

Syntactic markers and syntactic spelling: The noun phrase in German and French

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Abstract: In this paper, we first summarize the results of studies that have investigated the acquisition, reading, and spelling of noun phrases (NPs) in German and French. Then, we present the assumptions made in those studies. In the main part of the paper, we provide a detailed comparison of German and French noun phrases. There are numerous differences that have never been discussed in this context before; for example, the behavior of articles in German and French and the consequences for graphematic representation, such as sentence-internal capitalization in German.

Keywords: syntactic spelling, comparative graphematics (French – German), comparative grammar (French – German), reading aids, morphology-graphematics interface, capitalization

1. Disentangling syntax and spelling within empirical studies of syntactic spelling

Many studies have shown that experienced readers and writers make use of morphological structures for reading and spelling (Bredel et al., 2013; Brysbaert et al., 2000; Levesque et al., 2021; Sandra et al., 2024; Treiman et al., 2015). While experiments with stem spelling (Bredel et al., 2013; Brysbaert et al., 2000) have suggested that good readers utilize morpho-orthographic structure if it is crucial for understanding a sentence (Sandra et al., 2024), corpus studies involving online media and final school exams have shown that readers and writers overlook inflectional morphemes (Berg et al., 2024; Verhaert, 2016). One reason for the neglect of these morphemes in reading and for omissions in writing has been proposed by Sandra et al. (2024) who suggest that the morphological structure of an inflected word-form may be overlooked under two conditions: first, when the presented form is a higher-frequency word even if it is not the correct form, and second, when the reading error does not cause any problems at the semantic level. Moreover, inflectional morphology is often represented by constant spellings, e.g., <s> or <ed> in English compared to a variety of context-dependent realizations in phonology. The grapheme <s> is articulated as either [z] or [s], the morphograph <ed> can be reduced in spoken language and is often articulated as [t]. The inflections of the French language are often only part of the writing system, as they usually have no counterpart in phonology (Catach, 1980b; Fayol, 2020; Meisenburg, 1996; Pellat, 2023). In German, inflections are represented by a small number of word endings, which are the rhyme within the reduced syllables of stable trochaic word-patterns, i.e., <e>, <en>, , <er>, <es> (Evertz & Primus, 2013). Even in English, the word-final <s> has less pronunciation if it represents to an inflectional morpheme rather than being part of the stem (Aronoff et al., 2016; Plag et al., 2017).

Experienced readers may overlook the plural morpheme in French within sentences with “noun phrase 1 (NP1) of the NP2 + verb” structures, such as *Le chat des voisins *sautent* (third-person plural)/ *saute* (third-person singular) ‘The neighbors’ cat *jump/jumps.’ Experiments investigating fast orthographic revision have shown that participants are frequently misled by erroneous agreements between NP2 and the verb, suggesting that experienced readers decide based on the matches or mismatches of co-occurring formal characteristics, e.g., plural markers in the default

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syntactic structure of subject-verb. The participants were thus often misled by erroneous agreements between NP2 and the verb (Largy et al., 2004). Notably, response times for correct answers were slower than for incorrect answers, which suggests that when processing involves checking for subject-verb agreement, it is cognitively more demanding than relying on the frequent proximity of the subject and the verb.

The notion that the visible markers of syntactic structures are relevant for readers in cases of syntactic ambiguity has been demonstrated in two eye-tracking studies that focused on the use of initial capital-letters for German nouns. Pauly and Nottbusch (2020) showed that the capitalization of nouns that are homophone words, which could be either nouns or adjectives, prevents garden-path parsing. Such homophones may be semantically similar, in which case the sentence would remain intact if the noun were omitted (e.g., *Ich sehe den kriminellen Dieb / ... den Kriminellen*, 'I see the criminal thief / ... the criminal'). However, if the adjectives and nouns are not semantically similar, the sentence would have a completely different meaning if the noun is omitted. For example, *Ich sehe die matten Sportler* means 'I see the fainted athletes' instead of *Ich sehe die Matten*, which means 'I see the mats'. Similarly, Vogelzang et al. (2023) demonstrated that the capitalization of nouns assisted their participants in the absence of other structural elements for identifying the presence of NPs (e.g., the article), such as in the sentence *Morgen wollten sie Kerzen herstellen* (literally: 'Tomorrow they wanted to make candles' in the sense 'They would like to make candles tomorrow').

In terms of syntactic spellings, two conditions are considered influential, in addition to complexity, length, and lexicality: namely, the semantic properties of a word (Fayol et al., 2006; Sandra et al., 2024) and word frequency (Lété et al., 2008; Negro et al., 2014; Sandra et al., 1999; Sandra & Abbenyen, 2009). In French, it has also been shown that the position of a word within an NP relative to an article influences plural spellings, which has been interpreted as indicating that articles are the left-boundary markers of NPs, being the only audible sign of plurality in French (Fayol et al., 2006; Weth et al., 2021). These conditions are without doubt crucial factors that influence spelling performance and the learning processes related to various cognitive processes, such as categorization, memory, and automatization. Still, it remains unclear how learners acquire syntactic awareness concerning syntactic markers and under what conditions they can (or cannot) employ the appropriate cognitive processes to respond to a given occurrence of a linguistic construction to produce a syntactic marker (Cislaru et al., 2024; Funke, 2005; Funke & Sieger, 2012; Kilcher-Hagedorn et al., 1989). To correctly spell syntactic markers (Weth, 2020), a writer has to analyze the syntactic structure of a given sentence in order to produce the visible word spelling that conveys the appropriate syntactic information, such as, in French, adding <s> to all words in an NP to repeatedly indicate the plurality agreement within the syntactic unit, and, in German, capitalizing the noun to indicate the presence of an NP. Many young children utilize their awareness of morphological regularities (stems and derivations) that are visible within their writing systems to spell words (Deacon & Bryant, 2006; Sénéchal, 2000; Treiman & Cassar, 1996) and they can also produce syntactic markers from an early age (Günther, 2007; Largy et al., 2007; Totoreau et al., 1997). However, the plural spellings of nouns, adjectives, and verbs in French and German noun-capitalization only become automatized for most learners by the end of secondary school (Alamargot et al., 2015; Betzel, 2015; Bosse et al., 2021). Nevertheless, even expert writers can experience spelling difficulties with less frequent sentence contexts. Several studies have demonstrated the influence of frequency, homophone dominance, and congruency effects in French and Dutch (Cousin et al., 2002; Fayol et al., 1994; Largy et al., 2007; Sandra et al., 1999; Verhaert, 2016). For German, corpus studies have shown that expert writers might have difficulties

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with the capitalization of complex foreign words and sometimes for adjectives (Fuhrhop & Romstadt, 2021; Pießnack & Schübel, 2005; Ransmeyer, 2022).

Learning to spell syntactic markers seems to begin, in general, with word forms that entail a degree of semantic tangibility, such as the plurals of concrete nouns, *one* vs. *two dogs*, in contrast to the plural of an abstract concept, such as *liberty* vs. *liberties*, or adjectives, such as *red* vs. *reds*. In French, learners acquire the plural of (familiar, tangible) nouns first, as the mastering of plural nouns seems to be a prerequisite for learning how to spell the plural markers of adjectives and verbs (Bosse et al., 2021; Brissaud et al., 2014; Klasen et al., 2023; Weth et al., 2021). In German, learners first learn to capitalize concrete, tangible nouns and then learn to generalize the capital letter to the head of an NP. By the end of primary school, many students still capitalize concrete nouns significantly better than abstract nouns or nominalizations (Brucher et al., 2020; Funke, 2021; Mangelschots et al., 2023; Wahl et al., 2017). Several intervention studies have shown that learners of various ages and backgrounds profit from training about plural spellings in French that highlight the salience of plural markers and relate such spellings to the encoding of grammatical information about plurality (Bilici et al., 2018; Klasen, 2023; Totereau et al., 1997; Weth et al., 2024). Syntactic training about capitalization has shown different effects for different age groups: positive effects at Grade 5 for spelling (Bilici et al., 2019; Brucher et al., 2020), no effects at Grade 4 for spelling (Weth et al., 2024), and positive effects for detections during reading at Grade 2 (Wahl et al., 2017). These different effects for French and German are discussed in Weth et al. (2024) and can be interpreted according to both syntactic and graphematic differences between the syntactic markers of French and German and the approaches to teaching about the markers in the respective languages.

The knowledge we have gained about the morphological marking of syntax has come from studies that have investigated morphological and syntactic awareness and spelling by employing theoretical and methodological frameworks that were initially developed in the contexts of English (Bryant & Nunes, 2009; Nunes et al., 1997) and French (Largy et al., 1996; Totereau et al., 1997) and subsequently adapted for other languages, e.g., Dutch (Sandra & Abbenyen, 2009) and German (Görgen et al., 2021; Kargl & Landerl, 2018; Landerl & Reitsma, 2005). Research on syntax-related spelling in French and German has focused on the visible eye-catchers: inflectional morphology in written French and the constancies of written stems, as well as noun capitalization in German. However, the graphematic features that convey morphology and syntax have yet to be discussed within grammatical and graphematic frameworks. For example, the allography (Meletis, 2020) of capitalization in German (Bredel, 2010; Eisenberg, 1981; Maas, 1992) is a silent aspect of syntactic spelling in German that cannot be described morpho-syntactically. However, noun capitalization appears to function as indications of the inflected units of an NP, given that inflectional markers are not very specific in German. For example, *-en* can be an inflectional ending for nouns, adjectives, or verbs, but it is not always an inflectional ending. Therefore, both capitalization and inflectional markers indicate inflections, albeit in an unspecified manner (Fuhrhop, 2006; Köpcke, 2003).

As the differences in syntactic structures impact on the correct spelling of syntactic markers in both French and German (Weth et al., 2024), this paper aims to describe and compare syntactic marking in these two languages in terms of the syntactic and graphematic structures of the respective languages. The paper focuses on the linguistic units of NPs, as they realize the argument structure of a sentence: as the head of an NP, nouns bear a referential index and a given NP can be identical to another entity, such as a pronoun (Rijkhoff, 2007). Furthermore, complex nominal phrases are a central characteristic of academic writing (Biber & Gray, 2011). This paper focuses

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on German and French, as both are inflected languages with both similar and diverging NP structures. Both use articles or article-like words as the first element of an NP. Moreover, both languages have notable graphematic features that relate to (morpho-)syntax: German has noun capitalization and French has a largely silent inflectional morphology that is only marked in writing.

The first part of this paper provides a detailed comparison of the NP structures of French and German. We first look at the written representations of inflectional morphology in French and German. Then we describe how the core features of spelling in each language (stem constancy, heterography, conjunctive/disjunctive spelling) interact with syntactic markers. The first part concludes by discussing the status of noun capitalization in both French and German and argues that noun capitalization is a marker of syntax only in German.

In contrast, the second part of the paper adopts the perspective of the graphematic structures of the respective writing systems. More specifically, the paper moves to highlight how the present detailed examination of these linguistic structures can contribute to advancing theories about syntactic spelling, especially the acquisition of syntactic-marker spellings. Thus, the paper seeks to better elucidate the production and recognition of graphemes as an integral aspect of syntactic processing.

2. Grammatical comparisons: NP structures in French and German

In this section, we compare the grammatical aspects of NPs in both French and German. We will first focus on the positioning of articles within NPs and their distances from the noun, as well as the presence or absence of articles within French and German NPs. Then, we present a variety of article word-forms and article-like words. Finally, we consider the forms of inflectional endings, first for nouns and articles, then for adjectives. Last but not least, we comment on the inflection of NPs as a morpho-syntactic unit.

2.1 Articles and article-like usage in German and French: NP markers

2.1.1 The proximity of articles and nouns

The distance between articles and nouns is a crucial characteristic of German NPs (Gillmann, 2025), while in French, articles and nouns are typically placed close together. Most kinds of modifiers are usually placed after a noun, and only a few adjectives, such as *grand* ('big'), are placed before a noun (Abeillé & Gautier, 2021, Grevisse & Goosse, 2016).¹ The article in French is, hence, an integral part of an NP that precedes the noun. In German, however, the article is not an integral part to the same extent as it is in French. Still, articles also mark the beginning of an NP, as in French. In addition, some types of modifiers are usually placed before nouns, such as the genitive of proper nouns, adjectives, and participles. In fact, a whole group of adjectives and participles may be placed between an article and a noun, such that the distance between them may be considerable. We illustrate this distance with the beginning of a famous novel by Theodor Fontane: *Effi Briest*. This example illustrates the possible distance between the article (*des*, genitive, singular) and the noun *Herrenhauses* ('the manor house') within the NP.

In Front des schon seit Kurfürst Georg Wilhelm von der Familie von Briest bewohnten Herrenhauses zu Hohen-Cremmen ... (Fontane 1895)

¹ The limited set of adjectives can also be modified within the NP, e.g., *Le beau vieux garçon* 'the handsome old boy'.

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Here are two translations into French:

- a. *Devant la façade de **la maison** seigneuriale habitée par la famille Briest depuis l'époque de l'Électeur Georges-Guillaume* (Fontane 1902: 1)²
- b. *Devant **la maison** bourgeoise que la famille von Briest habitait à Hohen-Cremmen dès l'époque du prince Électeur Georges-Guillaume,* (Fontane 1981: 1)

Most of the information about the house is packed within a complex NP in German, whereas both translations place the article and the noun close together (*la maison*). The first French translation (a) uses an analogous participle, whereas the second (b) uses a relative-clause construction to present this additional information.

To emphasize the typological feature of German, we also provide two English translations:

- a. *To the front of **Hohen-Cremmen**, country seat of the von Briest family since the time of Elector Georg Wilhelm,* (Fontane 2000)
- b. *Outside **the manor house** in Hohen-Cremmen, where the Briests have lived since the days when Georg Wilhelm had been elector of Brandenburg,* (Fontane 2015)

The first English translation (a) shortens the description and calls the house *Hohen-Cremmen*, which is not the case in the German original (*Herrenhaus zu Hohen-Cremmen*). Using a proper noun means that no article is needed. In the second translation (b), the compound *manor house* is immediately preceded by an article.

In all the translations, both in French and in English, there is no distance between the article and the noun. However, in the German original, eleven words separate the article (*des*) from the noun (*Herrenhauses*). Granted the German example is a literary one, but it is common for participle phrases to intervene between an article and a noun.

2.1.2 Presence (or absence) of an article

The presence (or absence) of an article itself represents an immense difference between French and German overall. In French, there is always a clear indication that an NP is about to start due to the presence of a definite or indefinite article, a possessive or demonstrative article, or *de* as a partitive article.³ German does not provide any stable or clear indications that an NP is present. Articles can be replaced by other words or structures, such as pronouns as 'article words' (Duden 2022: 729) *alle, jede* ('all, each'), etc., or completely variable genitive constructions. In addition, plural nouns and all mass nouns are frequently used without an article. Table 1 compares different NP structures between German and French and provides the corresponding English translations.

² The place name *Hohen-Cremmen* is only mentioned in connection with the road, which is described later in the novel.

³ The apostrophe also helps to make the article clear. Phonologically, in *l'ami*, the article is merged with the noun; graphematically, the apostrophe ensures that the article is recognized.

Table 1. Different types of NPs in German, French (with English translations) according to the definite feature: definite (def.) or indefinite (indef.)

	German	French	Definite feature ⁴	English translation ⁵
A	<i>Er liest das Buch.</i>	<i>Il lit le livre.</i>	def.	He reads the book.
	<i>Er liest die Bücher.</i>	<i>Il lit les livres.</i>	def.	He reads the books.
	<i>Er liest ein Buch.</i>	<i>Il lit un livre.</i>	indef.	He reads a book.
	<i>Er liest Bücher.</i>	<i>Il lit des livres.</i>	indef.	He reads books.
B	<i>Ich trinke Tee.</i>	<i>Je bois du thé.</i>	indef.	I drink tea.
	<i>Tee ist teuer.</i>	<i>Le thé est cher.</i>	G: indef., F: def.	Tea is expensive.
	<i>Wir trinken viel Tee.</i>	<i>Nous buvons beaucoup de thé.</i>	indef.	We drink a lot of tea.
	<i>Wir trinken guten Tee.</i>	<i>Nous buvons un bon thé.</i>	indef.	We drink good tea.
	<i>Der Tee ist kalt.</i>	<i>Le thé est froid.</i>	def.	The tea is cold.
C	<i>Er liest das Buch nicht.</i>	<i>Il ne lit pas le livre.</i>	def.	He doesn't read the book.
	<i>Er liest kein Buch.</i>	<i>Il ne lit pas de livre.</i>	indef.	He does not read a book./ He is not reading a book.
	<i>Er liest gar kein Buch</i>	<i>Il ne lit aucun livre</i>	indef.	He doesn't read any books.
	<i>Er liest keine Bücher.</i>	<i>Il ne lit pas de livres.</i>	indef.	He does not read a book./ He is not reading a book.
D	<i>mein Buch</i>	<i>mon livre</i>	def.	my book
	<i>meine Bücher</i>	<i>mes livres</i>	def.	my books
	<i>ihr Buch</i>	<i>son livre</i>	def.	her book
	<i>sein Buch</i>	<i>son livre</i>	def.	his book
E	<i>jedes Buch</i>	<i>chaque livre/tous les livres</i>	G: indef., F: <i>tous les</i> : def.	every book
	<i>alle Bücher</i>	<i>tous les livres</i>	G: indef., F: def.	all books
F	<i>Peters Buch ist interessant.</i>	<i>Le livre de Peter est intéressant.</i>	def.	Peter's book is interesting.
	<i>Des Kaisers Buch</i>	<i>Le livre de l'empereur</i>	def.	The emperor's book
	<i>Des Wieners Eisbahn (ist des Tirolers Schilift)</i>	<i>La patinoire du Viennois (est le télési du Tyrolien)</i>	def.	The Viennese's ice rink (is the Tyrolese's ski lift)

⁴ The differences between French (F) and German (G) are highlighted.

⁵ English is not discussed here. We are aware that the word order within English NPs is very similar to that of German. The main difference between German and English is the adjacency of an article and a noun, which in German is often interrupted by (complex) participle groups.

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In Table 1, block (A) are examples of *definite* and *indefinite* NPs. The difference between German and French here is that German does not have an indefinite article in the plural. Consequently, a noun alone is possible: *Bücher*. In contemporary French, in most contexts, the article *des* is used and nouns alone are almost nonexistent (Dayal, 2023; Larrivée & Goux, 2024).

Block (B) are examples of *mass nouns*. In German, mass nouns usually do not have an article, even in the singular. In French, an article is used. Consequently, a noun alone is possible in German: *Tee*. Article-like words, such as *viel/viele* ('much/many'), emphasize the clear structure of French versus the opaqueness of German. If we are talking about 'much tea', the German word *viel* is not inflected, e.g., *viel Tee*, but other adjectives are inflected, e.g., *guten Tee* ('good tea'). In French, *much/many* translates as *beaucoup* or as *beaucoup de* if the meaning relates to and is followed by an NP. Due to the constant presence of *de*, readers expect a noun or NP to follow, so *de* is also a noun or NP marker.

Block (C) are *negation structures*. In German, the negation form of NPs with a definite article is *nicht*. If there is an indefinite NP, negation is realized with a form of *kein* (*keine, keinen, keiner, keinem*). Sometimes *kein* appears as a 'negation article' as it is part of an NP and can be replaced by an article. In French, the negation is achieved by *ne...pas* enclosing the inflected verb. If an NP follows, the NP is preceded by *de*. So, as in block B, the main function of *de* is as a marker for nouns or NPs.

Block (D) are *possessives*. The French possessive article agrees with the referenced noun (*son* for masculine nouns, *sa* for feminine nouns; e.g., always *son livre*). The German possessive article agrees with the referenced noun in terms of gender, number, and case, as indicated by inflectional markers. It also agrees in gender and number with the possessor (*sein* for masculine and neutral possessors, *ihr* for feminine and plural possessors). An example of a nominative masculine is *sein/ihr Hund* while *seine/ihre Katze* is a feminine example.

Block (E) presents some examples expressing an *indefinite quantity*. In German, these are not combined with articles but usually replace the article and are sometimes called "article words" (Duden 2022: 731). In French, they tend to be combined with an article, but not always (Grevisse & Goosse, 2016 §636-638). Corblin et al. (2004) discuss their syntactic structures; some being determiners, some being adjectives, and others having a different categorical status.

Block (F) presents other examples. In German, an NP in the genitive case can precede another NP. An NP in the genitive case takes the place of an article. This construction is particularly common with proper nouns. For nouns other than proper nouns, the construction is considered somewhat old-fashioned, albeit still grammatical. In French, an 'other' noun or NP is placed after the core noun linked with *de*.

2.2 The inflections of the different components of NPs

Written French NPs inflect for number and gender with highly predictable markers on the articles, nouns, adjectives, and participles. This measure of predictability comes from the fact that the same markers index one kind of information for each word within an NP, with the plural marker being the most visible: *les pantalons bleus* ('the blue trousers'), *les robes bleues* ('the blue dresses'). The feminine marker is only visible in the adjective *bleues*.

German NPs inflect for case, gender, and number, and the article word-forms, nouns, and adjectives depending on the immediate context. The engendered complexity stems primarily, but not solely, from there being three genders and four cases in German.⁶ The following example

⁶ In French, cases are represented by the prepositions *à* and *de*. Overt case is only present in pronouns (Rowlett, 2007).

illustrates the wrong parsing path one can take if relying on the uniformity of the word-final letters within an NP; in all cases, the three word-forms end in *-n*.

- a. *den blauen Hosen* (feminine, dative, plural)
- b. *den blauen Kleidern* (neuter, dative, plural)
- c. *einen blauen Affen* ((weak) masculine, accusative, singular)

The *-(e)n* in these noun forms have three different functions: (a) In *Hosen*, *-n* is a plural marker and every plural form in that paradigm is *Hosen*; (b) In *Kleidern*, the plural suffix is *-er*, and *-n* is added only in the dative; and (c) *Affen* is a singular form, and only the nominative is *Affe*. So, the noun inflections *-(e)n* could be either a plural suffix, a dative suffix only in the plural, or an oblique case suffix in the singular.

The following sections examine the visible inflection markers within NPs for the word classes of articles, nouns, and adjectives.

2.2.1 The inflections and word-form of articles

Articles are boundary markers for the left edges of NPs in both French and German. Nevertheless, as illustrated in the previous section, the use of articles in French appears to be considerably more generalized than in German, as illustrated in Table 1. We hypothesize that the similarities and diversity within the article-like word-forms visually emphasize boundary markers to different extents. Thus, we next examine the different word-forms of articles in the two languages. Our examination will show that French has fewer and more similar word-forms for articles than German.

Table 2. The singular and plural word-forms of French articles

Article forms	Singular	Plural	Word forms total
Definite articles	<i>le, la, l'</i>	<i>les</i>	4
Indefinite articles	<i>un, une, aucun, aucune</i>	<i>des</i>	3
Dividing article	<i>de, d'</i>		2
Contracted preposition-article forms	<i>du, au</i>	<i>aux, des</i>	4
Possessive articles	<i>ma, mon; ta, ton; sa, son; notre, votre, leur</i>	<i>mes, tes, ses, nos, vos, leurs</i>	15
Word-forms totals	20	10	30

Table 3. The singular and plural word-forms of German articles, including where no special plural word-form exists.

Article forms	Singular	Plural	Word forms total
Definite articles	<i>der, die, das, den, dem, des</i>	<i>die, den, der</i>	6
Indefinite articles	<i>ein, eine, eines, einen, einem, einer</i>	---	6

Contracted preposition-article forms	<i>im, zum, am, beim, vom</i>	---	7 ⁷
Possessive articles	<i>ins, zur</i>		
	<i>mein, meine, meines, meinen, meinem, meiner</i>	<i>meine, meinen, meiner</i> (<i>dein-, sein-, ihr-; unser-, euer-</i>)	36 (6x6)
Word-forms totals	56	No special plural form	56

Most importantly, in French, one word-form represents only one kind of morphological information, whereas the same word-form in German can be used for several kinds of morphological information. The word-forms of articles in German are always determined by gender, number, and case. All three categories are combined and, thus, underspecified. For example, the article *der* can indicate masculine-singular-nominative, either the feminine-singular-genitive or dative, or, for all genders, the plural-genitive. The article *die* can indicate the feminine-singular-nominative but also, for all genders, the plural-nominative. For example, *die Lehrer* ('the teachers') is plural and either nominative or accusative, but *der Lehrer* ('the teacher') can also be the singular-nominative or the plural-genitive.⁸

In addition, French has fewer forms of noun markers, as the language employs less inflectional morphology compared to German. Tables 2 and 3 list the word-forms of articles with contracted forms and possessive articles: 30 for French and 56 for German. For the definite article, French has four forms with a clear distinction between singular and plural instances (*s* for plural). Articles in French are phonologically and orthographically distinct for gender (*le* /lə/ masculine singular, *la* /la/ feminine singular) if they are not shortened before a vowel (l') and also for number, with there being one plural form for both genders (*les* /le/, plural). The written plural is thus the masculine singular form plus <s>. In contrast, German has six word-forms for articles, of which three are singular (*das, des, dem*), with the other three being either singular or plural (*der, die, den*). The same is true for case (*dem, des* are clear for case but not for gender, *das* is neuter but may also be nominative or accusative), so German articles do not clearly differentiate between singular and plural and do not provide information about gender and case. Additionally, French always uses an article for plural forms, whereas German often omits the article in the plural. With regard to contracted preposition-article forms, in French, only a few forms indicate number perfectly and gender fairly well, but, in German, there are six contracted forms that are only used in the singular and never contracted in the plural (*im Haus* ('in the house') vs. *in den Häusern* ('in the houses')).

2.2.2 The inflections and word-form of nouns

German nouns are assigned to one of three genders and inflect for case and number. Overt case inflection of nouns is rare in German. Most nouns have inflected forms only for one case at each number level: genitive in the singular and dative in the plural, but not always. In contrast to many other languages with inflections, plural nouns in German are not easy to recognize, as they

⁷ There are also additional forms, such as *ans, fürs, unters, unterm, untern, übern, and übers*. Some of these are sometimes spelt with an apostrophe and sometimes without. The seven forms are the contracted preposition-article forms as defined in the current edition of the Duden-Grammar (2022: 820).

⁸ French does have inherent overt case, e.g., in prepositions (Rowlett, 2007). Therefore, it is clear that one article form represents an NP within any argument structure in French. However, as German has overt cases, these overlaps are not as apparent in German.

can take a quite diverse array of endings and do not indicate any specific morphological information. Moreover, German has many morphologically simple forms that end with the same letters and sounds, as shown in Table 4. Considering the inflection information of the NP, the specific gender, case, and number can only be detected by the forms of the article, noun, and adjective altogether (cf. Table 6), if it is possible at all (Duden Grammar, 2022: 411-435).

Table 4. The German plural endings for nouns

	<i>-e</i>	<i>-en</i>	<i>-er</i>	<i>-e & umlaut</i>	umlaut	<i>-s</i>
Plural	<i>Hund-e</i> 'dogs'	<i>Frau-en</i> 'women'	<i>Schild-er</i> 'signs'	<i>Hüt-e</i> 'hats'	<i>Brüder</i> 'brothers'	<i>Auto-s</i> 'cars'
Singular	<i>Hund</i>	<i>Frau</i>	<i>Schild</i>	<i>Hut</i>	<i>Bruder</i>	<i>Auto</i>
Uninflected word-forms (singular)	<i>Tulpe</i> 'tulip'	<i>Wagen</i> 'wagon'	<i>Lehrer</i> ⁹ 'teacher'	<i>Hütte</i> 'hut'	<i>Bürger</i> 'citizen'	<i>Moos</i> , <i>Los</i> 'moss', 'lottery ticket'

French nouns are inflected for number in writing, with the plural suffix <s> being highly regular and reliable. Some exceptions are word-stems that end in <al>, <au>, and <eau>, which take the plural ending -x and word-stems that end in -s, -z, or -x (*dos* 'back'; *prix* 'price'; *nez* 'nose'), which do not take a plural suffix (Abeillé & Gautier, 2021, Grevisse & Goosse, 2016 §514-515). However, nouns in spoken French exhibit hardly any inflections in their single-word forms, although they do sometimes under the prosodic constraints of liaisons within sentence contexts, e.g., *leṣ amis* [le.za.mi] ('the friends') (Chevrot et al., 2013).

To summarize the comparisons of noun forms, in French, plural nouns are almost always represented by -s, thus, if a French word ends in -s, the probability that is a plural form is quite high (New et al., 2004). In German, plural forms are often indicated, but the range of endings is quite diverse, and they show syncretisms of gender and case. Furthermore, there are many uninflected words that have endings that are similar to plural-form information, as indicated in Table 4, and words that have no plural forms (the so-called zero-plurals) are common.

2.2.3 The inflections and word-form of adjectives

This section compares the inflections of adjectives in French and German. Compared to German, the inflections of French adjectives seem very simple, as shown in Table 5. For feminine nouns, the suffix is -e and for plurals, the ending is -s. The inflections of French adjectives are very straight forward, with one function corresponding with just one form. The masculine singular is the unmarked case, whereas the feminine-plural is double marked with both -e and -s combining.

Table 5. The inflections of French adjectives within NPs for the plural suffixes <s> and the feminine gender marker <e>

Definite	Gender	Singular	Plural
Definite	Masculine	<i>le pantalon bleu</i>	<i>les pantalons bleus</i>

⁹ As noted, *Lehrer* could also be a plural form, but -er here is not a plural suffix, it is a derivational suffix for nomina agentis, very similar to -er in English, as in *teach* - *teacher*.

	Feminine	<i>la robe bleue</i>	<i>les robes bleues</i>
Indefinite	Masculine	<i>un pantalon bleu</i>	<i>des pantalons bleus</i>
	Feminine	<i>une robe bleue</i>	<i>des robes bleues</i>

In contrast to German nouns (Table 4), monomorphemic adjectives do not end with inflections. Thus, there are five¹⁰ word endings (*-e*, *-en*, *-er*, *-es*, *-em*¹¹) for German adjective inflections, which highlight the presence of an inflected word-form but do not indicate a specific gender, case, or number by themselves. Importantly, specific information about inflections can only be detected by the forms of the article, noun, and adjective altogether; that is, all the word-forms within an NP, as illustrated in Table 6. Indeed, inflection rules are highly regular, but in addition to “cooperative inflections,” some forms overlap. Table 6 presents the adjective inflections of German and highlights the fact that there are no systematic indications for the plural forms of adjectives. The distribution overlaps.

¹⁰ The text shifts between counts for five and seven endings. The reason is that inflected adjectives are always written with an <e> in the last syllable. However, sometimes a final <e> is actually part of the basic form, as in *müde* (‘tired’) or *leise* (‘quiet’). German does not use endings, such as *-n*, *-s*, for forms such as *müden*, *leisen* because the rule is that there is always an <e>. It is different for nouns, where German has allomorphs, for example, the genitive-singular form of *Schuh* can be *Schuhs* or *Schuhes*. But if the plural form is made by adding *-s*, it is never as *-es* (*Auto – Autos* ‘cars’, not **Autoes*). Also, *-en* and *-n* can differ because the normal plural suffix for feminine nouns is *-en*, but the normal ending for dative-plurals, if it is marked, is only *-n*, never *-en* (dative plural forms with and without plural suffixes before *-n* include *Büch-er-n* ‘books’, *Lehrer-n* ‘teachers’, *Hund-e-n* ‘dogs’, *Rose-n* ‘roses’, and *Kittel-n* ‘lab coats’, but if the non-syllable *-n* is not possible because of constraints on syllable structures, so there is no dative suffix at all: *Auto-s-ø* ‘cars’, *Frau-en-ø* ‘women’).

¹¹ These are inflectional endings for syntagmatic relationships, case, gender, number, and the contrastive dimension traditionally referred to as “strong – weak.”

Table 6. German adjectival inflections <e, en, er, es, em> across the inflectional paradigm for gender, number, and case

Definite	Gender/ number	Nominative	Accusative	Dative	Genitive
Definite article with weak adjective inflection	M/Sg	<i>der blaue Schuh</i>	<i>den blauen Schuh</i>	<i>dem blauen Schuh</i>	<i>des blauen Schuhs</i>
	F/Sg	<i>die blaue Hose</i>	<i>die blaue Hose</i>	<i>der blauen Hose</i>	<i>der blauen Hose</i>
	N/Sg	<i>das blaue Kleid</i>	<i>das blaue Kleid</i>	<i>dem blauen Kleid</i>	<i>des blauen Kleides</i>
	Pl	<i>die blauen Schuhe/ Hosen/ Kleider</i>	<i>die blauen Schuhe/ Hosen/ Kleider</i>	<i>den blauen Schuhen/ Hosen/ Kleidern</i>	<i>der blauen Schuhe/ Hosen/ Kleider</i>
Indefinite article with mixed adjective inflection	M/Sg	<i>ein blauer Schuh</i>	<i>ein blauer Schuh</i>	<i>einem blauen Schuh</i>	<i>eines blauen Schuhs</i>
	F/Sg	<i>eine blaue Hose</i>	<i>eine blaue Hose</i>	<i>einer blauen Hose</i>	<i>einer blauen Hose</i>
	N/Sg	<i>ein blaues Kleid</i>	<i>ein blaues Kleid</i>	<i>einem blauen Kleid</i>	<i>eines blauen Kleid</i>
Indefinite, without articles, strong adjectival	M/Sg	<i>blauer Saft</i>	<i>blauen Saft</i>	<i>blauem Saft</i>	<i>blauen Saftes</i>
	F/Sg	<i>blaue Tinte</i>	<i>blaue Tinte</i>	<i>blauer Tinte</i>	<i>blauer Tinte</i>
	N/Sg	<i>blaues Wasser</i>	<i>blaues Wasser</i>	<i>blauem Wasser</i>	<i>blauen Wassers</i>
	Pl	<i>blaue Säfte/ Tinten/ Wasser</i>	<i>blaue Säfte/ Tinten/ Wasser</i>	<i>blauen Säften/ Tinten/ Wassern</i>	<i>blauer Säfte/ Tinten/ Wasser</i>

Note: M, masculine; F, feminine; N, neuter; Sg, singular, Pl, plural

Table 7. The inflected and non-inflected adjective forms in both attributive and predicative contexts in German, French, and English.

Grammatical Description		German (Nominative)	infl.	French	infl.	English	infl.
Attributive	M., Sg.	<i>Der langsame Hund</i>	+	<i>Le chien lent</i>	-	<i>The slow dog</i>	-
	M., Pl., def.	<i>Die langsamen Hunde</i>	+	<i>Les chiens lents</i>	+	<i>The slow dogs</i>	-
	M., Pl., indef.	<i>Langsame Hunde</i>	+	<i>Des chiens lents</i>	+	<i>Slow dogs</i>	-
Predicative	M., Pl	<i>Die Hunde sind langsam</i>	-	<i>Les chiens sont lents</i>	+	<i>The dogs are slow</i>	-

Note: +/- *infl.* indicates the presence (+) or absence (-) of an inflectional suffix. Abbreviations: M, masculine; Sg., singular; Pl., plural; def., definite; indef., indefinite

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2.3 The interplay between graphemic forms and grammatical information

The previous sections have shown that German and French NPs are generally structured in similar ways, with determiners marking the left NP boundary and possible markers for inflectional morphology for every word category within an NP. In both languages, inflectional morphology is more salient in the written forms. At the same time, there are also fundamental differences.

Section 2 first demonstrated how each language clearly marks the left boundary of an NP with the presence (or absence) of an article (or article-like word) and how the unity of an NP can be clearly discerned by looking at both the positions of and the distances between an article and the noun. We then presented the inflections of each word class within written NPs. More specifically, we showed that, in French, the unity of NPs is clearer and that the inflectional forms of plurals (albeit somewhat less so for the feminine gender) are very distinct, with singular forms without inflectional markers. In German, NPs are less clearly delimited due to the potential distance between the article and the noun, the frequent absence of determiners, and the large number of different article-like words. Moreover, although the morphologically-complex information is regular, it is characterized by syncretisms, with a handful of forms being used to represent distinct kinds of information.

While Section 2 focused on the grammatical structures of syntactic markers in both (written) languages, Section 3 turns to consider syntactic markers from the graphematic perspectives of both writing systems. The central issue for Section 3 is how the syntactic markers of German and French are integrated within their respective writing systems. To that end, inflectional markers are first described from the perspective of graphematic linguistics and are then examined in terms of two topics that are unrelated to inflections; namely, stem constancies and separate versus compound spellings.

3. The roles of nominal syntactic markers within the French and German graphematic systems

The French and German graphematic systems materialize the syntactic information of inflected NPs for readers, and, thus, writers are expected to conduct syntactic analyses in order to produce the appropriate syntactic markers. It is striking that plurality in French is indicated by every word-form within an NP because the plural *-s* is added to both the article and the noun (e.g., *les professeurs* ‘the teachers’). Gender is less visible, but it can also be detected reliably, as most word endings systematically indicate gender (Lyster, 2006). In contrast, in German, no word-form alone conveys any morphological information (Schwichtenberg & Schiller, 2004). The noun *Lehrer* (‘teacher/s’) does not provide any morphological information about the noun apart from its masculine gender. With the addition of an article, *der Lehrer* indicates either the singular nominative or the plural genitive. We again emphasize that only all the combination of endings—appended to the article, any adjectives, and the noun—convey morphosyntactic information. In order to better understand how inflection is represented in both French and German, this section first describes the written markers that convey morphosyntactic information at the level of an NP. Then, the markers are contextualized with other features of the respective writing systems (stem constancy and conjunctive spellings), and finally, the function of capital spelling in German is discussed to illustrate how it visually demarcates parts of NPs.

3.1 Written inflections

3.1.1 The inflectional morphology of written French

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The grammar of written French (*orthographe grammaticale*) has frequently been described due to its highly germane role for inflectional morphology and yet is, in general, not distinguished phonologically (Catach, 1980b; Meisenburg, 1996, Pellat, 2023). Although the plural and feminine markers are salient for readers, they represent difficult aspects of spelling for writers, as both markers entail grammatical reasoning (Peereman & Sprenger-Charolles, 2018, Weth et al., 2021). Beyond spellings that are unrelated to phonology, the word-final /e/ is most difficult, as it corresponds to a considerable range of morphological distinctions associated with different spellings (e.g., <é, ée, és, ées, er, ez>) (Brissaud et al., 2006).

Notably, it is not only inflectional morphemes that have silent word-endings in French, but the final consonants of stems can also be silent. In contemporary spoken French, there are words that end with consonant pronunciations, even though the final-consonants of Old French are preserved in the contemporary orthography (Meisenburg, 1996: 101ff). While the plural <s> is highly productive and predictable, the final consonants on word-stems are not (Meisenburg, 1996: 82f). Masculine singular is the default written word-form for adjectives and monomorphemic stems; many of which end with a written final-consonant that is not phonologically realized (e.g., *vert* /vɛʁ/, ‘green’). Because the silent consonantal endings of (masculine, uninflected) adjectives are phonologically realized in the feminine forms, due to the additional inflection of <e> (*verte* /vɛʁt/), learners learn to make analogies to the feminine form in order to correctly write the masculine (stem) forms of such words (Fayol, 2020).

3.1.2 The inflectional morphology of written German

German possesses more inflectional morphology than French (three genders, two for number, and four for grammatical case) but the language does not represent this information transparently (see Tables 3, 4, and 6). Adjectives, nouns, and articles have almost the same number of endings, even though they behave very differently. Although endings are phonologically transparent, they constitute the rhymes of unstressed syllables and, thus, may be reduced in utterances. In most cases, the interplay between endings within written NPs results in no ambiguity, or at least little ambiguity, because the different forms are not employed in a random manner. Within a single NP, the endings of each component word usually differ (e.g., *der kleine Baum*); but if several adjectives are combined within a NP, the endings of each adjective will be consistent in the majority of cases (*der kleine, schöne, grüne Baum* ‘the small, nice, green tree’).¹² In sum, the written word-final <e>, which may be combined with consonants and represents a reduced syllable in bisyllabic, trochaic words (Primus, 2003), often indicates a morphological inflection but does so in an imprecise way.

3.1.2 The inflections of adjectives in French and German

A comparison of French and German reveals that adjectives are not inflected within the same syntactic domains, which has consequences for the relationships between visible inflectional endings in writing and syntactic information. German adjectives are always inflected within NPs but never in other syntactic domains. Adjectives in French are usually inflected, regardless of whether they appear within an NP or not. Unmarked forms always indicate the masculine singular. In contrast, English adjectives are never inflected, as shown in Table 7. Furthermore, adverbs are easy to recognize in French, as they are in English, due to their derivational suffixes, such as *Les*

¹² With ‘strong’ endings, there can be some variation, such as *mit heißem grünen Tee*, or *mit heißem grünem Tee* (‘with hot, green tea’).

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chiens courent lentement ('The dogs run slowly'). However, in German, the word forms of both (predicative) adjectives and adverbs are not easy to distinguish, e.g., *Die Hunde laufen langsam*.

The written inflections on the adjectives demonstrate how the syntactic markers in both German and French emphasize different forms of morphological inflections. In French, number (plural) and gender (feminine) are always conspicuous for adjectives in contrast to the masculine singular, irrespective of a specific syntactic context or within an NP. The inflectional information related to a noun is repeatedly highlighted over the sequence of a sentence. This feature becomes even more apparent within relative clauses, e.g., *Les chiens que j'ai vus hier étaient lents* ('The dogs that I saw yesterday were slow'). In addition to the plural marker on the predicative adjective at the end of this sentence (*lents*), there is also plural marking of *chiens* ('dogs') as well as on the verb participle *vus* ('saw') due to the relative pronoun *que*. In German, on the other hand, adjectives are always inflected within NPs but never within other contexts. Although the morphological information provided is rarely precise, written German emphasizes the presence of NPs as inflected units.

3.2 Stem constancy in German and heterography in French

This section focuses on the constancy of written stems in German and the corresponding heterography in French. Although this aspect of morphology is not related to inflectional morphology, it is certainly related to the respective writing systems of each language and, hence, impacts on the saliences of the syntactic markers within both systems. Stem constancy refers to the phenomenon where the stems of different word-forms are always written in the same way, as long as there are no contradictions with the phonological structures. The phonologically-fully transparent forms of singular and plural nouns in German are *Tisch* (/tɪʃ/, 'table' Sg.) and *Tische* (/tɪʃə/, 'tables', Pl.). However, in the case of *Wald* /valt/ 'forest' (Sg.) and the plural form *Wälder* /vɛldɐ/, the phonological forms differ. But the <ä> produces a degree of visual alignment in the spellings, as it is an alternative spelling of <e> for /ɛ/. The <ä> is productively employed in words that are semantically related to words with <a>. Similarly, the <d> in *Wald* is productively employed in word forms pronounced with a /t/ if the lemma includes word forms with a stem ending of /d/. Hence, the heterophone word-forms of the same underlying lexical meaning remain (largely) homographic. Notably, the grapheme <ä> indicates to readers how the different stem forms are related. To correctly spell *Wälder* instead of *<Welder>, it is not necessary to analyze *Wälder* as being a plural form; rather a reader has to analyze the relationship to the word-stem *Wald* (see Table 4). In contrast to German, French is a language with many homophones, due to phonological changes over the history of the language (Meisenburg, 1996: 101f.). Written French differentiates its lexicon visually, such that the words *le saut* ('the jump'), *le seau* ('the bucket'), *le sceau* ('the seal') are all pronounced /so/. The stem of a lexical word is spelled the same across all word forms.

In linking stem constancy with syntactic spelling, a writer in French must determine whether a singular or plural form is appropriate when selecting in writing between the homophonous forms of 'forest', as either *forêt* in the singular or *forêts* in the plural, given that both are pronounced /fore/. In German, a writer can output plural word-forms without the need to reflect on the relevant inflectional paradigm or the inflected syntagma of an NP because the word forms are phonologically transparent; e.g., *Wald* and *Wälder*. The difficulties that arise with the <ä> spelling, instead of <e>, are related to stem constancy. Nevertheless, the word-form *Wälder* indicates that it is an inflected word-form that is plural, but without the necessity of explicitly indicating that it is a plural morpheme (or of providing other morphological information). Readers

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can recognize that this is a plural form due to the stable written stem-forms (Eisenberg, 2020: 343). In addition to representing different word-forms of the same lemma, *Wald* and *Wälder* can function as an argument in sentences such as *Ich sehe Wälder* ('I see forests'). The NP *Wälder* inherently includes information of its masculine gender, in addition to being marked for both its plurality (governed by the word form) and its accusative case (governed by the verb). None of this multi-layering of grammatical information is discernible in the word *Wälder* alone. Rather, what is immediately obvious is that the word form is inflected and hence morphologically complex (Eisenberg, 2013; Fuhrhop, 2006, 2011).

3.3 The conjunctive and disjunctive spellings of compounds in German and French

The issues of conjunctive versus disjunctive spellings do not relate directly to syntactic spellings; rather, the issues pertain to the graphematic word, and, thus, have significance for a word's syntactic role.

In German, morphologically-complex words are written as a single graphematic word, whether it is the output of combining two or more word-stems according to word-formation processes (composition, e.g., *Haustür* literally 'house-door'). Conjunctive spelling of compounds allows for the interpretation of two aligned words syntactically, e.g., the words *Stadt* ('city') and *Pläne* ('plans') as *Sie macht Stadtpläne* ('She designs city maps') or *Sie macht für die Stadt Pläne* ('She makes plans for the city') (Eisenberg, 2020; Fuhrhop, 2007). Such processes allow for very long compounds of various word classes. German compounds are clearly identifiable as single lexico-semantic units that inherit the grammatical characteristics (gender, number, case) of the final head-element within the compound and function syntactically as one word. Indeed, splitting compounds into two orthographic words hampers comprehension, e.g., **er öffnet eine Haus Tür* ('he opens a house-door')¹³ and renders comprehension impossible without the relevant context.

Compounds in French are syntactic units constructed from two or more lexico-semantic units. Such syntactic constructions are manifested through the presence of prepositions (Van Goethem & Amiot, 2019). Thus, compound constructions, such as *pommes de terre*, do not differ entirely from syntactic constructions, such as *solution du problème* ('solution to a problem'); the main distinction is lexical, not syntactic, as *pommes de terre* does not mean 'apples from the ground' but 'potatoes.' French compounds are, in general, left-hand headed. What is important for the inflections of French multi-word expressions with a noun as the head (e.g., *le vin rouge* 'the red wine'; *la bouteille de vin* 'the wine bottle') is that agreement in terms of number and gender within an NP accords with the head and the adjective, e.g., *les vins rouges*, but, in general, only to the head (N₁) within N₁N₂ compounds, e.g., *les bouteilles de vin* (Zwanenburg, 1990).

Conjunctive versus disjunctive spellings have consequences for the visual emphasis of words with respect to capitalization. Discussions about capitalization in French have included how to decide which constituent or constituents of a complex word should be capitalized, particularly for proper names, such as *Massif Central* (Meisenburg, 1990). Meisenburg (1990: 305) states that the proposals within various guidelines over history have by no means been unanimous and, therefore, they only reflect the multiple and diverse practices of printed texts. Compounds are also relevant for the historical development of noun capitalization practices in German, as compound

¹³ The English translation of this ungrammatical example is acceptable because the spelling rules for English are different. In German, the example looks strange. However, examples where the constituents of German compound words are written separately are attested within online texts and student writings (e.g., **Standard Sprache*, 'standard language'). It remains to be seen whether such forms will become established.

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words were more often capitalized compared to other nouns at the end of the 16th century; the beginning of the grammaticalization for capital spellings in German (Barteld et al., 2016).

3.4 Capital spelling as a syntactic marker in German versus indexing as reference in French

The capital spelling of nouns developed slowly over the history of writing systems, similar to word separation (Hartmann et al., 2021; Nowak & Hartmann, 2024). Both are means to facilitate the process of silent reading (Saenger, 1998). Many writing systems based on the Latin script have developed practices of capital spelling to emphasize words that are nouns, in parallel to German (Nowak, 2019), with French being among them (Catach, 1980a; Meisenburg, 1990). From the historical debates about intra-sentential capital spelling for German and French, it is clear that authors in both language contexts opted for the capitalization of words that printers or typesetters regarded as worth emphasizing for a particular reason, such as references to holy words (Szczepaniak & Barteld, 2016) and to persons or places of importance (Bredel, 2006; Meisenburg, 1990). Both writing systems developed sentence-internal capitalization at the end of the 16th century. During the 17th century, capitalization generalized to proper nouns (Bredel, 2006; Meisenburg, 1990; Mentrup, 1986). The emphasis on proper nouns does not have a grammatical basis, but it serves pragmatic aspects in marking a singular reference to a subject and designations of honor (Barteld et al., 2016; Hartmann et al., 2021; Szczepaniak & Barteld, 2016). In French, the generalizing trend stopped with proper nouns (Larousse 1989: “La majuscule”). Today, capitalization in French (as in English) includes a large variety of special rules and indexes a clearly definable referent.

In German, the grammaticalization of intra-sentential capitalization has continuously progressed. Looking at the historical development, the first capitalized words within texts were proper nouns. As a name can be replaced by an NP, structural properties made it possible to extend this practice to other nouns. The capitalization of names and designations for all kinds of entities became common during the 15th and 16th centuries, until the capitalization of nouns that refer to tangible referents was established at the beginning of the 17th century. Following that, nouns that refer to abstract concepts also came to be capitalized. Hence, capitalization was generalized to the grammatical word class of nouns, i.e., to words that grammatically have a fixed gender and that inflect for number and case, as well as semantically having a referential index (Rijkhoff, 2007). In the 18th century, conversions, which are adjectives and verbs used as the nucleus of an NP, also came to be capitalized as well (Bergmann & Nerius, 1997; Bredel, 2006).

In summary then, the shapes of NPs are highly variable in German, ranging from a sole noun to complex constructions that include one (or more) attribute phrase(s). In light of this variability, many researchers have argued that the capital spelling of nouns within the German writing system has continuously developed as a visual feature that indexes the presence of an inflected NP, i.e., the argument of a sentence. Today, it provides visual aids to readers, similar to other stable visual features, such as stem constancy, that aid readers to comprehend sentences and texts as smoothly and quickly as possible (Bredel, 2010; Eisenberg, 1981; Günther, 2007; Maas, 1992; Nübling, 2005; Pauly & Nottbusch, 2020; Vogelzang et al., 2023).

4. Discussion

The syntactic markers described in this paper relate to inflections at the level of NPs, e.g., suffixes, such as the French plural <s>, and word endings, such as the German <e, en, er...>, as well as capital spelling which indicates the presence of inflectional morphology in German. None of these markers can be deduced (solely) from phonology. Rather, the highly stable and salient

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written marking corresponds to only a few phonological cues and high phonetic variability. For example, the French plural is phonologically perceptible on articles. The plural markers on other word classes are almost always silent for isolated word-forms but they might be audible within larger prosodic units, e.g., in liaisons (Chevrot et al., 2007). Furthermore, the grammatical complexity of NPs in French is still manageable, as inflections involve only two genders and two number categories. Masculine and singular are morphologically unmarked, but the written morphemes for the feminine and, most of all, the plural forms are marked in writing. The visual indexing of plurality and/or feminine gender is marked continuously throughout an NP, with subject-verb agreements and the referencing of complex sentences, guiding readers through sentences.

German capital spelling has no phonological counterpart at all (Meletis, 2020), and German endings are phonologically realized in isolation, even if less so within connected speech. German NPs have highly diverse forms, ranging from frequently just a noun alone to the possibilities of complex constructions intervening between an article and a noun. Moreover, German inflectional morphology is rather complex and interdependent in nature. Hence, the phonologically-reduced yet audible endings of German can be regarded as forming part of the grammar than spelling conventions (Bayer et al., 2001; Funke, 2005). Although nouns rarely have endings that indicate inflectional morphology, articles and adjectives do. Indeed, because word endings are often phonologically reduced, it is only their presence in writing that indicates the presence of inflectional morphology. Such information is usually inferred from the interactions between different endings, when determiners, adjectives, and nouns appear within an NP. Thus, while the production of syntactic markers in French relates to the spelling of (almost always) inaudible suffixes that have distinctive features of form and function (even beyond NPs), in German, the capitalization of nouns and word endings indicate the presence of NPs that contain interdependent inflections.

From the perspective of writing, curriculums in both German and French include instruction about morphosyntactic spelling from the start of primary until the end of secondary education. Many studies have shown that young writers use the morphological (morphosyntactic) relationships between words to correctly spell syntactic markers within some contexts (Günther, 2007; Nunes et al., 1997; Pacton et al., 2013). However, it is also undeniable that syntactic markers are the aspect of orthography that are at the core of spelling difficulties across all years of schooling (Betz, 2015; Brissaud et al., 2006) and that even expert writers can experience difficulties with syntactic spellings in some contexts (Fuhrhop & Romstadt, 2021; Lamy et al., 1996; Sandra et al., 1999).

Looking into the processes of learning to spell syntactic markers in both German and French, some similarities in the patterns of learning seem to occur. For French plural spellings, learners have to learn to place the silent markers <s> on nouns and adjectives and <(e)nt> on the verb. Several studies have demonstrated that, in French, learning to spell the plurals of familiar nouns is essential before any other aspects can be learned (Brissaud et al., 2014; Klasen et al., 2023; Weth et al., 2021). The German capitalization of nouns also seems to be influenced by semantics, i.e., the tangibility of a noun's referent (Betz, 2015; Brucher et al., 2023). Thus, in both languages, learners must learn the appropriate levels of grammatical inferencing in order to correctly produce written word-forms within a given sentence, by employing cognitive processes to understand syntactic structure in both comprehending whilst reading and producing whilst writing.

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The syntactic (Section 2) and graphematic (Section 3) representation of syntactic markers in both written French and German can elucidate questions about the meaning of “syntactic” in the context of syntactic spellings, as both writing systems employ forms of syntactic marking albeit in different ways.

In French, syntactic markers are closely related to the spelling system and, thus, to its acquisition, because learning to spell entails learning a system of inflectional morphology that is absent from spoken French. After learners can append <s> as a plural marker to nouns, they next have to learn to extend the principle to append the grapheme on other words, namely, adjectives. Moreover, they also have to learn about the secondary plural marking of verbs. Across this learning process, the structure of prototypical NPs remains very similar, to the extent that NP units are always very clearly delimited by an article. For example, *les chiens* extends to *les grands chiens noirs*, or to less frequent words, such as *les mammifères* ‘the mammals.’

In German, syntactic markers are closely related to the system of inflections, where spelling (and spoken) forms do not provide precise morphological information. The most salient form of syntactic marking in German is the capitalization of nouns, which requires writers to determine the syntactic function of NPs within sentences and to determine the noun word-class, irrespective of whether a word is semantically tangible or not (e.g., *der Hund*, *das Säugetier*, *das Bellen*). Moreover, articles are often omitted from the syntactic context of nouns (*Ich mag Hunde*), or complex syntactic structures intervene between an article and a noun (cf. 2.1). Similarly, inflectional word-endings also depend on writers gaining sufficient syntactic awareness about NP structures and the argument function of NPs within a sentence (Roesch & Chondrogianni, 2016), even when the endings might be phonologically salient (Köpcke, 2003).

The differences between the NP structures of German and French suggest that models concerned with the use and production of syntactic markers need to integrate a more fine-grained understandings of the specific syntactic and graphematic structures of each language in order to better comprehend for how expert writers and learners process NP structures, taking into account the relative frequencies of lexical and phrasal patterns and especially of syntactic markers. The successful spelling of syntactic markers depends on the abilities of writers to reliably perceive whether a given word is an inflected word-form and grasp how syntactic markers are embedded within the general structure of a writing system, such as the silent word-endings of French and the representation of the prosodic word-structures in German. This paper has sought to highlight such complexities. Better understandings of both syntactic and graphematic structures may lead to deeper insights into the processes of spelling acquisition at the level of syntax and the development of instruction that facilitate learners to develop their syntactic spelling.

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