Syntactic markers in spelling

1. Introduction

Syntactic markers appear in orthographic writing in cases where the spelling of a word depends on the syntactic role it has in the context to be written. I will use the term 'syntactic spellings' interchangeably. The contrasting term would be 'lexical spellings'. Acquiring syntactic spellings is a major difficulty for children learning to write. In my presentation, I will deal with two main questions: First, are there common features shared cross-linguistically by syntactic spellings? And second, what makes it so hard to acquire syntactic spellings?

2. Syntactic spellings in various orthographies

Table 1 gives an overview over syntactic spellings in three languages.

Tab. 1: Syntactic spellings in three orthographies.

German	*French*	*English*
capitalization of syntactic nouns *sie sieht das Schwimmen* vs. *sie sieht das schwimmen*	accord dans le groupe nominal / accord dans la proposition (*la maison) grise* vs. (*les maisons) grises* (*il) parle* vs. (*ils) parlent*	possessive construction (*the) teacher's* vs. (*the) teachers'*
(*ich) küsste* vs. (*die) Küste* (*sie) jagt* vs. (*die) Jagd*	(*je) cours* vs. (*tout) court*	(*she) relaxed* vs. (*the) next, (*she) sighs* vs. (*the) size*
dass vs. *das*	*se* vs. *ce*	*which* vs. *witch*
totschlagen vs. *todmüde*	*aimant* vs. *vraiment*	
zusehends vs. *unversehens*	*quand* vs. *quant*	*quiet* vs. *quite, of* vs. *off*

The table starts with the clearest and most prominent instances of syntactic spellings (see first row). In these cases, it is obvious that one has to make an orthographic choice which depends on the syntactic context. Note that this applies to the capitalization of nouns in German no less than to the marking of agreement in French and of the possessive construction in English. Whether a linguistic unit has to be capitalized depends on its contextual role, not on its lexical features. For instance, *schwimmen* has to be capitalized when it figures as a noun in the context given though the word as such is a verb. That is, capitalization in German applies to syntactic nouns, not to lexical nouns.

When one passes through the rest of the table, one may wonder why the phenomena it lists have been classified as syntactic spellings. One might even question whether they share any common feature. These phenomena appear to be assembled at random, without following a principled procedure.

Let us start by looking at the second row. It contrasts inflected verbal forms to non-inflected, non-verbal word forms. The inflected forms show, in all cases, a regular pattern. This also transfers to their spellings. If there are any contingencies, they result from the existence of the non-verbal forms. They seem to, as it were, haphazardly cross the path of the verbal forms. In other words, the inflected forms in the second line are spelled quite consistently. It is just their contrast with the non-inflected forms which appears to be coincidental.

Some degree of consistency may be found in the third row too. The German subordinating conjunction *dass* is always spelled with a double <ss> whereas the pronoun *das*, though homophone, is spelled with a single <s>. In English, interrogative pronouns starting with consonantal approximants are spelled with an initial <wh> without regard to how they are pronounced (see *which, when, where* as compared to *who*). However, consistency, in these cases, does not mean generality in the sense that a regularity is implied which extends beyond the specific words at stake. There are several cases in German where the conjunction use of a unit alternates with a non-conjunction use (e.g., *während* which may function as a conjunction or as a preposition). Why, then, doesn't the spelling differ in the conjunction use and the non-conjunction use? In English, the interrogative pronoun *whether* is spelled with <wh> as one should expect based on the table. However, this pronoun may be replaced by *if* (i.e. *I wonder whether you will be there* may be rendered as *I wonder if you will be there*). There is no 'syntactic' spelling for this type of interrogative *if* as opposed to the conjunction *if*.

In the fourth row one finds spellings which indicate a grammatical feature of the unit to be written. The complex German words *totschlagen* and *todmüde* both contain the morpheme [tot]. This morpheme is written as <tot> if the whole word is a verb (*totschlagen, totschießen, totlachen …*) whereas it is written as <tod> if the whole word is an adjective (*todmüde, todernst, todschick …*). In French, the ending [ã] is spelled <ant> in present participles (*aimant*) but <ent> when it is part of the adverbial affix [mã] (*vraiment*). Both spellings are fairly consistent. However, one cannot say that they indicate the unit's syntactic role. For the marker is always the same, without regard to the context given. In the case of *totschlagen* one has to write <tot> even if the unit appears as a past participle which, in the context given, actually functions as an adjective (*die totgeschlagene Fliege*). The unit *aimant* retains its participial ending even if the word functions, in the context at stake, as a noun. As seen through this lens, one might conclude that these spellings are lexical ones.

There are, however, some features which indirectly connect them to syntactic spellings. When discussing these features, I will simultaneously thematize the fifth row which contains spellings whose syntactic status is even more dubious.

In sum, evaluation of the table suggests the hypothesis that syntactic markers are used consistently in a writing system in cases where spellings relate to the occurrence of inflectional markers.[1] Indeed, when one would amplify the table by cases of syntactic spellings reported to exist other languages (see, e.g., Notenboom & Reitsma 2007 for Dutch; Juul 2005 for Danish; Chliounaki & Bryant 2002 for Greek), the first two rows fill. These are the rows where the occurrence of inflection goes hand in hand with consistent syntactic spellings.

3.   **Student performances in syntactic spelling**

As for the study of student performance in syntactic spelling, one can make a distinction between naturalistic studies and laboratory studies. It refers to whether spelling errors are evaluated in 'authentic' texts, or whether the materials used to test syntactic spelling have been artificially constructed (e.g., by using pseudo-words). In some laboratory studies, the writing conditions have been experimentally controlled additionally (e.g., by giving writers a secondary task). Though the distinction is not always clear-cut, it is important. Evidently, error rates found in syntactic spelling will vary depending on how many opportunities to err the writing task carries with it. What, then, is the true

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[1] This may, in the cases listed in the first two rows of the table, be said to be true on condition that capitalization in German actually results from the occurrence of inflection. Is this condition met? Indeed it is, because this is precisely what the main criterion of capitalization in German states. According to this criterion, a unit functions as a syntactic noun if it may be accompanied by an inflected adjective. This is true without regard of the lexical category of the unit. For instance, the verb *schwimmen*, when it appears in the context *Das Schwimmen im Teich ist verboten*, has to be capitalized. For if one adds an adjective, say *unbewacht*, the adjective will appear in an inflected form (*Das unbewachte Schwimmen im Teich ist verboten*). In such cases, the inflection of the adjective mirrors the fact that the noun itself is, in principle, subject to inflection though it may not bear an overt inflection marker (Funke 2017).

error rate? Answering this question would boil down to determining what is the 'representative' text in a given language. If one would try to do so, one would get involved in a futile enterprise. Given this, I will focus on naturalistic studies and amplify what they found by laboratory studies on a case-by-case basis. I will focus on secondary school students and consider three aspects of performance in syntactic spelling: difficulty, interindividual variablility, and error types.

3.1 Difficulty

In the literature, syntactic spelling performance is quantified by various measures (e.g., mean error scores, mean error rates, estimated difficulty parameters). I will draw on the proportion of students who reach faultless performance.

As for French agreement markers, Manesse & Cogis (2007) found that less than half of the grade 7 students surveyed reached a perfect score in a short dictation comprising five sentences. In their grade 8 sample, this ratio was 62%. However, in a study by Gunnarsson & Largy (2010) where student compositions were evaluated, only 36 % of the grade 8 participants reached a perfect score. Totereau et al (2013), in a dictation administered to grade 6 students found that 40% of them marked all noun inflections correctly but only 17% did so in adjective inflections.

As for German capitalization, Schreinert (1983), in an evaluation of compositions written by grade 5-9 students, found that at no grade level the ratio of students who reached faultless performance exceeded 50%. Notably, this ratio did not increase across grade levels. In studies by Funke & Sieger (2012) and Funke et al. (2013), the ratio of grade 5-7 students who did not feature any capitalization error in a 20-item dictation task was consistently below 30%.

I have not been able to find comparables for the use of the English apostrophe, however Hokansson & Kemp (2013) report that even in a sample of undergraduate university students, performance in marking the possessive construction was "imperfect" (p. 241). In a sample of Dutch university students studied by Bosman (2005), only 13% of the participants reached a perfect score in a 72-item dictation task in the spelling of verb inflections.

In sum, it is hard to precisely quantify the difficulty of syntactic spellings. However, it seems that the majority of secondary school students do not reliably master these spellings across languages. This contrasts with the fact that in their oral speech, errors which would be equivalent to syntactic spelling errors are nearly absent.

3.2 Interindividual variablility

An observation which has been repeatedly made in German naturalistic studies is that the number of capitalization errors features a great degree of interpersonal dispersion in students' writing. In an older large-scale study with grade 5-6 students, students in the lowest quintile (lowest 20%) were found to produce 84% of all capitalization errors in the sample (Riehme & Zimmermann 1986; Zimmermann & Heckel 1986). This means that the performance distribution features what is called a 'fat tail' at the lower end of the performance spectrum, i.e. an overrepresentation of extremely low scores. The same tendency prevails in lexical spelling (Plickat 1970), however it seems to be less pronounced (Schreinert 1983). In the data of Manesse & Cogis (2007), a 'fat tail' at the lower end of the performance distribution for the spelling of French agreement markers in grades 5-9 can also be observed.

A revealing finding is reported in an Australian laboratory study by Mitchell et al. (2009). The authors had young adults write English pseudo-words to dictation which feature a final fricative consonant ([s] or [z]). The consonant may, or may not, stand for an inflection morpheme. In the former case, the consonant has to be spelled <s>, in the latter case, it has to be spelled otherwise, e.g. <se> or <ze>. The error distribution was found to be bimodal, and the authors were able to demonstrate that this resulted from two distributions being superimposed, one for participants without higher secondary education, the other one for participants with higher secondary education. This suggests that if one controls for lexical factors, a high interindividual variability in syntactic spelling will emerge. This rais-

es the question whether writers follow qualitatively different routes when they decide about using a syntactic marker or not.

3.3 Error types

In syntactic spelling, two types of error may occur: misses (i.e. not using a marker though it should be used) and false alarms (i.e. using a marker though it should not be used). In general, studies have found misses to be more frequent than false alarms. This is true for agreement markers in French (Gunnarsson & Largy 2010, Manesse & Cogis 2007, Thévenin et al. 1999) as well as for the apostrophe in English possessives (Hokansson & Kemp 2013) and for capitalization in German (Ruhfus 1980, Schübel & Pießnack 2005, Scheele 2006). One should, however, be cautious not to draw the conclusion that this is due to a specifically syntactic difficulty. In the cases described above, leaving out the marker simply results if one follows a phonographic maxim, choosing the most frequent phonographic representation of the sounds to be written. The crucial case occurs when using a syntactic marker and not using it are both plausible candidates from a phonographic view. This case is given in the English past tense marker <ed> as opposed to <t>. Nunes et al. (1997a) found that in early stages of writing development, false alarms (which they called 'overgeneralizations' according to their theoretical views) occur quite often for this syntactic marker.

In sum, syntactic spellings may be shown to be difficult across languages. Error scores seem to display great interindividual variation. The most frequent type or error consists of replacing a syntactic spelling by a phonographic one.

4. Conceptual issues

4.1 What is syntactic spelling?

Thus far, I have taken syntactic spelling to be a clear-cut phenomenon. If, however, one gets oneself more deeply into definitional issues, it turns out that some questions are left open. Syntactic spellings are defined as being conditioned by syntactic contexts (see Juul 2002). So, anybody would agree that the contrast of (*il) parle* vs. (*ils) parlent* in French involves a syntactic spelling because whether you choose the form *parle* or *parlent* depends on the context. What about the same contrast as it appears in the *passé simple*, that is in (*il) parla* vs. (*ils) parlèrent*? Which verbal form you choose here is conditioned by the syntactic context no less. The only difference is that in the former case, both forms are homophones whereas in the latter case they are not. Should one include the latter case under the heading of 'syntactic spellings'? According to the definition, one should. This, however, leads into delimitation problems because, to some degree, any word requires that some syntactic conditions are met when it occurs in a sentence.

I will not go further into definitional issues here, but I would like to point out that they are related to the question whether syntactic spelling is the same phenomenon cross-linguistically. English and French share the feature that syntactic markers generally represent morphemes (e.g., *-e* vs. *-ent* in French and *-s'* vs *-'s* in English). As to this, German stands alone because the capitalization of nouns does not mark a morpheme but the occurrence of a syntactic category. It turns out that this difference impacts on how one conceptualizes syntactic markers theoretically. In Anglophone research, there is the tendency to equate syntactic markers to written inflectional markers and thus to subsume them under morphological markers in general (see, e.g., Nunes & Bryant 2009). This, of course, fits with what is found in English orthography, and it might seem to transfer to French. The theoretical question, however, is, what one understands by 'inflection'. A recent study by Kemp et al. (2017) illustrates the issue. The authors had adults spell inflected and uninflected verbal pseudo-word forms which had been constructed in parallel to the real-word examples in Figure 1.

Figure 1. Examples to illustrate the target words used in the Kemp et al. (2017) study.

(she) sees		
		(it's going to) cease
	(we) seize	
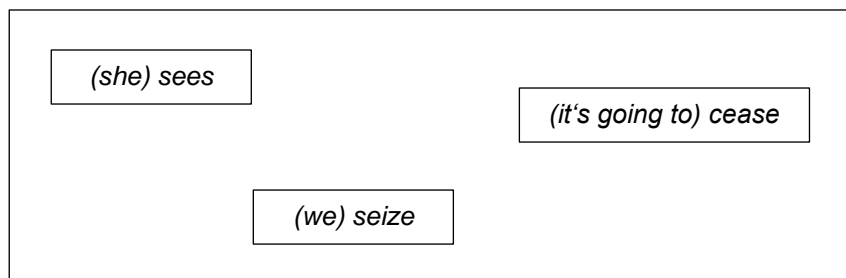
From the description Kemp et al. give of their materials, one can see that they classified forms such as *(she) sees* as inflected but forms such as *(we) seize* and *(it's going to) cease* as uninflected. The reason is that only in the first form the verb bears an inflectional morpheme. This is what one might call the morphological view of syntactic markers. One could, however, argue that the forms *(she) sees* and *(we) seize* go together because the verb is, in both cases, related to a subject in the same way whereas in *(it's going to) cease* the verb has no syntactic subject. This is what may be called the configurational view of syntactic markers. The English orthography suggests a morphological view of syntactic markers; the German capitalization, to the contrary, only reconciles with a configurational view.

4.2   How get writers alerted to the necessity to use a syntactic marker?

In a configurational view, it is not the presence or absence of morphemes which warrants syntactic marking but the fact that a specific syntactic configuration is given. When one accepts this premise, one can nevertheless adhere to different ideas about how writers detect that a syntactic configuration is given. One idea would be that the occurrence of a syntactic configuration as such may prompt writers to consider using a syntactic marker. This idea is based on the observation that when a syntactic configuration occurs, this may prime people to adopt it in their own speech or to expect its occurrence in the subsequent context (Bock 1986; Pickering & Branigan 1998; Branigan, Pickering & Cleland 1999). Thus, the occurrence of the configuration generates a disposition in the writer which may function like a cue to its presence. As a consequence, it may induce her or him to consider using a syntactic marker. I will call such dispositions 'indexical data' because they are related causally to the occurrence of a syntactic configuration. Note that this term is just a mnemonic because dispositions are not data in the proper sense but rather may, on a case-by-case basis, give rise to the detection of true linguistic data. An alternative idea would be that writers, when processing sentences, rely on features of the linguistic form as it is represented in speech, such as morphemes and their sequencing. In this case, they must infer the syntactic configuration in a second step from what they found out about these features. According to this idea, the writer uses observations about linguistic form to derive the syntactic configuration from it. I will call such observations 'epistemic data'.

Whether one subscribes to the 'indexical data' or to the 'epistemic data' view is consequential for the idea one adheres to about how writers succeed in reliably observing syntactic spelling rules. I will try to substantiate this by discussing a model of processing French agreement markers advanced by Fayol (see Jaffré & Fayol 1999, Fayol 2014). Fayol's model refers to markers of subject-verb agreement. It is an expert-writer model focusing on adults who master the use of orthographic agreement markers. The model assumes that literate writers normally align the verb inflection with the number feature of the immediately preceding nominal phrase. This is rather safe because in French, the subject mostly precedes the finite verb. As long as this procedure leads to a semantically plausible reading, there is no reason to give the spelling a deeper consideration. Only when a semantic inconsistency arises, writers are led to check their spelling. In such cases, they consider the sentence's syntax to arrive at a decision.

I will not undertake to discuss this model here. My key point is that it is based on an epistemic view as it assumes that writers, even expert writers, normally do not access the subject-verb configuration

at all. They recover it, if any, in a second step based on an analysis of linguistic form. I will now sketch an alternative based on an indexical view. It assumes two steps in the processing of syntactic spellings.

- If a syntactic marker has to be used, the 'data' needed to realize it are, as a default, accessible to the writer. This is because the writer may, based on dispositions arousing spontaneously in her (him), act as if she (he) knew the syntactic configuration.
The syntactic spelling is, however, not immediately written down but is rather held in working memory for some time (*orthographic buffer*, see Kandel & Perret 2014). Only after a certain amount of text has been assembled in working memory, the spelling is written down.
- Maintaining a syntactic writing in working memory is an error-prone process. The reason is that the means which are normally employed to support working memory (mainly phonological rehearsal, Gathercole & Baddeley 1985) are suited to maintain data which represent information, i.e. epistemic data. The 'data' which are made accessible by the spontaneous arousal of dispositions, however, do not represent anything. These 'data' serve their purpose only as long as they causally induce the writer to select the proper spelling.
Given this, whether the correct syntactic spelling is eventually realized depends on the type of the backup processes used to maintain the working memory status. If these backup processes just rely on phonological rehearsal, the form to be written will, when it is written down, be available only as a phonemic unit. It does no longer involve a specific cue to the syntactic spelling. This means that the syntactic spelling is unlikely to be realized properly.

This model deviates from Fayol's epistemic model by its assumption that the main problem in syntactic spelling is not accessing the relevant syntactic feature (step 1) but maintaining the information gained when accessing it (step 2). The model predicts that the typical error which is expected to occur in syntactic spelling is producing a phonographic spelling which does not feature the syntactic marker required. This is indeed the case, as was shown above. Also, ‚fat tails‘ are likely to emerge in any task domain where people belonging to both ends of the performance spectrum follow different ways of dealing with the tasks because, in this case, two error distributions overlap (see Mitchell et al 2009). Based on the model, two such patterns may be discerned: relying on 'indexical data', or being forced to rely on ‚epistemic‘ data where indexical data have got lost. So, this model, too, is compatible with empirical evidence though the evidence is descriptive rather than experimental.

3. Conclusion

In the past twenty years, some empirical knowledge about syntactic spellings has been accumulated in the international literature. Reviewing this literature reveals different theoretical concepts that are at enlisted. This may be due to linguistic differences. So cross-linguistic comparisons may contribute to taking research a step further.

References

Alamargot, D., Flouret, L., Laroque, D., Caporossi, G., Pontart, V., Paduraru, C, Morisset, P. & Fayol, M. (2015). Successful written subject-verb agreement: an online analysis of the procedure used by students in grades 3, 5 and 12. *Reading and Writing: An Interdisciplinary Journal, 28*(3), 291-312.

Assink, E.M.H. (1985). Assessing spelling strategies for the orthography of Dutch verbs. *British Journal of Psychology, 76*(3), 353-363.

Assink, E.M.H. (1987). Algorithms in spelling instruction: The orthography of Dutch verbs. *Journal of Educational Psychology, 79*(3), 228-235.

Baudrillard, L. (1973a). La morphologie du verbe. Essai d'un enseignement nouveau dans une classe de 6ᵉ [The morphology of verbs. A new instructional approach for grade 6]. *Recherches pédagogiques, 57*, 47-58.

Baudrillard, L. (1973b). Recherche sur la syntaxe du verbe chez les élèves du 1er cycle [Inquiry into verbal syntax in the early primary grades]. *Recherches pédagogiques, 57*, 59-73.

Betzel, D. (2015). *Zum weiterführenden Erwerb der satzinternen Großschreibung* [On the acquisition of advanced capitalization skills]. Baltmannsweiler, Germany: Schneider.

Bock, J. (1986). Syntactic persistence in language production. *Cognitive Psychology, 18*(3), 355-387.

Bock, M. (1986). Cognitive aspects of upper and lower case for initial letters in German. In G. Augst (Ed.), *New trends in graphemics and orthography* (pp. 287-299). Berlin, Germany: de Gruyter.

Bock, M. (1990). Zur Funktion der deutschen Groß- und Kleinschreibung: Einflüsse von Wortform, Muttersprache, Lesealter, Legasthenie und lautem versus leisem Lesen [The function of capitalization in German: Effects of word shape, readers' first language, reading age, reading disability, and reading aloud vs. reading silently]. In C. Stetter (Ed.), *Zu einer Theorie der Orthographie* (pp. 1-32). Tübingen, Germany: Niemeyer.

Bosman, A. (2005). Development of rule-based verb spelling in Dutch students. *Written Language & Literacy, 8*(1), 1-18.

Branigan, H. P., Pickering, M. J., & Cleland, A. A. (1999). Syntactic priming in written production: Evidence for rapid decay. *Psychonomic Bulletin & Review*, *6*(4), 635-640.

Bryant, P., Devine, M., Ledward, A., & Nunes, T. (1997). Spelling with apostrophes and understanding possession. *British Journal of Educational Psychology*, *67*(1), 91-110.

Bryant, P., Nunes, T. & Aidinis, A. (1999). Different morphemes, same spelling problems: cross-linguistic developmental studies. In M. Harris & G. Hatano (Eds.), *Learning to read and write* (pp. 112-132). Cambridge, UK: Cambridge University Press.

Bryant, P., Nunes, T., Bindman, M. (2000). The relations between children's linguistic awareness and spelling: The case of the apostrophe. *Reading and Writing: An Interdisciplinary Journal, 12*(3-4), 253-276.

Chliounaki, K. & Bryant, P. (2002). Construction and learning to spell. *Cognitive Development, 17*(3-4), 1489-1499.

Dahmen, S. & Weth, C. (2018). *Phonetik, Phonologie und Schrift* [Phonetics, phonology, and writing]. Paderborn, Germany: Brill-Schöningh.

DEPP (2016). *Les performances en orthographe des élèves en fin d'école primaire (1987⸺2007⸺2015)*. Note d'information 28, Novembre 2016. Paris, France: Direction de l'évaluation, de la prospective et de la performance.

Duchesne, J. & Piron, S. (2015). Écrits universitaires et orthographe grammaticale [Writing at the university and grammatical spellings]. *LINX. Revue des linguistes de l'université Paris X Nanterre, 72*, 95-110. http://journals.openedition.org/linx/1610#tocto1n4

Elley, W., Barham, I., Lamb, H. & Wyllie, M (1979). The role of grammar in a secondary school English curriculum. *Research in the Teaching of English 10*(1), 5–21.

Fayol, M., Hupet, M. & Largy, P. (1999). The acquisition of subject-verb agreement in written French: From novices' to experts' errors. *Reading and Writing: An Interdisciplinary Journal, 11*(2), 153-174.

Fayol, M. & Jaffré, J.-P. (1999). *Orthographier* [Doing spelling]. Paris, France: Presses Universitaires de France.

Fayol,M. & Jaffré, J.-P. (2014). *L'orthographe* [Orthography]. Paris, France: Presses Universitaires de France.

Fayol, M. & Largy, P. (1992). Une approche fonctionnelle de l'orthographe grammaticale [A functional approach to grammatical spelling]. *Langue française, 95*, 80-98.

Fayol, M., Largy, P. & Lemaire, (1994). Cognitive overload and orthographic errors: When cognitive overload enhances subject–verb agreement errors. A study in French written language. *The Quarterly Journal of Experimental Psychology Section A: Human Experimental Psychology, 47*(2), 437-464.

Fayol, M., Totereau, C. & Barruoillet, P. (2006). Disentangling the impact of semantic and formal factors in the acquisition of number inflections: nouns, adjective, and verb agreement in written French. *Reading and Writing: An Interdisciplinary Journal, 19*(7), 717-736.

Frisson, F. & Sandra, D. (2002). Homophonic forms of regularly inflected verbs have their own orthographic representations: a developmental perspective on spelling errors. *Brain and Language, 81*(1-3), 545-554.

Funke, R. (1995). Grammatik in Funktion [Grammar at work]. *Deutschunterricht, 48*(9), 430-434.

Funke, R. (2017). Syntaxbasierte Vermittlung der satzinternen Großschreibung: Varianten eines Ansatzes [Syntax-based teaching of capitalization: Variants of an approach]. In I. Rautenberg & S. Helms (Eds.), *Der Erwerb schriftsprachlicher Kompetenzen* (pp. 100-120). Baltmannsweiler, Germany: Schneider.

Funke, R. & Sieger, J. (2012). Continued access to syntactic information in reading. *Reading and Writing: An Interdisciplinary Journal, 25*(7), 1769-1794.

Funke, R., Wieland, R., Schönenberg, S., & Melzer, F. (2013). Exploring syntactic structures in first-language education: effects on literacy-related achievements. *L1-Educational Studies in Language and Literature, 13*, 1-24.

Gervaix, P. (1995). *Qu'avez-vous fait de votre participe passé? Maîtrise et stratégies d'accord du participe passé au niveau secondaire.* Lausanne, Switzerland: Centre Vaudois de Recherches Pédagogiques.

Günther, H. & Gaebert, D.-K. (2011). Das System der Groß- und Kleinschreibung [Capitalization as a system]. In U. Bredel & T. Reißig (Eds.), *Weiterführender Orthographieerwerb* (pp. 96-106). Baltmannsweiler, Germany: Schneider.

Gunnarsson, C. & Largy, P. (2010). Confrontation de données expérimentales à l'analyse d'un corpus: le cas de la récupération d'instances en production écrite [Comparing experimental and corpus data : the case of corrections in writing]. *Synergies, 5*, 49-64.

Guyon, O. (1997). Acquisition de l'orthographe du CE1 à la 5ᵉ [Acquiring spelling in the primary grades]. Les morphogrammes grammaticaux 's' et 'nt'. *La Linguistique, 33*(1), 23-40

Harris, M. & Giannouli, V. (1999). Learning to read and spell in Greek: the importance of letter knowledge and morphological awareness. In M. Harris & G. Hatano (Eds.), *Learning to read and write* (pp. 51-70). Cambridge, UK: Cambridge University Press.

Hokanson, L. & Kemp, N. (2013). Adults' spelling and understanding of possession and plurality: an intervention study. *Reading and Writing: An Interdisciplinary Journal, 26*(2), 241-262.

Hupet, M., Fayol, M. & Schelstraete, M.-A. (1998). Effects of semantic variables on the subject-verb agreement process in writing. *British Journal of Psychology, 89*(1), 59-75.

Juul, H. (2002). Conditioned spellings in Danish. *Lund University Working papers, 50*, 97-107.

Juul, H. (2005). Grammatical awareness and the spelling of inflectional morphemes in Danish. *International Journal of Applied Linguistics, 15*(1), 87-112.

Juul, H. & Elbro, C. (2004). The links between grammar and spelling: a cognitive hurdle in deep orthographies? *Reading and Writing: An Interdisciplinary Journal, 17*(9), 916-942.

Kandel, S. & Perret, C. (2014). How does the interaction between spelling and motor processes build up during writing acquisition? *Cognition, 136*, 325-336.

Kemp, N., Mitchell, P. & Bryant, P. (2017). Simple morphological spelling rules are not always used: individual differences in children and adults. *Applied Psycholinguistics, 38*(5), 1071-1094.

Largy, P., Cousin, N.-P. & Fayol, M. (2004). Acquérir le pluriel des noms [Acquiring the nominal plural]. *Revue de linguistique et de didactique des langues, 30*, 39-54.

Largy, P. & Dédéyan, A. (2009). Automatisme en détection d'erreurs d'accord sujet-verbe: étude chez l'enfant et l'adulte [Automatic detection of agreement errors: A study with children and adults]. *L'année psychologique, 102*(2), 201-234.

Largy, P. & Fayol, M. (1996). The homophone effect in written French: the case of verb-noun inflection errors. *Language and Cognitive Processes, 11*(3), 217-255.

Leong, C. K. (2009). The role of inflectional morphology in Canadian children's word spelling. *Elementary School Journal, 109*(4), 343-358.

Maas, U. (1992). *Grundzüge der deutschen Orthographie* [Outline of German orthography]. Tübingen, Germany: Niemeyer.

Manesse, D. & Cogis, D. (2007). *Orthographe: À qui la faute?* [Orthography: Who is to blame for errors?] Paris, France: ESF.

Maratsos, M. (1982). The child's construction of grammatical categories. In E. Wanner & L. Gleitman (Eds.), *Language acquisition. The state of the art* (pp. 240-266). Cambridge, UK: Cambridge University Press.

Menzel, W. (1985). *Rechtschreibunterricht. Praxis und Theorie* [Spelling instruction. Theory and practice]. Beiheft zu Praxis Deutsch 69/1985. Seelze, Germany: Friedrich.

Mitchell, P., Kemp, N. & Bryant, P. (2011). Variations among adults in their use of morphemic spelling rules and word-specific knowledge when spelling. *Reading Research Quarterly, 46*(2),119-133.

Morin, M.-F., Alamargot, D., Diallo, T. & Fayol, M. (2018). Individual differences in lexical and grammar spelling across primary school. *Learning and Individual Differences, 62*(1), 128-140

Müsseler, J., Nißlein, M. & Koriat, A. (2005). German capitalization of nouns and the detection of letters in continuous text. *Canadian Journal of Experimental Psychology, 59*(3), 143-158.

Negro, I., Chanquoy, L., Fayol, M. & Louis-Sidney, M. (2005). Subject-verb agreement in children and adults: Serial or hierarchical processing? *Journal of Psycholinguistic Research, 34*(3), 233-258.

Nißlein, M. (2001). *Über das Entdecken von Buchstaben und das Verstehen von Sätzen* [On detecting letters and understanding sentences]. Dissertation. Universität München.

Notenboom, A. & Reitsma, P. (2007). Spelling Dutch doublets: children's learning of a phonological and morphological spelling rule. *Scientific Studies of Reading, 11*(2), 133-150.

Nunes, T. & Bryant, P. (2009). *Children's reading and spelling*. Chichester, UK: Wiley.

Nunes, T., Bryant, P., & Bindman, M. (1997a). Morphological spelling: developmental stages and processes. *Developmental Psychology, 33*(4), 637-649.

Nunes, T., Bryant, P., & Bindman, M. (1997b). Spelling and grammar: The necsed move. Perfetti, C. A., Rieben, L., & Fayol, M. (eds.). *Learning to spell: Research, theory, and practice across languages* (pp. 151-170). Mahwah, NJ: Erlbaum.

Nunes, T., Bryant, P., & Bindman, M. (1997c). Learning to spell regular and irregular verbs. *Reading and Writing: An Interdisciplinary Journal*, *9*(5-6), 427-449.

Nunes, T., Bryant, P. & Olsson, J. (2003). Learning morphological and phonological spelling rules: An intervention study. *Scientific Studies of Reading, 7*(3), 289-307.

Pacton, S. & Fayol, M. (2003). How do French children use morphosyntactic information when they spell adverbs and present participles? *Scientific Studies of Reading, 7*(3), 273-288.

Pickering, M. J., & Branigan, H. P. (1998). The representation of verbs: Evidence from syntactic priming in language production. *Journal of Memory and language*, *39*(4), 633-651.

Pike, K. L. (1945). *The intonation of American English.* Vol 1. Ann Arbor, MI: University of Michigan Press.

Plickat, H.-H. (1970). Lehrprogramme als Mittel der Differenzierung im Rechtschreibunterricht der Grundschule? [Programmed instruction as a means for diversification of spelling instruction in the primary school?] *Die Grundschule, 2*(2), 28-36.

Rego, L.L.B. (1999). Phonological awareness, syntactic awareness and learning to read and spell in Brazilian Portuguese. In M. Harris & G. Hatano (Eds.), *Learning to read and write* (pp. 71-88). Cambridge, UK: Cambridge University Press.

Riehme, J. & Heidrich, M. (1970). Die Fehlerursachen analysieren, um die Schwerpunkte der Übungen zu erkennen [Analyzing the causes of orthographic errors to identify the focus of remedial practice]. *Deutschunterricht, 23*(9), 346-355, 426-433.

Riehme, J. & Zimmermann, F. (1986). Ziele, Methoden und ausgewählte Ergebnisse einer Analyse orthographischer Leistungen von Schülern der allgemeinbildenden polytechnischen Oberschule der DDR [Objectives, methods, and selected results of an analysis of students' orthographic perfomance at the general polytechnic high school in the GDR]. In *Analyse orthographischer Leistungen von Schülern der POS der DDR* (pp. 1-20). Forschungsinformation. Zwickau, Germany: Pädagogische Hochschule ‚Ernst Schneller' Zwickau.

Ronneberger-Sibold, E. (2010). Die deutsche Nominalklammer [Nominal frame in German]. In A Ziegler (Ed.), *Historische Textgrammatik und historische Syntax des Deutschen*. Vol. 1 (pp. 85-120). Berlin, Germany: de Gruyter.

Ruhfus, S. (1980). Legasthenie und Rechtschreibreform [Dyslexia and spelling reform]. Frankfurt, Germany: Peter Lang.

Sandra, D., Frisson, S., & Daems, F. (1999). Why simple verbs can be so difficult to spell: The influence of homophone frequency and distance in Dutch. *Brain and Language, 68*(1-2), 277–283.

Scheele, V. (2006). *Entwicklung fortgeschrittener Rechtschreibfähigkeiten* [Development of advanced spelling skills]. Frankfurt, Germany: Peter Lang.

Schreinert, G. (1983). Fehlerquoten und ihre Distribution bei den Hauptfehlerarten, den Interpunktionsfehlern und den Verstößen gegen die Groß- bzw. Kleinschreibung—eine Analyse des Leistungsstandes und der Leistungstendenzen in der Klassenstufen 6 bis 9 [Error ratios in the main error categories, punctuation, and capitalization and their distribution. An analysis of achievement levels and achievement trands in grades 6 to 9]. In B. Friedrich, R. Gerlach, & P. Lang (Eds.) (1999), *Geschichte der Deutschmethodik in der SBZ und DDR in Biographien* (pp. 317-335). Frankfurt, Germany: Peter Lang.

Schübel, A. & Pießnack, C. (2005). Wie gut beherrschen Abiturienten die Rechtschreibung? [Gymnasium graduates' command of spelling] *Deutschunterricht, 58*(3), 20-22.

Sereno, J. A. & Jongman, A. (1990). Phonological and form class relations in the lexicon. *Journal of Psycholinguistic Research, 19*(6), 387-404

Simard, G. & Coté, M. (1984). L'apprentissage de l'orthographe grammaticale au secondaire [Learning grammatcal spelling in the secondary school]. *Quebec français, 54*, 107-113.

Steinig, W., Betzel, D., Geider, F.-J., & Herbold, A. (2009). *Schreiben von Kindern im diachronen Vergleich* [Children's writing in a diachronic view]. Münster, Germany: Waxmann.

Sterling, C.M. (1983). Spelling errors in context. *British Journal of Psychology, 74*(3), 353-364.

Thévenin, M. G., Totereau, C., Fayol, M., & Jarousse, J. P. (1999). L'apprentissage/enseignement de la morphologie écrite du nombre en français [Teaching/learning written morphology in French]. *Revue française de pédagogie*, *126*, 39-52.

Totereau, C. & Brissaud, C. (2006). Acquisition des flexions verbales homophones en /E/: une étude longitudinale du CE2 au CM2 [Acqusition of verbal inflections spelled out as /E/. A longitudinal study in the middle grades]. *Rééducation orthophonique, 44*(225), 59-74.

Totereau, C., Brissaud, C., Reilhac, C. & Bosse, M. L. (2013). L'orthographe grammaticale au collège: une approche sociodifférenciée [Spelling grammatically in the college: An investigation with a focus on social differences]. *Approche Neuropsychologique d'Apprentissage de l'Enfant (ANAE), 123*, 164-171.

Totereau, C., Thévenin, M.-G. & Fayol, M. (1997). The development of the understanding of number morphology in written French. In C.A. Perfetti, L. Rieben & M. Fayol (Eds.), *Learning to spell* (pp. 97-114). Mahwah, NJ: Erlbaum.

Valtin, R., Badel, I., Löffler, I., Meyer-Schepers, I., & Voss, A. (2003). Orthographische Kompetenzen von Schülerinnen und Schülern der vierten Klasse [Orthographic competences of fourth grade students]. In W. Bos, E.-M. Lankes, M. Prenzel, K. Schippert, G. Walther, & R. Valtin (eds.). *Erste Ergebnisse aus IGLU. Schülerleistungen am Ende der vierten Jahrgangsstufe im internationalen Vergleich* (pp. 227-264). Münster, Germany: Waxmann.

Weth, C. (2017). Bausteng Grammatik – Bausteine Grammatik—Briques de grammaire. Material zum Erforschen von Wörtern und Sätzen [Grammar bricks. Materials to explore words and sentences]. Luxembourg: Université du Luxembourg.

Zimmermann, F. (1980). Untersuchungen zu Verstößen gegen die Norm der Schreibung bei Schülern der allgemeinbildenden polytechnischen Oberschule [A study of the violations of orthographic norms in college students]. *Wissenschaftliche Zeitschrift. Pädagogische Hochschule ‚Ernst Schneller' Zwickau, 16*(1-2), 164-185.

Zimmermann, F. & Heckel, B. (1986). Untersuchungen zu Normverstößen bei der Groß- und Kleinschreibung [An analysis of capitalization errors]. In *Analyse orthographischer Leistungen von Schülern der POS der DDR. Forschungsinformation* (pp. 21-35). Zwickau, Germany: Pädagogische Hochschule ‚Ernst Schneller' Zwickau.