

# LINGUISTIC FACTORS AND INVENTED SPELLING IN CHILDREN

The case of French beginners in Canada

MARIE-FRANCE MORIN

*Université de Sherbrooke*

**Abstract:** Most studies in the field of first writing experiences in kindergarten have focused on the behaviour of young English-language writers (Treiman & Bourassa, 2000). By considering increasingly acknowledged linguistic factors in spelling development (Seymour, Aro & Erskine, 2003), the present study seeks to contribute to existing studies of young French-language children in Europe by examining the case of young French-Canadian writers (North America). Drawing on 202 kindergarten children, this study seeks to provide a better understanding of the impact of linguistic characteristics on the production of graphemes in an invented spelling task involving the writing of six words. Firstly, it analyzes the “word” effect on the participants’ capacity to produce the appropriate graphemes to represent the phonological information of words (exhaustiveness of the graphemes). Secondly, there is an analysis of unconventional graphemes in order to identify the causes of the deviation from the expected norm. Generally speaking, the findings support the relevance of taking into account the particularities of written French in the spelling development of young French-language children as well as the constructivist view that deviations from the norm are often indicative of difficulties arising from the nature of the writing system to be learned.

**Keywords:** spelling development; invented spelling; kindergarten; French language; linguistic factors; error analysis.

173

*Morin, M.F.- (2007). Linguistic factors and invented spelling in children: The case of French beginners in children.*

*L1 – Educational Studies in Language and Literature*, 7(3), p. 173-189.

© *International Association for the Improvement of Mother Tongue Education*

Correspondence to Marie-France Morin, *Département d’études sur l’Adaptation scolaire et sociale (Department of Special Education), Faculty of Education University of Sherbrooke, 2500, boul. De l’Université, Sherbrooke, Québec J1K 2R1. Email: marie-france.morin@usherbrooke.ca*

**Chinese**

[Translated by Shek Kam Tse]

論文摘要：很多關於幼稚園內初次寫作經驗的研究，主要集中在幼兒英語作者的行為表現 (Treiman & Bourassa, 2000)。語言學因素對拼寫的發展漸受公認 (Seymour, Aro & Erskine, 2003)，本文希望在現時研究歐洲法語幼兒的基礎上，加入加拿大法語幼兒作者（北美洲）的研究資料。本研究的對象是 202 名幼稚園學生。研究員通過一個自創拼寫的活動，要求幼兒寫下六個詞語，從而深入探討語言學元素對產生標音的字母的影響。首先，研究會分析「詞語」效應怎樣影響參與者產生適當標音字母的能力，這可說明詞語的語音資料（表示音素的字母的耗損）。其次，我們還會分析非常規的標音字母，從預期基準中把造成誤差的原因分辨出來。整體而言，研究結果顯示：法語幼兒的法文拼寫發展，和建構觀點造成的由基準中分辨出來的誤差，兩者都可證明與兒童學習寫作系統的本質時遇到的困難有關係。

關鍵詞：拼寫發展、自創拼寫、幼稚園、法語、語言學因素、錯誤分析

**Dutch**

[Translated by Tanja Janssen]

Het meeste onderzoek naar de eerste schrijfervaringen in de kleuterschool is gericht op het gedrag van jonge Engelstalige leerlingen (Treiman & Bourassa, 2000). Deze studie wil een bijdrage leveren aan bestaand onderzoek onder jonge Franstalige kinderen in Europa, door jonge Frans-Canadese schrijvers (in Noord-Amerika) te onderzoeken. Het richt zich daarbij op taalkundige factoren in de ontwikkeling van de spelling (Seymour, Aro & Erskine, 2003). Aan het onderzoek namen 202 kleuters deel. Doel was meer inzicht te krijgen in de invloed van taalkundige kenmerken op de productie van grafemen. De taak betrof het schrijven van zes woorden. Eerst werd het effect van “woord” onderzocht op het vermogen van kinderen om de juiste grafemen te produceren, grafemen die de fonologische informatie van woorden weergeven (uitputtendheid van grafemen). Vervolgens werden onconventionele grafemen geanalyseerd, om oorzaken van afwijkingen van de verwachte norm te achterhalen. De resultaten bevestigen over het algemeen dat het belangrijk is om de bijzonderheden van geschreven Frans in de spellingontwikkeling van jonge Franstalige kinderen in aanmerking te nemen. Ook bevestigen ze de constructivistische visie dat afwijkingen van de norm vaak een indicatie zijn van moeilijkheden die voortkomen uit de aard van het schriftelijke systeem dat geleerd moet worden.

**French**

Résumé [Translated by Laurence Pasa]

Dans le domaine d'études qui s'intéresse aux premières tentatives d'écriture en maternelle, une majorité de chercheurs ont étudié les comportements de jeunes scripteurs anglophones (Treiman & Bourassa, 2000). En tenant compte de l'influence des facteurs linguistiques de plus en plus admise pour le développement orthographique (Seymour, Aro & Erskine, 2003), la présente étude se veut une contribution aux recherches déjà menées auprès de jeunes francophones en Europe, en étudiant le cas de jeunes scripteurs francophones canadiens (Amérique du Nord). Cette étude, menée auprès de 202 élèves de maternelle, vise à mieux comprendre l'impact de caractéristiques linguistiques sur la production de phonogrammes dans une épreuve d'écriture inventée comportant l'écriture de six mots. Une analyse est d'abord réalisée afin de vérifier l'effet « mot » sur la plus ou moins grande capacité des participants à produire les phonogrammes attendus (exhaustivité des phonogrammes). De plus, une analyse des phonogrammes non conventionnels est menée afin de dégager les causes expliquant les écarts à la norme. Globalement, les résultats obtenus appuient, d'une part, la pertinence de tenir compte des particularités du français écrit dans le développement orthographique des jeunes francophones et, d'autre part, la vision constructiviste selon laquelle les écarts à la norme sont souvent le reflet de difficultés engendrées par la nature du système écrit à apprendre.

Mots-clés : développement orthographique; écriture inventée; école maternelle; système d'écriture français; facteurs linguistiques; analyse d'erreurs

**German**

Zusammenfassung [Translated by Irene Pieper]

Die meisten Studien im Bereich früher Schreiberfahrungen beziehen sich auf das Verhalten junger englisch-sprachiger Schreiber (Treiman & Bourassa, 2000). Mehr und mehr finden aber linguistische Faktoren im Schriftspracherwerb Beachtung (Seymour, Aro & Erskine, 2003). Die vorliegende Studie zu

jungen frankophonen kanadischen SchreiberInnen (Nord-Amerika) möchte vorhandene Untersuchungen über französisch-sprachige Kinder in Europa ergänzen. Ziel unserer Untersuchung ist es, ein besseres Verständnis der Bedeutung linguistischer Faktoren bei der Graphemproduktion zu erreichen, und zwar mithilfe einer Gruppe von 202 Kindergarten-Kindern, die eine Aufgabe zur Spontanschreibung einschließlich des Schreibens von sechs Wörtern bearbeiteten. Erstens wird der Wort-Effekt in seiner Wirkung auf die Fähigkeiten der Teilnehmer, Grapheme, die die phonologische Information der Wörter repräsentieren, zu verschriften, analysiert (exhaustiveness of the graphemes). Zweitens werden unkonventionelle Grapheme analysiert, um Gründe für die Abweichung von der Erwartungsnorm zu finden. Allgemein gesagt zeigen die Ergebnisse, wie wichtig es ist, Eigenheiten des geschriebenen Französischen im Schriftspracherwerb junger frankophoner Kinder zu berücksichtigen. Unterstützung findet auch die konstruktivistische Position, wonach Abweichungen von der Norm oft auf Schwierigkeiten hinweisen, die in der Natur des Schriftsystems begründet liegen, das es zu erwerben gilt.

### Greek

Metafrase [Translated by Panatoya Papoulia Tzelepi]

Οι περισσότερες μελέτες στα παιδιά των πρώτων εμπειριών γραφής στο Νηπιαγωγείο έχουν επικεντρωθεί στις συμπεριφορές αγγλόφωνων παιδιών (Treiman & Bourassa, 2000). Αναγνωρίζοντας όλο και περισσότερο το γλωσσολογικό παράγοντα στην ανάπτυξη ορθογραφημένης γραφής (Seymour, Aro & Erskine, 2003) η παρούσα έρευνα επιζητεί να συμβάλει στις υπάρχουσες μελέτες για Γαλλόφωνα παιδιά στην Ευρώπη εξετάζοντας την περίπτωση Γάλλο-Καναδών γραφέων της Βόρειας Αμερικής. Στηριζόμενη σε δεδομένα 202 παιδιών Νηπιαγωγείου η παρούσα έρευνα επιζητεί να επιτύχει μια πληρέστερη κατανόηση της επίδρασης των γλωσσολογικών χαρακτηριστικών στην παραγωγή γραφημάτων σε ένα έργο επινοημένης γραφής έξι λέξεων. Πρώτα αναλύει την επίδραση της «λέξης» στην ικανότητα των παιδιών να παράγουν τα κατάλληλα γράμματα ώστε να αντιπροσωπευτούν οι φυσιολογικές πληροφορίες των λέξεων (εξάντληση των γραφημάτων).

Δεύτερον υπάρχει η ανάλυση των μη συμβατών γραφημάτων για να ανακαλυφθούν οι αιτίες της παραβίασης του αναμενόμενου τύπου. Γενικά, τα ευρήματα υποστηρίζουν το σκεπτικό να λαμβάνει κανείς υπόψη τις ιδιαιτερότητες της γραπτής Γαλλικής γλώσσας στην ανάπτυξη της ορθογραφημένης γραφής γαλλόφωνων παιδιών καθώς και την εποικοδομητική άποψη ότι αποκλίσεις από τη νόρμα πολλές φορές επιστημαίνουν τις δυσκολίες που προέρχονται από την φύση του προς μάθηση συστήματος γραφής.

### Polish

Streszczenie [Translated by Elżbieta Awramiuk]

Większość badań poświęconych pierwszym doświadczeniom w przedszkolnym pisaniu koncentrowała się na zachowaniu młodych anglojęzycznych piszących (Treiman & Bourassa, 2000). Odwołując się do coraz lepiej zdiagnozowanych czynników lingwistycznych w rozwoju umiejętności pisania (Seymour, Aro & Erskine, 2003), prezentowanym artykułem opisującym badania młodych francuskojęzycznych Kanadyjczyków (Północna Ameryka) pragniemy dołączyć do istniejących prac poświęconych francuskojęzycznym dzieciom w Europie. W niniejszej pracy, opierając się na badaniach 202 dzieci w wieku przedszkolnym, staramy się lepiej zrozumieć wpływ czynników lingwistycznych na produkcję grafemów w zadaniu polegającym na pisaniu przez dzieci sześciu wyrazów. Po pierwsze, analizujemy wpływ wyrazów na umiejętność wyboru przez uczestników eksperymentu poprawnych grafemów do reprezentacji informacji fonologicznej niesionej przez wyrazy. Po drugie, analizujemy grafemy niekonwencjonalne, aby zidentyfikować przyczyny odstępstw od normy. Ogólnie mówiąc, wyniki potwierdzają zarówno konieczność uwzględniania właściwości pisanej francuszczyzny w rozwoju umiejętności pisania przez francuskojęzyczne dzieci, jak i konstruktywistyczny pogląd, że odejścia od normy często świadczą o trudnościach wynikających z natury systemu pisma, którego dzieci się uczą.

Słowa-klucze: rozwój umiejętności pisania; pismo małych dzieci; przedszkole; język francuski; czynniki lingwistyczne; analiza błędów

### Portuguese

Resumo [Translated by Paulo Feytor Pinto]

A maior parte dos estudos sobre as primeiras experiências de produção escrita na educação pré-escolar tem-se centrado no comportamento de jovens escritores de língua inglesa (Treiman & Bourassa, 2000). Tendo em conta o crescente reconhecimento de factores linguísticos no desenvolvimento ortográfico (Seymour, Aro & Erskine, 2003), o presente estudo procura contribuir para o aprofundamento de estudos existentes sobre crianças francófonas, na Europa, a partir da análise do caso de crianças escritoras no

Canadá francófono (América do Norte). Levado a cabo junto de 202 crianças de jardins de infância, este estudo procura compreender melhor o impacto de características linguísticas na produção de grafemas, no contexto de um exercício ortográfico que envolvia a escrita de seis palavras. Em primeiro lugar, foi analisado o efeito da “palavra” na capacidade de os intervenientes produzirem os grafemas adequados à representação da informação fonológica das palavras (exaustividade dos grafemas). Em segundo lugar, é feita uma análise dos grafemas não convencionais tendo em vista identificar as causas dos desvios à norma esperada. Em termos gerais, os resultados apontam para a importância das particularidades da escrita em francês no desenvolvimento ortográfico das crianças francófonas e corroboram a perspectiva construtivista segundo a qual os desvios da norma são geralmente indicadores de dificuldades decorrentes da natureza do sistema de escrita que se aprende.

Palavras-chave: desenvolvimento ortográfico, ortografia inventada, jardim de infância, língua francesa, factores linguísticos, análise do erro.

## 1. RESEARCH PROBLEM

### 1.1 *Conceptions of spelling development*

By analyzing the errors made by young writers who have had no formal writing teaching, research on emergent spelling has shown that deviations from spelling norms are rarely accidental. Indeed, these deviations are viewed as indicative of the understanding constructed by writers at the time of its development (Read, 1986; Chomsky, 1971; Ferreiro & Teberosky, 1982). With a view to conceptualizing the various errors made by young writers, Ferreiro notes that writing development in children occurs through a series of ordered and successive stages of conceptual constructions (Ferreiro & Teberosky, 1982; Ferreiro, 2002). Based on a large study of Spanish-language subjects, this view of spelling development has had considerable impact among researchers who have conducted studies of young English-language children (Ehri, 1986; Frost, 2001) and young French-language children (Besse, 1990; Fijalkow & Fijalkow, 1993).

The developmental view is not favoured by all researchers, however. In the past few years, some researchers have taken a more global view of spelling development on the basis of an increasing number of observations that indicate that young writers draw on varied procedures and knowledge in spelling (Korkeamäki & Dreher, 2000; Rittle-Johnson & Siegler, 1999; Sénéchal, 2000). These observations led Treiman and Bourassa (2000) to argue that spelling development among children was more a matter of a change of degree than of a change in nature.

### 1.2 *The importance of the language to be learned*

Ideas about spelling development have recently been enriched by studies of the impact of the features of the language to be studied among children during the reading-writing acquisition period (Borzone de Manrique & Signorini, 1998; Bourassa & Treiman, 2001; Eme & Golder, 2005; Goswami, Gombert & Barrera, 1998; Seymour & al., 2003; Sprenger-Charolles, 2003).

The imposing study by Seymour & al. (2003) of 13 European orthographies demonstrated that written language learning was more difficult for students learning deep orthography (French, Danish, Portuguese and English) than for students learning shallow orthography (Finnish, German). Deeper orthographies present more

difficulties for learners because they have to learn not only the system of phoneme-grapheme correspondences (alphabetical principle), but also “orthographic inconsistencies and complexities, including multi-letter graphemes, context dependent rules, irregularities and morphological effects” (Seymour & al., 2003: 146). In addition to providing a better understanding of issues related to learning different orthographies, the findings by Seymour & al. (2003) also inform the debate surrounding models of spelling development. They suggest that learning a relatively shallow orthography involves the development of a single process focused only on the alphabetical principle whereas deeper orthographies entail the development of a dual foundation, involving the mobilization of phoneme-grapheme correspondences and word memorization (to provide a better understanding of irregular words, for example). As such, Seymour & al. (2003) argue for a certain flexibility in conceptions of spelling development and which are influenced by the characteristics of the language to be learned.

Whether researchers view spelling development in terms of successive development stages or in more global terms that take into account the language to be learned, all agree on the importance of grasping the alphabetical principal at the earliest encounters with written language and that this understanding is related to success in learning how to read and write (Dixon, Stuart & Masterson, 2002; Sprenger-Charolles, Siegel, Béchennec & Serniclaes, 2003; Vernon & Ferreiro, 1999).

### *1.3 Explanatory factors for errors in children's spellings*

In learning languages governed by an alphabetical principle, one of the foundations of spelling development is children's ability to identify the oral language's phonemes and to transcribe them by appropriate written signs. However, this development is not without challenges for deeper languages such as French and English,<sup>1</sup> which often have more than one graphic possibility for the same phoneme. In other words, the progression of young French speakers and young English speakers is linked to their evolving awareness that the way given words are written does not vary and that only one possibility is accepted. In their study of young writers, Block & Peskowitz (1990) illustrate well this challenge in learning a deep language:

“...it might be useful to conceptualize spelling learning as the reduction of a pool of possible alternatives. In other words, one learns a correct spelling by developing a strategy that eliminates incorrect alternatives and possible spellings. How well a spelling is learned could be characterized by the number of admissible spellings: the smaller the number, the better” (Block & Peskowitz, 1990: 160).

In order to gain a better understanding of deviations from the norm by young writers, some researchers have studied the complexity of the construction of orthographic knowledge by focusing on the behaviour of kindergarten-level writers (Bourassa & Treiman, 2001; Jaffré, 1992; Montésinos-Gelet, 1999).

In a study involving 30 participants throughout a kindergarten year, Jaffré (1992) analyzed children's spellings and comments in order to identify the proce-

<sup>1</sup> See the article by L. Pasa and M.F. Morin in this issue for a better understanding of the particularities of the French language.

dures that enable kindergarten children to write words even though they are unfamiliar with their spelling. Jaffré (1992) noted that different procedures could coexist at the moment of writing. With regard to the use of phoneme-grapheme knowledge in writing, Jaffré (1992) also noted certain difficulties among French-language children. Firstly, all the phonemes in the words' sound chain are not always present (absence of graphemic exhaustiveness). In addition, a significant number of children draw on the names of letters (letter-naming procedure) to identify certain oral segments and thereby find a written solution (e.g., *bébé*: BB, or *c'est*: c). This phenomenon is also observed among young English-language writers (Treiman & Bourassa, 2000). Jaffré (1992) also observed that certain unconventional graphemes in children's spellings can be linked to problems with pronunciation, to phonemic characteristics (voiced or unvoiced phonemes), or to letter confusion. Some difficulties can also be linked to the adjunction of phonemes through over-articulation or omission in a consonant group. Other difficulties can also be mentioned with regard to the particularities of the French language: e.g., complex graphemes and double letters. Lastly, Jaffré (1992) also identified distributional procedures which involve taking the writing context into account (e.g., *majice* vs. *magique*).

In line with these results, findings from a group word (24) spelling task administered to 228 first-grade children (Écalte, 1998) revealed that spelling performances were influenced by linguistic variables which had been controlled for (regularity of correspondences, syllabic structure and frequency). In this regard, this observation is consistent with findings by Montésinos-Gelet (1999) in a study of 390 kindergarten subjects which indicated that procedural variations observed in word and sentence writing tasks could be explained by certain linguistic variables. While familiarity with and the limited number of syllables in a word lead to the use of a phonological procedure, certain syllables or intra-syllabic units can lead more to the use of letter-naming procedures. The presence of complex graphemes and phoneme positioning are also factors which can have an incidence on the kind of procedures used. In her study, Montésinos-Gelet (1999) also noted that the adopted procedures evolved with the child's capacity for identifying phonemes from the words.

Although these studies shed specific light on the sources of difficulties involved in learning French, it needs to be pointed out that all these studies were conducted in a context specific to the school system in France. In this regard, some studies have drawn out the importance of considering the nature of the pedagogical environment at the moment when children begin to learn how to write (Pasa, Armand & Montésinos-Gelet, 2002). In this light, it is relevant to supplement studies conducted in France with other studies focused on the behaviour of French-language writers in other school settings, such as that of Quebec, Canada's majority French-language province.

#### 1.4 *The specificity of kindergarten in Quebec (Canada)*

Generally speaking, in Quebec, children only go to kindergarten in the year preceding grade one and it has only been since 1997-98 that attendance has been full time. This situation is quite different from the one prevailing in French-language countries

in Europe, where kindergarten is generally spread out over the three years preceding primary school. In addition to the difference in educational traditions distinguishing Quebec from other French-language countries, a recent study noted important differences in kindergarten educational orientations in Quebec and in France with regard to the literacy competencies developed (Pasa, Armand and Montésinos-Gelet, 2002). In Quebec, for example, activities designed in relation to formal writing teaching in kindergarten are much less widespread than in France, where teachers insist on the development of phonological awareness, on the link between the oral and the written, and on various writing practices.

With a view to contributing to studies of young writers of various maternal languages on the one hand (Treiman, 2000), and to studying the behaviour of young writers in different pedagogical contexts on the other, it is quite relevant to examine the behaviour of young French-language writers in Quebec, all the more so since few studies in this regard have been conducted with this population.

## 2. RESEARCH OBJECTIVES

The study presented here seeks to provide a better understanding of spelling development of French-language kindergarten pupils in Quebec (Canada). Firstly, and with a view to shedding light on the role of linguistic factors in spelling tasks (Écalte, 1998; Montésinos-Gelet, 1999), it assesses the impact of linguistic characteristics (word effect) on the number of graphemes produced (exhaustiveness of graphemes) in word writing. Secondly, it analyzes unconventional graphemes in order to shed light on the factors which might account for deviations from the expected norm. With a view to enhancing the analysis, the study seeks to verify whether the nature of the errors committed can be linked to various levels of spelling competence.

### 2.1 Methodology

This study was conducted with a sample of 202 French-language (mother tongue) children at the end of their kindergarten year (May-June). The sample consisted of 102 girls and 100 boys; the average age was six (6.0 years). These children were from a semi-urban area, of middle class socioeconomic status, and were distributed among four different schools (13 classes) in a region in the French-language province of Quebec (Canada).

#### 2.1.1 Invented spelling task

The subjects were met individually and given an invented spelling task. This task involved writing six words (*riz*, *ami*, *cerise*, *chapeau*, *éléphant* and *macaroni*).<sup>2</sup> The selected words took into account a certain number of characteristics (Catach, 1995):

---

<sup>2</sup> *Rice*, *friend*, *cherry*, *hat*, *elephant*, *macaroni*.

variable length (1, 2, 3 or 4 syllables), more or less frequent graphemes, morphological clues (the lexical information at the end of *éléphant* and *riz*).

This invented spelling task was administered using a semi-structured procedure (Besse, 1990) which allows the interviewer to adapt his or her questions to different writing behaviours while keeping the questions within a well-defined interview framework. Each of the words to be written was introduced by an illustration in order to avoid semantic confusion. Following each produced word, the writer was asked to explain some of the written characters. These explanations add depth to the analysis through the simultaneous consideration of what is written and the subject's comments about writing.

### 3. DATA ANALYSIS<sup>3</sup>

The data gathered during the invented spelling interviews were analyzed with a view to examining various aspects of the subjects' productions. As has been shown by previous studies of the development of spelling skills in French, young children must not only isolate the phonemes in the words to be written, but also learn the norms governing grapho-phonetic correspondences. As such, given that the present study focuses on spelling development among kindergarten children who progressively construct the relationships between voiced signs, phonemes, and the graphemes used to transcribe them, two criteria indicative of this progression are used (Montésinos-Gelet, 1999): graphemic exhaustiveness and graphemic conventionality.

- Graphemic exhaustiveness measures the subjects' ability to transcribe various extracted phonemes by means of written signs (graphemes). For example, subject A wrote MACARI for macaroni; he produced six of the eight expected graphemes for this word. Graphemic exhaustiveness seeks to account for the proportion of graphemes produced relative to all the graphemes to be produced for all the words, namely, 27. This score allows for an assessment of the child's ability to transcribe phonemes extracted from the sound chain of the words to be written.
- Graphemic conventionality measures the subject's ability to take into account the conventional nature of the produced graphemes. Given that one of the objectives of this study is to assess the place occupied by graphemes that deviate from the norm, it will identify unconventional signs, that is, graphemes that are phoneme carriers but that do not respect the rules for phoneme-grapheme transcription in French. To identify this kind of grapheme, the study considered both what was written and subject comments made during the interview. These comments often shed light on the spelling produced by the subjects. For example, for *éléphant*, which has five phoneme-transcribing graphemes (é, l, é, ph, an), subject D wrote *éléfa*. While the first four graphemes respect the rules for grapho-phonetic correspondences in French (all the graphemes produced are

---

<sup>3</sup> This research was funded by the FCAR (Fonds pour la formation de chercheurs et l'aide à la recherche) and the SSHRC (Social Sciences and Humanities Research Council of Canada).

plausible from the perspective of written French), the last grapheme is unconventional (the child said “I wrote a for the last sound I hear in elephant”).

#### 4. DISCUSSION OF THE FINDINGS

This section presents the findings from the invented spelling task. This task involved the production of 27 graphemes containing phonological information. The discussion begins with an examination of the exhaustiveness of these graphemes in light of the nature of the words to be written. This will be followed by an examination of the unconventional graphemes used by the children.

##### 4.1 Graphemic exhaustiveness

Before discussing the findings under this rubric for the six words to be written, it is important to sketch a global portrait of the sample for this criterion. The sample's subjects ( $N=202$ ) produced on average 26.33% of the expected graphemes (7.11 graphemes). There was, however, a significant standard deviation of 25.07. As Figure 1 shows, while a majority of the subjects ( $n=162$ ) produced at least one grapheme, 40 subjects did not produce any. The median value for this criterion is 5. This is to say that on average, the subjects in this sample produced a very small number of the expected graphemes, which suggests a limited awareness of phoneme-grapheme correspondence.

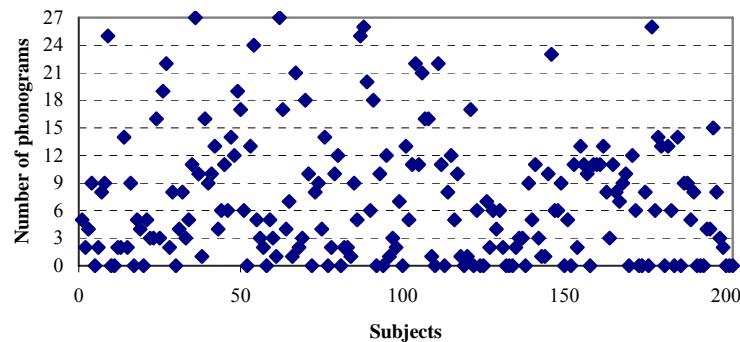


Figure 1. Distribution of performances for all the kindergarten subjects ( $N=202$ ) for the graphemic exhaustiveness criterion.

To gain further information about the subjects' real abilities in this regard, I examined the average exhaustiveness level for each word produced by considering only those subjects who produced at least one grapheme that translates phonological in-

formation for each word ( $n=162$ ). This examination led to the observation of a certain variation in subject performances, depending on the word in question. Figure 2 indicates that *ami* is the word for which there was the highest percentage of graphemes (63.59%), followed in descending order by *riz* (56.69%), *chapeau* (49.26%), *éléphant* (40.57%), *cerise* (40.15%) and *macaroni* (39.86%).

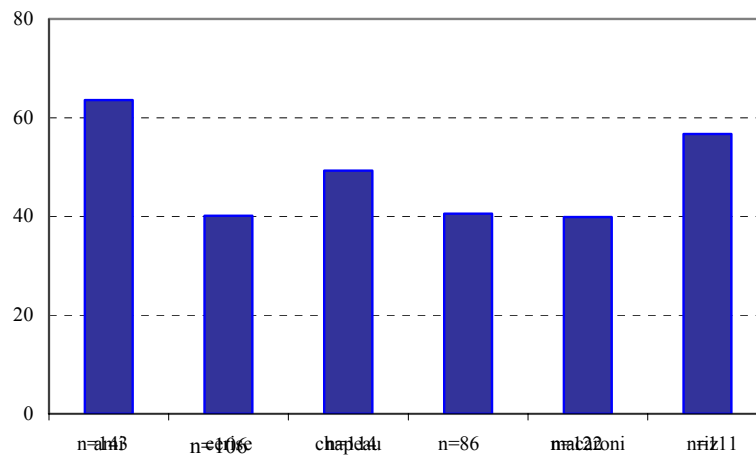


Figure 2. Average level of observed exhaustiveness for each word to be produced by the kindergarten subjects who produced at least one grapheme<sup>4</sup>.

Statistical analyses (ANOVA) reveal that the differences observed among the words from the perspective of graphemic exhaustiveness are significant ( $F=78.00$ ;  $df=5.728$ ;  $p<.0001$ ). In particular, *ami* significantly ( $p<.0001$ ) stands apart from the other words for this criterion. Next, on average, *riz* displays significantly lower exhaustiveness than *ami* ( $p<.0001$ ) and a significantly higher level of exhaustiveness ( $p<.0001$ ) than *cerise*, *chapeau*, *éléphant* and *macaroni*. Similarly, *chapeau* displays a significantly lower level of graphemic exhaustiveness than *ami* and *riz* ( $p<.0001$ ) and a significantly higher level than *éléphant*, *cerise* and *macaroni* ( $p<.0001$ ). Lastly, the words that display the lowest percentages for the graphemic exhaustiveness criterion (an average of 40.19% for the last three words) do not differ significantly from one another (between *éléphant* and *cerise*,  $p<0.7816$ ; between *cerise* and *macaroni*,  $p<0.8551$ ; between *éléphant* and *macaroni*,  $p<0.6412$ ).

These findings illustrate well a “word” effect on the subjects’ greater or lesser ability to produce the graphemes contained in the proposed words at the kindergar-

<sup>4</sup> Given that the subjects did not necessarily produce graphemes for all the words, the number of subjects considered for each word is provided in Figure 2.

ten level. We can note that words for which the subjects produced the greatest proportion of the expected graphemes (*ami*, *riz*, *chapeau*) are words which, for the most part, contain frequently-occurring graphemes in French (Catach, 1995). The majority of the phonemes contained in *ami*, *riz* and *chapeau* are stable from the perspective of the graphemes associated with them (6/8), and only two phonemes in these words ([i] and [o]) can be transcribed in more than one way ([i]= I and y; [o]= o, au, eau). With regard to syllabic structure, we can also observe that these words are relatively simple (in general CV) and are made up of one or two syllables. In contrast, the words for which the proportion of graphemes produced is lower (*cerise*, *éléphant* and *macaroni*) contain a higher proportion of phonemes (9/18) which can be transcribed by more than one grapheme ([s], [i], [z], [e], [f], [a], [k], [o]). We can also observe that the words for which a low level of graphemic exhaustiveness is observed are longer words containing three written syllables.

However, as has been noted in studies focused on invented spelling, the construction of spelling competence in French must be accompanied by the development of an awareness of orthographic norms (Block & Peskowitz, 1990). As such, and with a view to gaining a better understanding of the challenges facing young French-language writers, I now turn to an examination of the place occupied unconventional graphemes in the words and attempt to shed light on the causes of these deviations from the norm.

#### 4.2 The place of unconventional graphemes in invented spelling

Table 1. Breakdown of the subjects who produced graphemes (N=162) according to the number of unconventional graphemes produced for the entire word writing task

Nr. of unconventional graphemes	Number of subjects	Percentage (%)
0 phonogram	78	48.15
1 phonogram	44	27.16
2 phonograms	17	10.49
3 phonograms	16	9.88
4 phonograms	5	3.09
5 phonograms	2	1.23

Out of all the graphemes the subjects' produced on average (26.33%; 7.11 graphemes), only 10.82% are unconventional, which would indicate that out of the 7.11 produced graphemes, only one of them (0.77) is unconventional.<sup>5</sup>

<sup>5</sup> On the other hand, 11.32% of the graphemes produced by the children to represent phonemes are conventional (0.92 graphemes out of 7.11), which indicates that the produced graphemes, while respecting the rules of phoneme-grapheme correspondences in French, do not conform to the orthographic spelling of the words. Lastly, 77.79% of the produced graphemes are orthographic (5.41 phonograms out of 7.11) that respect the expected norm.

If we turn our attention to the subject breakdown according to the number of unconventional signs, Table 1 shows that of the 162 subjects who produced graphemes with phonological information, half of them used unconventional graphemes ( $n=84$ ; 51.85%), 44 of them used only one, and a very small percentage produced more than one

In order to develop the analysis, I now turn to an analysis of unconventional graphemes for each of the words produced.

#### 4.3 Type of grapheme produced for each word

The average percentages indicating the appearance of unconventional graphemes for each word are given in Figure 3 below. Repeated measures ANOVA analyses reveal a significant effect of words for the presence of unconventional signs ( $F=25.53$ ;  $df=5.515$ ;  $p<.0001$ ).

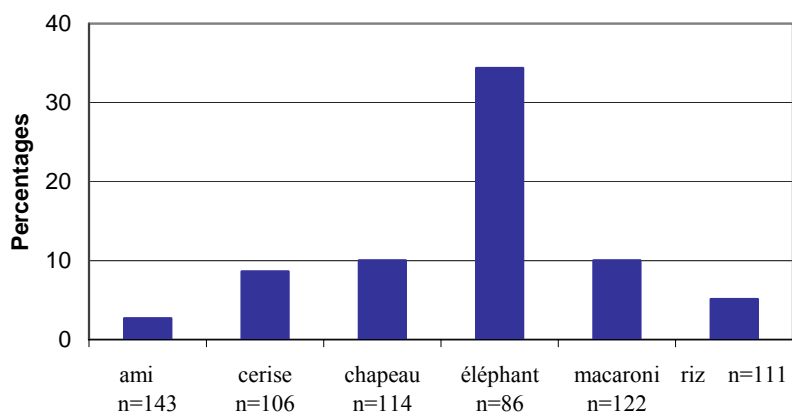


Figure 3. Breakdown of the number of unconventional graphemes (%) according to the words produced ( $n=162$ ).

More precisely, Figure 3 shows that *éléphant* stands out from the other words in that on average, it engendered a 34.28% rate of unconventional phonograms, that is, the highest for all the words to be produced. This difference, which sets *éléphant* apart with regard to the presence of unconventional graphemes, is statistically significant ( $p<.0001$ ). In contrast, *ami* significantly differs from *cerise* ( $p<.05$ ), *macaroni* ( $p<.001$ ), *chapeau* ( $p<.001$ ) and *éléphant* ( $p<.0001$ ) in terms of its low proportion of unconventional graphemes. There is no significant difference between *ami* and *riz* with regard to the presence of this kind of written sign.

In addition to indicating a “word” effect on the grapheme exhaustiveness criterion, the foregoing results also indicate a “word” effect on the presence of uncon-

ventional graphemes. These findings are consistent with other studies of young French-language spellers (Écalte, 1998; Eme & Golder, 2005; Montésinos-Gelet, 1999) and with other studies in English (Bourassa & Treiman, 2000), in that they draw out the impact of the characteristics of the words to be produced on the degree of ease children have in producing certain words.

In order to supplement my study, I now turn to the causes of the presence of unconventional graphemes in the words produced by these kindergarten participants. With a view to exploring a hypothesis by Montésinos-Gelet (1999), I also seek to determine whether the subjects' level of writing competence is related to the nature of the errors made.

#### 4.4 Explaining deviations from the norm

A qualitative analysis (see Table 2) shows that the factors that can account for the presence of unconventional graphemes are similar to what has been observed in previous studies (Jaffré, 1992; Montésinos-Gelet, 1999). The main factors explaining unconventional graphemes are: use of letter-naming procedures; phonological distortions; graphic distortions; and the production of complex graphemes.

Table 2. Breakdown of the number of occurrences according to the linguistic causes of the presence of unconventional graphemes

Linguistic causes	Subject total	
	Number of occurrences	%
Letter-naming procedure	51	30.64
Phonological distortions	24	14.37
Graphic distortions	31	18.56
Complex grapheme processing	35	20.96
Other	26	15.57

A proportion of the errors made (51%) can be linked to the use of a procedure which involves the name of a letter. For example, subject E produced the letter L to mark the first two phonemes of *elephant*, and used the letter K to mark the two phonemes of the syllable [ka] in *macaroni*.

The presence of phonological distortions among the same subjects in the sample also indicates the considerable influence of spoken language on spelling by kindergarten children (Bourassa & Treiman, 2000; Jaffré, 1992),<sup>6</sup> in that certain pronunciation deviations in which the phonological proximity of two phonemes can lead to

<sup>6</sup> A recent study also showed that deviations from the norm can be caused by spoken language among older French-language pupils (mean age 10.0) with learning disabilities (Hoefflin & Franck, 2005).

deviations in the choice of graphemes. For example, some subjects chose the letter *e* instead of *o* to mark the vowel of third syllable in *macaroni*. Phonologically speaking, this confusion can be explained by noting the acoustic and articulatory similarities of the phonemes [ə] and [c]. Graphic distortions (18.56%) are related to the construction of an unclear representation of the form of letters, which can lead to confusing them with letters with similar characteristics. Difficulties engendered by the production of complex graphemes (20.96%) stem from a memory failure which leads to problems in the production of these graphemes.

These observations are consistent with those of other studies, and lead to the suggestion that the majority of deviations from the norm by young writers are not random occurrences (Jaffré, 1992; Montésinos-Gelet, 1999; Treiman & Bourassa, 2000) but attempts to manipulate language due to phonological processing of spelling.

With a view to refining the present analysis, Table 3 presents the error breakdown for two groups I created. The composition of these groups corresponds to different levels of spelling competence. More precisely, the first group is composed of "phonological spellers," that is, subjects who are able to transcribe some of the phonemes contained in the words to be produced, without, however, displaying any orthographic concerns (taking into account written morphology or memorized words). The second group is composed of "orthographic spellers," that is, children who are more advanced in their understanding of the writing system in that they display orthographic knowledge in addition to knowledge of how to mobilize their understanding of phoneme-grapheme correspondences. Orthographic spellers also display a statistically significant ( $p < .0001$ ) higher level of graphemic exhaustiveness (61.1%) than phonological spellers (23.54%).

Table 3. *Linguistic causes accounting for the presence of unconventional graphemes for both phonographic and orthographic writers*

Linguistic causes	Phonographic writers		Orthographic writers	
	Number of occurrences	%	Number of occurrences	%
Letter-naming procedure	45	33.33	6	18.75
Phonological distortions	21	15.56	3	9.38
Graphic distortions	22	16.3	9	28.13
Complex grapheme processing	24	17.78	11	34.38
Other	23	16.3	3	9.38

Table 3 indicates that the proportion of unconventional graphemes is higher among phonological spellers (11.6%) than orthographic spellers (6.77%) and that this difference is statistically significant ( $p < .05$ ).

With regard to the main linguistic causes that might account for the presence of unconventional graphemes, Table 3 indicates that they vary from one group to the

other. Phonological spellers often tend to introduce unconventional signs caused by reliance on a letter-naming procedure (33.33%) whereas orthographic spellers introduce more errors due to the processing of complex graphemes (34.38%). We can thus hypothesize that in the case of phonographic spellers, reliance on a letter-naming procedure is linked to a limited ability to segment spoken language, which translates into low levels of graphemic exhaustiveness (23.54%). In line with Treiman & Bourassa (2000), I suggest that reliance on a letter-naming procedure is indicative of a limited capacity for phonological analysis situated midway between the syllable and the phoneme. As such, the letter-naming procedure is a normal phenomenon in the spelling development of young children learning a deep orthography such as English or French.

In contrast, orthographic spellers, who display much higher levels of graphemic exhaustiveness, tend to make mistakes related to grapheme processing (e.g., *ph*, *an*, *eau*). It can be argued that these spellers draw on word representations which include more specifically orthographic information. This kind of procedure can also be the source of errors in the choice of graphemes and, as such, be indicative of a development process.

The comparison of the presence of unconventional graphemes in the sample's phonographic and orthographic spellers sheds new light on these graphemes. In this regard, my findings tend to show that the type of deviation from the norm is influenced by the kind of treatment favoured by the young children. The use of phonological procedures leads phonographic spellers to produce unconventional signs and is indicative of a failure to use these procedures properly. For their part, orthographic spellers appear to pay more attention to the orthographic structure of words, which engenders a reliance on memory processing which mobilizes orthographic representations of words. These procedures can, in turn, be a source of error for these spellers.

## 5. CONCLUSION

The results of the present study reveal significant differences in graphemic exhaustiveness and the use of unconventional graphemes according to the words to be produced. These findings, which were obtained with young French-language children in Quebec (Canada), are consistent with the findings of studies young children in France (Écalte, 1998; Jaffré, 1992; Montésinos-Gelet, 1999). According to these studies, the degree of difficulty experienced in spelling depends on the specific characteristics of a given language system. My findings show that the structural characteristics and regularity of graphemes are linguistic variables which have an incidence on spelling abilities in the early moments of learning. In comparison with learning other, more regular or transparent languages, for which a knowledge of phoneme-grapheme correspondences almost always gives access to orthographic graphemes (Borzone de Manrique & Signorini, 1998), learning French orthography requires a greater mastery of these correspondences. Consequently, it is relevant to support Seymour et al.'s (2003) view of spelling development, which takes into account of differences as a function of the writing system to be learned. In this regard,

other studies conducted with a larger population of French-language pupils are needed to support this hypothesis.

By examining the kinds of deviation from the norm, the present study seeks to show that the nature of these deviations varies according to the kind of treatment favoured by children. These findings as well as those from recent studies (Eme & Golder, 2005) justify that other studies be conducted with a view to providing a better understanding the first moments of spelling development and the learning difficulties appearing at later moments (Hoefflin & Franck, 2005).

From a pedagogical perspective, the present study makes a contribution to the literacy practices of kindergarten teachers and primary school teachers (Invernizzi & Hayes, 2004; Lombardino, Bedford, Fortier, Carter, & Brandi, 1997). More precisely, my findings provide support for a constructivist view of spelling development by demonstrating that writing that deviates from the norm can be an important source of information in understanding young spellers' writing knowledge. My results can also be useful in increasing teacher awareness of the influence of linguistic factors in the acquisition of an orthographic code, the French code in particular. More concretely, the study of young children's spelling combined with an awareness of the importance of linguistic factors will enable teachers to adopt different strategies and to adapt themselves to children's different levels of understanding, and thereby be of help in ensuring success in the shift from spoken to written language.

## REFERENCES

- Besse, J. M. (1990). L'enfant et la construction de la langue écrite [Children and the construction of written language]. *Revue Française de Pédagogie*, 90, 17-22.
- Block, K. K., & Peskowitz, N. B. (1990). Metacognition in spelling: Using writing and reading to self-check spellings. *The Elementary School Journal*, 91(2), 151-164.
- Borzone de Manrique, A.M., & Signorini, A. (1998). Emergent writing forms in Spanish. *Reading and Writing: An interdisciplinary Journal*, 10(6), 499-517.
- Bourassa, D.C., & Treiman, R. (2001). Spelling development and disability: the importance of linguistic factors. *Language, Speech, and hearing Services in Schools*, 32, 172-181.
- Chomsky, C. (1971). Write first, read later. *Childhood Education*, 47, 296-300.
- Dixon, M., Stuart, M., & Masterson, J. (2002). The relationship between phonological awareness and the development of orthographic representations. *Reading and Writing: An Interdisciplinary Journal*, 15, 295-316.
- Écalte, J. (1998). *L'acquisition de l'orthographe lexicale* [Acquiring lexical orthography]. *Glossa*, 62, 28-35.
- Ehri, L. C. (1986). Sources of difficulty in learning to spell and read. In M. L. Wolraich & D. Routh (Eds.), *Advances in developmental and behavioral pediatrics*: Vol. 7. (pp. 121-195). Greenwich: JAI Press.
- Eme, E., & Golder, C. (2005). Word-reading and word-spelling styles of French beginners: Do all children learn to read and spell in the same way? *Reading and Writing*, 18, 157-188.
- Ferreiro, É. (2002). *Culture écrite et éducation* [Written culture and education]. Paris: Éditions Retz.
- Ferreiro, E., & Teberosky, A. (1982). *Literacy before schooling*. Exeter, NH: Heinemann.
- Fijalkow, J., & Fijalkow, É. (1993). L'écriture provisoire des enfants au cycle des apprentissages: Étude génétique [Children's provisional writing in the learning cycle: a genetic study]. In G. Boudreau (Ed.), *Réussir dès l'entrée dans l'écrit* [Beginning literacy successfully] (pp. 103-134). Sherbrooke: Éditions du CRP.
- Frost, J. (2001). Phonemic awareness, spontaneous writing, and reading and spelling development from a preventive perspective. *Reading and Writing*, 14(5-6), 487-513.

- Goswami, U., Gombert, J.E., & Barrera, L.F. (1998). Children's orthographic representations and linguistic transparency: Nonsense word reading in English, French, and Spanish. *Applied Psycholinguistic*, 19, 19-52.
- Hoefflin, G., & Franck, J. (2005). Development of spelling skills in children with and without learning disabilities. *L1-Educational Studies in Language and literature*, 5, 175-192.
- Invernizzi, M., & Hayes, L. (2004). Developmental-spelling research: A systematic imperative. *Reading Research Quarterly*, 39(2), 216-228.
- Jaffré, J. P. (1992). Le traitement élémentaire de l'orthographe: les procédures graphiques [Elementary treatment of orthography: graphic procedures]. *Langue Française*, 95, 27-48.
- Korkeamäki, R. L., & Dreher, M. J. (2000). Finnish kindergartners' literacy development in contextualized literacy episodes: A focus on spelling. *Journal of Literacy Research*, 32(3), 349-393.
- Lombardino, L. J., Bedford, T., Fortier, C., Carter, J., & Brandi, J. (1997). Invented spelling: Developmental patterns in kindergarten children and guidelines for early literacy. *Language, Speech, and Hearing Services in Schools*, 11, 333-343.
- Montésinos-Gelet, I. (1999). *Les variations procédurales au cours du développement de la dimension phonogrammique du français: recherche auprès d'enfants scolarisés en grande section maternelle en France* [Procedural variations during the development of the phonogramic aspect of French: A study of kindergarten educated children in France]. Unpublished doctoral thesis, Université Lumière Lyon 2.
- Pasa, L., Armand, F., & Montésinos-Gelet, I. (2002). The didactic conditions of emergent literacy: A comparative study of curricula and teaching tools in France and Quebec. *L1 - Educational Studies in Language and Literature*, 2, 271-296.
- Read, C. (1986). *Children's Creative Spelling*. London: Routledge and Kegan Paul.
- Rittle-Johnson, B., & Siegler, R.S. (1999). Learning to spell: Variability, choice, and change in children's strategy use. *Child Development*, 70(2), 332-348.
- Sénéchal, M. (2000). Morphological effects in children's spelling of French words. *Canadian Journal of Experimental Psychology*, 54(2), pp. 76-85.
- Seymour, P.H.K., Aro, M., & Erskine, J.N. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, 94, 143-174.
- Sprenger-Charolles, L. (2003). Linguistic processes in reading and spelling: The case of alphabetic writing systems: English, French, German and Spanish. In T. Nunes and P. Bryant (Eds.), *Handbook of children's literacy* (pp.43-65). Dordrecht: Kluwer Academic Publishers.
- Sprenger-Charolles, L., Siegel, L., Béchennec, D., & Serniclaes, W. (2003). Development of Phonological and Orthographic Processing in Reading Aloud, in Silent Reading and in Spelling: A Four Year Longitudinal Study. *Journal of Experimental Child Psychology*, 84, 194-217.
- Treiman, R. (2000). *The foundation of literacy*. *Current Directions in Psychological Science*, 9, 89-92.
- Treiman, R., & Bourassa, D. (2000). Children's written and oral spelling. *Applied Psycholinguistics*, 21, 183-204.
- Treiman, R., & Cassar, M. (1997). Spelling acquisition in English. In C.A. Perfetti, L. Rieben, & M. Fayol (Eds.), *Learning to spell: Research, theory, and practice across languages* (pp. 61-80). Hillsdale, NJ: Erlbaum.
- Varnhagen, C. K., McCallum, M., & Burstow, M. (1997). Is children's spelling naturally stage-like? *Reading and writing: an interdisciplinary journal*, 9, 451-481.
- Vernon, S.A., & Ferreiro, É. (1999). Writing development: A neglected variable in the consideration of phonological awareness. *Harvard Educational Review*, 69(4), 395-415.