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Article

Does Japanese/German L1 Metrical and Tonal Structure Constrain the Acquisition of French L2 Morphology?

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Abstract: In different studies dedicated to the acquisition of verbal morphology by bilingual children or by L2 learners, it has been noted that differences in the acquisition process cannot be accounted for by only considering the distance between L1 and L2 morphology. Some forms, such as auxiliaries, may occur in L2 productions without being motivated by L1 morphology. To account for this, the *prosodic transfer hypothesis*—according to which the acquisition of morphology in the non-dominant language is influenced by the prosody of the dominant language—has been formulated. That prosodic features may influence the acquisition of morphology is interesting as it shows that the acquisition process must be apprehended by considering interfaces and interrelations between the various levels of linguistic description. The aim of this contribution is thus two-fold: (i) clarifying to which aspects of prosody *prosodic transfer hypothesis* refers (specifically, among tonal and metrical prosodic elements, which one comes into play to account for morphological development); and (ii) explaining the importance of considering grammatical interfaces in study on L2 development. To do so, an exploratory study, which relies on the analysis of L2 French narratives produced by two learners with L1 Japanese and two with L1 German, was achieved. This preliminary analysis of the data suggests that metrical structure—more precisely, the nature of the basic metrical unit—may constrain the occurrence of auxiliary and vowel-final forms in the productions of Japanese learners.

Keywords: L2 acquisition; cross-linguistic interferences; prosody-morphology interface; metrical structure

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1. Introduction

To account for the gradual process of acquisition of verbal morphology in inflectional second languages, it is common to show the evolution of verbal inflectional rate in an obligatory context. This index of inflection allows us to compare different speakers and to analyse, for example, cross-linguistic influences in the acquisition of verbal morphology in a contrastive way. However, it may be insufficient to understand the specificity of certain morphological developmental aspects. Thus, recent studies have shown the limits of a binary approach to verbal morphology (inflected vs. uninflected verbs) and the interest of a qualitative analysis of verbal forms used at different stages (Benazzo and Starren 2007; Blom et al. 2013; Giuliano 2003). These studies have also highlighted the intermediate role of analytic verb forms—i.e., forms containing separate elements, such as auxiliaries as in (1)—in the acquisition of synthetic verb forms as in (2). Even if the constructions with auxiliaries do not fulfill all the functions (agreement, temporal, aspectual, agentive) assigned to them in the target languages, it is generally

accepted that they are relevant clues to ongoing morphological development. The statement in (1), for example, taken from an account of family activities, is characteristic of the production of a late speaker of French.

- (1) grand-mère [e] peint un barque de la loch ness
 grand-mother [e] paint.3SG a boot from the loch ness
 'the grand-mother is painting a boot from the Loch Ness' or 'the grand-mother
 paints a boot from the Loch Ness' (L36, Linguistic Development Corpus¹)
- (2) la grand-mère peint le lac
 the grand-mother paint.PRES. 3SG the lake
 'the grand-mother is painting the lake' (L49, Linguistic Development Corpus)

Only the verb forms *a peint* (has painted), with the preverbal element *a/has* or *peint* (paints/is painting), are attested in the speech of early French speakers, i.e., L1 French speakers. Studies dedicated to these constructions, also called dummy auxiliary constructions (Blom et al. 2013), have mainly focused on what motivate their occurrence and even on which functions they fulfill in the utterance, morphosyntactic vs. semantic. In (1), for example, there are at least two possible functions of the monophonemic element [e] located before the past participle form of the verb *peindre* (paint). A morphosyntactic analysis would emphasize the formal resemblance of this element with *est*, the inflected form of the auxiliary *be* in the third-person singular, and invite consideration that this element of morphological nature realizes in an economical way the agreement in person and number between the subject *grand-mère* and the verb *peindre*, as is the case for the auxiliary *do* in English (Parodi 2000). Alternatively, a semantic analysis would consider that an auxiliary form is motivated by an objective change in the temporal-aspectual context or a subjective change in the speaker's perspective on the event. Thus, the preverbal element could be interpreted as a progressive aspectual marker expressing the ongoing nature of the painting situation. This debate suggests that only one interpretation of the auxiliary would be valid at a given stage. Yet, a recent study shows that at the same stage of development in French as a second language (L2), the frequency of auxiliary verbal constructions in narrative discourse varies according to the first language (L1) of the narrators, German vs. Japanese (Granget 2018). This result suggests an influence of the first language and opens the way to other explanations than those previously outlined, which are mostly related to morpho-syntax and semantics. Phonological and prosodic features from the L1 may also come into play, as has been stated in the *prosodic transfer hypothesis* (Schlyter 1995; Goad and White 2004, among others). This is what we wish to investigate in this contribution by analysing productions in French from two learners with L1 Japanese and two with L1 German. Our aim is thus threefold: (i) to analyse the relevance of the hypothesis of a prosodic bias in the acquisition of L2 French verbal morphology by L1 Japanese and German speakers; (ii) to clarify the different prosodic domains and/or levels at which L1 could exert a constraint on the choice of verbal form in L2; and (iii) to present the results of a pilot analysis of four L2 French narratives, half of which were produced by L1 Japanese speakers and the other half by L1 German speakers.

In what follows, we first recall the main results of research on dummy auxiliary constructions and on the prosodic hypothesis. We then present the main morphological and prosodic features of the three languages under investigation—Japanese, German and French—by also clarifying the various domains/levels of prosodic analysis that could come into play. Then, we present the L2 French corpus used for the exploratory study presented in this contribution. In addition, the methodology used for annotating and analysing verbal phrases is explained. Finally, the results of this study are presented and discussed.

2. The Prosody/Morphology Interface in L2 Acquisition

2.1. The Use of Dummy Auxiliary Constructions

Research on the development of verbal morphology in inflectional second languages points to a proto-morphological stage in which dummy auxiliary verbal constructions, consisting of a lexical verb form preceded by a formally auxiliary-like but functionally restricted element, emerge (Blom et al. 2013; Noyau et al. 1995; Parodi 2000; Starren 2001). In the literature, this last element is variably called a “light or nuclear verb” (Viberg 2006), a “non-thematic verb” (Parodi 2000), a “proto-auxiliary” (Benazzo and Starren 2007; Starren 2001), or a “dummy-auxiliary” (Blom et al. 2013), the last of which is used in this article. Dummy auxiliary verbal constructions have been analysed in Dutch (Starren 2001; Jordens and Dimroth 2006; Verhagen 2011, 2013; Jordens 2012, 2013; Van de Craats and van Hout 2010), German (Schimke 2013), and French (Starren 2001; Giuliano 2003; Myles 2005; Benazzo and Starren 2007; Schimke 2013; Granget 2015, 2018). Although most studies focus on the auxiliaries HAVE (e.g., *hat/has* for German in (3)) and BE (e.g., *is* for Dutch in (4) or *est/is* and *a/has* for French in (5) and (6), respectively), the dummy auxiliary class includes a variable set of elements from one study to another. For example, it also includes the semi-auxiliaries *go, gaat* (Dutch) or *aller* in French, as well as modals like *veut/veulent* (will) or *peut/peuvent* (can). Moreover, the copula *c’est, /sE/* and *il y a* or the reduced form *ya, /ja/* /there is in French have often been considered as a preverbal central element in L2 acquisition as in (7a) and (7b) (see Noyau et al. 1995; Schimke 2013; Starren 2001; Véronique 2013).

(3) herr grün hat schlafen
 mister green have.3SG have.3SG sleep.INF/PRES.3PL
 ‘Mister Green is sleeping’ or ‘Mister Green (has) sleep(s)’² (Schimke 2013, p. 318)

(4) de ouders is nog slapen
 the parents be.3SG still sleep.INF/PRES.3PL
 ‘The parents are still sleeping’ (Van de Craats and van Hout 2010, p. 491)

(5) monsieur vert il est dormir
 mister green he be.3SG sleep.INF
 ‘Mister Green he is sleeping’ or ‘Mister Green (is) sleep(s)’ (Schimke 2013, p. 317)

(6) il a dort
 He have.3SG sleep.3SG
 ‘He has slept’ or ‘he (has) sleeps’ (Schimke 2013, p. 318)

(7) a. c’est prépar[e] le gâteau
 it’s prepare.INF the cake
 ‘il prepare le gâteau’ ou ‘he is preparing the cake’ (Schimke 2013, p. 318)

b. il y a dort
 there/he y.PRO have.3/2SG sleep.PRES.SG
 ‘he is sleeping’ or ‘he (has) sleep(s)’ (Schimke 2013, p. 319)

Studies on dummy auxiliary constructions show also the relevance of complementing analyses of inflectional verbal morphology in terms of inflectional rate with analyses in terms of verbal forms.

Most studies have sought to determine the function of dummy auxiliaries, and most discussions have focused on the semantic vs. morphosyntactic properties of the preverbal auxiliary since there is a risk of over-interpretation if we infer the function of an element in learner varieties from the function it fulfills in the L1 (Jordens 2013; Myles 2004). In some cases, the dummy auxiliary is interpreted following Parodi (2000) as a pro-

to-grammatical verbal element, which has no specific meaning but carries inflection (agreement), such as the auxiliary *do* in English. In other cases, it is considered a verbal element expressing a semantic contrast, be it temporal or aspectual, depending on the first language at an intermediate stage (Benazzo and Starren 2007; Giuliano 2003; Starren 2001). Most studies on dummy auxiliary constructions have argued in favor of one interpretative hypothesis or the other. According to them, based on L2 data from speakers of the same first language who have reached different stages of development in the target language, semantic or morphosyntactic factors trigger the use of dummy auxiliary constructions.

The specificity of the singular auxiliaries *a* /a/ and *est* /E/ in French, in contrast to other flexional languages, is that they are monophonemic. In the French *input* they are often cliticized to the subject pronoun that precedes them, *il* /il/ or *elle* /ɛl/, and build a phonological block /ilE/, /ɛlE/ and /ila/, /ɛla/. Studies of verbal morphology in French L2 have often pointed out the difficulty of perceiving the auxiliary as distinct from the pronoun for learners who are only exposed to spoken French (Noyau et al. 1995; Benazzo and Starren 2007). In French L1 at early stages, there is no clear evidence for a phonological vs. morphological status of the preverbal element in the child's productions (Bassano 2000; Veneziano and Parisse 2010). We may expect that L2 learners exposed to written French and the visual chain of words get an early representation of pronouns and auxiliaries as free independent morphemes and do not go through this proto-morphological stage. But this is not the case since dummy auxiliaries are also used in L2 varieties produced by instructed learners of French (Granget 2015, 2018; Myles 2005). As the usual triggers of a dummy auxiliary are no longer relevant, this form may be a phonological element due to segmental or suprasegmental constraints.

In a contrastive study on the use of auxiliary constructions in the plural narrative utterances of Japanese and German learners of L2 French at an intermediate level, Granget (2018) observes that the rate of auxiliary verbal constructions depends on the first language: it is significantly higher in plural utterances produced by L1 Japanese speakers as in (8) than in those produced by L1 German speakers.

(8)	il(s)	sont	trainé	de danse
	he/they	be.3PL	train.PastPART	to/of dance
	'they are training to dance		(L1 Japanese, Granget 2018)	

Explaining this difference in terms of morphological development and the distance between L1 and French is rather difficult. Even if subject-verb agreement is not a relevant category in Japanese L1, the subject-verb agreement in French L2 (plural contexts) occurs more often in the production of the Japanese L1 group than in that of the German L1 group. Consequently, morphosyntactic transfer cannot explain the realizations obtained. An additional phenomenon catches our attention here: in the utterances where subject-verb agreement is realized with a plural subject, the preferred verbal form in the Japanese L1 group is the auxiliary verbal construction with a dummy auxiliary in 41.8% of the cases, compared to 4.7% of the cases in the German L1 group. The simple plural form is used in only 14% of cases compared to 35.8% in the German L1 group. This result suggests that the frequency of auxiliary constructions does not depend on morphosyntax; other properties of the learner's L1 must be involved.

As Japanese and German verbal morphology cannot allow explaining the forms observed in terms of morphological transfer (see Section 3), a prosodic transfer of the first language is likely to account for the preposed morphophonological element, as suggested by various studies that refer in such cases to a prosodic bias (Schlyter 1995) or a prosodic transfer (Goad and White 2004). Other studies also argue for the influence of L1 prosody in the realisation of epenthetic vowels (Yazawa et al. 2015; Sauzedde 2018). The aim of the following section is to review studies on prosodic bias that are relevant to the morphology/prosody interface.

2.2. Prosodic Bias, Transfer, or Epenthesis?

The occurrence of a form comparable to an auxiliary could also be considered as an epenthesis. As phonological epenthesis are often realised to satisfy prosodic constraints (well-formedness of syllable structures, stress-clash avoidance, etc.), several studies on L2 development have analysed these forms as resulting from a prosodic bias. Due to the influence from the prosodic and phonological structures and patterns of their L1, learners may insert segments in the speech chain of the L2 in order to conform to them.

In a case study dealing with the use of different morphemes in English L2 produced by an advanced Turkish learner, Goad and White (2004) proposed to account for morphological variability and to examine the prosodic influence of the first language on the acquisition of inflected verb forms. In order to explain why postposed verbal suffixes (agreement and past inflection) and plural morphemes on nouns are significantly more frequent than preposed definite and indefinite articles, they refer to the *Prosodic Transfer Hypothesis* (PTH). Their claim is that the production of L2 inflectional morphology and function words is constrained by the prosodic representations available in L1. When L1 prosodic representations are not identical to those required for L2, as it may appear in a contrastive analysis of the prosodic structure (syllable, foot, prosodic words, phonological phrases), they can be minimally adapted to represent the morphological material of L2. In this case, L2 speakers are predicted to build appropriate prosodic representations and produce functional morphology, as is the case for verbal suffixes in the English interlanguage of the Turkish learner. If prosodic representations are not adapted, learners are predicted to omit functional morphology, as for articles since the morphological material cannot be represented in prosodic structure. According to PTH, the distance between the prosodic structures of the verbal phrase in L1 and L2, especially at the low level, is a good predictor to account for the learnability of preposed or postposed morphemes. However, the authors do not address the particular case of our study, namely the frequency of dummy auxiliary construction due to the L1.

In a study dedicated to the acquisition of verbal morphology by children with early exposure to French and Swedish, Schlyter (1995) highlights a possible effect of prosodic dominance on verbal morphology that she calls the Prosodic Bias hypothesis. The study compares the morphological development of two bilingual children, one French dominant, Ann, and one Swedish dominant, Jean. According to Schlyter, children are sensitive to their dominant language in the way they construe verbal forms. This sensitivity is not only related to morphology (preposed auxiliary-stem as in (9) vs. postposed stem-suffix as in (10)), but also to the prosody of the language. The morphological analysis of the productions of the children consists of classifying verbal forms into two categories: preposed morphemes as in (9) and postposed morphemes as in (10). As for prosodic analysis, which is qualitative and quantitative, it consists of encoding the metrical patterns associated with small utterances. To assign a metrical form to each phrase, a distinction is made between FINAL stress patterns that are typical for French (iambic (ia), weak strong; anapestic (ana), weak-weak-strong) as in (9), where the stress syllable is in capital letters, and INITIAL stress patterns that are typical for Swedish (trochaic grave (gr), strong-weak, grave; trochaic acute (ac), strong-weak, acute; and dactylic (dac), strong-weak-weak) as in (10), as well as patterns attested in both languages (monosyllable (m), grave word preceded by a weak syllable (xgr)).

- (9) Final prosodic pattern, preposed verbal morpheme, French
 ils sont veNUs
 They are come.PastPART
 'They have come' or 'they come'
- (10) Initial prosodic pattern, postposed verbal morpheme, Swedish
 KOmm-er dom
 Come.PRES they
 'Will they come' or 'they come'

Since French spoken by adults has regular phrase-final stress, stress being culminative at the accentual phrase or clitic group (i.e., (*ils sont veNUS*) ‘they have come’, (*je VIENS*) ‘I come’, etc.), French-speaking children in a French environment easily pick up words and phrases with final stress. Those patterns facilitate the acquisition of preposed grammatical morphemes, ie., prefixes, auxiliaries, and other preposed morphemes such as clitic pronouns in French: *il dort* ‘he sleeps’, *est cassé* ‘is broken’. In contrast, as Swedish spoken by adults has a more variable stress pattern than French, Swedish-speaking children in a Swedish environment develop in the first stage initial stress patterns that favor the acquisition of postposed verbal morphemes.

The results of Schlyter’s analysis show that the two children have different prosodic patterns due to their language dominance and different morphological preferences. The dominant prosodic pattern in the Swedish utterances of Jean (Swedish dominant due to his family situation) is a final one in the early stage, but an initial one typical for Swedish people in the late stage (age 2;2). During that period, most of the morphemes (verbal and nominal) are post-posed (70%), as is the case in Swedish L1 acquisition (Table 1). The dominant prosodic pattern in the Swedish utterances of Anne (French dominant) is different, it is a final one during all stages, from age 2;6 to 2;10. During that period, most of the morphemes (verbal and nominal) and even all morphemes at the last stage are pre-posed, as is the case in French L1 before age 3, but not in Swedish L1 (Table 2).

Table 1. Proportion of initial and final stress pattern (% of the total number of patterns) and of pre- and postposed morphemes in the Swedish utterances of Jean (Swedish dominant).

Stage (age)	1 (1;8)		2 (2;0)		3 (2;2)	
Stress	Initial ¹	Final ²	Initial	Final	Initial	Final
	28	62	56	38	77	28
Morphemes position	Pre-	Post-	Pre-	Post-	Pre-	Post-
	42	58	50	50	30	70

¹(gr, ac, dac) ² iambic (ia), anapestic (ana), m, (xgr).

Table 2. Proportion of initial and final stress pattern (% of the total number of patterns) and of pre- and postposed morphemes in the Swedish utterances of Ann (French dominant).

Stage (age)	1 (2;6)		2 (2;8)		3 (2;10)	
Stress	Initial ¹	Final ²	Initial	Final	Initial	Final
	14	80	8	71	3	74
Morphemes position	Pre-	Post-	Pre-	Post-	Pre-	
	79	21	94	6	100	

¹ (gr, ac, dac) ² iambic (ia), anapestic (ana), m, (xgr).

This case study clearly shows a close relationship between prosodic and morphological patterns and a clear prosodic bias: the dominant prosodic pattern of bilingual children constrains the position of emerging morphemes at the proto-morphological stage. According to Schlyter (1995, p. 102), it is still to be studied if the prosodic bias hypothesis is transferable to L2 acquisition since “the late acquisition of morphology in L2 may be partly due to prosodic patterns in L1 and L2, with prosodic habits from L1 which do not fit the habits of the L2”. If the prosodic bias hypothesis is true for French L2 acquisition, the stress patterns or some other metrical features of the first language may constrain the position of verbal morphemes. We also may expect that L2 learners will be able to acquire the position of French morphemes if they acquire French metrical patterns.

In de Bot's multilingual model of speech production inspired by Levelt et al. (1999), the way syllables are realised at the surface level in an L2 is influenced by the syllabic structure inventory of the L1 (De Bot 2004). Yazawa et al. (2015) and Sauzedde (2018) have documented such influence through the production of vowel epenthesis in the speech data produced by Japanese learners of L2 English and L2 French: the insertion of a vowel between two consonants is due to constraints on syllables well-formedness. In Japanese, the basic rhythmic unit is the mora, as a consequence syllables of the form CV that consist of a single mora are highly preferred and consonant clusters or syllable-final consonants are not allowed except in a few instances. Consequently, a vowel is often inserted to break up consonant clusters and to avoid word-final consonants (e.g., *cross*/krɒs/, CCVC in English, may be realised as /kuRɒsu/, CVCVCV, with epenthetic vowels /o/ and /u/ to overcome the consonant cluster and the final consonant). Even if vowel epenthesis has mainly been documented in experimental data on words and nonwords (Detey and Nespoulous 2008), it may also occur in more ecological speech data. Therefore, the verbal phrase *il mange* /ilmãʒ/, VCCVC, may be resyllabified to CVCVCV, with two epentheses realised as in /ilumãʒu/. A plausible scenario for L2 French is that this verbal form is realised /ilamãʒe/ because this form is already available in French input and has a moraic structure.

According to this hypothesis, the use of a monophonemic *a* /a/, *est* /é /E/ or a biphonemic auxiliary like *sont* /sõ/, which satisfies Japanese monomoraic syllabic templates, has a double function: marking subject-verb number agreement and satisfying L1 metrical structure. In the narratives analysed for this study, the preverbal vowels or syllables clearly have the phonological forms of free morphemes (singular auxiliaries /a/ or /E/, plural, *sont*/are, [z]ont/[plural liaison z]are, *vont*/go), but it is not excluded that this phoneme can take other forms closer to the intervocalic vowels /u/ identified in the studies mentioned above. Indeed, learners may prefer solutions that have several advantages: the forms exist in the target language and they are morphosyntactically functional, prosodically congruent, and easily pronounced.

2.3. Issues Raised and Objectives of the Paper: From Theory to Data

Despite some differences in the way to apprehend the prosodic transfer hypothesis, Schlyter (1995) and Goad & White (2004) consider that L1 prosody, be it expressed in terms of metrical patterns or prosodic structure, plays a role in the way to encode verbal inflection in an L2. According to Schlyter (1995), metrical and prosodic structure account for the linear position of verbal markers, whereas Goad and White (2004) consider that the frequency of occurrence of a morpheme depends, among other things, on the distance of the L1 and L2 prosodic representations. In our case, we do not want to compare the realisation of an inflectional morpheme, but for the same functional category, subject-verb agreement, we wish to explore how it is encoded in the L2 French discourse of learners of different L1s. The dependent morphological variable of interest is not the rate of inflection but the type of inflection, i.e., a complex form with auxiliary (mostly observed in the Japanese-speaking group) or a simple form (observed in the German-speaking group). This variable corresponds to the morphological variable observed by Schlyter (1995).

The question raised by the comparison of the two explanatory models is, which prosodic properties of Japanese would favour auxiliary forms in the L2 French spoken by Japanese learners at A2 stage? Is the accentual pattern sufficient? Does the prosodic phrase in Japanese present an accentual pattern that is transferred to L2 French and, thus, constrains the development of preverbal morphemes? Do some other metrical features of the language come into play? In order to investigate these issues, let us first present the prosodic and morphological characteristics of the languages involved, i.e., French, Japanese, and German.

3. Morphological and Prosodic Features of the Languages in Contact

The aim of this section is to present (i) the verbal elements or morphemes used to encode tense, aspect, person, and number, with a special attention on auxiliaries; and (ii) some aspects of Japanese, German, and French prosody, in particular those regarding metrical units/patterns and accentuation. This presentation will then allow formulating cross-linguistic differences and their consequences.

3.1. Morphology and Verbal Markers

Japanese and German verbal morphology differ in some aspects from French and are similar in others. The three languages have in common that they have simple verb forms as in (11), consisting of a synthetic prefixed, suffixed, or infixal lexical base, and complex forms as in (12), consisting of a lexical verb form and a free morpheme or auxiliary. However, the three languages differ in the marking of agreement, the meanings of auxiliary constructions, and the position of the inflected components of the verb.

While subject-verb agreement is a central functional category in French and German, this is not the case in Japanese. The Japanese verb form in the present tense does not vary according to number as in (11a). In German, most of the lexical verbs have an inflected present third-person singular form ending in *-t*, [t] in the spoken form, as in (11b), and an inflected present third-person plural verb form ending in *-en*, /ən/ or /n/ in the spoken form, as in (11b'). In French, there are different types of inflection in the present tense depending on the verbal class of the verb. Some verbs keep the same form in the third-person singular and the third-person plural in the present tense in spoken French. In written French, as in (11c) and (11c'), the singular form ends in <e> and the plural form in <ent>. Those suffixes, typical for written French, have been called “silent morphemes” (Ågren 2008). Most of these verbs have their infinitive form in <-er> but some verbs do not, see *découvre* /dekuvʁ/ discover (3SG) and *découvrent* /dekuvʁ/ (3PL) from the verb *découvrir*. That is why Michot (2014) considers them all together as a uniform verb class (Vuni). She also considers two other classes of verbs whose plural form is different from the singular one: the class of verbs making their plural form with an additional final consonant (Vcons) as in (11d'). The verb form *disent* /diz/ corresponds to the addition of the consonant /z/ to the singular form *dit* /di/. A third class of verbs includes those making their plural in the third-person present tense with a changing stem (Vste), keeping most of the time one or more element of the consonantal architecture of the stem, e.g., the verb *savoir* (know/can), whose singular and plural forms in the third person are *sait* /sɛ/ and *savent* /sav/, respectively.

(11)	a.	onnanohito ni woman to	kiki-masu ask.NONPAST	(Japanese)
	b.	sie frag-t she ask.PRES.3SG	eine Frau a woman	(German)
	b'	sie frag-en they ask.PRES.3PL	eine Frau a woman	
	c.	elle demande she ask.PRES.1/3SG	à une femme to a woman	(French)
	c'	elles demandent they ask.PRES.3PL	à une femme a woman	
	d.	il dit he say.PRES.3SG	goodbye	au revoir
	d'	ils disent they say.PRES.3PL	goodbye	
	e.	il sait he can.PRES.3SG	dance	danser
	e'	ils savent they can.PRES.3PL	danser	dance

Even if agreement is not a relevant category for Japanese, verbs are indeed inflected because their form varies in tense, namely past and non-past. In (11a), the verb form *kiki-masu* is 'non-past', and contrasts with the past verb form *kiki-mashita*. The same is true for auxiliary forms where the auxiliary can be non-past as in (12) or past tense as in (13).

- (12) onnanohito ni kiki-te i-masu (Japanese)
 woman to ask.TE Aux.NONPAST
 ‘she is asking a woman’
- (13) onnanohito ni kiki-te i-mashta (Japanese)
 Woman to ask.TE Aux.PAST
 ‘she was asking a woman’

The meaning of auxiliary forms varies according to the auxiliaries and the language. In French, the constructions *avoir* /have + V (14) express the past perfective or present perfect, while the constructions *est*/be + V express these temporal-aspectual categories with motion verbs, but also passive meaning with transitive verbs.

- (14) elle a demand-é à une femme (French)
 she AuxHave.3SG ask.PAST.PART to a woman
 ‘she asked a woman’

In German, auxiliary constructions with the auxiliaries *haben*/have as in (15) and *sein*/be also have past meaning, but it has often been claimed that aspect is not a relevant category for German (Klein 1994; Lasser 1997). As for the auxiliary choice, *haben*/have is more frequently used, *sein*/be being restricted to motion verbs. The auxiliary *werden*, by contrast, is used for future and passive constructions.

- (15) sie hat eine Frau ge-frag-t (German)
 she AuxHave.3SG a woman ask.PAST.PART
 ‘she asked a woman’

The auxiliary form *V-te imasu* in Japanese (12)–(13) has a quite unusual double meaning, imperfective progressive or resultative, depending on the aspectual lexical class of the verb. Moreover, it may occur in the past or non-past tense (Shirai 1998).

Syntactically, the languages also differ: French is a VO language, German is a V2 (declarative sentences) and OV (subordinate sentences) language, and Japanese an OV language. It follows that the position of the lexical verb and the auxiliary differ in declarative utterances. In French, the auxiliary is after the subject and before the lexical verb as in (14), whereas in Japanese the auxiliary is in final position, preceded by the lexical verb as in (12) and (13). In German auxiliary forms, as any inflected component, are in the second position of the sentence, and the lexical component in final position (see, e.g., *hat* and *gefragt* respectively in (15)). It is important to mention these syntactic positions as their form may be realised differently depending on the prosodic and metrical structure of the language.

3.2. Prosodic Features

This section does not offer an exhaustive description of the prosodic features of French, German, and Japanese. We are only interested in the prosodic features that are essential to accounting for metrical and intonational patterns at the level of the prosodic word and the accentual phrase (which may also be called the clitic group or minor phrase in the literature), i.e., prosodic phrases in which verbal forms are wrapped. The prosodic representation and analysis presented here are developed within an adapted version of the AM model (see Ladd 2008 for a review). In this framework, the prosody associated with an utterance is represented by means of two distinct representations or structures, the metrical structure and the tonal profile. Metrical structures encode which mora, syllables, or other units (i.e., foot, prosodic words, etc.) are prominent and explain at which level of structuring stress is culminative (Lieberman and Prince 1977; Prince 1983, among others). The tonal pattern consists of a linear sequence of pitch accents (associated with stressed or metrically strong positions in metrical structures) and edge tones associated to the edges of prosodic phrases, especially intermediate and intonational phrases (Pierrehumbert 1980; Pierrehumbert and Beckman 1988; Ladd 2008, among others). The

two types of representations are independently constructed, but language-specific association principles are necessary. In order to present and compare the prosodic features of the languages under investigation, we will first present the metrical features and then the tonal ones. But, as previously said, the descriptions will only focus on the metrical and tonal structure up to the level of the prosodic word and the accentual phrase (AP). Basic metrical units, i.e., units that can be prominent and associated with a pitch accent, are the mora and the syllable. At the phrasal level, we refer to prosodic or phonological words as the domain of primary stress assignment in many languages and accentual phrases.

In any language, metrical structure is construed from a basic metrical unit. In Japanese, this unit is the mora, whereas in French and German it is the syllable. Japanese is thus clearly different from German and French. Based on Japanese linguistic tradition, as well as on the study of versified poetry and on numerous language games, Labruno (2012) has shown that the syllable seems to have no cognitive reality in Japanese. In contrast, in German and French, the syllable is the basic metrical unit (Wiese 1996 among others), and it plays an important role in versification. As for syllable structure, there are differences between the three languages. In German, complex syllable structure with consonant clusters and/or coda (CVC, CCV, VCC, etc.), which also appear in French, are frequent. In Japanese, by contrast, syllables are usually of the form CV in order to coincide with a mora.

Concerning stress patterns, in German and Japanese, stress is culminative at the level of the prosodic word, i.e., among the basic metrical units that compose a lexical word, one is more prominent, i.e., considered as stressed or accented. By contrast, in French, stress is culminative postlexically at the level of the accentual phrase. As for the localization of the stressed/distinguished metrical unit, stressed syllables are usually in the rightmost trochaic foot of the word in German (Wiese 1996, among others); and, in terms of realisation, the stressed syllable does not necessarily receive a tonal marking. As for Japanese, the location of the strong mora cannot be derived straightforwardly, but it is given in the lexical representation. Moreover, the strong or accented mora is always realized by a melodic movement that corresponds to a melodic fall from the prominent mora, noted as H*+L (Venditti 2005). In addition, note that some words remain unaccented. As for French, it has no lexical stress, which could allow distinguishing lexical words having the same phonemic form. Nevertheless, the elaboration of French stress patterns derives from underlying metrical templates. Their construction is based on (i) word classification and (ii) the principle of bipolarity (Di Cristo 1999, among others). The different words of the language can be classified into two classes according to whether they are capable or not of receiving a final stress on their last syllable (unless their nucleus is a schwa). A [+ stress] word is any word that can receive a final accent, and a [- stress] word is any word that never receives a final accent. Determiners, weak pronouns, the complementor *que* ‘that’, the negative prefix *ne*, and monosyllabic prepositions such as *à*, *de* or *en*, i.e., monosyllabic grammatical words, are generally [- stress]. Other words, such as nouns, verbs, adjectives, interrogative pronouns, and adverbs, are [+ stress]. In terms of metrical patterns, [- stress] words are represented as a simple sequence of weak syllables, whereas the initial and final syllables of [+ stress] words are strong (s), as shown in (16a) and (16b), respectively.

- (16) a. Metrical templates associated with [- stress] words
- | | | |
|---------|----------|---------|
| ʒə (je) | lɛ (les) | ɑ̃ (en) |
| w | w | w |
- b. Metrical templates associated with [+ stress] words
- | | | |
|------------------|-------------|----------------------|
| dɛmɑ̃ ‘tomorrow’ | livr ‘book’ | partira ‘will leave’ |
| dɛ | mɛ̃ | livR |
| s | s | paʁ ti ʁa |
| | | s w s |

Note that at the lexical-level final strong position does not dominate initial strong position in French. It results from the fact that stress is not culminative at this level. Thus,

depending on the context, the noun *chaton* ‘kitten’ may be stressed on the initial syllable or on the final one, and the forms *chaton* /ʃa.tɔ/ and *chaton* /ʃa.ˈtɔ/ always refer to the same word. The same occurs for *demain* (16b). In the prosodic phrase *demain soir* in the utterance in (17a), an initial accent is often realized on the syllable /də/ and the final one falls on /swaʊ/, the syllable /mɛ̃/ remaining unstressed. In contrast, in the prosodic phrase *demain* in (17b), the syllable /də/ is unstressed and /mɛ̃/ is. The representation in (16b) thus represents the fact that both positions can potentially be stressed at a higher level in conformity with the principle of bipolarity (Di Cristo 1999).

- (17) a. *Demain soir,* *Pierre viendra*
 Tomorrow evening Peter will come
 (ˈdə.mɛ̃.ˈswaʊ)_{AP}
- b. *Demain* *Pierre viendra*
 (də.ˈmɛ̃)_{AP}

In French, German, and Japanese, utterances are segmented into larger prosodic phrases marked tonally (APs, intermediate phrases, and intonational phrases). Among them, focus is given here to any prosodic phrases containing minimally a pitch accent, and sometimes edge tones or accents. In French, the left edge of the AP is associated with a L tone, whereas its right edge receives a pitch accent ((L)H*) on the last metrically strong position (see (17b)). Moreover, when the AP contains more than three syllables, an internal accent with the form of a rising melodic movement (LH) may be realized on a strong metrical position (initial or final prominent syllable in (16b)). By and large, the melodic profile associated with an AP is thus of the form [L (H*) L H*] (Post 2000; Jun and Fougeron 2000; Delais-Roussarie et al. 2015, among others). In Japanese, the melodic pattern associated with the accentual phrase is either (H- H*+L L-) or (H- L-), depending on whether the AP includes an accented or an unaccented lexical word (Pierrehumbert and Beckman 1988; Venditti 2005). As for German, tonal patterns are assigned at the level of the intermediate or intonational phrase (Wiese 1996; Truckenbrodt 2005, 2007). However, according to Uhmann (1991) and Truckenbrodt (2005, 2007), pitch accents are usually realized on primary stressed syllables in a prosodic word, and pitch accented prosodic words are predictable on the basis of information and syntactic structure. Moreover, this accent is realized by a L*+H pitch movement when it does not coincide with the IP final accent. As for the IP final accent, it is of the form H+L*. Following Truckenbrodt (2005, 2007), we may consider that any XP (NP subject, NP object, VP) receives a pitch accent as shown in (18).

- (18) Die Lena will dem Werner im Jänner ein Lama malen
 (die LEna) (will dem WERner) (im JÄnner) (ein LAMa malen)
 L*+H L*+H L*+H (H+)L* L%
 (Truckenbrodt 2005, example (4), p. 277)

In terms of phonetic implementation, accented syllables are realized by means of a pitch movement in German and Japanese, whereas they are also lengthened in French as they coincide to the right edge of a prosodic phrase.

3.3. Summary and Hypotheses

At the morphological level, inflections and, in particular, verbal auxiliaries are attested forms in all the languages studied. Hence, no difference in the rate of inflection and auxiliary forms should be observed in the French L2 speech spoken by Japanese or German learners. Nevertheless, the study of subject-verb agreement in the third-person plural in an oral narrative corpus in L2 French shows that agreement in number is more frequent in the narratives of L1 Japanese speakers than in those of L1 German speakers,

but this agreement is achieved by means of an auxiliary in 42% of the cases in the productions of L1 Japanese speakers, compared to only 4% of the cases in the narratives of L1 German speakers (Granget 2018). Since the differences observed cannot be attributed to the verbal morphology of the learner L1, other explanatory paths need to be explored, such as the prosodic bias hypothesis as formulated by Schlyter (1995).

Prosodically, German, Japanese, and French differ along several dimensions. Metrically, the basic metrical unit is the syllable in German and French, whereas it is the mora in Japanese. This difference has implications for syllable structure: consonant clusters and coda are frequent in German, and to a lesser extent in French, whereas syllables of the form CV are usually observed in Japanese. As a consequence, Japanese L1 speakers may prefer CV syllables. As for stress, it is assigned and thus culminative at the lexical level in Japanese and German, in contradistinction to French. At the level of APs, unaccented APs, i.e., APs with no syllable receiving stress, are possible in Japanese, but not in French and German.

As for tonal patterns associated with prosodic phrases, in French and Japanese, tones are realized at the edge of accentual phrases, be it a pitch accent as in French or an edge tone as in Japanese. By contrast, in German, edge tones are only associated at the level of the intermediate or intonational phrase. Note, however, that a pitch accent may be associated with the primary stressed syllable of a lexical word. Consequently, the tonal marking of APs should not be a problem for learners with Japanese L1, in contradistinction to those with German L1. Note, however, that features concerning tonal marking at the level of the AP should not have an impact on morphological development (see, among other, previous studies on prosodic bias, Schlyter 1995; and Goad and White 2004).

4. Data and Methods

4.1. Corpus and Materials

4.1.1. Corpus Recording Protocol

The data used for this exploratory study were collected in a European research program on crosslinguistic influences on subject-verb agreement³. In fact, they are extracted from a larger corpus that consists of oral productions of Japanese and German learners at A2 or B1 level according to the CEFR. The level was evaluated by mean of the DIALANG lexical test (Alderson 2005).

The participants were recorded in a quiet room in a university environment. They were asked to tell a story based on 30 images projected on a computer screen one by one. This story, entitled *Paul et Pauline font la fête* 'Paul and Pauline are having a party', adapted from Ågren and Van De Weijer (2013), has been designed to account for the acquisition of number agreement in L2 French verbal morphology (Ågren et al. 2021; Granget et al. 2021).

Before recording the narratives, the following instructions were given to the participants: (i.) they had to look at all 30 pictures to understand the narrative before starting to tell the story orally; (ii.) they were then asked to tell the story with the help of the visual support shown on the computer screen; and (iii.) they had to consider the events to be happening now and, thus, retell the story in the present tense. This last point aimed to encourage the use of present tense and simple verbal forms, and it was recalled by the interviewer before each recording session. Note also that lexical help was provided on request during the preparatory phase prior to the narration proper, and very rarely some lexical help was also given during the recording phase.

4.1.2. Participants

For the current study, four participants were selected on the basis of their linguistic profile: two participants in each L1 group (Japanese and German). To increase comparability, only female participants at A2 level were chosen; moreover, their amount and type

of exposure to French, their age at the time of recording, and the duration of their learning were more or less the same.

At the time of recording, the speakers with Japanese L1 were living in France. Consequently, for the German speakers, priority was given to German L1 students who spent time in France or declared in the questionnaire that they had had contact with French people outside the classroom. The relevant information is summarized in Table 3.

Table 3. Participants chosen for the pilot study.

Speaker ID and L1	Level	Age at the Time of Recording (First Exposure)	L2 "Spoken" in Addition to English	Level in English (Self-Assessment)
JAPA201	A2	43 (37)	Korean	1
JAPA202	A2	26 (18)		2
GERA207	A2	43 (13)	Latin, Italian	4
GERA205	A2	26 (12)	Spanish	6

As Table 3 shows, the learners' multilingual repertoires are not strictly comparable in terms of previously learned L2s and the self-reported level of English: the 43-year-old German-speaking learner reports having learned Latin and Italian and having a self-assessed level of 5 in English on a scale ranging from 1 to 6, whereas the Japanese-speaking learner of the same age reports having learned Korean and having a level of 1 in English. According to multilingual models of speech production (De Bot 2004), L2 English might have an influence on L3 French verb forms, which is greater in (German) advanced learners than in (Japanese) intermediate learners. However, it is very difficult to achieve such a high level of comparability in any research on L2 acquisition; thus, this issue should certainly be investigated in further studies.

Because of the limited number of participants, we are also conscious that the study cannot produce generalizable results. Our first intention here is rather to show the interest of looking at metrical and prosodic features in a cross-linguistic manner in order to account for morphological development. More widely, it is important to consider the interrelation that could exist between the various grammatical levels of linguistic description (phonology, morpho-syntax, semantics, prosody, etc.) when studying L2 acquisition.

4.1.3. Data Used

The data recorded with the protocol mentioned above are gathered in a corpus designed to carry out research on cross-linguistic influences in the acquisition of agreement in French L2. The narratives were produced by speakers with L1 having different degrees of morphological richness, e.g., Dutch, Italian, French, German, and Swedish (Ågren et al. 2021, Granget et al. 2021). A sub-corpus was constructed from the productions of 14 speakers with German (7 speakers) and Japanese (7 speakers) as a L1, which were divided into two subgroups according to their lexical level: one subgroup estimated at A level and another subgroup estimated at B level (Granget 2018). The present case study uses data from this sub-corpus: the 4 narratives contain 1940 words, among which 1205 were produced by the Japanese learners and 735 by the German learners.

4.2. Methods and Annotation Protocol

The narratives were transcribed orthographically according to the protocol described in 4.2.1. As for the morphological annotation, we used the morphological protocol described in 4.2.2. and designed to account for subject-verb number agreement in third-person context, as well as an ad hoc protocol to account for dummy auxiliary constructions (Granget 2018). As for the prosodic annotation, we used the protocol presented in 4.2.3. Morphological and prosodic information was encoded from a careful listening of the audio forms and not from the transcriptions.

4.2.1. Orthographic Transcription

When the content and the form of the words used in the narratives were clearly identifiable, they were transcribed orthographically, sometimes with a simplified and adapted orthography, using the CHAT format in CLAN (MacWhinney 2000). Silent morphemes or letters were used with verbs in ambiguous contexts since they are the only cues indicating if one or more protagonists are involved in the situation. The silent plural morphemes *-s* and *-nt* are written in *ils préparent* (19) because the plural and singular forms of the pronoun *il/ils* and the verb *prépare/préparent* are homophonous. However, the silent letter *-t* is not written in *boi* and *von* in (20) and (21) because *boi* /bwa/ is a non-ambiguous singular form, in opposition to the plural form /bwav/, here in a plural position, whereas *von* /võ/ is a non-ambiguous plural form (opposed to singular /va/) in a plural position as well.

Audio and text were also aligned at roughly the level of the inter-pausal unit. The choice of orthography for oral data is motivated by the fact that this level of annotation allows (i) readability of the data and (ii) immediate access to the meaning of (frequent) homophones, as in French (see also on this issue Delais-Roussarie and Post 2014, among others). In addition, in all cases of hesitation or unexpected forms, the International Phonetic Alphabet (IPA) was used as in (22).

- (19) &euhm et ils préparent un cadeau pour ## un ami je crois
 &hm and they prepare a gift for ## a friend I think (AllA205)
- (20) et boi [*] de [/] de limonade [/] de la limonade.
 and drinks [*] limonade limonade (AllA207)
- (21) ils von plépalé de de cadeau pour son ami (JapA201)
- (22) a. et paul &èh sectionne [//] choisit les pantalons et [/] /kʁavet/ oui [=]
 et /kʁavet/ [/] rires].
 b. and paul sect [//] chooses the pants and and tie tie yes [=] laughs] (JapA202)

The spelling has been enriched by diacritics to encode pauses (#), repetition ([/]), reformulation ([//]), hesitations (&), para-verbal information ([! =]), and morpho-phonological errors on the verb [*], as shown in the above transcribed utterances (19, 20, and 22). All of these symbols are requested by CLAN to allow a proper use of the automatic analysis module. Pauses are encoded by # from an attentive listening of the audio data, and the longer the pause is perceived, the more important the number of #s. The orthographic representation sometimes differs from standard orthography, despite EAGLES and TEI's recommendations on this issue (see, for instance, (21)), and includes symbols to allow CLAN to perform an automatic morphological annotation with the use of tools, such as the morphological tagger (%mor). Note, however, that we did not use the tools that were mostly designed for research in L1 acquisition. In (21), the verbal form derived from the verb *préparer* 'to prepare' is transcribed *plépalé* to best reflect the learners' pronunciation [plepale].

As for simplified spelling, it is mostly used in cases where verbal agreement markers, which are usually encoded in French orthography, are not audible (the so-called silent morphemes), such as <-ent> in *arrivent* (arrive.3PL), pronounced [aʁiv], identical to *arrive* (arrive.3SG). Chosen an orthography over the other in cases of silent morphemes would reflect the representations of the transcriber and not necessarily those of the learners. That is why a simplified orthographic form is used to account for the indeterminacy of the morphological representations. For all of these reasons, we decided to use an ad hoc protocol for morphophonological annotation that does not presuppose the existence of grammatical or semantic functions attached to verb forms.

4.2.2. Morphological Annotation

The morphological annotation protocol used in this cross-linguistic project on the acquisition of subject-verb agreement in French L2 was designed to account for subject-verb agreement in number in third-person contexts. Consequently, only utterances with a third-person subject were coded morphologically using a special tier (%ver) for annotating the following information:

- the number of protagonists involved in the situation described according to the picture (Context): one participant (ContSing for singular contexts), more than one (ContPlur for plural contexts), or ambiguous (ContAmb for ambiguous or indeterminate contexts);
- the type of verb used by the learner (Vuni, Vcons, Vste as described in 3.1 and Vont for verbs whose form in the third-person plural ends in /ō/ like *von* /vō/);
- if the lexical verb was preceded by a classical auxiliary form, *avoir*/ have or *être*/be as is the case in (23);
- the type of subject (nominal, pronominal, both, relative, etc.);
- the form of the verb (accurate morphophonological form, which is encoded Facc and includes the existing form, e.g., singular instead of plural, and inaccurate and nonexistent form)

(23) *STU: il a brossé ses chaussures
 %ver: abrosse&ContSing&Vuni&aux&Facc

According to this annotation protocol, utterances with a simple invariable verb form (Vuni) in singular and plural contexts were excluded (e.g., *préparent* (3PL)/*prépare* (3SG), both pronounced [pʁɛpaʁ] as in (19)), whereas complex (auxiliary) verb forms, such as *a brossé*/brushed, were not excluded because the auxiliary is not an invariable form. When the verbal form is reformulated as in (22), only the last form is considered, i.e., *choisit*. For the purpose of the present analysis, we analysed the global rate of agreement in plural and singular contexts, not only in plural contexts as in Granget (2018). The rate of agreement was calculated on the basis of the selected verb forms by means of the following formula:

<p>number of plural verb forms (simple <i>boivent</i> /bwav/ and complex <i>ont bu</i> /ō by/) in plural contexts</p> <p>+ number of singular verb forms (simple <i>boit</i> /bwa/ and complex <i>a bu</i> /a by/) in singular contexts</p> <p>= number of accurate verb forms</p> <p>----- (divided by)</p> <p>total number of verb forms in plural and singular contexts <i>(boivent, ont bu, boit, a bu, boivu, sont boi, etc.).</i></p>

The principal limit of this annotation system is that it is based on a restricted definition of auxiliary in which only *avoir*/have and *être*/be are considered. In order to account for the broad class of dummy auxiliaries in the sense of Blom et al. (2013) or Starren (2001), we used an ad hoc protocol for the present study that considered as dummy auxiliary constructions (encoded as DAC in the annotation tier) all verbal constructions containing a lexical verb—be it an accurate, an infinitival, or a past participle form— or not (e.g., *plépalé, arrivé, sorti, mette*)—preceded by a form of the following verbs: *avoir*/to have (*a/has, ont/have*, including forms preceded by the plural consonant [z] as in *ils ont* [ilzō]/they have); *être*/ to be (*est/is, sont/are*); *aller*/to go (*vont/go.3PL*); *c'est/it is*; and *pouvoir/can* (*peut/can.3SG*).

- (24) &euhm et ils préparent un cadeau pour ## un ami je crois
&hm and they prepare a gift for ## a friend I think
 %ver': préparent&ContPl&Vuni&Facc (ALLA205)
- (25) pauline collé [//] pauline a collé &euh le [lə]
 [ləbato:]
 Pauline paste.PAST.PART [//] pauline have.3SG the boot
 paste.PAST.PART &euh the the
 %ver: acollé&ContSg&Vuni&DAC&Facc (JAPA202)
- (26) il von fai de danser
 they go.3PL do.SG/PAST.PART to dance
 %ver': vonfai&ContPl&DAC&Vont&Facc (JAPA201)

The above examples from (24) to (26) illustrate the descriptive categories we used in the ad hoc annotation protocol (%ver') to account for the rate of dummy auxiliary constructions (DAC) among all verb forms. Among these examples, DAC are observed in (25) and (26).

4.2.3. Prosodic Annotation and Analysis

Prosodic annotation has been done using the prosodic annotation system IV, which derives from IViE (Grabe et al. 2001; Delais-Roussarie and Post 2014). On the basis of a careful listening of each utterance or inter-pausal chunk, prominent syllables are encoded and then categorized as corresponding to initial or final stressed syllables depending on their position within words or phrases. As for the tonal patterns, the tonal movement associated with prominent syllables and edges was determined on a perceptive basis by listening to the implementation domain. Roughly, such a domain corresponds to one of the following chunks:

- from a pause to a prominent syllable and the following non-prominent one;
- from an already tonally encoded prominent syllable to the next prominent syllable and the following non-prominent one;
- from an already tonally encoded prominent syllable to the next prominent syllable when followed by a pause.

The tonal movements were encoded by assigning a relative tone to the prominent syllable, as well as to what precedes and follows, with the tone associated to the prominent syllable being in a capital letter (e.g., *LMh* for a rising movement that continues after the prominent syllable, *hL* for a fall on the accented syllable, etc.). These movements were then translated into the pitch accent of the form LH^* , H^* , and L^* , or into edge movements of the form $L-/L\%$ and $H-/H\%$ to a lesser extent.

Apart from this annotation, a prosodic analysis was achieved for all third-person verbal forms, be they realized on one or more prosodic phrases or APs. Take for instance (26): the sequence *ils vont fai* is selected for the analysis, and it could have been realized in a single AP (*ils vont fai*) or in two (*ils vont*) (*fai*). Note, however, that sequences with hesitations or repetitions that made prosodic analysis difficult or even impossible were discarded. Moreover, when the verbal form was fully repeated as in (25), only the repetition was considered. Because of the mentioned restrictions, only 106 forms (50 produced by the two German learners and 56 by the Japanese learners) were retained for the prosodic analysis. The prosodic annotation achieved with the IV transcription system was then used to determine how verbal forms were wrapped into accentual phrases (AP). In addition, the tonal pattern associated with each phrase was noted, and we calculated the number of syllables within each AP and examined the structure of each syllable (CV, CVV, CCV, etc.).

5. Results and Discussion

The results presented here were obtained from the analysis of the forms according to the method exposed in Section 4. As already mentioned, the morphological analysis aimed to calculate both (i) the rate of agreement in number and (ii) the use of preverbal auxiliaries in the 138 forms under investigation. As for the prosodic analysis, it aimed to evaluate the characteristics of the APs produced by the four learners, as well as the syllabic structures usually observed. Japanese L1 speakers produced 77 forms (J01, 28 and J02, 49) compared to 61 for German L1 speakers (A05, 23 and A07, 38). One third of these statements are singular (48 statements) and two thirds are plural (90 statements).

5.1. Auxiliary Constructions

The morphological analysis of the 138 verb forms confirms the previous analyses carried out on a larger corpus. In order to analyse the frequency of agreement, only 95 verbal forms were taken into consideration, with 43 forms of the present tense of the third person having been excluded from the analysis because of their invariability in number in the spoken form ([mãʒ] eat, [uvʁ]open, [dãs] dance, etc.). In these data, no a priori L1-related differences were observed: 63% of the 95 verb forms agree in number (i.e., 60 forms), with 57% in the two L1 German and 67% in the two L1 Japanese. But there are important inter-individual differences (J01, 41%; A05, 53%; A07, 60%; J02, 88%).

Among the 60 agreed verb forms, we distinguish simple synthetic forms from complex forms with an auxiliary. The analysis shows that in the two French L2/Japanese L1 narratives, dummy auxiliary constructions are much more frequent than in the two French L2/German L1 narratives. Indeed, they represent 5% of the verb forms that agree in number in the German L1 narratives, but 72.5% in the Japanese L1 narratives, despite the fact that present tense, i.e., a simple verb form, was required. Here there are interindividual differences, but the likelihood of dummy auxiliary constructions clearly depends on the L1: A05, 12.5%; A07, 0%; J01, 81%; J02, 68%. This analysis of singular and plural contexts confirms that L1 Japanese speakers favor the use of a dummy auxiliary construction.

5.2. Prosodic Analysis

The analysis of the prosodic phrases in which the verbal forms were wrapped focused on their size and internal composition. There are two reasons for this. First, learners' productions, whatever their L1 (Japanese or German), lack fluency; thus, each phrase is often separated from the next by pauses and hesitations. As a result, phrases can be analysed in a way as an intermediate or intonational phrase (I-Phrase). Second, the intonational contours associated with I-phrases and the form of the pitch accents associated with metrically strong syllables often present characteristics from the speaker's L1. Thus, it is relatively frequent that in the productions of German speakers, prosodic phrases are longer than in French and contain pitch accents on stressed syllables. The tonal realization of these accents is often similar to what is observed in German. In (27), the accent on the syllable /vãʒ/ (from the verb *rangent*) is of the form L*+H as in German, and a rising edge tone H- appears at the end of the I-phrase. This implementation, shown in Figure 1, is close to the German one, in which non-final pitch accents are of the form L*+H.

(27)	[ils	rangent	les	affaires]i
	They	clean up	the	things
	'They clean up the things'			(A1A205)
	il	vãʒ	le	zafɛʁ
		L*+H		L+H* H-

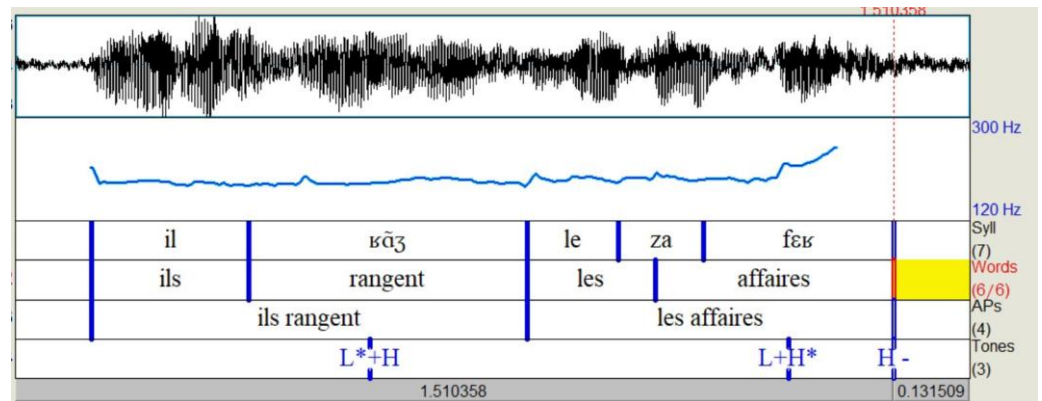


Figure 1. Waveform and pitch track associated with (27).

As for the Japanese learners’ productions, they are characterized by short APs of two syllables as in (28). In addition, APs often receive edge tone of the form H- at the left edge and L- at the right edge, whether they contain a pitch accent or not. In (28), the AP (paul) receive a H* pitch accent on the syllable /po/ and a L-edge tone, whereas the APs (ne peut pas) and (danser) just receive an initial edge tone H- and a final one L- as the final syllables of these APs are realized with a flat or slightly falling pitch contour and a significant syllabic lengthening, as shown in Figure 2.

- (28) [(Paul)_{AP} (ne peut pas)_{AP} (danser)_{AP} (bien)_{AP}]_i
 H* L- H- L- H- L- H* H% (JapA201)

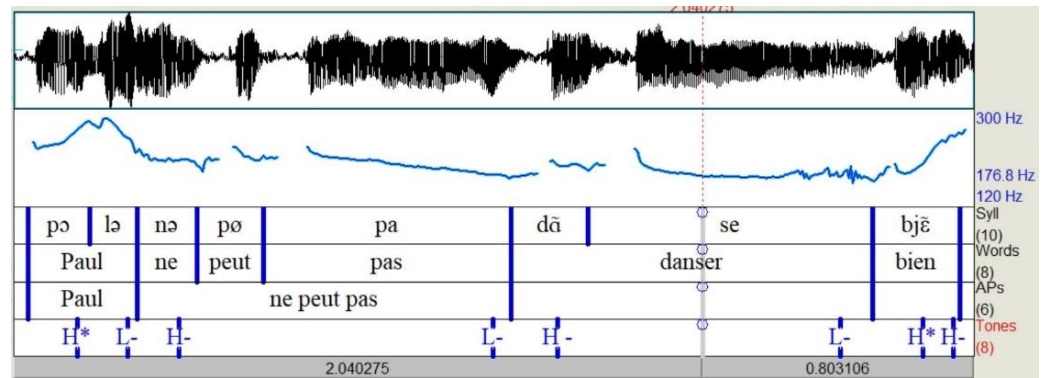


Figure 2 . Waveform and pitch track associated with (28).

In summary, the rhythmic patterns and intonational contours observed in the different narratives are highly influenced by those of the speaker’s L1; thus, they cannot explain the differences observed in the morphological development between German and Japanese learners.

Therefore, we decided to focus on verbal forms in order to evaluate how they were prosodically realized. This showed that the 106 verbal forms studies were wrapped in 121 accentual phrases (APs), a verb form sometimes being realized under two APs (e.g.,: *ils vont plépalé*/they will prepare is phrased as (il von)_{AP}(plépalé)_{AP}; the same for example (28)). This segmentation in AP occurred especially for utterances in which verb forms were composed of an auxiliary. Moreover, it was much more frequently observed in the productions of the Japanese learners. The 50 verbs uttered by German L1 learners are realised on 51 APs, whereas the 56 verb forms produced by Japanese L1 speakers are realised on 70 APs. In addition, a closer analysis of the segmentation in APs showed that 12.6% of the Japanese speakers’ APs are composed solely of elements that are unaccented in French (pronouns and auxiliaries of some sort), whereas the proportion is 1.6% for German speakers. This could result from the fact that APs in Japanese can be composed of unaccented words (see 3.2 and also (ne peut pas)_{AP} in (28)).

As for AP size, the APs realised by Japanese learners are slightly shorter (2.91 syllables/AP on average) than those by German speakers (3.25 syllables/AP on average). This may result from the minimality constraint at work in Japanese. Indeed, prosodic words, and consequently APs, often contain only two morae.

As far as syllabic form is concerned, the analysis indicates that Japanese speakers clearly prefer verbal forms ending with a CV syllable. Of all the final syllables of the verbal nuclei they produced, 80.21% are of CV form and 19.8% of CVC form, whereas for L1 German learners, the proportion is 49% and 51%, respectively. Auxiliary and schwa insertion in verb-final position thus correspond to a more general modification of verbal forms to allow resyllabification in accordance with Japanese CV moraic templates. Indeed, in introducing an epenthetic vowel (/a/ or /E/) or a syllable (/zɔ̃/,/sɔ̃/), auxiliary use allows the emergence of monomoraic CV syllables (e.g.,: /i.zɔ̃.kə.sy/ 'ils ont reçu'/they have received *vs* /il.kə.swav/ 'ils reçoivent'/ they receive). Similarly, the insertion of schwas in the case of consonant cluster or a coda leads to the production of CV syllables. In the case of monosyllabic verbs, it also contributes to satisfying the minimality constraint (two morae for a prosodic word or APs).

5.3. Discussion

The analysis of the data shows that, morphologically, Japanese learners use more dummy auxiliary constructions than German learners, regardless of the auxiliary used. As neither the morphological differences between the two L1s and French, nor the levels of the learners (that is equivalent) can explain this, the validity of the prosodic hypothesis as formulated by Schlyter (1995) was explored.

Among the prosodic features, special attention was given to metrical and tonal patterns up to the level of the accentual phrase as verbal forms are usually wrapped within APs in French. Concerning the rhythmic and tonal patterns observed at the level of the AP and higher, they are influenced by the learner's L1 in all cases. Indeed, the tonal patterns associated with APs shows that, even when verb forms are accurate (for instance, for the German L1 speakers), some prosodic features of the L1 are present. In fact, the APs produced by German L1s are longer, and above all, frequently realised with a melodic contour similar to what is often observed in German. The prosody of the L1 thus always plays a role independently of the morphological development. Thus, the overuse of dummy auxiliaries in the productions of the Japanese learners cannot be explained from prosodic constraints applying at a higher level in the prosodic structure (accentual, intermediate, and intonational phrases).

As Japanese differs metrically from German and French by having as basic metrical unit the mora and not the syllable, this difference was investigated more thoroughly. It appears that in Japanese, the use of auxiliaries and the past participle, as in "*pauline a collé e: le bateau*", allows the transformation of the verb form *colle*, metrically CVC (i.e., an impossible form in the Japanese moraic-driven syllabic inventory), into a V.CV.CV form. In the same way, the use of the verbal form *vont fai* in "*ils vont fai de danser*", realised [i.vɔ̃.fE] with the omission of the /l/ and the /ʁ/ in respectively *ils* and *faire*, is again of the form V.CV.CV, compatible with the moraic-based metrical structure of Japanese. The presence of the auxiliary form is thus motivated by metrical phonological constraints related to the nature of the basic metrical unit and its manifestation in the syllabic inventory.

The function of auxiliaries in L2s has been the subject of much discussion and analyses proposing a syntactic or semantic interpretation of these preverbal morphological elements, but this is not satisfactory to explain what really occurs. The analysis proposed here considers, following Granet (2018), that the sound dimension should also be considered. It appeared from the preliminary study that metrical principles related to basic units (i.e., syllables vs. morae) exert constraints on the segmental realisation of the verbal forms. The use of auxiliaries and past-participles as well as the insertion of a

schwa are thus motivated to guarantee the well-formedness of the metrical templates associated with each word. In other words, at the observed stage, verbal forms are not only morphosemantic or morphosyntactic elements, but morpho-prosodic elements. The vowel between the subject and the verb can be analysed as a prosodically constrained morpheme, or just as simple epenthetic vowels constrained by Japanese metrics as it also occurs in loanwords or in lexical acquisition by Japanese-speaking learners of L2 French at a low intermediate stage (Sauzedde 2018).

6. Conclusions and Perspectives

The aim of this contribution was twofold: (i) analysing French verbal forms produced by learners with L1 German and Japanese in order to evaluate whether the overuse of auxiliaries in the productions of the Japanese learners could be explained by means of the *prosodic transfer hypothesis*; and (ii) explaining the importance of considering grammatical interfaces in study of L2 development. Concerning the first point, the analysis of the data showed that the presence of dummy auxiliaries in the forms uttered by the learners with L1 Japanese is probably due to the moraic structure of this language, which leads to preference for a syllable of the form CV. As for the second point, the results obtained clearly show that one cannot analyse language development in a modular manner, without considering other levels of linguistic description. Indeed, the occurrence of dummy auxiliaries in the data investigated appear to be motivated by metrical and phonological constraints.

In order to evaluate more precisely the weight of prosodic-phonological constraints on morphology, further research is necessary. As vowel epenthesis appears elsewhere in the production of the Japanese learners, can we really account for the occurrence of these vowels or forms in terms of dummy auxiliaries and not just in phonological terms (e.g., vowel epenthesis, metrical filler, etc.)? Would the forms analysed as dummy auxiliaries disappear as soon as learners modify the surface forms of subject pronouns, as is often done in standard spoken French (*ils ont* uttered as [izɔ̃] instead of [ilzɔ̃])? In order to investigate the nature of the correlation between morphology, phonology, be it segmental or metrical, in the acquisition process, we may also wonder whether a better control of morphology implies a suppression of auxiliary forms and epenthesis. In order to pursue this exploratory work, we will continue the analyses on a larger sample and in more developed narratives to observe the extent to which epenthesis occurs. This should allow understanding its relation to morphology. This can also be done by comparing it with written productions to verify whether auxiliaries would be as frequent.

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Institutional Review Board Statement: Not applicable. The data used for our paper was recorded more than seven years ago, i.e. at a time where such approval was only required for very invasive collection procedures. Note also that in France it is nowadays still not compulsory to be approved by an ethics committee for non-invasive data recording and for a population without any trouble). Nevertheless, speakers that were recorded all signed a consent form and were informed of what was being asked of them and what the recordings would be used for.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study

Data Availability Statement:

Conflicts of Interest: The authors declare no conflict of interest.

Notes

1. French Oral Learner Corpora (FLLOC), <http://www.flloc.soton.ac.uk>. (last accessed on 15 November 2022).
2. For examples (3)–(7), we have proposed several translations as these are the results of our interpretation. Moreover, the authors of the articles from which these examples were taken did not always provide a translation.
3. This research program is not funded by a third party and not limited in time. It involves Marie-Eve Michot (Vrije Universiteit Brussels) who initiates the research group, Malin Ågren (University of Lund), Pascale Hadermann (University of Ghent), Sonia Gerolimich (University of Udine), Isabelle Stabarin (University of Trieste) and Cyrille Granget (University of Toulouse).

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