjections, and empty words (e.g., “well”) (German, 1991). The definitions of these behaviours can be found in Appendix A. Interestingly, three of these seven WF behaviours have also been included in disfluency research: repetitions, word reformulations and time fillers. In these cases, repetitions, word reformulations, and time fillers, may also reflect other language or processing difficulties: difficulties in conceptual planning, syntax building or phonological encoding (Bourassa Bédard & Trudeau, 2021; Lickley, 2017). To account for the variety of possibilities of breakdowns, repetitions, word reformulations and time fillers are also commonly referred to as disfluencies or typical disfluencies.

Although they can be classified as both WF behaviours or disfluencies, repetitions, word reformulation, and time fillers can be used, along with the other four WF behaviours, to

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differentiate children with typical development from children with WF difficulties (German, 1991). The Test of Word Finding in Discourse (TWFD; German, 1991) is the only normed instrument that assesses WF difficulties using discourse as the focus of assessment. In the TWFD, examiners look for German's seven WF behaviours in the language sample. The analysis is not interested in the cause for the presence of these WF behaviours in the language sample. That is, they are counted whether they are due to trouble retrieving the right word or may be arising from other language processing difficulties (disfluencies). The percentage of T-Units that contain at least one of these WF behaviours is then compared to the normative sample. For this test, the data for the normative sample was collected from English-speaking children living in the United States who took part in a discourse task that included elements of picture description and storytelling. For other languages, only our pilot study (Bourassa Bédard & Trudeau, 2020) analyzed WF behaviours in discourse using a story generation context. This study found that insertions, delays and time-fillers were uncommon for the eleven 7-8 years old children with typical development who spoke French. Overall frequencies of WF behaviours were significantly higher than the TWFD's normative sample. We argued that this result could be due to the language spoken by the child (i.e., French whereas previous research focused on English-speaking children) or the task (i.e. picture description/storytelling vs. story generation). More data across languages and tasks are recommended in order to understand this behaviour and to accurately assess WF difficulties. The current study aims to collect preliminary data on a larger sample of French-speaking children with typical development and explore whether other factors could be associated with the frequency of WF behaviours.



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To expand the understanding of WF behaviours, we propose that including research on factors that contribute to typical disfluencies might provide insight on WF behaviours considering that there is more research on disfluencies, and the factors that influence disfluencies in children, than on WF behaviours. These typical disfluencies, namely repetitions, word reformulations/revisions, and time fillers/interjections, are also included as WF behaviours. Repetitions and word reformulations are the most frequent WF behaviours and are highly correlated with the TWFD score ( $r = 0.76$  for repetitions,  $r = 0.68$  for word reformulation; German, 1991). We thus hypothesize that factors that influence typical disfluencies in typically developing children may influence WF behaviours similarly. We remain cautious, however, when making comparisons between WF behaviours and disfluencies, since studies vary greatly in their measures. For example, some studies that measured the frequency of repetitions, word reformulations and time fillers focused on the syllable level (Ambrose & Yairi, 1999), while others focused on the word level (Leclercq et al., 2018), or the utterance level (German, 1991 and the current study). Despite this variability in the way repetitions, word reformulations and time fillers were measured, the following section will include studies of both WF behaviours and typical disfluencies with children with typical development. We will focus on studies of French-speaking children with the goal of identifying potential factors that are associated with the frequency of WF behaviours or disfluencies.

### **Factors associated with the frequency of WF behaviours**

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While the factors associated with WF behaviours in discourse are poorly understood, research has identified three possible groups of factors: sociodemographic variables, language abilities, and characteristics of spoken productions. Other factors, or groups of factors, may be associated with the frequency of WF. In the following section, we have pooled together research on both WF behaviours and disfluencies.

### *Sociodemographic characteristics*

Sociodemographic characteristics, such as a child's gender, age, or socioeconomic status are all factors that are known to be linked to a child's language development (Bouchard et al., 2009; Huttenlocher et al., 2010). It is possible that these characteristics could also be linked to a specific language measure, that is, the frequency of WF behaviours. Evidence is limited, but German (1991) found minimal differences on TWFD scores between gender, age, and mother's education groups. In contrast, there is a stronger research base in disfluency that has investigated sociodemographic characteristics. However, most of these studies focus on preschoolers. The following paragraphs will review the effects for gender and age.

**Gender.** In a study on disfluencies with French speakers, a Belgian study on 50 children with typical development aged 4 to 5 found no significant difference between boys and girls on the number of typical disfluencies per 100 words for all three typical disfluencies (Leclercq et al., 2018). Boys produced 8.13% of words with typical disfluencies whereas girls produced 7.61% of words with typical disfluencies in conversation (Leclercq et al., 2018). In other languages, mixed results were obtained with some studies reporting more repetitions, word reformulations or time fillers for boys, for girls, or no difference (for a review see Leclercq et al., 2018). Overall, in Leclercq et al.'s

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review (2018), more studies reported that boys produce slightly more typical disfluencies than girls, but the differences were often negligible.

**Age.** Studies of English-speaking children who do and do not stutter have indicated that the impact of age on the production of typical disfluencies is negligible. In a study with school-aged children who do and do not stutter (aged 6 to 10), Byrd et al. (2012) found no effect of age in the production of typical disfluencies. In a study with preschoolers who do and do not stutter (aged 2 to 5), Ambrose & Yairi (1999) found no significant association between the frequency of typical disfluencies and age (only a non-significant trend). In another study with preschoolers who do and do not stutter (aged 3 to 5), Tumanova et al. (2014) found a significant association between age and the number of typical disfluencies in a 300-word conversation (and no interaction of age with group) but argued that the obtained beta value had “minimal clinical significance”.

Together, these studies of typical disfluencies suggest that age, gender and socioeconomic status are not associated, at least not strongly, with WF behaviours nor typical disfluencies.

### *Language abilities*

Research on children with WF difficulties have identified that these children also experience difficulties on a wide range of tasks. By definition, these children struggle with picture naming (Dockrell & Messer, 2006), but evidence suggests that many of these children also struggle with other areas of language, such as lexical fluency and nonword repetition, when compared to typically developing peers (Dockrell & Messer, 2007). None of these studies have included discourse measures of WF behaviours, but they raise the possibility that WF behaviours would be associated with other languages abilities.

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**Vocabulary.** A child's language abilities, specifically their vocabulary, as measured on a single-word naming test, has been found to be associated with the frequency of WF behaviours, but the evidence is not conclusive. For instance, when developing the TWFD, German (1991) found that TWFD scores correlated with single-word naming, but only for a subgroup of older children (grades 3 through 6) with WF difficulties. Other studies did not observe a relationship between word naming and WF behaviours (Tingley et al., 2003; Bourassa Bédard & Trudeau, 2021). The differences across studies may be due to the participants' diagnosis or the task. Indeed, the last two studies did not include a group of individuals with WF difficulties. The tasks were also different from the TWFD (conversation and narrative tasks).

For disfluencies, one study looked at the link between disfluencies and vocabulary. Tumanova et al. (2014)'s results are consistent with Tingley et al. (2003) and Bourassa Bédard & Trudeau (2021)'s results. They found a significant, but negligible association between a single-word naming score (expressive vocabulary) and the number of typical disfluencies per 100 words (and no group interaction). To our knowledge, no other study looked at the link between a child's receptive vocabulary and the frequency of disfluencies. Based on this single study, we would expect vocabulary not to be associated with the frequency of disfluencies.

These studies suggest that vocabulary is not associated, at least not strongly, with WF behaviours nor disfluencies. It is important to note that these studies only considered expressive vocabulary, measured in single-word naming, and none considered receptive vocabulary, measured in word comprehension. It is not known if there exists an association between receptive vocabulary and disfluencies or WF behaviours.

**Nonword repetition.** Research on children with WF difficulties has suggested that problems could arise at different levels of the classic speech production models and nonword repetition may be a key task in the identification of the level of breakdown (Best et al., 2021). Most studies have focused on a semantic or a phonological level of deficit for WF difficulties and have suggested that semantic or phonological profiles of WF difficulties may exist (Bragard et al., 2012; German, 2015; German et al., 2012). In this context, nonword repetition may be useful by allowing the examiner to determine if WF difficulties are due to problems at the phonological level (Best et al., 2021; Constable & Stackhouse, 1997). To our knowledge, no study has looked at the relationship between nonword repetition and WF behaviours or disfluencies even though examining this relationship may provide insight to better understand the origin of WF difficulties. Nonword repetition is a phonological measure, that taps into phonological working memory. Determining if WF behaviours, an important measure in the assessment of WF difficulties, is associated with a phonological measure will inform whether both measures reflect underlying abilities at the phonological level.

### *Characteristics of spoken productions*

The frequency of WF behaviours could also be associated with other measures derived from the same spoken productions. Research on disfluencies has mainly focused on utterance length and observed that an increase in utterance length was associated with a higher number of disfluencies. These studies have mainly focused on preschoolers who stuttered (e.g, Zackheim & Conture, 2003), but some studies were also interested in children with typical development. In two studies of typically developing preschoolers,

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disfluent utterances were found to be longer than fluent utterances (Zackheim & Conture 2003, Yaruss et al., 1999). Indeed, longer utterances also involve more opportunities to be disfluent. These results do not necessarily imply that a higher mean length of utterance (MLU) will lead to more typical disfluencies, but rather that the utterances that are above a child's MLU may be more likely to contain typical disfluencies than utterances that are below the child's MLU (Zackheim & Conture (2003).

Based on the literature reviewed above, it seems crucial to 1) collect normative data in French relative to the frequency of WF behaviours in narration and 2) to explore the potential contribution of three groups of factors. The impact of these three groups of factors (i.e. sociodemographics characteristics, language abilities, and characteristics of the spoken productions) on WF behaviours and disfluencies is either unknown or inconsistent. For WF behaviours, only a few studies described their frequency, or the factors associated with them in school-aged children, which highlights the need to partly base our hypotheses on disfluency research. The expected impact of the three groups of factors on the frequency of disfluencies is summarized in Table 1. It is expected that a child's gender, age, vocabulary, and mean length of utterance will have little impact on the frequency of typical disfluencies. As for WF behaviours, there are only a few studies that describe their frequencies, or the factors associated with them in school-aged children. In the context where little is known about what influences WF behaviours, exploratory studies including a variety of variables are needed. An important step is expanding on previous research to include variables such as sociodemographic characteristics (gender, age, SES), language

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abilities (vocabulary, nonword repetition), and characteristics of the spoken productions (mean length of utterance (MLU), number of different words).

The current study aims to describe the expected frequency of WF behaviours and to explore possible relationships between the three groups of factors by answering the two following research questions:

- 1) What is the frequency of WF behaviours in narration for typically developing French-speaking children between 7 and 12 years of age?
- 2) Which factors (sociodemographic characteristics, language abilities or characteristics of the spoken productions) are associated with the frequency of WF behaviours in narration?

[insert Table 1 here]

## Methods

### Participants

This project was approved by the University of Montréal's Comité d'éthique de la recherche en éducation et en psychologie (CEREP; project CPER-17-026-D).

A subgroup of 61 monolingual French-speaking children aged 7 to 12 years old, with a mean age of 9 years and 9 months ( $SD = 18$  months), was drawn from a larger pan-Canadian study of children's discourse called the French/English Discourse Study – Canada (FrEnDS-CAN; Cleave, 2015-2021). All participants were living in the Greater Montréal area. As shown in Table 2, they were drawn from a diversity of socioeconomic backgrounds as measured by the mother's highest level of education. Other socioeconomic

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status measures were collected as part of the FrEnDS-CAN study, but we only included mother's highest level of education since it is commonly used in child language and WF research. This variable was categorized with four levels: 1) high school or lower, 2) technical college, 3) bachelor's degree, and 4) master's degree or higher. The participant's guardian answered a sociodemographic questionnaire on the phone and confirmed that their child did not have language, learning, or hearing difficulties. An extensive language exposure history was collected, and participants were considered monolingual if they spoke French at least 90% of the time and were not able to have a conversation in another language according to the guardian<sup>1</sup>. The participants' main exposure to other languages was through English classes in school (about one hour per week) and through television and videogames.

[insert Table 2 here]

### **Procedure**

Most ( $n = 59$ ) of the children were assessed directly at their school, while two were seen at our lab. Testing took place in French over one or two sessions, less than a week apart, for a total of around an hour and included the full protocol of the FrEnDS-CAN. For the current study, only a subset of tasks was analyzed. The task order was the same for all the participants: *Échelle de vocabulaire en images Peabody* (EVIP; Dunn et al., 1993), a story

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<sup>1</sup> One of the 61 participants did not meet the 90% criterion, but was still considered monolingual. As part of the FrEnDS-CAN, participants who, according to their parent, spoke English more than 10% of the time were considered bilingual and were tested in both languages. In this case, the child's proficiency in English was too low to allow testing (the child admitted not understanding the assessment script), which lead us to consider this participant as monolingual.



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stem, two stories from the Test of Narrative Language, and a nonword repetition task. Each is described below.

**EVIP.** The *Échelle de vocabulaire en images Peabody* (Dunn et al., 1993) is a Canadian\_French adaptation of the Peabody Picture Vocabulary Test. It is a receptive vocabulary test where the child must point to the one picture out of four that matches the word said by the examiner.

**Narratives.** The examiners followed the procedure outlined in Bourassa Bédard & Trudeau (2020). The participants took part in two narrative tasks: a story stem and a story from the Test of Narrative Language (TNL; Gillam & Pearson, 2004 or adaptation of the TNL (Gillam et al., in development). Both narratives were audiotaped and transcribed offline. For the story stem, the examiner read a sentence that served as a setting, such as “There was an old man who lived by the water”. The examiner then asked the child to tell a story. For the TNL, the participant was first read a story and asked comprehension questions about the story. The child was then shown another picture for them to make up a story about. Two versions of each task were used. For the TNL, the pictures from a Spanish adaptation of the test were used (Gillam et al., in development). The two versions of the story stem and the TNL were translated in French and shown equivalent as part of the FrEnDS-CAN’s pilot study (Cleave et al., 2013).

**Nonword repetition.** Participants were asked to repeat 16 nonwords that varied in length ranging from two to five syllables, that is, four nonwords of each length. Ten different sequences of nonwords were created from Chiat’s (2015) Quasi-Universal Nonword List as part of the FrEnDS-CAN (Cleave, 2015-2021). Children’s responses were scored correct when the nonword was repeated correctly, and no partial credit was given.

### **Inter-rater agreement**

We followed the procedure outlined in Bourassa Bédard & Trudeau (2020) to compute inter-rater agreement for the coding of WF behaviours. Raters (first author and a research assistant) read the TWFD manual and reviewed the coding guidelines (see Appendix). The second rater then transcribed two narratives as practice and feedback was given by the first author. To compute inter-rater agreement, the second rater transcribed 11 children's narrations (18% of the sample) and coded the language samples for the presence of WF behaviours. We first computed the percentage of agreement for the separation of language samples into T-Units. Most disagreements were due to the transcription of pronouns; specifically, in Québec French, "he" and "they" are often pronounced /i/ or /j/ in continuous speech. Since the presence of this one phoneme dictated utterance boundaries, differences in transcription resulted in presence of one or two T-Units. Other disagreements were due to word reformulations that were interpreted as being a part of the story or not. Both raters reviewed the disagreements and reached a consensus. Following this consensus on the T-Units, we were able to compute inter-rater agreement for the percentages of T-Units containing each of the seven WF behaviours and for the percentage of T-Units containing at least one WF behaviour (%WFB). We report in Table 3 both percentages of agreement and Cohen's Kappa since reporting only percentages of agreement can be problematic (Feng, 2015). Following Landis & Loch's (1977) interpretation of kappa values, all of them showed substantial agreement (0.61-0.8). Percentages of agreement seem consistent with this interpretation (almost all >90%).

[insert Table 3 here]

### **Analyses**

The total number of words (TNW), the mean length of utterance in words (MLU) and the number of different words (NDW) were computed using the Systematic Analysis of Language Transcript software (SALT; Miller & Iglesias, 2019).

For the number of T-Units and the frequency of WF behaviours, the procedures outlined in the TWFD (German, 1991) and used in our pilot study (Bourassa Bédard & Trudeau, 2021) were applied to the narrative samples. The two narratives were combined to be analyzed as one sample as in Bourassa Bédard & Trudeau. German's (1991) analysis starts by segmenting the narratives into T-Units and then identifying WF behaviours (time fillers, insertions, substitutions, word reformulations, repetitions, empty words and pauses). Examples of what were and were not considered WF behaviours, drawn from our participants stories are found in the Appendix. Two types of percentages relative to the WF behaviours were computed: 1) a percentage of T-Units containing each of the WF behaviours for a total of seven percentages, and 2) a percentage of T-Units containing at least one of the WF behaviours (%WFB).

To answer the first research question, simple descriptive statistics were used. To answer the second research question, we applied a hierarchical regression with a fixed order of variables. A hierarchical regression allowed us to group together the variables and enter them in order from furthest related to the task to most closely related to the task (i.e., sociodemographic characteristics, language abilities and characteristics of the spoken productions).

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### Results

For our first research question, we aimed to quantify the frequency of German's (1991) seven WF behaviours observed in our participants. In total, the participants produced 2507 T-Units and 28,249 words, or an average of 41.1 T-Units and 463.1 words per participant. The seven percentages of T-Units containing each of the WF behaviours and the %WFB were computed and are reported in Table 4. Overall, 39% of our participant's utterances contained at least one of the WF behaviours. Repetitions and word reformulations were relatively frequent, followed by empty words, time fillers, substitutions and insertions. Delays of 6 seconds or more were the least frequent.

[insert Table 4 here]

The second research question was to examine which variables were associated with the %WFB. We first computed means and standard deviations for the language tasks and the characteristics of the spoken productions. For the participant's language abilities (EVIP and NWR), the participants obtained high scores on the EVIP ( $M = 123$ ,  $SD = 11.1$ ) as shown in Table 4. The participants also obtained high scores on the NWR task. 40% of the sample obtained a perfect score of 16, with scores ranging from 9 to 16 ( $M = 14.56$ ,  $SD = 1.7$ ).

[insert Table 5 here]

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Secondly, we used a hierarchical regression with a fixed order of variables. The first model included the participant's sociodemographic characteristics: age, gender, and their mother's highest level of education. We added performance on the two language tasks to form the second model. The third model included characteristics of the spoken productions: the number of different words and the mean length of utterance in words. A summary of the three models is provided in Table 6. For the MLU, one participant obtained an MLU of 18, which we considered was an outlier<sup>2</sup>. This participant's MLU was removed from analysis for the regression model. Each model's residuals were checked, and all the models respected the assumptions of linear regression. Variance inflation factors values confirmed that multicollinearity was not a problem in any of the models.

[insert Table 6 here]

The three models explained around 20 to 27% of the variance in the dependent variable. The differences in  $R^2$  were only significant for the first model ( $p = 0.008$ ). In other words, when the participants' gender (and other sociodemographic characteristics) was accounted for, the other variables did not contribute meaningful information to explain the variance in %WFB. Only one variable stood out as being statistically significant in all three models: the child's gender ( $p = 0.003$ ). The models estimated that girls produced around 10,5% fewer T-Units with at least one WF behaviour than the boys did in the study.

### **Post hoc analyses**

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<sup>2</sup> This participant's MLU score was more than four standard deviation above the mean ( $M = 10.0$ ,  $SD = 1.7$ ) and obtained a high Cook's distance.

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While we had not predicted a strong gender effect, we sought to better understand the contribution of the participant's gender on WF behaviours. More specifically, we aimed to understand 1) whether boys and girls differed on other variables that could better explain the gender effect, and 2) which WF behaviours were influenced by the participant's gender. For the first objective, we computed independent samples T-tests on the continuous variables that were entered in the model. The results of these T-tests appear in Table 7 with effect size measures (Cohen's *d*). None of the T-tests revealed a significant difference between boys and girls, suggesting that the gender effect is specific to WF behaviours.

[insert Table 7 here]

For the second objective, we also computed independent samples T-tests, but on the percentages of T-Units containing each of the seven WF behaviours. To control for false discovery rate, we applied a Benjamini Hochberg correction to compute adjusted *p* values. The results of these T-tests appear in Table 7 with effect size measures. Boys produced significantly more repetitions ( $t(59) = 3.594$ ) and word reformulations ( $t(59) = 2.858$ ), while no significant differences were observed for substitutions ( $t(59) = -0.445$ ), insertions ( $t(59) = -0.776$ ), delays ( $t(59) = -0.248$ ), time fillers ( $t(59) = 0.955$ ) and empty words ( $t(59) = 1.040$ ).

[insert Table 8 here]

## Discussion

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The current study is the first to describe the WF behaviours in narration of French-speaking children with typical development aged 7 to 12 years. This study involved a robust sample of a relatively large number of participants who were from a range of socioeconomic status, and with a balanced number of boys and girls. We sought to describe the frequency of WF behaviours in narration for these children. On average, 39% of our participants' T-Units contained at least one of the following WF behaviours: repetitions, word reformulations, empty words, insertions, substitution, time fillers or delays. While this result is similar to our pilot study of 11 participants of a younger age range (i.e., mean of 39.8%; Bourassa Bédard & Trudeau, 2021), it differs from what was observed in the normative sample of the TWFD (i.e., mean of 22.1%; German, 1991). The normative sample of the TWFD included 856 English-speaking children, aged 6;06 to 12;11, who performed a picture description/storytelling task. As stated in our pilot study, further studies need to compare different tasks (narration, conversation, or picture description) with the same speakers to better understand the differences between our results and the TWFD. We hypothesized that producing a narration could be more complex than describing pictures as it would involve generating and sequencing the events of a story (Bourassa Bédard & Trudeau, 2021). In narration, children may produce more WF behaviours to allow themselves time to find the right words while generating a complete narrative.

We also found that, overall, the frequency of each of the seven WF behaviours seemed similar to previous studies (Bourassa Bédard & Trudeau, 2021; German, 1991). Most notably, our participants frequently produced repetitions and word reformulations, while the other five WF behaviours were somewhat rare. In our pilot study (Bourassa Bédard & Trudeau, 2021), we hypothesized that insertions, delays and time fillers may be red flags

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in the identification of WF considering their low frequency in storytelling for children who speak French. With its larger sample size, the present study supports this observation that these WF behaviours are uncommon in children with typically developing language. We are now conducting a study including a sample of children with WF difficulties to determine if these WF behaviours can accurately differentiate children with and without WF difficulties.

[insert Table 9 here]

Our second research question aimed to identify which sociodemographic characteristics, language abilities or characteristics of the spoken productions were associated with the frequency of WF behaviours in narration. We observed high EVIP scores, which is in line with previous reports for Québec-French speakers using that measure (Elin Thordardottir et al. 2010) due to the normative sample of the task. Table 8 summarizes the contribution of different factors to disfluencies, and to WF behaviours, based on previous research. Our results show that the participant's gender was the only significant factor that contributed to the frequency of WF behaviours. The regression models estimated that boys produced 11% more T-Units with at least one WF behaviour than girls. This finding conflicts with other studies on WF behaviours and disfluencies. As noted in the introduction, studies vary with regard to the units of measurement for WF behaviours and disfluencies, that is, focusing on syllables, words or T-Units. In the TWFD analysis, producing more than one WF behaviour in an utterance does not change the percentages that are computed. Indeed, the measures are percentages of T-Units, not occurrences. Unlike measures at the T-Unit level,



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measures at the syllable or word level can vary greatly depending on the number of repetitions, word reformulations or time fillers that are produced per T-Unit. Moreover, what is considered a disfluency can vary between studies. In particular, the TWFD only counts time fillers if there are more than three in a single T-Unit. In contrast, studies that considered typical disfluencies only counted repetitions and word reformulations of more than one word (for example Tumanova et al., 2014), while other studies included single word repetitions (for example German, 1991). In Leclercq et al.'s 2018 study, the concept of typical disfluencies also included single word repetitions, but only for multisyllabic words. Nevertheless, studies have found that boys produced more WF behaviours or disfluencies, but none of these differences reached statistical or clinical significance. Most notably, in the TWFD (German, 1991), there was a mean difference of 1.43% between boys and girls of the normative sample. While we did not initially anticipate gender differences, we conducted two secondary analyses to explore this finding. Boys' and girls' performances were similar across all the other variables that were measured: age, EVIP and NWR scores, NDW and MLU. In fact, repetitions and word reformulations were the only two WF behaviours that varied by gender. As these WF behaviours were the most frequent, they may better reflect gender differences.

A possible explanation for the observed gender effect may lie in the different ways that boys and girls are socialized with regard to storytelling. Through socialization, children adopt gendered behaviours in interaction with their parent and peers, which includes how they tell stories (Peterson & Roberts, 2003; Schick & Melzi, 2010). Research shows differences in the way girls and boys tell personal and fictional narratives exist at the macrostructure level with regard to overall coherence (5-years-old; Von Klitzing et al.,

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2000), and the use of descriptions, emotions and internal states (Schick & Melzi, 2010) and at the microstructure level with regards to differences in the use of temporal and causal markers (see Schick & Melzi (2010) for a review of studies with children aged 3 to 8 years old). A higher percentage of T-Units with WF behaviours could thus be another way that the narratives of boys and girls differ at the microstructure level. Overall, although our data were limited to a binary definition of gender, this exploratory study suggests that taking a child's gender into account could potentially be useful when assessing WF difficulties. Although it is too early to conclude at this point, it may prove necessary to establish distinct norms for boys and girls should this difference be confirmed with a larger sample including children with WF difficulties.

The model also found that receptive vocabulary and nonword repetition were not significantly associated with WF behaviours. Regarding vocabulary, one may argue that we could have found an association with WF behaviours if we included a single-word naming task instead of a word-comprehension task. However, this seems unlikely, given that the current result is compatible with previous studies that used an expressive vocabulary measure (Bourassa Bédard & Trudeau, 2021; German, 1991; Tingley et al., 2003). Regarding nonword repetition, this provides preliminary insight that WF behaviours may not be linked, or only partially linked to phonological abilities, at least for children who are typically developing. This finding is somewhat compatible with the literature stating that some of the WF behaviours are not limited to breakdowns at the phonological level (German, 2015). However, this interpretation is very preliminary and must be taken with caution since it remains possible that this result was due to a ceiling effect and because it needs to be confirmed with a sample of children with WF difficulties. Future studies on

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WF behaviours should thus include younger children to avoid a ceiling effect. These studies should also include a sample of children with WF difficulties. Submitting both children with and without WF difficulties to phonological tasks, as well as semantic tasks, would help better understand WF behaviours and WF difficulties. A sample of children with WF difficulties would allow us to determine if all children with WF difficulties have difficulties with nonword repetition or if there exists a specific profile of children with WF difficulties who have difficulties with phonological tasks such as nonword repetition.

### **Limitations & Future Directions**

As mentioned above, research on child word finding is sparse, especially in French. Future studies on WF should focus on including a variety of tasks/measures, better understanding gender's role in WF and including a variety of participants with and without WF difficulties. Including a variety of discourse tasks, such as conversation, expository, narration and picture description, could be useful to better understand if the frequency of WF behaviours varies in each task. Other tasks or measures were not included in the current study but could have contributed to the %WFB. As mentioned earlier, we measured the children's receptive vocabulary, but not their expressive vocabulary. Although these two measures are usually correlated for typically developing children (see for example Ukrainetz & Blomquist, 2002), it is possible that expressive vocabulary (both accuracy and speed of naming) could have contributed to the %WFB, but not receptive vocabulary. This hypothesis would be especially important to verify with children with WF difficulties considering that this population is known to show a mismatch between receptive and expressive vocabulary (Messer et Dockrell, 2006).

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Another interesting factor to be added to the regression models would be a parent's questionnaire on WFB. Parent's questionnaires, such as the Word Finding Referral Checklist (German & German, 1992), gather a caregiver's perspectives on each of German's WF behaviours. Thus, it would have been interesting to see how the caregiver's perception contributes to a more objective measure, the %WFB.

Future studies also need to address if and why there are gender effects in WFB in narration. To our knowledge, no other study has examined the effect of gender on WF behaviours for children with or without word finding difficulties. The effect of gender needs to be further explored in future studies by considering a participant's gender when interpreting results. In fact, future studies could verify if the participant's gender can influence other WF measures, such as parent questionnaires related to their child's word finding and single-word naming tasks paired with comprehension tasks. Our team is currently conducting research with French-speaking children with WF difficulties to better understand what language process or processes are underlying WF difficulties, and to determine the best tools to identify these difficulties.

### **Conclusion**

The goal of the present study was to collect data relative to the frequency of WF behaviours in school-aged children's spoken productions and to better understand the relationship between the frequency of WF behaviours and three groups of factors, that is, sociodemographic characteristics, language abilities and characteristics of the spoken productions. We studied narrative samples produced by 61 French-speaking children aged 7 to 12 years of age. The results indicated that repetitions and word reformulations were

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relatively frequent, while the others, especially delays of more than six seconds, were relatively rare. Regression analyses identified that gender was the only significant variable associated with the frequency of WF behaviours. More specifically, boys tended to produce a higher percentage of T-Units containing WF behaviours, especially repetitions and word reformulations. This finding suggests that speech-language pathologists and researchers may need to consider a child's gender when assessing WF difficulties. Additional research is needed to explore whether the effect of gender extends to other tasks of WF and to children with WF difficulties.

### References

AMBROSE, N. G. and YAIRI, E., 1999, Normative disfluency data for early childhood stuttering. *Journal of Speech, Language, and Hearing Research*, 42, 895–909.

BEST, W., HUGHES, L. M., MASTERSON, J., THOMAS, M., FEDOR, A., RONCOLI, S., FERN-POLLAK, L., SHEPHERD, D.-L., HOWARD, D., SHOBBROOK, K. and KAPIKIAN, A., 2018, Intervention for children with word-finding difficulties: a parallel group randomised control trial, *International Journal of Speech-Language Pathology*, 20, 708–719.

BEST, W., HUGHES, L. M., MASTERSON, J., THOMAS, M., HOWARD, D., KAPIKIAN, A. and SHOBBROOK, K., 2021, Understanding differing outcomes from semantic and phonological interventions with children with word-finding difficulties: A group and case series study. *Cortex*, 134, 146–161.

BISHOP, D. V. M., SNOWLING, M. J., THOMPSON, P. A., GREENHALGH, T. and the CATALISE-2 consortium, 2017, Phase 2 of CATALISE: a multinational and multidisciplinary delphi consensus study of problems with language development: terminology. *The Journal of Child Psychology and Psychiatry*, 58, 1068–1080.

BOUCHARD, C., TRUDEAU, N., SUTTON, A., BOUDREAU, M.-C. and DENEAL, J., 2009, Gender differences in language development in French Canadian children between 8 and 30 months of age. *Applied Psycholinguistics*, 30, 685–707.

BOURASSA BÉDARD, V. and TRUDEAU, N., 2021, Étude pilote : accès lexical en contexte de narration chez des enfants unilingues francophones d'âge scolaire. *Canadian Journal of Speech-Language Pathology and Audiology*, 45, 15–28.

## WORD-FINDING BEHAVIOURS IN NARRATION

BRAGARD, A., SCHELSTRAETE, M.-A., COLLETTE, E. and GRÉGOIRE, J., 2010, Évaluation du manque du mot chez l'enfant : données développementales récoltées auprès d'enfants francophones de sept à 12 ans. *Revue européenne de psychologie appliquée*, 60, 113–127.

BRAGARD, A., SCHELSTRAETE, M.-A., SNYERS, P. and JAMES, D. G. H., 2012, Word-finding intervention for children with specific language impairment: a multiple single-case study. *Language, Speech, and Hearing Services in Schools*, 43, 222–234.

BYRD, C. T., LOGAN, K. J. and GILLAM, R. B., 2012, Speech disfluency in school-age children's conversational and narrative discourse. *Language, Speech, and Hearing Services in Schools*, 43, 153–163.

CHIAT, S., 2015, Non-word repetition. In S. Armon-Lotem, J. de Jong and N. Meir (eds), *Assessing Multilingual Children: Disentangling Bilingualism from Language Impairment* (Croydon: Deanta Global Publishing Services Ltd), pp. 125–150.

CLEAVE, P. L., KAY-RAINING BIRD, E., CORMIER, P., SQUIRES, B., CHIASSON, S., RUSHBROOK-DICKEY, T., ROACH, M. and PATENAUDE, T., November, 2013, Discourse abilities in monolingual and bilingual school-aged children. Poster presented at the annual American Speech-Language-Hearing Association Convention, Chicago, IL.

CONSTABLE, A., STACKHOUSE, J. and WELLS, B., 1997, Developmental word-finding difficulties and phonological processing: The case of the missing handcuffs. *Applied Psycholinguistics*, 18, 507–536.

DEGANI, T., KREISER, V. and NOVOGRODSKY, R., 2019, The joint effects of bilingualism, DLD and item frequency on children's lexical-retrieval performance. *International Journal of Language & Communication Disorders*, 53, 485–498.

DOCKRELL, J. E., MESSER, D., GEORGE, R. and Wilson, G., 1998, Children with word-finding difficulties—prevalence, presentation and naming problems. *International Journal of Language & Communication Disorders*, 33, 445–454.

DUNN, L. M., THÉRIAULT-WHALEN, C. M. and DUNN, D. M., 1993, Échelle de vocabulaire en images Peabody (Toronto, Ontario: Psycan Corporation).

ELIN THORDARDOTTIR, KEHEYIA, E., LESSARD, N., SUTTON, A. and TRUDEAU, N., 2010, Typical performance on tests of language knowledge and language processing of French-speaking 5 year-olds. *Canadian Journal of Speech-Language Pathology and Audiology*, 34, 5–16.

FENG, G. C., 2015, Mistakes and how to avoid mistakes in using intercoder reliability indices. *Methodology: European Journal of Research Methods for the Behavioral and Social Sciences*, 11, 13–22.

## WORD-FINDING BEHAVIOURS IN NARRATION

- GERMAN, D. J., 1991, Test of word finding in discourse (Austin, Texas: Pro-Ed).
- GERMAN, D. J., 2009, Child word finding. Student voices enlighten us. *The ASHA Leader*, 14, 10–13.
- GERMAN, D. J., 2015, Child word finding: differential diagnosis guides comprehensive intervention. In R. H. Bahr and E. R. Silliman (eds), *Routledge Handbook of Communication Disorders* (Abingdon: Routledge), pp. 215–225.
- GERMAN, D. and GERMAN, A. E., 1992, Word finding referral checklist (Long Grove, Illinois: Word Finding Materials).
- GERMAN, D. J., SCHWANKE, J. H. and RAVID, R., 2012, Word finding difficulties: differentiated vocabulary instruction in the speech and language room. *Communication Disorders Quarterly*, 33, 146–156.
- GILLAM, R. B. and PEARSON, N. A., 2004, Test of narrative language (Austin, Texas: Pro-Ed).
- GILLAM, R. B., PEÑA, E. D., BEDORE, L. M. and PEARSON, N., in development, Test of narrative language (Spanish adaptation).
- GILLAM, S. L., OLSZEWSKI, A., SQUIRES, K., WOLFE, K., SLOCUM, T. and GILLAM, R. B., 2018, Improving narrative production in children with language disorders: an early-stage efficacy study of a narrative intervention program. *Language, Speech, and Hearing Services in Schools*, 49, 197–212.
- HUTTENLOCHER, J., WATERFALL, H., VASILYEVA, M., VEVEA, J. and HEDGES, L. V., 2010, Sources of variability in children's language growth. *Cognitive psychology*, 61, 343–365.
- LANDIS, J. R. and KOCH, G. G., 1977, The measurement of observer agreement for categorical data. *Biometrics*, 33, 159–174.
- LECLERCQ, A.-L., SUAIRE, P. and MOYSE, A., 2018, Beyond stuttering: disfluencies in normally fluent French-speaking children at age 4. *Clinical Linguistics & Phonetics*, 32, 166–179.
- LEONARD, L. B., 2014, *Children with specific language impairment* (Cambridge, Massachusetts: MIT Press).
- LICKLEY, R., 2017, Disfluency in typical and stuttered speech. *Studi AISV*, 3, 373–387.
- MILLER, J. and IGLESIAS, A., 2019, Systematic analysis of language transcripts (SALT), Research version 20 [Computer software] (Madison, Wisconsin: SALT Software, LLC).

## WORD-FINDING BEHAVIOURS IN NARRATION

MESSER, D. and DOCKRELL, J. E., 2006, Children's naming and word-finding difficulties: descriptions and explanations. *Journal of Speech, Language, and Hearing Research*, 49, 309–324.

NEWMAN, R. S., GERMAN, D. J. and JAGIELKO, J. R., 2018, Influence of lexical factors on word-finding accuracy, error patterns, and substitution types. *Communication Disorders Quarterly*, 39, 356–366.

PAUL, R., NORBURY, C. and GOSSE, C., 2018, *Language disorders from infancy through adolescence: Listening, speaking, reading, writing and communicating* (St. Louis, Missouri: Elsevier).

PETERSON, C. and ROBERTS, C., 2003, Like mother, like daughter: Similarities in narrative style. *Developmental Psychology*, 39, 551–562.

SCHICK, A. and MELZI, G., 2010, The development of children's oral narratives across contexts. *Early Education and Development*, 21, 293–317.

TINGLEY, S. J., KYTE, C. S., JOHNSON, C. J. and BEITCHMAN, J. H., 2003, Single-word and conversational measures of word-finding proficiency. *American Journal of Speech-Language Pathology*, 12, 359–368.

TUMANOVA, V., CONTURE, E. G., LAMBERT, E. W. and WALDEN, T. A., 2014, Speech disfluencies of preschool-age children who do and do not stutter. *Journal of Communication Disorders*, 49, 25–41.

UKRAINETZ, T. A., and BLOMQUIST, C., 2002, The criterion validity of four vocabulary tests compared with a language sample. *Child Language Teaching and Therapy*, 18, 59–78.

VON KLITZING, K., KELSAY, K., EMDE, R. N., ROBINSON, J. and SCHMITZ, S., 2000, Gender-specific characteristics of 5-year-olds' play narratives and association with behavior ratings. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39, 1017–1023.

YARUSS, J. S., NEWMAN, R. M. and FLORA, T., 1999, Language and disfluency in nonstuttering children's conversational speech. *Journal of Fluency Disorders*, 24, 185–207.

ZACKHEIM, C. T. and CONTURE, E. G., 2003, Childhood stuttering and speech disfluencies in relation to children's mean length of utterance: a preliminary study. *Journal of Fluency Disorders*, 28, 115–142.



## WORD-FINDING BEHAVIOURS IN NARRATION

### Tables

Table 1.

Contribution of different factors to disfluencies based on existing research

	Disfluencies
<hr/>	
Sociodemographic characteristics	
Gender	Negligible
Age	Negligible
Socioeconomic status	Unknown
Language abilities	
Vocabulary	Negligible
Nonword repetition	Unknown
Characteristics of the spoken productions	
MLU	Negligible
Number of different words	Unknown

*Note.* MLU = mean length of utterance.

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Table 2

*Participant's characteristics (n = 61 unless otherwise specified): means and standard deviation or frequencies*

	<i>M (SD) or frequencies</i>
Age (months)	116.7 (18.7)
Gender	
M	29
F	32
Maternal education	
High school or lower	7
Technical college	15
Bachelor's degree	20
Master's degree or higher	19

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Table 3

*Inter-rater agreement for the coding of WF behaviours*

	Percentage of agreement	Cohen's Kappa	95% Confidence interval
T-Units	90.4	-	-
Substitutions	96.9	0.610	[0.410-0.811]
Insertions	99.2	0.723	[0.423-1,000]
Delays ( $\geq 6s+$ )	100.0	1.000	[1.000-1.000]
Time fillers ( $\geq 3$ )	96.1	0.632	[0.460-0.803]
Word reformulations	90.2	0,692	[0.601-0.783]
Repetitions	90.4	0.767	[0.697-0.838]
Empty words	95.1	0.744	[0.636-0.853]
%WFB	89.0	0.771	[0.707-0.834]

*Note.* %WFB = Percentage of T-Units containing at least one WF behaviour; WF = word finding.

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Table 4

Mean percentage of T-Units containing each WF behaviour ( $n = 61$ )

	<i>M</i>	<i>SD</i>
Repetitions	28.22	14.83
Word reformulations	18.06	8.81
Empty words	7.68	9.67
Time fillers ( $\geq 3$ )	3.71	6.25
Substitutions	2.42	3.55
Insertions	1.43	2.90
Delays ( $\geq 6s$ )	0.55	1.65
%WFB	39.0	15.0

*Note.* %WFB = Percentage of T-Units containing at least one WF behaviour.

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Table 5

*Participant's results on the EVIP, the NWR task and the combined narratives (n = 61 unless specified otherwise)*

	<i>M</i>	<i>SD</i>
<b>Language abilities</b>		
EVIP (standard score; <i>n</i> = 60)	123.0	11.1
NWR (raw score, /16)	14.56	1.7
<b>Characteristics of the spoken productions</b>		
Total number of T-Units	41.1	23.4
MLU (words)	10.0	1.7
TNW	463.1	427.2
NDW	144.2	72.4

*Note.* EVIP = Échelle de vocabulaire en images Peabody, NWR = Nonword repetition, MLU = Mean length of utterance, TNW = total number of words, NDW = number of different words, %WFB = Percentage of T-Units containing at least one WF behaviour.

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Table 6

*Regression models with %WFB as the dependent variable*

	<i>B</i>	<i>SE</i>	<i>Standardized Beta</i>	<i>p</i>	<i>R</i> <sup>2</sup>
<b>Sociodemographic model</b>					
Age	0.12	0.10	0.157	0.204	0.209
Gender	-11.07	3.50	-0.390	*0.003	
Maternal Education	0.75	1.72	0.053	0.665	
<b>Language abilities model</b>					
Age	0.13	0.11	0.160	0.237	0.255
Gender	-11.14	3.45	-0.394	*0.002	
Maternal Education	0.25	1.73	0.018	0.885	
EVIP	0.17	0.17	0.131	0.317	
NWR	1.51	0.99	0.187	0.134	
<b>Characteristics of the spoken productions model</b>					
Age	0.09	0.13	0.117	0.477	0.259
Gender	-11.05	3.53	-0.390	*0.003	
Maternal Education	0.22	1.83	0.016	0.904	
EVIP	0.16	0.17	0.124	0.368	
NWR	1.60	1.03	0.198	0.127	
NDW	0.01	0.03	0.039	0.783	
MLU	0.52	1.60	0.048	0.745	

*Note.* EVIP = Échelle de vocabulaire en images Peabody, NWR = Nonword repetition, MLU = Mean length of utterance, NDW = number of different words, %WFB = Percentage of T-Units containing at least one WF behaviour.

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Table 7

*Sociodemographic, language and task variables by gender ( $n_{boys} = 29$ ;  $n_{girls} = 32$  unless specified otherwise)*

	Boys <i>M (SD)</i>	Girls <i>M (SD)</i>	<i>p</i>	<i>d</i>
Sociodemographic characteristics				
Age (months)	120.5 (18.2)	113.3 (18.8)	0.134	0.389
Language variables				
EVIP	122.3 (11.4)	123.5 (10.9) <sup>a</sup>	0.670	0.108
NWR	14.6 (1.7)	14.5 (1.8)	0.904	0.057
Discourse measures				
NDW	152.8 (83.2)	136.5 (61.2)	0.382	0.223
MLU	10.1 (1.2) <sup>b</sup>	9.7 (1.4)	0.210	0.307

*Note.* <sup>a</sup>  $n = 31$ , <sup>b</sup>  $n = 28$ , EVIP = Échelle de vocabulaire en images Peabody, NWR = Nonword repetition, MLU = Mean length of utterance, NDW = number of different words.

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Table 8

Percentages of T-Units containing each WF behaviour by gender ( $n_{\text{boys}} = 29$ ;  $n_{\text{girls}} = 32$ )

	Boys <i>M (SD)</i>	Girls <i>M (SD)</i>	<i>p</i>	Adjusted <i>p</i>	<i>d</i>
Substitutions	2.20 (2.64)	2.61 (4.25)	0.658	0.768	0.113
Insertions	1.13 (1.56)	1.71 (3.73)	0.441	0.617	0.203
Delays	0.50 (1.37)	0.60 (1.88)	0.805	0.805	0.067
Time fillers	4.51 (7.22)	2.98 (5.23)	0.343	0.600	0.243
Repetitions	34.77 (14.11)	22.29 (13.02)	*0.001	*0.007	0.734
Word reformulations	21.27 (3.24)	15.16 (8.41)	*0.006	*0.021	0.921
Empty words	9.03 (10.20)	6.46 (9.15)	0.305	0.600	0.266

Note. <sup>a</sup> Benjamini Hochberg adjustment.



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Table 9

Contribution of different factors to disfluencies, based on previous research, and to WF behaviours, based on the current study

	Previous research on disfluencies	Current study on WF behaviours
Sociodemographic characteristics		
Gender	Negligible	Yes
Age	Negligible	No
Socioeconomic status	Unknown	No
Language abilities		
Vocabulary	Negligible	No (receptive)
Nonword repetition	Unknown	No
Characteristics of the spoken productions		
MLU		
Number of different words	Unknown	No

*Note.* MLU = mean length of utterance, WF = word finding.