
VARIABILITY AND OPTIONALITY IN SECOND LANGUAGE GRAMMARS: A QUANTITATIVE APPROACH

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This study assesses syntactic optionality, a common phenomenon observed in second language (L2) acquisition that can be considered as a subtype of linguistic variability. It is usual for L2 learners to use optionally two syntactic realizations (one of them being grammatical and the other ungrammatical) to express the same meaning. While optionality has attracted much attention in acquisition studies over the past decade, researchers have confusingly used the term 'optional' to refer to different types of variable learner behaviours which are sometimes unrelated. However, little is known about the precise quantitative properties that optional constructions in non-native grammars must show in order to be considered truly optional. This study addresses optionality from a quantitative point of view and presents a quantitative, statistical definition of optionality which will help future L2 researchers discriminate between truly optional L2 behaviour and other subtypes of variable (but not optional) behaviour.

INTRODUCTION

It is well known that one of the characteristic features of developing grammars is their high degree of variability (e.g. Sorace 1993, 2000, 2001, 2005b). In particular, a subtype of variability, namely, syntactic optionality, has recently received much attention in L2 studies as it has been shown that it pervades all linguistic levels and all stages of development, especially initial and developing grammars (see Eubank, Bischof, Hufstutter, Leek and West 1997; H. 1998; Prieto and White 2000; Panari and Tsimpli 2005; Sorace 2000, 2005a, 2005b; Sopata 2005; Truscott 2006 and also reference works by Grass and Selinker 2001, Hawkins 2001, White 2003, Montrul 2004). Interestingly, optionality has been attested even in end-state and near-native L2 grammars (Sorace 2005a, 2005b).

Importantly, the term optionality has been used rather arbitrarily in the literature since authors have confusingly used the term optional to refer to
different types of variable learner behaviours which are sometimes unrelated. To confuse things further, the terms variable and optional have been used interchangeably. In this paper, I will propose a quantitative definition of optionality so as to distinguish it from other patterns of L2 attainment subsumed under the general term variability.

Before presenting a theoretical and working definition of optionality, it can be defined pre-theoretically as the coexistence of two (or more) realisations with the same truth conditions and meaning. In other words, optionality is the use of two structures to describe the same meaning. As used in L2 acquisition, the term also implies that one of the constructions is grammatical whereas the other is ungrammatical. To illustrate this phenomenon, consider some evidence from English L2 acquisition. It is well known that Chinese learners of L2 English show a high degree of variability in their production of the definite and indefinite articles (e.g. Robertson 2000). In (1), a learner (A) has a geometrical shape in front of her and is describing it to another learner (B). As can be observed in the italicised forms, both learners of English variably produce both grammatical definite and indefinite articles (the, a, an) and ungrammatical zero articles (Ø) where an overt equivalent would be required. The data in (1) show that these learners’ production of overt and null articles is optional in non-native English.

(1) A: Yeah. Draw, er, without, draw, er, Ø double line but without the, the bottom.
Ø Triangle, er (okay), meets at the bottom.
B: Okay.
A: But, er, the right, Ø right one, Ø right line you should use Ø blue pen and Ø left, Ø left line is red.
B: Ø Left line is red?
A: Yes. Ø Right triangle, but without Ø bottom.
B: Okay.
(Examples taken from Robertson 2000:136)

Another well-known example of optional behaviour is adverb placement in L2 English, (2). French-speaking learners of English place the adverb in its grammatical position (before thematic verbs) but they optionally allow it to appear postverbally, which is ungrammatical (White 1991).

(2) a. Alice quickly ate the mushrooms.
b. *Alice ate quickly the mushrooms.

Importantly, note that learner variability and optionality must be distinguished from the type of apparent optionality found in native, stable grammars. A case in point is dative alternation, (3), where the same meaning and truth conditions are realised by two different syntactic variants which are in free alternation: either NP PP or NP NP. Similarly, complementiser-drop also illustrates the point, (4), where the conjunction that can be optionally elided.

(3) a. I gave a book to Sue.
b. I gave Sue a book.
(4) a. I think that Sue has the book.
b. I think Sue has the book.

Crucially, unlike non-native optionality, in native optionality we find that both options are perfectly grammatical. This clearly indicates that learner optionality is a different phenomenon from native optionality, as about to be shown in the next section.

THEORETICAL APPROACHES TO OPTIONALITY

It may be initially assumed that syntactic optionality implies that both syntactic constructions can be used variably and interchangeably. While this is the case in non-native grammars (where both a grammatical and its ungrammatical equivalent are used optionally and interchangeably), this is certainly not the case in native grammars. In particular, Bolinger’s (1977) Principle of non-synonymy of grammatical forms states that a difference in syntactic form spells out a difference in meaning and/or pragmatic function. This principle relates to native grammars and it captures the intuition that, while two syntactic forms may represent the same truth value and meaning, each of them will convey a (slightly) different semantic/pragmatic interpretation from the other. For example, Arnold, Wasow, Losonczy and Ginstrom (2000) have shown that dative alternation is constrained by two well-known principles: (i) the Principle of given/new is a discursive principle whereby (con)textually given (topic) information typically appears earlier in the sentence than new (focus) information; (ii) the Principle of end weight, whereby syntactically complex and heavy constituents tend to appear in sentence-final position. Thus, two principles interact in dative alternation structures in such a way that in cases like (5), where both sentences are perfectly grammatical, sentence a. is preferred over sentence b. since (i) given information (her) precedes new information (a book...) and (ii) syntactically complex information (a book about...) is placed in sentence-final position. This implies that true optionality is more apparent than real in native grammars as each variant has different implications; hence the term pseudo-optionality seems more appropriate here (Papp 2000).

(5) a. I gave [her] [a book about applied psycholinguistics]
b. I gave [a book about applied psycholinguistics] [to her]

1 Pronouns (e.g., her) are, by definition, given (topic) information as their referent must appear in the preceding discourse. By contrast, indefinite noun phrases (a book...) represent elements that are being introduced in the discourse for the first time, hence they represent new (focus) information.
Sorace (2000) argues that L2 optionality can be defined as the coexistence in the learner’s interlanguage of two phonological forms ($\lambda_1$, $\lambda_2$) for one logical form ($\lambda$). In simpler terms, optionality implies two spell-outs for one meaning. This implies that, unlike Bolinger’s principle for native grammars, non-native grammars can and do indeed use two different syntactic forms to express the same meaning.

(6) Optionality in L2 grammars: $\lambda_1 \left\{ \frac{\pi_1}{\pi_2} \right\}$

Importantly, $\pi_1$ and $\pi_2$ typically do (but may not) make use of the same lexical resources. For example, in the case of the optional use of article omission, (1), Chinese learners of English produce either an overt determiner (e.g., *the*) or its null equivalent (6). In this case, optionality is making use of two different lexical items. By contrast, in the adverb placement examples shown above, (2), learners of English make use of exactly the same lexical resources in each syntactic variant. The crucial point here is, then, that learners do use both variants optionally and interchangeably.

It is crucial to highlight an obvious fact at this point. In order to study optional behaviour in L2 acquisition, it is important for the researcher to consider only native categorical constructions where one variant is grammatical and the other ungrammatical, as shown in (1) and (2). Then, the researcher can compare native vs. learner behaviour and, if learners are shown to use both the grammatical and ungrammatical constructions simultaneously, then we could face a case of L2 optionality. If, on the other hand, the researcher focuses on native pseudo-optimal constructions where both alternants are perfectly grammatical, as in (3) and (4), and then finds that learners are also using both alternatives optionally, then the researcher will never be sure whether L2 optionality is a result of the pseudo-optimal input or a consequence of development (see Domínguez and Arche 2007 for a discussion of non-robust input leading to optionality).

To conclude this section, it is important to highlight that this article will analyse optionality in L2 grammars and propose a quantitative approach to distinguish optionality from other types of variability. The actual cause(s) of such optionality is an issue that is being currently debated in the L2 literature but is beyond the scope of this study (for a discussion see, e.g., Papp 2000, Lozano 2006, Sorace 2005a, 2005b).

DEFINING PATTERNS OF VARIABILITY IN L2 ACQUISITION

In this section I will first present previous accounts of variable patterns in L2 acquisition. Then, I will propose some new minimal criteria to define variability quantitatively.

Previous accounts

Sorace (1993) proposes that optionality is one case of three possible behaviour types in L2 acquisition. Representations can be (i) native-like, when the learner’s representation converges with the native representation; (ii) divergent, when the learner’s representation consistently diverges and differs from the native representation (optionality is a possibility here); and (iii) incomplete, when learners show indeterminate intuitions.

Papp (2000), building on work by Sorace (1993), presents a working definition of optionality, Figure 1, where the light bars represent the grammatical construction and the dark bars the ungrammatical construction. Value 10 corresponds to a completely acceptable sentence, whereas 0 indicates a completely unacceptability sentence. Intermediate values correspond to varying degrees of (un)acceptability.

![Figure 1. Different patterns of L2 behaviour](Source: adapted from Papp, 2000:181, her Figure 1)

As shown in Figure 1, for a construction to be considered categorical in native grammars, Papp (2000) assumes that native speakers must prefer the grammatical construction (henceforth it will be labelled ‘sentence a’) around 9 and disprefer the ungrammatical construction (henceforth b) at around 3 or even at a lower rate. This difference must be statistically significant for the construction to be categorical in the native grammar. Regarding learners’ variable behaviour, Papp distinguishes between divergent representations (scenarios 1-3) and incomplete representations (scenario 4). In scenario (1)

2 Recall that L2 optionality is a deficit in the sense that learners optionally accept both the grammatical and ungrammatical construction to the same degree.
learners’ acceptance of both a and b leads to optionality. Only if learners were accepting a but rejecting b, would their intuitions then be native-like. In scenario (2) they reject both sentences. In (3) they behave in a manner diametrically opposed to natives, accepting b and rejecting a. In (4) they show indeterminate (incomplete) intuitions, as they accept both constructions around the mean (chance level). Obviously, when learners’ behaviour does not statistically differ from native behaviour, learners’ grammar converges with natives by showing native-like behaviour (scenario 0).

A new account: minimal criteria

While Papp’s (2000) pioneering proposal presents a working definition of optionality and introduces some statistical considerations, it raises three immediate questions:

(i) From a statistical point of view, Papp (2000) analyses similarities/differences within groups only, but not between groups, i.e., what counts in her analysis is whether a is similar to different from b (within-group analysis), but not whether natives’ a is similar/different to learners’ a (and natives’ b is similar/different to learners’ b) (between-group analysis). As we are about to see, this statistical observation is crucial to clearly determine the exact type learners’ variable behaviour. 
(ii) The use of a positive scale from 0 to 10 makes it difficult to see acceptance versus rejection rates, as categorical constructions (in native grammars) imply that the a sentence should be accepted, yet b rejected. To solve this shortcoming, the use of a positive-negative Likert scale would yield a clearer picture, as shown in Figure 2 (see next page).
(iii) There are other possible scenarios (both for natives and non-natives) that Papp does not discuss and that will be crucial to arrive at a more fine-grained quantitative definition of optionality, as will be illustrated in the next section.

Assimilating a modified version of previous research on variability and optionality (Sorace 1993, 2000, Papp 2000) into a method for investigating the different patterns of variable knowledge in L2 acquisition, the following four basic observations would seem to be the minimum criteria needed in L2 studies so as to arrive at a precise and clear picture of the type of learner behaviour that could potentially be compared across studies.

First: Statistical criteria. As shown above, previous research has focused on theoretical definitions (Sorace 2003, 2000) and working definitions of optionality (Papp 2000). A full picture of optionality needs to take into account two basic principles from inferential statistics: both within-group and between-group comparisons need to be undertaken in conjunction with between-group analyses at the α=0.05 level of statistical significance, as standardly assumed in L2 linguistics. In other words, comparisons must be made between constructions a and b within the same group, as well as between the native and the learner group for construction a and then for construction b. Given the nature of the data (at least two independent variables with two levels: group [native/learner] x construction [grammatical/ungrammatical]), the researcher can perform within-group and between-group comparisons with two-way ANOVAs or simply t-tests. These statistical criteria will be illustrated in the next section.

Second: Instrument and measurement scales. One of the shortcomings of previous empirical L2 studies (see previous section) is the wide array of instruments and scales used to measure learner behaviour. We can find a spectrum of instruments ranging from naturalistic and spontaneous data (where learner corpus frequencies are counted) to more (quasi)experimental methods, including different types of numeric scales and even reaction-time measurements. Obviously, the use of different measuring techniques will inevitably lead to different interpretations of optionality: as we have seen, what some authors consider indeterminacy may be simply treated as true optionality by others. In short, authors that have addressed the issue of optionality have not used unified measurement criteria. In these circumstances, it seems recommendable to design and administer grammaticality judgement tasks (which are standardly used in L2 research) containing Likert-type scales with both negative and positive values. Positive values would correspond to grammaticality and negative values to ungrammaticality. This would indicate the extent to which whether natives and learners accept or reject the constructions under investigation. In the next section, the idea of positive-negative Likert scales will be illustrated.

Third: Native categorical rules. As explained earlier, it is crucial to use native categorical constructions (grammatical vs. ungrammatical) in order to test
optionality in L2. In other words, there must be a within-group statistically significant difference between a and b for the construction to be considered categorical in the native grammar. Such categorical rules can be probed in L2 by using grammaticality judgement tasks containing paired sentences (a and b).

**Fourth: Control group.** Native controls are needed for comparative purposes. Learners’ performance would be then compared against natives’ performance. This is essential since, as Papp (2000) and Heutel (2000) argue, some supposedly categorical rules in the theoretical literature are judged as being optional by native speakers.

**A QUANTITATIVE APPROACH TO OPTIONALITY**

In this section I will first present and discuss certain quantitative notions to discriminate between various types of variability from a qualitative perspective. Then I will use those notions to review how previous L2 studies have misused the term *optionality*. Finally, I will present a quantitative definition of variability and, in particular, optionality.

**Discriminating various types of variability**

The four minimal criteria needed to assess optionality will be illustrated in what follows. In particular, the above scenarios can present certain variations that are not accounted for by Papp (2000).

Suppose an additional scenario like number (5) in Figure 3, which Papp (2000) does not discuss. Natives prefer a but reject b, the difference being significant, as expected for categorical rules (though note that the rejection of b is not as sharp as in Figure 1). The dashed arrow line indicates a statistically significant (sig) difference. As for learners, they accept both a and b, but sentence a is statistically preferred over b. No between-group differences are detected in this scenario, i.e., natives’ a is statistically similar to learners’ a, thus there being no significant differences (n.s.), as shown by the dotted arrow line. The same applies to b. We can safely conclude that scenario (5) is a slight variation of scenario 0 and it represents native-like behaviour.

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3. The terms ‘grammatical’ and ‘ungrammatical’ are used here in a broad sense to refer not only to (un)grammatical constructions (where morphosyntactic properties are violated), but also to constructions where pragmatic and/or semantic properties are violated.

4. The use of a control group of native speakers as a benchmark is standard practice in L2 acquisition, since learner behaviour is compared against the native norm. A different issue is whether L2 behaviour should be compared against an ideal native norm. Certainly, in this study we assume that learner grammars (interlanguage) have the right to be studied on their own as a unique linguistic system. But, as explained throughout this article, in order to determine optionality in L2 grammars, it is necessary to have a native benchmark (categorical constructions). The issue of the legitimacy of comparing native vs. non-native grammars is an issue that is beyond the scope of this study (see Gass & Selinker 2001 for an overview).

5. This observation can be confirmed by simply conducting an overview of empirical studies in L2 journals (see, e.g., Second Language Research, Studies in Second Language Acquisition, Bilingualism: Language and Cognition) and related L2 textbooks.
In scenario (1), Figure 5, natives again accept both sentences, though a is significantly preferred over b (see upper dashed line). Learners accept both a and b to the same statistical extent, that is, there is no within-group significant difference, as the upper dotted line shows. A between-group analysis reveals that natives’ b and learners’ b differ significantly, though natives’ a and learners’ a do not differ significantly. This scenario is clearer than the previous one (number 6), as learners are clearly showing optional behaviour, i.e., they are accepting a and b equally.

Finally, Papp’s (2000) scenario 4 (see Figures 1 and 2) is a clear-cut case of indeterminate intuitions: learners (i) do not distinguish between a and b (within-group), but natives do, and (ii) learners differ from natives (between-group) in both a and b. Therefore, indeterminate intuitions are easily detectable from a quantitative viewpoint.

Review of previous L2 studies on optionality

In this subsection, we will take into account the above quantitative considerations to review how the term optionality has been misused in previous L2 research.

L2 studies typically treat both scenarios (5) and (6) as representing native-like competence, e.g., Sorace (1993), Yuan (1999), Pérez-Leeroux and Glass (1997, 1999), Papp (2000), Parodi (2002), just to name a few. These studies implicitly assume that the only prerequisite for native-like/convergent competence is for learners to significantly prefer a to b, as natives do (within-group analysis only). However, between-group differences/similarities are overlooked. White (2003) argues that trying to compare learners’ performance on a given type of construction, say construction b, against natives’ performance on b leads to a “comparative fallacy”. What is crucial, in her view, is that learners discriminate between the grammatical a and the ungrammatical b, as natives do, irrespective of whether learners’ a (or b) is statistically different to natives’ a or b. In other words, White’s stipulation implies that only within-group similarities/differences should be taken into account to describe learners’ behaviour.

In what follows, I will illustrate graphically how the term optionality has been used to refer to different and variable patterns of learner behaviour. Consider Figure 6 (next page), which contains four scenarios (a-d). These figures have been adapted from several studies that used near-native learners (Figure 6a,b) and advanced learners (Figure 6c,d). These studies use positive values which have been turned into a positive-negative Likert scale (–5 … +5). All of them show a familiar trend, similar to scenarios 5 and 6 above: they belong to categorical rules in the natives’ grammar. For clarity reasons, we will be focused on significant differences only, assuming that the rest of differences are non significant.

Consider first Figure 6a, which corresponds to Sorace’s (1993) study of Italian and French learners of L2 Italian judging auxiliary alternation (essere/habere ‘be/have’) under clitic climbing with a type of intransitive verbs (unicative). As the dashed line indicates, natives prefer a (correct sentence with auxiliary essere) over the ungrammatical b (auxiliary habere) to a significant extent, as expected. The same applies to learners. But, crucially, Sorace’s (1993) study does not state whether natives’ b significantly differs from learners’ b (between-group analysis). Regarding figure 6b, it corresponds to Papp’s (2000) study of Hungarian and French learners of L2 Hungarian judging
verb movement in negative adverbial focus constructions. The same dilemma arises: it is not stated whether natives' b differs from learners' b. The same occurs in Figure 6c, corresponding to Pérez-Leroux and Glass' (1999) study of English learners of L2 Spanish judging null and overt pronominal subjects. Finally, Figure 6d corresponds to Hertel's (2000) study of English learners of L2 Spanish judging Subject-Verb and Verb-Subject orders with intransitive verbs (unaccusatives and unergatives). The same pattern emerges here, as above, but Hertel (2000) acknowledges that there is a significant difference between natives' b and learners' b. Despite this difference, she still assumes that learners show native-like/convergent representations, as in scenario (0) above.

Statistical definition of variability and optionality

Given the dilemma scenario (6) poses, I propose a modified working definition of divergent representations in L2 acquisition, which will help us discriminate truly optional non-native behaviour from other types of variable learner behaviour. I follow Sorace (1993) and Papp (2000) in assuming that learners' knowledge of language can be of three types: native-like, convergent and incomplete. However, some refinements are in order. In principle, two options are available to learners: non-native intuitions can either converge with or diverge from native intuitions.

As Figure 7 shows, other patterns can arise within these two options as a result of what has been presented so far, namely:

(i) Convergent behaviour occurs when learners' intuitions converge with natives'. In a within-group analysis, both natives and learners significantly prefer a over b. But, crucially, no between-group differences must be detected between natives and learners. The expected trend is native-like representations, as in scenario 5.

(ii) Divergent behaviour can be of three types, depending on the degree of within-group/between-group statistical differences:

a. Near-native behaviour corresponds to scenario 6, where a within-group analysis reveals that both groups behave similarly, but, crucially, the between-group analysis yields a significant difference between the natives and the learners, this difference usually (but not necessarily) being the ungrammatical b structure.

b. Optional behaviour corresponds to scenario 7 and Papp’s (2000) scenario 1, where learners accept both a and b (no within-group difference). Crucially, natives' b must differ from learners' b (between-group difference).
c. Indeterminate behaviour corresponds to Papp’s (2000) scenario 4, which, unlike previous scenarios, is a rather clear-cut case. Learners accept both a and b (no within-group difference) typically around the mean. This implies that natives’ a is accepted more than learners’ a and natives’ b is rejected more than learners’ b.

Figure 7 can be further refined in statistical terms. Consider Table 1, representing again the four possible outcomes of non-native behaviour. The grammatical sentence a is statistically compared against the ungrammatical sentence b. For example, ‘a>b’ means that a is accepted more than b, the difference being significant at the 5% level of probability (p<0.05).

<table>
<thead>
<tr>
<th>Behaviour type</th>
<th>within groups</th>
<th>between groups</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>NN</td>
</tr>
<tr>
<td>Native-like (scenario Θ)</td>
<td>a&gt;b</td>
<td>a&gt;b</td>
</tr>
<tr>
<td>Near native (scenario Θ)</td>
<td>a&gt;b</td>
<td>a&gt;b</td>
</tr>
<tr>
<td>Optional (scenario Θ)</td>
<td>a&gt;b</td>
<td>a&gt;b</td>
</tr>
<tr>
<td>Indeterminate (scenario Θ)</td>
<td>a&gt;b</td>
<td>a=b</td>
</tr>
</tbody>
</table>

Notes: N = natives; NN = non natives
a = grammatical sentence
b = ungrammatical sentence

Therefore, for optional behaviour to occur in non-native grammars, a within-group analysis must reveal the following: natives must significantly prefer a to b, but learners must prefer both a and b to the same statistical extent, irrespective of whether a can be accepted slightly (but never significantly) more than b. Additionally, a between-group analysis must result in natives’ a being not significantly different from learners’ a. However, natives’ b must be accepted significantly less than learners’ b.

In principle, there can be other possible combinations than those presented in Table 1. However, these will not be discussed as they are not relevant for the purposes of the current study. Certainly, defining convergence/divergence in distributional and statistical terms is not the same thing as explaining convergence/divergence from a linguistic and developmental perspective. Being clear about the status of distributional properties is, however, an important first step. Linguistic-theoretic explanations are still murky, though some suggestive attempts have been put forth. For example, it is generally assumed that near-native, optional intuitions may be caused by L1 featural influence (e.g., Beck 1998, Eubank 1996, inter alia), or by deficits at the syntax-discourse interface

caused by either discursive features (Sorace 2000, 2004, 2005), or by syntactic features (Lozano 2006) or even by processing shortcomings (Sorace 2006).

CONCLUSION

This paper has addressed a subtype of variable behaviour in L2 acquisition named optionality. Previous research has used the term optionality confusingly to refer to a wide array of non-native behaviour patterns. In this study, I have presented a quantitative definition of optionality, where within-group and between-group inferential statistics must be taken into consideration to distinguish optionality from other types of learner variability.

REFERENCES


