

# Are Second Language Learners Just as Good at Verb Morphology as First Language Learners?\*

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## Abstract

We addressed whether children learning French as a first (L1) and multilingual children (MUL, for whom French is a second or third language) are sensitive to sub-regular verb conjugation patterns (i.e., neither default, nor idiosyncratic) (e.g., Albright, 2002; Clahsen, 1999). Some argue that children with other first languages have more difficulty learning verb conjugation patterns due to their lesser exposure to the language (e.g., Nicoladis, Palmer, & Marentette, 2007). We hypothesized that older children would perform better than younger children and that L1 and MUL children learning French would process verb inflection patterns differently based on their default status (*-er* verbs), and reliability (e.g., sub-regular *-ir* verbs), with MUL children showing weaknesses in non-default types (Royle, Beritognolo, & Bergeron, 2012).

We elicited verbs in 169 children (aged 67 to 92 months) attending preschool (n = 105) or first grade (n = 64), who were L1 or MUL learners of Québec French, using 24 verbs with regular, sub-regular, and irregular participle forms (6 of each, ending in /e/, /i/, /y/ or *IDiosyncratic*) in the *passé composé* (perfect past). Using our Android application *Jeu de verbes*, verbs were presented with images (see Figure 1) to each child in an infinitival form (infinitival complements or the periphrastic future, e.g., *Marie va cacher ses poupées* 'Mary will hide her dolls') and present tense contexts (e.g., *Marie cache toujours ses poupées* 'Mary always hides her dolls'). Children were prompted to produce the *passé composé* by answering the question 'What did she do yesterday, Marie?'.

Preliminary analyses (n = 94, 70 in preschool, 31 L1 and 39 MUL; 24 in first grade, 13 L1 and 11 MUL) reveal a Verb conjugation group effect,  $F(3, 88) = 52.31, p < .001$  as well as a Verb conjugation group\*Language group\*Age group interaction,  $F(3, 88) = 3.35, p < .05$ . Moreover, trends toward significant effects were found for Age group,  $F(1, 90) = 3.07, p = .08$ , and for the interaction of factors Verb conjugation group\*Language group,  $F(3, 88) = 2.36, p = .08$ . These results indicate that responses to verb conjugation groups differ according to verb conjugation, age and language group (see Figure 1).

Overall, children's responses to verb conjugation groups highlight morphological productivity and reliability effects on mastery of French conjugation. Results also show higher target productions in the first grade than in preschool and varying response patterns depending on language background. In depth analyses comparing all 169 children including language group analyses (L1 vs MUL) will further inform us on children's mastery of French *passé composé*, while non-parametric analyses on frequency of response types should reveal a clearer picture of children's response strategies by verb or language group. These data will show that MUL children who have lesser exposure to oral French language, rapidly master verb conjugation patterns to the same level as L1 children (and might even do better) in immersive (school) contexts.

**Keywords:** *verbs, conjugation group, elicitation, French, multilingualism, Android tablet*

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## 1. Introduction

Morphological awareness is the ability to recognize, use and manipulate morphological units comprised in words (e.g., Carlisle, 1995, 2003). This ability is particularly important in the acquisition of reading and writing at the onset of the school years (Pacton & Deacon, 2008; Sénéchal, 2000). Theoretically, the acquisition of common morphological patterns, rules, or schemas could be achieved through a generalization process from stored items in the lexicon (e.g., Bybee, 1995; Paradis, Nicoladis, Crago, & Genesee, 2010) or via analogical linking of forms (e.g., Lavallée & Langlais, 2009). Rubin (1988), for instance, tested preschool and first grade children on their morphological awareness in relation to their writing abilities. In that study, oral morphology performances seem to be linked with early writing abilities. Wolter, Wood and D'zatko (2009) evaluated children attending first-grade on oral as well as spelling morphological production. Results appear to highlight the emergence of first-graders' implicit morphological awareness before explicit teaching, even though inflectional and derivational morphology were not clearly distinguished in their tasks. Levin, Ravid, and Rapaport (2001) show similar results for Hebrew. Both Rubin (1988) and Wolter et al. (2009) tested children in the United States educated in English, while Levin et al. (2001) studied a Semitic language. One may wonder whether the same conclusions hold with languages that are typologically similar but richer in verb morphology than English, like French for instance.

In acquisition, French verbs first emerge in the present and imperative tenses, and children quickly move to producing other forms. French toddlers aged between 21 and 47 months are already productive users of inflected verbs, as they produce them in the imperative, the periphrastic future (an infinitive with an auxiliary), the imperfect as well as the perfect past (the *passé composé*, a form produced with an auxiliary and a past participle) (Elin Thordardottir, 2005). Moreover, verbs produced at this age are usually properly inflected according to person, number and tense. In fact, children speaking Romance languages often display error free verbs in their early productions, before entering a stage with errors on inflected verb forms (e.g., Clahsen, Aveledo, & Roca, 2002 for Spanish; Royle & Thordardottir, 2008 and Elin Thordardottir & Namazi, 2007 for French). French children also appear to be sensitive to morphological frequency, regularity, and verb paradigm productivity (Royle et al., 2012). By age three, they distinguish conjugation groups, are sensitive to specific verb frequencies, and demonstrate significantly more correct productions for regular verbs (i.e., verbs from the 1st conjugation ending in *-er* in the infinitive) compared to irregular verbs (Royle, 2007), a finding that parallels data reported for English by Berko (1958). Moreover, high frequency verbs (e.g., *manger* 'to eat', *boire* 'to drink') are more often successfully produced than low frequency ones (e.g., *graver* 'to engrave', *battre* 'to beat'). Verb paradigm productivity effects (that is the frequency of a conjugation group pattern as types in the corpus) can be found in French children's speech errors who show overregularizations of irregular verb forms into default regular but also sub-regular paradigms (e.g., Kresh, 2008; Nicoladis et al., 2007; Royle, 2007, also see Royle et al., 2012 for a discussion). These patterns parallel those of other children learning languages with multiple verb conjugation patterns, such as Italian or Spanish, who overregularize within, rather than across, conjugation class (e.g., see Clahsen et al., 2002 for Spanish; Say & Clahsen, 2002 for Italian).

### *Theoretical models pertaining to verb conjugation groups*

Some psycholinguistic models describe verbs in a dichotomous fashion: regulars versus irregulars (e.g., see Pinker, 1999, for English verbs; and Kresh, 2008; Nicoladis et al., 2007; Paradis et al., 2010, for French verbs). Regular verbs are inflected following a regular and productive morphological scheme (e.g., for *cacher* 'to hide', *cache* [kaʃ], *caché* /kaʃ/ + /ɛ/, *cachait* /kaʃ/ + /ɛ/) that may serve during verb production or comprehension, while irregular verbs seem to be inflected without morphological concatenation (e.g., *couvrir* 'to cover', *couvre* [kuvʁ], *couvert* [kuvʁɛ], *couvrais* [kuvʁɛ])<sup>1</sup>. It has therefore been suggested that all forms of irregular verbs are memorized and stored separately in the lexicon (e.g., Pinker, 1999). Verbs in romance languages (e.g., Spanish, Italian and French) could be described better in terms of a three-way distinction (see for e.g., Clahsen et al., 2002, for Spanish; Royle et al., 2012, for French; Say & Clahsen, 2002, for Italian). In French for instance, verbs are traditionally divided into three groups: verbs of the first group (ending in *-er* /e/ in the infinitive and *-é* /e/ in the past participle), regular verbs of the second group (ending in *-ir* /iʁ/ in the infinitive and *-i* /i/ in the past participle) and irregular verbs from the third group. Yet, a closer analysis highlights the presence of regularities and irregularities in both the second and the third group. Some so-called irregulars appear to borrow, at least for the past participle, inflection schemes from regular conjugation patterns (e.g., irregulars in /e/, *aller* – *allé* /ale/ 'to go – gone') and sub-regular verbs (e.g., irregulars in /i/, *prendre* – *pris* /pʁi/ 'to take – taken'), while other irregulars are inflected in a clearly

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<sup>1</sup> However, as this example shows, irregular verbs can carry regular suffixation in certain forms *couvrais* /kuvʁ/ + /ɛ/. This is also the case for verbs with stem changes, e.g., *boire* [bwaʁ] 'to go', *buvait* /byv/ + /ɛ/ 'drank'.

irregular fashion (e.g., *ouvrir – ouvert* /uvɛʁ/ ‘to open – opened’). Yet, a particular sub-group of irregulars, those with endings in /y/ (e.g., *voir – vu* /vy/ ‘to see – seen’), include some of the most frequent verbs in the French language (e.g., *boire – bu* ‘to drink – drank’, *vouloir – voulu* ‘to want – wanted’, *savoir – su* ‘to know – known’ etc.). Since frequency can influence the acquisition of verbs in children (see for e.g., Royle, 2007), it is of great importance to evaluate children’s knowledge of regular and sub-regular schemes occurring frequently in the language. Sub-regularities linked to unproductive morphophonological rules (e.g., *voir – vu* /vwar – vy/ ‘to see – seen’, *boir – bu* /bwar – by/ ‘to drink – drunk’, University of Oxford, 2011) could allow children to correctly produce verb forms on probability bases (Labelle & Morris, 2011). The lack of distinction between sub-regular and irregular verbs could lead to a misunderstanding (or simplified understanding) of verb conjugation abilities in children.

### *Frequency effects*

Even if verbs belonging to the first group represent the majority of French verbs (between 85 and 90 percent of all verbs, Beschерelle, 2006), type and token frequency affect exposure to all conjugation groups (type frequency is the frequency of class of items and token frequency is the frequency of a specific item). In Guillaume’s (1927[1973]) spontaneous speech corpus of francophone children aged two to four years, verbs of the first group (e.g., *donner* ‘to give’) represent 76 % of verb types, while they constitute only 36 % of tokens. Verbs of the second group (both regular and irregular verbs; e.g., *tenir* ‘to hold’, *ouvrir* ‘to open’) include 6 % of types and 6 % of tokens, while verbs of the third group (all irregular; e.g., *faire* ‘to do’, *vouloir* ‘to want’) account for up to 18 % of types and 58 % of tokens. Irregular verbs thus appear to be highly represented in the language the child is exposed to.

Nicoladis et al. (2007) tested the importance of type and token frequency for verb acquisition by analyzing child literature corpora and child-directed speech. Their investigations reveal that regular verbs of the first group account for 63 % of verb types and 51 % of tokens in both literature and child-directed speech, differing from Guillaume’s (1927[1973]) results in that the most regular first conjugation is more highly represented in the input than what children produce. In addition, Nicoladis et al. (2007) grouped regular verbs of the second group together with irregulars, and Guillaume’s corpus predates the Nicoladis study by 80 years. Royle et al. (2012) recently confirmed Guillaume’s (1927[1973]) data with a more recent corpus (2005-2008) from 12 French-speaking children aged between 36 and 45 months. They produced 66 % regular verb types of the first group, representing 36 % of tokens, 12 % types and 6 % tokens for the second group and 22 % types and 58 % tokens for the third irregular group. They also showed that *passé composé* types and tokens had similar distributions to Nicoladis et al. (2007) adult input. Their analysis of *passé composé* forms demonstrates the predominance of schemata from the first group (61 % of types and 47 % of tokens) for this conjugation, while schemata from the second group are moderately present (17 % of types and 27 % of tokens, if we include irregular verbs with a past participle ending in /i/) compared with verbs with past participles ending in /y/ (9 % of types and 5 % of tokens), and verbs with non morphological (or non paradigmatic) forms such as *mourir – mort* ‘to die – died’ (11 % of types and 19 % of tokens). Compared to Nicoladis et al. (2007), who considered only two verb groups, regulars (-er verbs) and irregulars (all other verbs), Royle et al. (2012) distinguished French verbs according to four groups: regular /e/, regular /i/, irregular /y/ and IR. These analyses demonstrate that the French *passé composé* includes a large variety of forms, with a predominance of the first group. A study testing children’s production abilities of these four verb groups would allow us to investigate children’s sensitivity to frequency of morphological schemes of French verbs. In the early Royle (2007) study of child verb production, these four groups were not systematically studied, and some children were too young to complete the task, especially with infrequent verbs.

### *Productivity*

One must distinguish between regular, productive, and default rules in morphology. Linguistic rules may be regular but nonetheless not be used productively by speakers of the language, whereas other rules may not be productive but still serve as defaults. For example, German -s plural ending is the default suffix regardless of its rarity in the language (Marcus, Brinkmann, Clahsen, Wiese, & Pinker, 1995). Productive rule acquisition is most often reflected by overregularizations. Marcus et al. (1995) discuss overregularizations as follows: “In any case in which a person’s memory retrieval mechanism fails to deliver a stored irregular form but that person’s grammatical system is functioning, a regularized version of that form should be available.” (p. 206). French children generally overregularize in the first group (e.g., *\*il a ouvert* for *il a ouvert*) and occasionally into the second conjugation as young as 3 years of age (e.g., Guillaume, 1927[1973]; Hiriarteborde, 1973; Royle, 2007).

A productivity index of the *passé composé* is essential if the aim is to determine the effects of frequency, regularity and productivity for French verb acquisition. As discussed, the past participle is highly frequent in child

language (it is used in French, not only in the *passé composé* but also in other tenses such as the pluperfect indicative and subjunctive, present and future anterior, past conditional and imperative and gerund past tenses, although these forms are not as used as frequently or at such early ages as the *passé composé* in child language). The past participle is also used in deverbal adjectival form, e.g., *la maison est brûlée* ‘the house is burnt’, as demonstrated by Bassano (2010) who found that this form represented approximately 16% of spontaneously produced action verb forms<sup>2</sup> in the speech of one child followed from 14 to 36 months (Pauline CHILDES corpus, Bassano & Maillachon, 1994). In 1973, Hiriarteborde elicited the *passé composé* of both regular frequent and less frequent verbs. By 3.5 years of age, French children correctly produced *passé composé* forms, but only if they produced four different *passé composé* types in their spontaneous speech corpus. Children learning Québec-French can produce *passé composé* forms for both regulars and irregulars of known verbs at 3.5 years old and unknown verbs at 4 years (Royle, 2007). Kresh (2008) studied French children aged 6 to 8 years using lexical decision and elicitation tasks of French past participles. In this study, in addition to traditional verb groups with past participles in /e/, /i/ and other irregulars (e.g., *souffrir – souffert* ‘to suffer – suffered’), Kresh also evaluated a sub-group of irregular verbs with past participles in /y/ (e.g., *paraître – paru* ‘to appear – appeared’). Results of her study show frequency effects for all items, except those ending in /y/, and paradoxical effects for irregular forms: reverse frequency effects were observed for less frequent verbs as they were better produced than verbs of medium frequency. However, only medium and low frequency items were tested in that study.

If children are sensitive to type frequency effects, a study investigating these effects with high frequency verbs while controlling for sub-regular conjugation groups is necessary to better understand processing of various verb forms in French. In the present study, we will use the same verb groups ending in /e/, /i/, /y/ and irregulars studied by Kresh (2008), but we will use only frequent forms. Being the less frequent types, in addition to not being productive (see Royle et al., 2012 for discussion), verbs in /y/ and irregulars should be more difficult to produce than regular and sub-regular verbs. Due to the uniqueness of irregular forms (no pattern within the type), irregular verbs should be the most difficult forms to be produced by children.

### *Bilingualism*

It is nowadays common that within a class setting, a large number of children will speak another language at home than the language of education. These children are considered multilinguals because they are exposed to more than one language at home and at school and have various language learning experiences: simultaneous or sequential bilingualism, and simultaneous or sequential multilingualism. The great area of Montreal, Canada, where the present study took place, is no exception. Some argue that children with first languages other than the majority one have more difficulty than their monolingual peers acquiring this majority language due to their lesser exposure to it (e.g., Gathercole, 2007; Nicoladis et al., 2007), while others believe in a bilingual (metalinguistic) advantage over monolinguals (e.g., Bialystok, 1991, 1997). Yet, others describe similar development paths in monolingual and bilingual children (e.g., Elin Thordardottir, Rothenberg, Rivard, & Naves, 2006; Paradis & Genesee, 1996).

As young as two years of age, simultaneous bilingual children can tease apart morphosyntax from their two languages (see Nicoladis & Genesee, 1997 for a review). Empirical studies aiming specifically at morphosyntactic acquisition show either one of these three patterns, depending on various factors such as task (e.g., language comprehension vs. production), age of children (e.g., 5 vs. 7 vs. 9 year olds), type of bilingualism (simultaneous or sequential) or nature of bilingualism (heritage or majority language) and so on. For instance, Bialystok (1986) found that bilingual children were better than monolinguals at judging grammatical non-meaningful utterances. In a verb morphology study, children having English as a second language differed on their verb use from their bilingual Spanish-English and English-speaking monolingual peers, behaving similarly to children with language impairment (Gutiérrez-Clellen, Simon-Cerejido, & Wagner, 2008). In a more recent study using an English test (TEGL, Rice & Wexler, 2001), Paradis (2010) tested French-English bilinguals from Canada educated in French and living in Edmonton where the majority language is English. She found that children who spoke mainly French at home were significantly worse at the tasks than children who spoke mainly English or who spoke equal amounts of French and English at home. Most interestingly, on some measures, the children speaking equal amounts of French and English at home (called balanced bilinguals) scored higher than the monolingual norms. Taken together, it appears that further evidence is needed to depict a clearer portrait of bilingual versus monolingual morphosyntactic behavior and knowledge. Few studies test the whole range of language experience encompassing different types of bilingualism and second or third language learning we term multilingual.

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<sup>2</sup> Action verbs represent actions (e.g., to eat, to run), while non-action (or stative) verbs refer to a state or condition (e.g., to like, to think).

## 2. Present study

In the present study, we addressed whether children learning French as a first (L1) and multilingual children (MUL, for whom French is a second or third language) are sensitive to sub-regular verb conjugation patterns (i.e., neither default, nor idiosyncratic) (e.g., Albright, 2002; Clahsen, 1999). While we initially categorized MUL children as second language learners, it soon became obvious that a better term was needed since many children were exposed to more than two languages. We thus opted for the term multilingual, which in our view, was better suited to our participant sample.

Our experiment evaluates how 6 and 7 year old children master the French *passé composé* (PC), using verbs with past participles ending either in the three main verb groups and following one of the four following patterns: past participles ending in /e/, /i/, /y/ or ID (idiosyncratic). The PC is considered by some researchers to be a complex tense (e.g., Labelle & Morris, 2011) because it combines an auxiliary (either *avoir* 'to have' or *être* 'to be') with a past participle. However, as noted above, it is early acquired and can be elicited in young speakers.

### *Hypotheses*

There are three possible outcomes for MUL children on this task. They could have a metalinguistic advantage compared to monolinguals (e.g., Bialystok, 1991, 1997), and thus could perform better than monolinguals at verb conjugation. Second, they could have a disadvantage due to a lesser exposure to the L2 compared to monolinguals (e.g., Nicoladis et al., 2007; Paradis, Genesee, & Crago, 2011), and thus produce less target forms or produce more overregularizations than L1 children. Finally, they could be on par with monolinguals (see for e.g., Paradis & Genesee, 1996; Elin Thordardottir et al., 2006) and produce as many target verbs and similar errors as L1 children. The bilingual differences may begin with initial confusions followed by advantages once the confusion is resolved (Bialystok, 1997). Given existing data on French verb production and the conflicting evidence found in bilingual children studies, we formulated the following hypotheses.

1) Age group difference should be found. Children from the first grade should perform better on the task than preschool children.

2) A gradient effect of productivity should be obtained: /e/ > /i/ > /y/ > ID.

Considering results from Royle (2007) demonstrating over-regularization productions in /i/ in children aged 4 years, verbs in /i/ should be well mastered by school-aged children, possibly on par with verbs from the first group. Irregular verbs, in /y/ and ID, should be more difficult than regular and sub-regular verbs due to their lack of productivity and their low type frequency in the corpus. Verbs in /y/ will be better mastered than ID verbs, even if they are not productive, because of the presence of a word final morphophonological regularity/consistency (/y/) (see Albright, 2002 for a discussion on morphological reliability).

3) Based on Paradis et al. (2010) and Nicoladis et al. (2007), MUL children should show difficulties on the task as well as stronger verb group effects (i.e., better responses on the first group only) due to their lesser exposure to French.

### 2.1.1. Participants

One hundred and sixty-nine<sup>3</sup> children<sup>4</sup>, from two French-speaking grade schools in Laval, Québec, participated in this experiment. Children were from two school level groups, preschool (P) and first grade (F), and two language backgrounds, French speaking (L1) and multilingual (MUL). We considered children to be L1 when they were exposed to French for a minimum 90% of the time and MUL when they were exposed to French for less than 90% of the time. The data presented below include preliminary analyses from 94 children<sup>5</sup>. The P group included 70 children aged 6 years ( $M = 6;6$ ,  $SD = .35$ ), of which 31 were L1 French speakers (12 girls and 19 boys) and 39 were MUL children (21 girls and 18 boys). The F group included 24 children aged 7 years ( $M = 7;1$   $SD = .38$ ), 13 L1 French (4 girls and 9 boys) and 11 MUL children (7 girls and 4 boys). Data collection was carried out at the end of the school year (in May and June 2011 and in March and April of 2014).

Sixty of these children were participating in a larger study aiming at developing an early detection tool for spelling disorders in French (Rvachew, Gonnerman, & Royle, 2011-2013). The remaining children were also tested with another task that will not be discussed in this paper. Testing protocols were approved by the internal review

<sup>3</sup> Children were attending Preschool (n=105) or First grade (n=64).

<sup>4</sup> An additional child was tested, but her data were not analyzed because they were incomplete. She was suspected of suffering from mental retardation.

<sup>5</sup> The data from 35 of these children are presented in Marquis, Rvachew, Gonnerman, & Royle (2012).

board from the Université de Montréal Faculty of Medicine (or both McGill University and Université de Montréal Faculties of Medicine for the children that participated in the 2011-2013 study). Parents signed a consent form allowing children to participate in the study. Children could withdraw from the study at any time. We gathered demographic, literacy, health, and language information from a phone interview with the parents. According to parents' reports, no child had been diagnosed with developmental or cognitive disorders, or had a medical history that could affect their language development.

### 2.1.2. Stimuli

We used seven verbs for each of the four verb groups discussed above ( $N = 28$ ): 7 with a past participle ending in /e/ (e.g., *cacher* – *caché* ‘to hide – hidden’), 7 with a past participle ending in /i/ (e.g., *finir* – *fini* ‘to finish – finished’), 7 with a past participle ending in /y/ (e.g., *mordre* – *mordu* ‘to bite – bitten’) and 7 with an ID (non paradigmatic) past participles (e.g., *ouvrir* – *ouvert* ‘to open – opened’) (see Marquis, Rvachew, Gonnerman, & Royle, 2012 for more details). Verb groups were matched on frequency measures (from LEXIQUE and MANULEX databases for 6-7 year-olds, see Appendices A and B). Form and lemma frequencies did not differ statistically (all  $p > .1$ ). Verb groups were matched for number of phonemes, number of syllables, number of orthographic neighbors and number of phonological neighbors (all  $p > .1$ ). Before data collection, we evaluated the plausibility of the carrier sentence pairs by obtaining judgments from adult native French speakers ( $N = 10$ ) using a six point Likert scale (1 = *absolutely impossible* and 6 = *absolutely possible* in French). Most sentence pairs were judged plausible in French (i.e., 5 or 6). Sentences that scored 4 or lower were modified then judged again until they reached our plausibility score of 5 or higher.

The images illustrating verbs to be elicited were created by a professional artist (see an example of *cacher* ‘to hide’ in Appendix C). The order of stimuli presentation was the same for all children and was pseudo-randomized so that a maximum of two verbs of a given conjugation group were presented sequentially, to avoid production strategies based on analogy from preceding items. In the initial analysis, one point was granted for the full *passé composé* production (i.e., full subject – auxiliary – participle group, e.g., *Marie/elle a caché* ‘Marie/she has hidden’).

According to the provincial educational program (Quebec Ministry of Education, MELS, 2008a, 2008b, 2008c), children have not been taught these forms in school. We were thus able to study children's linguistic competence about verbs before explicit teaching. This allowed us to develop a model of verb representation in children at the onset and earliest stages of schooling.

### 2.1.3. Procedure

Traditionally, past tense acquisition is tested using spontaneous samples from children (e.g., Kuczaj, 1977; Marcus, Pinker, Ullman, Hollander, Rose, & Xu, 1992). Although very informative, children's spontaneous speech lacks the possibility for researchers to have real control over certain elements such as frequency or class membership. We thus opted for an elicitation task. We created an elicited speech production task, implemented on an Android touch tablet, designed to elicit past tense verb forms (see Marquis et al., 2012 for more details). An *Open Source* Android application was developed to present images as a virtual book. The Android application simulates a storybook where the child has to complete short stories by answering the experimenter's questions. The application automatically records all verbal responses, date and time information, as well as duration for each image presentation.

Children were tested individually in a quiet room in the school during class hours. The testing sessions included other experiments and lasted about 15 to 20 minutes. During the experiment, the tablet was on a table in front of the child, who could observe and touch the images as desired. The experimenter read aloud the script sentences containing the target verbs to elicit PC forms using the well-known procedure first implemented by Berko (1958). Our adaptation to French context was modeled on work with French-speaking children by Royle (2007), Royle and Thordardottir (2008) and Kresh (2008), with adaptations (a shorter script with only two sample presentations of the verb). A script example is given in (1). The experimenter would skip to the next image if a child provided no answer following the presentation of the script (i.e., after about 20 seconds). Regardless of the accuracy of their responses, children were encouraged for their efforts before passing to the next image.

- (1) Image: A girl hiding dolls under a box (see Appendix C)  
*Marie va cacher ses poupées.* ‘Mary will hide her dolls.’  
*Marie cache toujours ses poupées.* ‘Mary always hides her dolls.’  
*Qu'est-ce qu'elle a fait hier Marie?* ‘What did Mary do yesterday?’

The experiment began with four practice items covering one example from each verb group being studied. For the practice items only, if the child produced a wrong answer or if no response was given, feedback in the form of the right answer was given. The script gave clues on the verb's inflection paradigm by providing present (e.g., *cache* /kaʃ/ 'hide.sg.', *finir* /fini/ 'finish.sg') and infinitive (e.g., *cache* /kaʃe/ 'hide.INF', *finir* /finiʁ/ 'finish.INF') forms: both the 1<sup>st</sup> and 2<sup>nd</sup> conjugation have typical vowels in their infinitive stems (/e/ and /i/), while 3<sup>rd</sup> conjugation forms (i.e., /y/ and ID) do not (e.g., *boire* /bwɑʁ/ 'drink.INF').

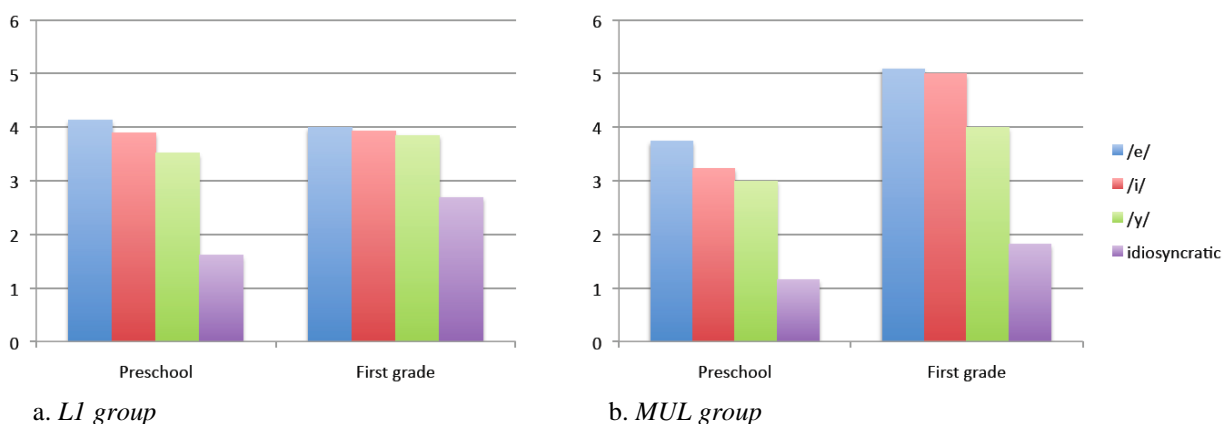
### 2.1.4. Results

We conducted repeated measures analyses of variance (ANOVA) for children's mean scores on target responses with an alpha value of .05. Verb conjugation group was the within-subject factor (four levels: /e/, /i/, /y/ and ID verbs) while Age group (two levels: Preschool versus First grade) and Language group (two levels: L1 versus MUL) were between-subject factors. Preliminary analyses (n = 94) reveal a Verb conjugation group effect,  $F(3, 88) = 52.31, p < .001$  as well as a Verb conjugation group\*Language group\*Age group interaction,  $F(3, 88) = 3.35, p < .05$ . Moreover, trends toward significant effects were found for Age group,  $F(1, 90) = 3.07, p = .08$ , and for the interaction of factors Verb conjugation group\*Language group,  $F(3, 88) = 2.36, p = .08$ .

In order to decompose the three-way interaction above, *post hoc* analyses were then conducted based on Language group and Age group separately. For L1 children, we obtained a significant main effect for Verb conjugation group  $F(3, 40) = 15.83, p < .001$  (where /e/ = /i/ > /y/ > ID), while the interaction Verb conjugation group\*Age group failed to reach significance  $F(3, 40) = 1.58, p > .05$  (see Figure 1a). For MUL children, similar results were obtained, such that a significant main effect for Verb conjugation group was found  $F(3, 46) = 37.93, p < .001$  (/e/ = /i/ > /y/ > ID), while the interaction of Verb conjugation group\*Age group failed to reach significance  $F(3, 46) = 2.10, p > .05$  (see Figure 1b). For First grade children, a significant effect of Verb conjugation group was found,  $F(3, 20) = 26.72, p < .001$  (/e/ = /i/ > /y/ > ID), as well as a Verb conjugation group\*Language group interaction,  $F(3, 20) = 5.63, p < .01$ . For Preschool children, we obtained a significant main effect for Verb conjugation group,  $F(3, 66) = 46.87, p < .001$  (/e/ > /i/ > /y/ > ID), while the interaction of Verb conjugation group\*Language group failed to reach significance  $F(3, 66) = 0.45, p > .05$ . Taken together, these results indicate that children's responses differ according to verb conjugation, age and language group (see Figure 1).

**Figure 1.**

*Mean correct responses for Verb conjugation group\*Age group in both language groups*



### 3. Discussion and Conclusion

The importance of studying verb acquisition lies in the fact that the verb is the central element of sentence structure (Bassano, 2010). In French as well as in a large number of languages, verbs comprise combinations of two or more morphemes. Productive mastery of morphological processes makes it possible to recognize and produce newly encountered or created words. This study aimed at demonstrating the necessity to study pattern frequency

effects by investigating regular, sub-regular and irregular French verbs. We tested French-speaking children's ability to produce regular, sub-regular and irregular verbs while investigating sub-regularities in verbs usually considered to be irregular: i.e., verbs having a past participle ending in /y/ (e.g., *voir* – *vu* 'to see – seen'). We hypothesized that younger children would have more difficulty producing PC forms compared to older children. Our preliminary analyses of 94 from the total 169 children indicate that this hypothesis was supported for ID verbs in L1 children and all verbs for MUL children. We also predicted a performance gradient according to paradigm regularity and frequency (/e/ > /i/ > /y/ > ID). This hypothesis is partly confirmed since regular verbs ending in /e/ and /i/ were significantly better produced than the other verb groups, and ID verbs were significantly less correctly produced overall. Our third hypothesis was that MUL children should show difficulties on the task and stronger verb group effects. This was not supported by our current analyses. In fact, if anything, the MUL children do better than their monolingual peers in first grade. However, because the number of first graders is small, we would have to consider a larger group before proposing a strong interpretation of this particular result.

Our data differ from results obtained by other authors (e.g., Kresh, 2008; Nicoladis et al., 2007; Royle, 2007), who did not observe significant frequency effects for sub-regular verb types ending in /y/, and showed a gradient effect of success on different verb groups having low and medium type frequency. Future research should pursue sensitivity to these types of morphophonological patterns. Other research should also include children with language disorders (e.g., Specific Language Impairment) that may differ qualitatively from children in the current study. We believe that they should not show similar patterns to these unimpaired children, and rather exhibit no verb conjugation effects (i.e., no sensitivity to the patterns outlined). Some authors argue that it takes between 3 to 5 years to attain native-like production for children acquiring an L2 (e.g., Hakuta, Goto Butler & Witt, 2000; Jia, 2003; Jia & Fuse, 2007; Paradis, 2008). Our data seem to show that in highly immersive environments, MUL children can acquire subtle and complex morphological systems quite rapidly.

It is clear that further analyses are needed to verify strategies used by children to produce these verbs including qualitative error analyses of past participle production (i.e., regardless of subject and auxiliary production), omission versus commission errors (see for e.g., Paradis, 2005; Paradis et al., 2011; Paradis, Rice, Crago, & Marquis, 2008), as well as detailed factorial or correlational analyses for bilingual status (simultaneous vs. sequential L2 learning vs. multilingualism), L1 language family (e.g., Romance and Arabic speakers, but see the Paradis et al., 2011 report showing that L1 has little effect on L2 development) family literacy and so on.

The current study suggests a three-way distinction between regular, sub-regular and irregular French verb schemes, differing from a dichotomic approach of regular versus irregular verb schemata proposed by Kresh (2008), Nicoladis et al. (2007) and Paradis et al. (2010), but also differing slightly from Royle's (2007) triadic approach. Children tested in our study have not yet received explicit teaching of conjugation rules in French. They can thus inform us about scheme constructions based on implicit exposition to language, in their first as well as their second or third language.



## Appendix A

*Properties of target verb types (standard deviation)*

Verb group	Form frequency <sup>a</sup>	Lemma frequency <sup>a</sup>	Number of phonemes <sup>a</sup>	Number of syllables <sup>b</sup>	Orthographic neighbors <sup>a</sup>	Phonological neighbors <sup>a</sup>
/e/	110,4 (141,40)	535,6 (572,65)	4,17 (0,41)	2 (0)	4,83 (1,72)	17,67 (8,33)
/i/	74,50 (104,85)	255,95 (218,04)	3,86 (1,07)	1,71 (0,49)	5,43 (4,96)	8,86 (9,30)
/y/	98,04 (109,11)	393,95 (248,92)	4,17 (1,17)	2 (0,63)	5,33 (5,28)	10,33 (7,23)
IR	61,72 (114,73)	231,52 (330,99)	3,71 (1,11)	1,71 (0,49)	4,17 (4,67)	13,5 (9,59)

<sup>a</sup> From LEXIQUE (New, Pallier, Ferrand, & Matos, 2001)

<sup>b</sup> Syllabic structure of Québécois French

Univariate analyses by verb type, all  $F(3, 23)$ ,  $p > .1$

## Appendix B

*Written lemma and form frequencies in child literature (standard deviation)*

Verb group	Lemma CP <sup>c</sup>	Lemma CE1 <sup>c</sup>	Lemma CP-CM2 <sup>c</sup>	Form CP <sup>c</sup>	Form CE1 <sup>c</sup>	Form CP-CM2 <sup>c</sup>
/e/	678,83 (485,00)	780,82 (773,74)	652,04 (673,42)	84,95 (76,84)	70,64 (74,27)	70,44 (75,79)
/i/	290,63 (208,00)	446,92 (567,95)	407,56 (478,28)	57,72 (57,48)	71,54 (111,12)	63,35 (85,47)
/y/	333,94 (232,32)	390,16 (394,22)	358,06 (254,40)	69,82 (108,88)	40,33 (52,52)	52,70 (60,72)
IR	157,03 (230,96)	128,97 (163,33)	156,68 (164,71)	21,22 (25,73)	17,18 (9,20)	23,22 (14,12)

<sup>c</sup> From MANULEX (Lété, Sprenger-Charolles, & Colé, 2004)

CP = *cours préparatoire* France ‘preschool’ (6 years)

CE1 = *cours élémentaire 1* France ‘elementary course’ (7 years)

CM2 = *cours moyen 2* France ‘medium course’ (11 years)

Univariate analyses by verb type, all  $p > .1$

## Appendix C

*Example of image used during the procedure (for cacher ‘to hide’).*



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