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Prosodic Effects on L2 Grammars
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Abstract:

This paper provides an overview of the Prosodic Transfer Hypothesis (PTH), which accounts for certain difficulties that learners experience with L2 morphosyntax. We focus on inflection and articles, which have often been accounted for through defective syntactic representations or problems with the interface between morphology and syntax (inflection) and between semantics or discourse/pragmatics and syntax (articles). We argue that some problems in these domains reflect transfer of L1 prosodic constraints: certain forms cannot be prosodically represented as target-like and hence are omitted or mispronounced. We trace how the PTH has developed over time, from its initial instantiation as involving permanent L1 transfer, to currently, where L1 representations are seen as adaptable to the needs of the L2, and new representations can in fact be acquired. We provide an overview of work conducted in this framework and discuss how the theory has been extended beyond production to encompass comprehension and processing.

Keywords:

Prosodic transfer; articles; inflection; omission; substitution; L2 acquisition.

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1. Introduction

There has been considerable interest in recent years in how adult second language learners and speakers (henceforth L2ers) acquire and process phenomena pertaining to so-called linguistic interfaces, where different domains of linguistic knowledge, such as syntax and semantics or syntax and discourse, intersect. This interest stems from the particular challenges that arise at interfaces: successful acquisition not only requires command over more than one area of grammar, it also requires an understanding of how these distinct domains must be integrated (see, for example, Sorace, 2011; White, 2009). Most of the L2 literature on this topic has centred on interfaces relating to syntax; the interface between phonology and other domains has received less attention. In this paper, we provide an overview and rationale for adopting a phonological perspective on certain issues traditionally assumed to pertain principally to morphology or the lexicon and its interface with syntax (production and comprehension of inflectional morphology), and syntax and its interface with semantics and discourse (production and processing of articles). We argue that consideration of phonological, and specifically prosodic, constraints on these phenomena can shed light on puzzling patterns observed in L2 behaviour.

Our goal is to demonstrate how phonology interfaces with other grammatical modules; our intention is to show that prosodic accounts of L2 behaviour complement, rather than replace, non-prosodic accounts. Indeed, we take the view that most linguistic constructions are multi-faceted in ways that touch on multiple types of linguistic knowledge. Most importantly, consideration of the phonological constraints imposed on L2ers by the L1 grammar can shed light on why target-like behaviour on some linguistic constructions in non-phonological domains seems particularly difficult to attain.

2. Puzzles

We begin by examining some well-known puzzles that have engaged the field for a number of years, relating to the production of bound and free functional elements, in particular, inflection and articles.

As the examples in (1) show, learners of L2 English often fail to regularly produce inflection in obligatory contexts (target words are in *italics*; contextually required material that is not produced is crossed out):

(1) Omission of inflection in English:

a. Tense:

He ~~callee~~ me last night (L1 Mandarin and Hokkien; Lardiere, 1998)

I didn't remember clearly what it ~~talke~~d about. I just ~~laughe~~d a lot. (L1 Chinese; Hawkins & Liszka, 2003)

b. 3rd person singular (3SG) agreement:

Mary *gets* up at 6 o'clock every morning. And then she *cleans* her teeth and her face. (L1 Mandarin; White, 2008)

She's really sleepy so she *goes* to bed and *reads* a little bit and at 10:45 she *turns* off the light and *goes* to sleep. (L1 French; White, 2008)

c. Plural:

I'm pleased to be here as we *liberals* choose the next generation of the Liberal Party leadership. Our party has reflected the *values* and *aspirations* of *Canadians* for *generations*. (L1 French; former Canadian Prime Minister Jean Chrétien, 14 April 2013; retrieved from <https://www.youtube.com/watch?v=49lOCCC0MvQ>)

A body of literature on English L2ers has shown that variability in production of inflectional morphemes occurs together with implicit knowledge of the syntactic reflexes of the categories that house them (T, Agr, Det, Num), as shown by pronominal case assignment, absence of null subjects, correct verb placement, knowledge of the definiteness effect, etc. (e.g., Haznedar & Schwartz, 1997; Lardiere, 1998, 2007; Prévost & White, 2000; White, 2003). In spite of L2ers' knowledge of the syntactic shell into which inflectional morphemes must be inserted, omission errors can persist, even in the productions of advanced learners from certain L1 backgrounds. This is surprising, given that the semantic and discourse conditions under which the morphemes in (1) must be overtly marked in English are relatively straightforward, contexts calling for past tense and plural marking are frequent in the input to which learners are exposed, and 3SG agreement and plural morphology are both marked by a perceptually salient consonant, *s~z*.

Turning to free functional elements such as English articles, omission is, again, the most widespread error observed, as shown in (2).

(2) Omission of articles in English:

So ~~the~~ brain is already shaped (L1 Turkish; White, 2003)

She decide to...buy ~~a~~ umbrella. (L1 Mandarin; Goad & White, 2008)

Previous literature has offered a range of accounts for article omission—syntactic (e.g., Trenkic, 2007), semantic (e.g., Huebner, 1985) and discourse/pragmatic (e.g., Robertson, 2000; Trenkic, 2007). These differing accounts highlight the fact that target-like knowledge of article use requires command over several grammar-internal and external domains.

In this paper, we discuss several seemingly unexpected patterns in the production of inflection and articles that go beyond omission. For inflection, these patterns include: (i) better performance on verbs ending in short (VC-final) rhymes than in long (VVC- and VCC-final) rhymes, exemplified in (3a); (ii) inappropriately stressed inflection alongside high rates of omission, (3b); and (iii) better performance on irregular than on regular past tense, (3c). Although these patterns are puzzling from a non-phonological perspective, we will show that they fall out naturally from an account based on prosodic transfer.

(3) Inflection—Beyond omission:

- a. then she *gets* dressed...And then *makes* breakfast and *cleans* the dishes. (L1 Mandarin; Goad, White, & Steele, 2003)
- b. [árbol] + PL → [arbolés] (target: [árboles]) ‘trees’ and [papél] + PL → [papél] (target: [papéles]) ‘papers’ (L1 French–L2 Spanish; Goad, White, & Bruhn de Garavito, 2011)
- c. I never *saw* them before; they *opened* my brain (L1 Mandarin; Goad et al., 2003)
went to school and *learned* English. (L1 Mandarin and Hokkien; Lardiere, 2003)

Alongside omission, it is similarly puzzling on non-phonological accounts that: (i) articles sometimes appear as inappropriately stressed, indicated in bold italics in (4a-b); (ii) articles in DPs with adjectives are more likely to be omitted or stressed than in DPs without adjectives, (4b); and (iii) substitution of other determiners for articles is sometimes observed, namely *this* or *that* for the definite article and *one* for the indefinite, (4c).

(4) Articles—Beyond omission:

- a. ...***a*** man and ***a*** girl (L1 Turkish; Goad & White, 2009)
- b. ~~***the***~~ big building / ***the*** big building (L1 Turkish)
- c. ...*this* ~~***the***~~ square size is eight cm. (L1 Mandarin; Robertson, 2000)
...*one* ~~***a***~~ person is playing, playing *one* ~~***a***~~ guitar (L1 Mandarin; Goad & White, 2008)

Although syntactic, semantic and discourse/pragmatic explanations have been provided for substitutions like those in (4c) (Ionin, Baek, Kim, Ko, & Wexler, 2011; Robertson, 2000), demonstratives and numerals are stressed and, thus, from a prosodic perspective, substitution is similar to the production of articles as stressed.

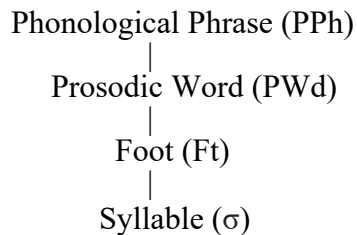
In earlier work, we have proposed that the profile of errors in the production of functional morphology in (3) and (4), alongside omission in (1) and (2), stems from constraints on prosodic structure transferred from the L1 into the interlanguage grammar. In this way, our approach shares much in common with research in first language acquisition, which has shown that variable production of functional morphology can be attributed to prosodic factors, thereby

potentially under-representing the child's morphosyntactic knowledge (e.g., Gerken & MacIntosh, 1993; Gerken, 1996; see Demuth, 2014 for a review).

3. Prosodic structure

We adopt the position that phonological units are arranged as per the hierarchy in (5) (e.g., McCarthy & Prince, 1995; Nespor & Vogel, 1986; Selkirk, 1980): segments are organized into syllables which are, in turn, organized into feet (the domain where stress is realized), prosodic words (which are analogous to stems), and phonological phrases.

(5) Prosodic hierarchy (partial):



Although lexical elements are typically prosodified so as to directly mirror the hierarchy in (5), the representations in (6) show that this is not necessarily the case for functional elements (fnc), our focus in this paper. Functional elements are prosodified in one of four ways (following Selkirk, 1996), depending on how closely they are bound to a preceding or following lexical host (lex). Functional elements that are organized as *internal clitics* appear inside the PWd that organizes their lexical host, as in (6a), and thus they are phonologically indistinguishable from other segmental material that appears internal to lex; *affixal clitics* are adjoined to the PWd of their host, (6b), a common representation for inflectional affixes across languages; *free clitics* attach directly to the PPh, (6c), the most common representation for function words across languages; and *prosodic word* status, (6d), is reserved for functional elements that display the same phonological behaviour as monomorphemic lexical items (e.g., they are stressed).¹

¹ Dotted lines in (6) indicate that feet and syllables are excluded from lexical elements given that these will vary depending on the length and shape of lex. Hereafter, all representations include only relevant structure.

- (6) Prosodic representations for functional elements (adapted from Selkirk, 1996: 196)
- a. Internal clitic: b. Affixal clitic: c. Free clitic: d. Prosodic word:
-

As Selkirk (1996) points out, languages can vary in how the same morphosyntactic entity is prosodified (see also Zec, 2005). We have argued, for example, that tense/aspect is represented as an internal clitic in Mandarin and French, but as an affixal clitic in English; and that articles are represented as affixal clitics in Turkish, in contrast to their free clitic status in English (Selkirk, 1996). Cross-language differences such as these have segmental and prosodic signatures, which can underlie non-target behaviour in the functional domain. Errors along the lines of (3) and (4), we propose, arise from constraints on prosodic structure that are transferred from the L1 grammar and shape the interlanguage grammar accordingly. We refer to this as the Prosodic Transfer Hypothesis (PTH) (Goad, White, & Steele, 2003; Goad & White, 2004, et seq.), defined in (7).

- (7) Prosodic Transfer Hypothesis:
Prosodic structure transferred from the L1 grammar constrains production of L2 functional morphology.

We motivate the PTH in section 4, by examining prosodic effects on the production of functional elements. We then turn, in section 5, to address whether prosodic effects may additionally hold in perception, comprehension and processing of the L2.

4. Prosodic effects on the production of functional elements

We begin by considering prosodic effects on the production of inflectional morphology, as this was the focus of our earliest work on prosodic transfer (Goad et al., 2003). There is considerable agreement that production of overt morphology is problematic for L2ers from a variety of L1 backgrounds, an observation that stems from the early days of L2 research (e.g., Dulay & Burt, 1974, amongst many others). Although there is little disagreement about the data, at least at a broad level, there is a divergence of opinion as to how to theoretically interpret it, the debate centring on whether L2 linguistic representations are defective (e.g., Hawkins, 2000; Tsimpli & Mastropavriou, 2007) or not (e.g., Haznedar & Schwartz, 1997; Hopp, 2010; Lardiere, 1998; Prévost & White, 2000).

An example of the first approach is provided by the Representational Deficit Hypothesis (RDH), advanced by Hawkins and colleagues (e.g., Hawkins, 2000; Hawkins & Franceschina, 2004; Hawkins & Liszka, 2003). According to this approach, L2ers transfer morphosyntactic features from the L1 and, crucially, are unable to add new (uninterpretable) features to the interlanguage grammar, that is, features that are required for the L2 but that are not activated in the L1. In contrast, the Full Transfer Full Access Hypothesis (FTFA) (Schwartz & Sprouse, 1996) maintains that there is no permanent representational deficit: although L2ers begin acquisition with the feature inventory available from the L1, they are not ‘stuck’ with it. However, FTFA needs an alternative means of explaining the discrepancies between underlying competence, demonstrated by syntactic success in domains relevant to inflection, and production, demonstrated by morphological errors. Several proposals have been advanced suggesting that L2ers, regardless of their L1, sometimes experience problems in accessing material from the lexicon, resulting in failure to consistently supply appropriate morphology, even when the relevant morphosyntactic properties can be demonstrated to be in place. These proposals include the Missing Surface Inflection Hypothesis (Haznedar & Schwartz, 1997; Prévost & White, 2000) and related proposals involving failure to appropriately map between the lexicon and syntax (Lardiere, 1998, 2000).

The Prosodic Transfer Hypothesis was advanced in the context of the debate over the status of grammatical features in the interlanguage grammar, particularly the source of morphological errors in L2 production. The PTH is a representational theory, advancing the position that L2ers’ productions are a reflection of the L1 phonological grammar. In other words, the PTH assumes an essential role for transfer in interlanguage representations, like the RDH and FTFA. In common only with the RDH, the PTH initially assumed that L2ers are ‘stuck’ with their L1 representations (Goad et al., 2003; section 4.1 below), with no access to *specific* properties of Universal Grammar (UG), namely to prosodic licensing relations not sanctioned by the L1 grammar but required for appropriate representation of functional morphology in the L2.² Subsequent work in the areas of both inflectional morphology and function words has suggested that this position was too strong (sections 4.2-4.3).

4.1 Prosodic Transfer Hypothesis: Full Transfer No Access

4.1.1 Inflection

As mentioned above, the PTH was developed in the context of claims about L2ers’ difficulties with inflection, particularly with morphology marking overt tense and 3SG agreement in languages like English. In the case of tense, Hawkins and colleagues take the lack of overt tense morphology in Mandarin to indicate that no $[\pm\text{past}]$ feature is present in that language. Learners

² This does not preclude acquisition of prosodic complexity in the phonology proper, where prosody does not impinge on functional morphology. Mandarin speakers, for example, can overcome the severe syllable structure constraints that hold of their L1 grammar (see section 4.1.1).

of English whose L1 is Mandarin are argued to be permanently affected by the lack of tense in the L1 grammar: no tense feature is available for transfer; and L2ers are presumed to be unable to access [\pm past] from the inventory of features available in UG, as required for appropriate representation of past constructions in the L2. In support of this hypothesis, Hawkins and Liszka (2003) contrast performance on English tense inflection by speakers of Chinese, Japanese and German, where the Chinese speakers but not the Japanese or German speakers (whose L1s realize tense overtly) have particular problems with English tense morphology. Furthermore, Hawkins and Liszka, as well as earlier work by Bayley (1996), show that Chinese speakers have greater difficulty realizing English *t/d* in regular past tense contexts (due to the absence of [\pm past]) than in past participles or monomorphemic words (where Tense is not implicated).

We have argued against this account, suggesting that the representation of morphosyntactic features is not permanently defective and that failure to regularly supply inflectional morphology requires, instead, a prosodic explanation. Specifically, English tense and agreement are pronounced variably due to phonological factors—for example, depending on the shape of the rhyme that precedes them, as shown in (3a) (Goad et al., 2003). The RDH does not expect the segmental and prosodic shape of morphemes to determine whether or not the morphology is produced; the crucial issue on that account is only the missing feature.

We briefly detail our prosodic approach here. In earlier work (Goad et al., 2003; Goad & White, 2006), we show that languages vary in the way they prosodically organize inflection in relation to the base to which it attaches. As per the PTH, we argue that omission or variable suppliance of inflection can be traced to L2ers' inability to organize it in the manner required by the target grammar. One way to determine the appropriate representation for inflection is to compare inflected words with monomorphemic words. In our earlier work, we show that English inflection does not respect the segmental and prosodic constraints that hold of monomorphemic words. One of these constraints concerns length and it is the one that we focus on here.

In the vast majority of languages, there is an upper bound of three on the number of segments that can appear in word-final rhymes. The examples in (8a-b) show that monomorphemic words in English respect this constraint. As English allows both consonant clusters and long vowels/diphthongs (transcribed as vowel+glide), it admits both VCC- and VVC-final words, but not VCCC- and VVCC-final words.³ Class 1 derivational suffixes respect this upper bound of three; vowel shortening takes place to avoid violating this constraint, as

³ There is a class of systematic exceptions to the upper bound of three: VVCC-final words where the cluster shares coronal (e.g., [pejnt] 'paint', [tʃajld] 'child') (Chomsky & Halle, 1968). Nasal + fricative clusters in dialects where the cluster is separated by an excrescent stop (e.g., [prin(t)s] 'prince' vs. [prints] 'prints') are not, we contend, exceptions because excrescent stops are short in duration (Feldscher & Durvasula, 2017), suggesting that they are not represented as full-fledged segments. True exceptions include a handful of words like [mænks] 'manx' and [kɔɹps] 'corpse'.

shown in (8c).⁴ Regularly inflected stems, on the other hand, do not need to respect the length constraint; see (8d). This observation holds for plural, 3SG agreement, past tense and participial morphology.

- | | | |
|-----|----------------------------|----------------------------|
| (8) | a. Word-final VCC: | b. Word-final VVC: |
| | [hɛlm] ‘helm’ | [rijm] ‘ream’ |
| | [hɛmp] ‘hemp’ | [rijp] ‘reap’ |
| | *[hɛlmp] | *[rijmp] |
| |
c. Class 1 derivation: |
d. Regular inflection: |
| | [diɪp] ‘deep’ | [hɛlmz] ‘helms’ |
| | [dɛpθ] ‘depth’ | [rijpt] ‘reaped’ |
| | *[diɪpθ] | [dɛpθs] ‘depths’ |

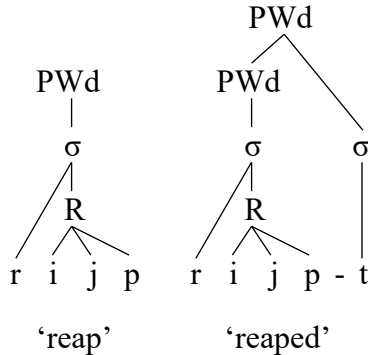
The fact that inflection in English does not trigger vowel shortening suggests that it is more loosely attached to its host than is class 1 derivation. To formally express this, we have proposed that inflectional material is not organized internal to the PWd of its host but is, instead, adjoined to it as an affixal clitic (Goad et al., 2003), as shown in (9a). Since inflection is expressed by a single consonant in an adjoined position, it is represented as a defective syllable (an onset lacking an overt nucleus), in the spirit of Government Phonology (e.g., Kaye, 1990). The representation for inflection contrasts with that for class 1 derivation, which appears as a rhymal consonant internal to the PWd of its host, (9b), resulting in the same prosodic representation as holds for monomorphemic words, (9c).⁵

⁴ Class 1 affixes are those that are closely bound to their hosts and, thus, respect (most) constraints that hold of monomorphemic words.

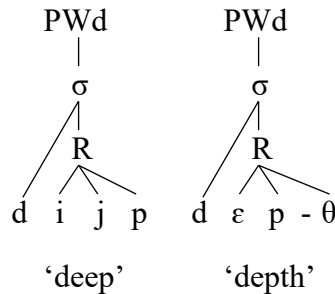
⁵ One may question why inflectional suffixes in English cannot link directly to the lower PWd, instead of via the proposed adjunction structure. In the text, we mentioned that inflection does not respect the segmental constraints that hold of monomorphemic words. Consider nasal+stop (NC) clusters. NC clusters in monomorphemic words must share place (e.g., [sænd] ‘sand’, *[sæmd]; [sændəl] ‘sandal’, *[sæɲdəl]), but across an inflectional boundary, they are not required to (e.g., [slæmd] ‘slammed’, [hæɲd] ‘hanged’). If inflection were internal to the lower PWd, in a representation like [(hæɲ)σ (d)σ]PWd, or possibly [(hæɲd)σ]PWd after short rhymes, NC clusters should respect the same place constraints that hold of words like [(sæn)σ (dəl)σ]PWd and [(sænd)σ]PWd. Clearly, then, a PWd boundary must interrupt the NC cluster in inflected contexts.

(9) English:

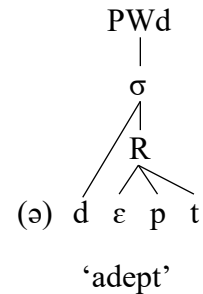
a. Regular inflection:



b. Class 1 derivation:

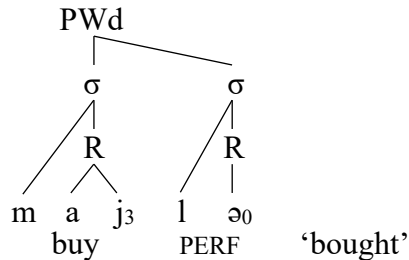


c. Monomorphemic:



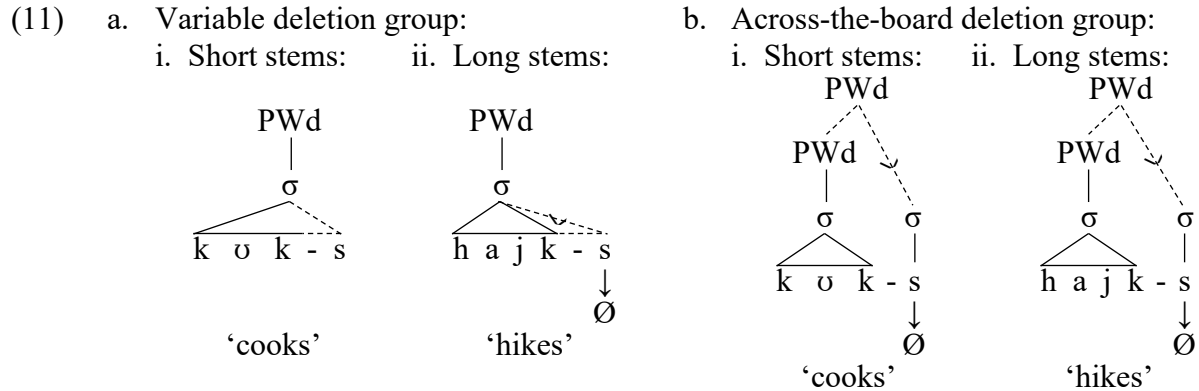
If L1 prosodic constraints underlie Mandarin speakers’ omission of English inflectional morphology, it must be the case that Mandarin employs a different representation for inflection than that observed in (9a). We have argued that this is indeed the case: in Mandarin, aspect (the only inflection that is overtly realized) is organized inside the PWd of its host as an internal clitic (see Goad et al., 2003 and Goad & White, 2006 for arguments). This is shown in (10) (numbers represent tones: 3 = dipping tone; 0 = neutral tone).

(10) Mandarin verbal inflection:



In Goad et al. (2003), we argued that Mandarin speakers’ productions are limited, through prosodic transfer, to their L1 representation for inflection. Data were elicited via a picture description task that targeted agreement. Responses revealed two patterns of behaviour. The first was variable deletion of inflection. Learners in this group only produced 3SG agreement reliably when it could be incorporated into the PWd of its host, as in the Mandarin grammar in (10). Although not target-like for English, inflection can be organized PWd-internally after stems ending in short rhymes (two segments), like [kɔk] ‘cook’ in (11a.i), without violating the near-universal constraint on the upper length of rhymes discussed above. However, in the case of stems ending in long rhymes (three segments), like [hɛjk] ‘hike’ in (11a.ii), there is no room for inflection inside the PWd and agreement cannot be realized. Consistent with this, learners in the variable deletion group produced agreement morphology an average of 68% of the time after short stems but only 9% of the time after long stems.

The second pattern we observed was across-the-board deletion of inflection. Learners in this group recognized that the Mandarin representation for inflection is not suitable for English but, unlike the variable deletion group, they were sensitive to the need for a unified analysis of inflection (i.e., one representation for stems of all shapes). Since their grammar does not permit inflection to be adjoined to the PWd, as required for English, inflection was deleted across-the-board, as shown in (11b), that is, after short stems like [kɒk] and long stems like [hæjk].



As expected, for the across-the-board deletion group, deletion of agreement morphology was independent of cluster reduction in monomorphemic words. While this group had difficulty with clusters in general, the rate of production of final clusters was much higher in monomorphemic words like [fæks] ‘fax’ (on average 57%) than in inflected words like [kɒks] ‘cooks’ (7%), suggesting that clusters that arise from the addition of inflection and those found elsewhere are represented differently for this group, as they are in the target grammar (viz. (9a) vs. (9c)).⁶ By contrast, the suppliance rate of agreement morphology for the variable deletion group mirrored their production of clusters in monomorphemic words, 68% for both, suggesting that forms like [kɒks] and forms like [fæks] are represented identically for this group, with the final consonant in both cases being internal to the lower PWd.

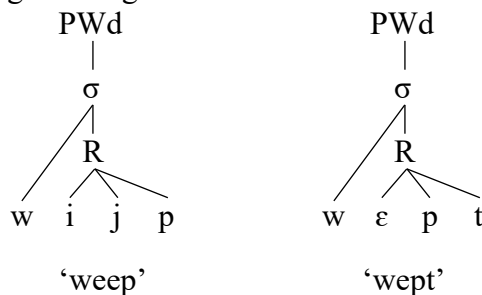
One drawback of the Goad et al. (2003) study is that the data were collected via a picture description task that was designed for a purpose other than to test the PTH. As a result, the number of verbs requiring 3SG agreement varied appreciably across participants and there was no way to systematically control the phonological shapes of these verbs as well as the monomorphemic words with which they were compared. A study recently conducted by Austin, Chang, Kim, and Daly (2019) on Korean-speaking learners of English plural and agreement

⁶ We concur with Grimshaw and Rosen (1990) that differential performance on two linguistic phenomena indicates a distinction in grammatical knowledge, even if learners do not show as clear a distinction as might be expected from adult native speakers. In the present case, the rate of suppliance for clusters in monomorphemic words is only 57% because Mandarin has much more severe constraints on rhymes than English does (Duanmu, 2000). This is, however, significantly higher than the 7% observed for inflection after short stems.

morphology was designed to rectify these problems. Austin et al. argue that Korean inflection (specifically, tense) is organized as an internal clitic, like Mandarin aspect in (10). Prosodic transfer thus predicts the same patterns discussed earlier for Mandarin: short stems should be reliably marked for inflection, while long stems should be overtly inflected significantly less often. Austin et al. find that intermediate learners consistently produce English inflection only for short-stems, similar to the variable deletion group in Goad et al. (2003), and thus consistent with prosodic transfer.

So far, we have shown how the PTH accounts for one of the patterns in (3), namely that in (3a), where deletion of inflection or suppliance using a non-target structure are both observed. We now briefly consider the pattern in (3c), where L2ers' performance on irregulars is more successful than their performance on regulars. A difference along these lines has been widely reported in the literature (e.g., Bayley, 1996; Hawkins & Liszka, 2003; Lardiere, 2003). Regulars and irregulars are represented identically in the syntax, which poses a challenge for syntactic accounts: the absence of $[\pm\text{past}]$ from the interlanguage grammar of L1 Chinese speakers, as per the RDH, predicts regular and irregular to be equally problematic.⁷ By contrast, regulars and irregulars are not represented identically in the phonology. Unlike regularly-inflected forms, irregulars always respect the upper bound on the length of rhymes that holds of monomorphemic words; for instance, the irregular ablaut and suppletive forms, *saw* and *went*, in (3c) contain two and three rhymal segments, respectively. Further, when uninflected rhymes already contain three segments and are VVC in shape, the addition of irregular inflection triggers shortening (e.g., *weep-~~wept~~*), parallel to class 1 derived words (e.g., *deep-~~depth~~*), indicating that irregular past *t*, like derivational *th*, is internal to the lower PWd, as shown in (12). Because of this, Mandarin-speaking learners can use their transferred PWd-internal representation in (10) for irregular inflection in English.

(12) English irregular inflection:



In sum, we have seen that the PTH not only accounts for L1 influence on the production of inflectional morphology but also offers an explanation for variation. The claim is that

⁷ Hawkins and Liszka (2003) account for this by proposing that irregular forms are conceptually associated with past time without bearing the feature $[\pm\text{past}]$. They recognize, however, that this begs the question as to why L2ers do not analyse regulars in the same way.

individual learners will be able to supply—or fail to supply—inflection depending on phonological factors that arise from (i) whether the stem is regularly or irregularly inflected, and (ii) if regular, the length of the stem to which inflection attaches. As alluded to above, such variability is unexpected under theories that assume representational deficits in the morphosyntactic domain; under the RDH, in particular, if the interlanguage representation lacks a certain feature, there is no principled reason to observe prosodically conditioned variation relating to that feature.

Although the PTH and RDH differ in several ways, they share a core assumption, namely that difficulties with inflectional morphology reflect a representational deficit, in the prosodic and morphosyntactic domains, respectively. In Goad et al. (2003), it was proposed that prosodic deficits in the functional domain are permanent, which was motivated by the more general observation that phonological development often seems to fossilize in adult L2ers. In this way, the PTH, like the RDH, was initially assumed to be a theory of Full Transfer No Access: while UG-governed grammars are built by L2ers, the interface between morphosyntax and phonology is constrained such that learners are unable to access UG properties not already instantiated in the L1. There is, however, an important difference between the PTH and the RDH: although, as per the PTH, L2ers are assumed to be unable to access new prosodic licensing relations from UG, this does not prevent the grammar from generating an appropriate syntactic representation for the functional material. What our proposal prevents, in the case of Mandarin-speaking learners of English, is the building of the affixal clitic representation necessary for English inflection in (9a). However, since the same morphosyntactic element can be prosodified in different ways across languages, other representations are possible, namely the PWd-internal representation for inflection that is present in the L1 grammar.

Consistent with this, for Mandarin-speaking learners of English, inflection should, at best, be reliably supplied only for irregulars and for short stemmed regulars, where inflection can be incorporated into the PWd of its host; long-stemmed regulars should either resist being overtly inflected or should only surface as inflected if they undergo vowel shortening (e.g., [rijpt] → [ript] ‘reaped’) or cluster reduction (e.g., [hɛlmz] → [həmz] ‘helms’). In sum, differences in the prosodic representation of inflection in Mandarin and English predict failure to produce inflectional morphology under certain conditions and success in producing it under others although not, in the latter case, using the target representation. In section 4.2, we question whether representational deficits in the prosodic domain are truly permanent.

4.1.2 *Function words*

Although the PTH was initially proposed to account for L2ers’ errors in the inflectional domain, subsequent work has demonstrated its applicability to function words as well. As with inflection, articles are often omitted in the productions of L2ers who come from L1 backgrounds that lack articles or have only one article. In addition to omission, we observe the patterns in (4), which

have a phonological bent: articles may be stressed and other (stressed) determiners may be substituted for articles, typically *one* for *a* and *this* or *that* for *the*. In Goad and White (2008, 2009), we propose that this is due to L2ers from certain L1 backgrounds lacking the free clitic representation (see (16b)) required for representing articles in English-like languages.

We focus here on Turkish-speaking learners of English. We begin with some discussion of the distribution and representation of determiners in the two languages. In contrast to English, where singular count nouns require an article, (13a) shows that bare nouns are felicitous in Turkish; their interpretation, as definite or indefinite, is determined principally by word order and case marking (Kornfilt, 1997). Although Turkish has no definite article, in indefinite contexts, *bir* can be used, (13b). When *bir* surfaces as unstressed, it is interpreted as the indefinite article *a*, (13b); when stressed, it is interpreted as the numeral *one*, (13c) (e.g., Erguvanli, 1984; Kornfilt, 1997; Öztürk, 2005).⁸ Other determiners, such as demonstratives, also appear as stressed, (13d).⁹

- | | | | | | | |
|------|----|-----------|----------------|----|-----------|-------------|
| (13) | a. | kitáp | ‘(the/a) book’ | c. | bír kitap | ‘one book’ |
| | b. | bir kitáp | ‘a book’ | d. | bú kitap | ‘this book’ |

A comparison of (13) and (14) might suggest that Turkish and English share the same prosodic representations for articles and other determiners, as articles are unstressed and other determiners are stressed in both languages.

- | | | | | |
|------|----|------------------|----|-----------|
| (14) | a. | bóok | c. | òne bóok |
| | b. | a bóok, the bóok | d. | this bóok |

Although the two languages do indeed share the same representation for stressed determiners ((16c) below), differences in word order in DPs containing adjectives suggest that this is not the case for articles. In Turkish, the numeral and article interpretations of *bir* appear in different positions relative to the adjective (Kornfilt, 1997; Öztürk, 2005). When *bir* precedes the adjective, (15a), it is stressed and interpreted as a numeral. When *bir* follows the adjective, (15b), it is unstressed and interpreted as the indefinite article.

⁸ We follow Kornfilt (1997) in analysing unstressed *bir* as an article. There is, however, some dispute in the literature as to whether or not definiteness is grammaticalized in Turkish (see Lyons, 1999; Öztürk, 2005; Underhill, 1976).

⁹ Only phrase-level stress is marked in the Turkish examples because there is disagreement in the literature as to whether or not stress surfaces on all PWds in a phrase. We follow Kabak and Vogel (2001) who propose that main stress falls on the final syllable of the leftmost PWd in the phrase.

- (15) a. *bir iyi kitap* 'one good book'
 b. *iyi bir kitap* 'a good book'

We have argued that this word order alternation is prosodically conditioned: unstressed *bir* is represented as an affixal clitic that must prefix onto the noun that it modifies, as shown in (16a). In English, where the presence or absence of adjectives has no bearing on the position of articles, articles link higher in the tree, as free clitics at the level of PPh; see (16b). Finally, in both languages, other determiners form independent PWds, which enables them to receive stress, as shown in (16c).

- (16) a. Turkish article: Affixal clitic:
 PPh
 |
 PWd
 / \
 PWd
 |
 bir kitap
- b. English article: Free clitic:
 PPh
 / \
 the/a PWd
 |
 bók
- c. Other determiners: Independent PWd:
 PPh
 / \
 PWd PWd
 | |
 bír kitap
 òne bók

Since articles are unstressed in English, the Turkish representation that would seem to be most appropriate to transfer into the interlanguage grammar for English articles would be the affixal clitic structure in (16a). However, although productions using this structure for Art + N constructions will sound target-like, the structure is not, in fact, correct and, critically, is not available for Art + A + N constructions, as indicated in (17a). This representation is illicit because *bir* prefixes onto the adjective. Accordingly, the Turkish structure that is most suitable is, instead, that in (17b); the problem here is that the article forms its own PWd and will therefore incorrectly surface as stressed.

- (17) Interlanguage representations:
- a. Illicit:
 * PPh
 / \
 PWd PWd
 / \ |
 PWd
 |
 a góod bók
- b. Stressed article:
 PPh
 / \ \
 PWd PWd PWd
 | | |
 á góod bók

In view of these cross-language differences, prosodic transfer in the article domain predicts the following patterns of behaviour for Turkish-speaking learners of English, alongside omission: stressing of articles, substitution of other (stressed) determiners in place of articles,

and insertion of pauses or fillers after articles, which disrupts the prosodic structure of phrases and thereby circumvents the target representation. All of these patterns should be particularly evident in DPs containing adjectives, given that (17a) is illicit.

In Goad and White (2009), a story-telling task was used to test these predictions. Three of the four predicted patterns were robustly attested: omission; stressing;¹⁰ and insertion of a pause or filler.¹¹ Substitution was not, although it has been observed for other learners for whom prosodically motivated patterns in the production of articles have been reported.¹² Further, as predicted, for each group, the number of target-like productions was lower in DPs with adjectives, where the L1 affixal clitic representation cannot be used.

In sum, the results of this study show that the PTH can account for L1 effects on the production of articles, predicting various types of outputs that are consistent with the prosodic representations available from the L1 grammar. Similar to what was observed for inflection, the ability to produce an article in a target-sounding way depends on phonological factors: the Turkish affixal clitic representation can be employed for English articles in some circumstances but not in others.

4.2 *Prosodic Transfer Hypothesis: Full Transfer Partial Access*

As discussed, the earliest version of the PTH (Goad et al., 2003) assumed Full Transfer No Access (in terms of access to new prosodic licensing relations required for functional morphology). Further investigation of prosodic effects in the functional domain, however, suggested that this position was too strong, that under certain circumstances, it is possible to adapt L1 representations in order to build appropriate structures in the L2. In Goad and White (2004), we showed that suppliance of tense, 3SG agreement and plural morphology in the English productions of SD, a Turkish native speaker with advanced proficiency in the L2, was high because the necessary representations could be built from structures available in the L1 grammar, while suppliance of articles, where no adaptation of L1 structures was possible, was much lower. In addition, Goad and White (2006) provide a detailed examination of phonetic constraints on verbs inflected for tense and participial morphology in the English productions of Mandarin

¹⁰ The observation in Goad and White (2009) that articles are stressed comes from narrowly transcribed data. This pattern has been acoustically confirmed in two other studies. One is Snape and Kupisch's (2010) reanalysis of the productions of SD, an L1 Turkish/L2 English speaker (see White (2003)); the other is Ueyama's (2000) analysis of the productions of four Japanese-speaking learners of English.

¹¹ In Goad & White (2009), we did not consider the use of pauses and fillers. Re-examination of the data shows that, for the advanced speakers, the greatest difference in non-target productions across the two types of DPs is an increase in the number of pauses and fillers, suggesting that this is a strategy employed to circumvent the target structure.

¹² The learners in question are Turkish-speaking SD (Snape & Kupisch, 2010) and Mandarin-speaking M6 and M15 (Goad & White, 2008).

speakers (intermediate proficiency), which showed that the required representation for English inflection could be built, in contrast to the conclusion arrived at in Goad et al. (2003) for agreement.

The PTH was thus revised to be a Full Transfer Partial Access model, where L1 prosodic representations can be *minimally adapted* to accommodate the L2. Specifically, we proposed that representations necessary for the L2 can be constructed under two conditions: when they can be built through combining L1 licensing relations; or when they involve L1 structures being licensed in new positions (Goad & White, 2004, 2006). Both types of minimal adaptation require prosodic licensing relations in the L1 to be accessible to learners independently of the constructions that host them.

In our earlier work, the second condition was intended to cover two scenarios. One was when the target representation involved L1 structures being licensed in new morphosyntactic domains (e.g., a licensing relation permitted in the nominal domain in the L1 grammar is required in the verbal domain in the L2; a licensing relation permitted in one type of projection in the L1 (e.g., DP) is required in another in the L2 (e.g., TP)). The other scenario was when the target representation involved L1 structures being licensed at new edges of the prosodic domain (e.g., a licensing relation permitted at the left edge in the L1 grammar is required at the right edge in the L2). Consequently, we now consider minimal adaptation to involve three separate conditions, as shown in (18):

(18) Conditions on minimal adaptation:

L1 prosodic structures can be minimally adapted to accommodate the needs of the L2:

- a. when they can be built through combining L1 licensing relations;
- b. when they involve L1 structures being licensed in new morphosyntactic domains;
- c. when they involve L1 structures being licensed at new edges of the prosodic domain.

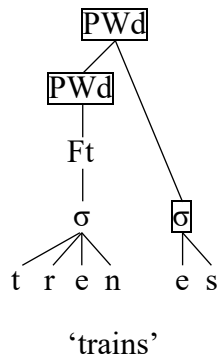
In the following paragraphs, we examine a number of scenarios to clarify the differences between (18a-c).

To illustrate condition (18a), we consider learners of Spanish whose L1 is Quebec French. The adjunction structure in (19a) employed for Spanish plural morphology is absent from French; overt inflectional morphology is instead organized as an internal clitic (see below). The question thus arises as to whether French speakers can build the representation in (19a) in the interlanguage grammar from extant L1 licensing relations. Two licensing relations are required, indicated by the boxes in (19a): (i) a PWd must be able to dominate another PWd, and (ii) a PWd must be able to directly dominate a syllable. Both of these structures are attested in the L1, (i) in compounds (see (19b)), and (ii) in lexical words that are longer than one foot (see

(19c-d)).¹³ In (19c), a binary right-headed foot is built at the right edge of the word, reflecting the fact that French is conventionally described as a language with final stress; as there is no room in the foot for the initial syllable, it is parsed directly by the PWd. In (19d), stress is not final because, in many varieties, including Quebec French, stress can optionally shift to the penult when it contains a heavy syllable (for Quebec French, see Lamontagne & Goad, submitted; Paradis & Deshaies, 1990; Thibault & Ouellet, 1996). Since feet are right-headed in French, the foot must also shift in and, consequently, the final syllable in (19d) is parsed directly by the PWd. In sum, the grammar of French should facilitate the building of the affixal clitic representation required for Spanish plurals under condition (18a): the necessary licensing relations, (i) and (ii), are both permitted in the L1 grammar, and (ii) is permitted at the same (right) edge as needed for Spanish plural.

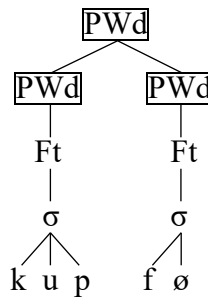
(19) Combining L1 licensing relations:

a. Spanish plural inflection:



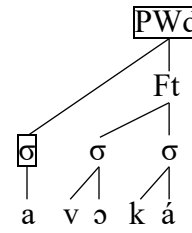
‘trains’

b. French compounds:



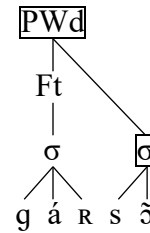
‘fire-break’
(*lit.* cut fire)

c. French final stress:



‘lawyer’;
‘avocado’

d. French penult stress:



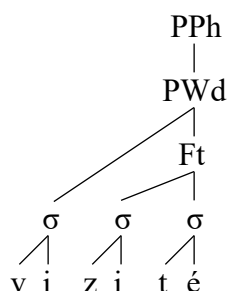
‘boy’

To determine whether speakers of Quebec French can truly adapt their L1 licensing relations for Spanish plurals, Goad, White, and Bruhn de Garavito (2011) examined learners’ productions of singular and plural nouns at two levels of proficiency (beginner and low-intermediate), using data collected through a picture description task (from Bruhn de Garavito, 1986). Stress provides an important piece of evidence for learners to determine how Spanish plural is prosodically organized; specifically, the location of stress is unaffected by the addition of plural morphology in Spanish ([mé^sa] ‘table’, [mé^sas], *[mesás] ‘tables’; [balón] ‘ball’, [balónes], *[balonés] ‘balls’), indicating that this morphology is not organized internal to the lower PWd where it would be visible for stress assignment. Instead, as seen earlier in (19a), it is

¹³ The discussion here assumes that French prominence is formally stress (PWd-level prominence assigned within the domain of the foot) (following, e.g., Charette, 1991; Scullen, 1997). However, the fact that the only obligatory position of prominence in French is the right edge of PPh (e.g., Dell, 1984) has led some scholars to reject the foot for French altogether (e.g., Jun & Fougeron, 2000).

represented as an affixal clitic. This is in contrast to French where the location of stress, as phrase-final, is affected by the addition of verbal inflection, for example person/number marking ([vizít] ‘visit’, [vizit[́]] ‘visit’-1PL, [vizité] ‘visit’-2PL), suggesting that this morphology is represented as an internal clitic. This is shown in (20) for [vizité].¹⁴

(20) French verbal inflection:



The French-speaking beginners supplied the plural in L2 Spanish on average 65% of the time. When they produced the morphology, stress was incorrectly placed on that syllable ([mesás], [balonés]), consistent with plural being organized as an internal clitic. Goad et al. (2011) suggest that the beginners fluctuate between deletion of the plural and resorting to the structure for verbal inflection in (20) transferred from the L1 grammar (see earlier (3b)).

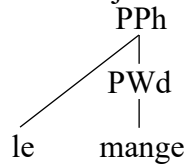
The crucial question is whether French speakers are stuck with their L1 PWd-internal representation for inflection or whether they can minimally adapt the representations in (19b) and (19d) to build the affixal clitic structure required for Spanish plural. The low intermediate group supplied plural morphology 91% of the time and, most importantly, there was significantly less stress shift to the final syllable than for the beginners, indicating that the appropriate affixal clitic representation had been acquired. In short, we can conclude that minimal adaptation of the type in (18a) is possible.

Next, we consider minimal adaptation under condition (18b), namely, whether L1 structures can be licensed in new morphosyntactic domains. Consider English-speaking learners of French object clitics in constructions such as *Marie le mange* ‘Marie eats it’. French object clitics are prosodically organized as free clitics, licensed by a host to their right, as shown in (21a). Although English has reduced pronouns in constructions like *They see ‘im*, these pronouns are organized as affixal clitics (Selkirk, 1996), licensed by a host to their left, as can be seen in (21b), and thus they do not provide a suitable prosodic model for French preverbal object clitics. English does, however, employ the necessary representation for articles, shown in (21c). Minimal adaptation in this case thus requires that a prosodic structure licensed in the DP domain in the L1 be redeployed to the TP domain in the L2.

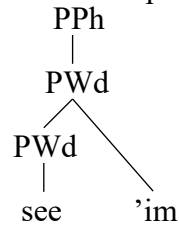
¹⁴ Examples come from the verbal domain because nominal inflection is not overtly realized in French.

(21) Licensing L1 structures in new domains:

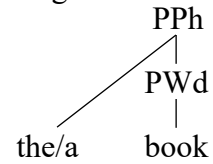
a. French object clitics:



b. English reduced pronouns:



c. English articles:



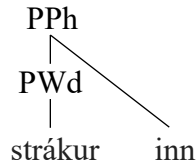
Herschensohn and Gess (2018) provide evidence for this kind of minimal adaptation, that is, the adaptation of the free clitic representation for L1 English articles (21c) to object clitics in L2 French (21a). Their evidence comes from three advanced (post-puberty) learners of French who show: near ceiling performance on the suppliance of object pronouns in preverbal position; appropriate application of segmental alternations involving object pronouns and their hosts (i.e., liaison and elision); and, critically, target-like prosodic realization of these elements: pronouns in pre-verbal position were not stressed, indicating that they did not form independent PWds (*Marie [[lè]_{PWd} [mángo]_{PWd}]_{PPh} 'Marie eats it'), nor were there errors in constructions involving multiple clitics, indicating that object pronouns were not treated like reduced pronouns in the L1 grammar (21b), a representation that does not allow recursion (*Marie [[le [lui [dónne]_{PWd}]_{PWd}]_{PWd}]_{PPh} 'Marie gives it to him').

We turn finally to minimal adaptation under (18c), where L1 structures must be licensed at new edges of the prosodic domain in the L2. Here, we sketch such a case for articles in language pairs like Icelandic and English. In Icelandic, the definite article is a bound element that appears to the right of its host (e.g., *strákur-inn* 'the boy'). Skrzypek (2009) argues that *-inn* is syntactically a clitic, which corresponds to a free clitic in the phonology. Recall that in English, articles are also free clitics, but licensed at the left edge of their host. Thus, English learners of Icelandic should be able to adapt their L1 representation for articles by licensing the necessary structure at the opposite edge of its nominal host in the L2, as shown in (22). This proposal, however, is yet to be tested.¹⁵

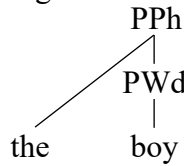
¹⁵ Gerken (1996) proposes that unstressed articles in English can lean leftward as well as rightward. Evidence for two representations comes from the finding that children produce articles at higher rates in sentences like *Tom pushed the zebra* than in sentences like *Tom pushes the zebra*. In the former case, she proposes that the verb and article together form a bisyllabic foot ([*pushed the*]_{Ft}), which protects the article from deletion. In the latter case, there is no room for the article inside the foot because the syllabic inflection occupies the foot dependent position ([*pushes*]_{Ft} *the*). If articles were able to lean leftward in the manner proposed by Gerken, the acquisition challenge for English learners of Icelandic would be somewhat different: L2ers would be able to use this representation for Icelandic when articles follow a monosyllabic noun. Although Gerken's experimental results clearly support a prosodic difference between the two types of sentences she examines, we do not accept that this motivates a foot-internal analysis of English articles for three reasons (see section 4.1.1): (i) the rhyme constraints that hold of

(22) Licensing L1 structures at new edges:

a. Icelandic articles:



b. English articles:



We have sketched a number of scenarios where L1 representations can be minimally adapted for use in the L2.¹⁶ With the evidence thus far available, we cannot determine with certainty whether one type of minimal adaptation is more costly than another (in the sense of being harder to acquire). At present, however, we have some evidence to suggest that it is not too costly to arrive at new representations in the L2 when these can be built solely by combining existing licensing relations from the L1, as in (18a): the Quebec French-speaking learners in Goad et al.'s (2011) study were able to successfully build the necessary affixal clitic representation for Spanish plurals at a relatively low level of proficiency. We also have some evidence to suggest that it is costly to license L1 structures in new morphosyntactic domains, (18b). The English-speaking learners in Herschensohn and Gess's (2018) study, who were able to adapt their free clitic representation for articles in their L2 grammar for French object clitics, were at an advanced level of proficiency. On the other hand, Buckley (2005) found that intermediate proficiency learners of French who produced object clitics as seemingly target-like (unstressed) were unsuccessful with multiple clitic constructions: the first clitic typically appeared as stressed, suggesting that these learners adapted their L1 affixal clitic representation for English reduced pronouns to appear at the opposite edge of their host; this forced the first clitic to surface as an independent PWd, due to the impossibility of having recursive affixal clitics (e.g., Marie [[le [mángo]PWd]PWd]PPh, but Marie [[lè]PWd [lui [dónne]PWd]PWd]PPh). This inappropriate use of the affixal clitic representation involves an L1 structure being licensed at a new edge, (18c), perhaps because it is an easier adaptation than that required to yield target-like outputs: licensing the L1 structure for articles in a new domain, (18b).

stressed syllables in monomorphemic words are not respected in inflected forms like *pushed*; (ii) the phonotactic constraints that hold of consonants at the juncture between stressed and unstressed syllables in monomorphemic words are not respected in strings like *pushed the*; and (iii) inflection would be organized foot- and thus PWd-internally, contra (9a). We suggest instead that Gerken's results are due to the child optimizing the overall rhythmic profile of the sentence, which favours peak-trough alternations, independent of the manner in which trough syllables are prosodically organized. Following from this, we assume that there is only one representation for unstressed articles in English, that in (22b).

¹⁶ Another perhaps simpler type of minimal adaptation is provided by Cabrelli Amaro, Campos Dintrans, and Rothman (2018), who show that the affixal clitic representation required for English tense can be built by Spanish speakers by redeploying their L1 affixal clitic representation for person/number marking within the inflected verb itself.

An assessment of cost, however, must not only consider whether and how L1 licensing relations can be redeployed or adapted for use in the L2; the type of licensing relation required (internal clitic, affixal clitic, free clitic) may also be relevant for assessing cost, as is whether the new construction requires command over prosody alone or, instead, the interface between prosody and other domains of the grammar. Clearly, more targeted research must be conducted in this area.

In the next section, we examine situations under which minimal adaptation is not possible because the L1 does not include the necessary representations and yet the target representation is acquired.

4.3 *Prosodic Transfer Hypothesis: Full Transfer Full Access*

In (18a), we proposed that prosodic structures can be minimally adapted for use in the L2 when they can be built through combining L1 licensing relations. This situation commonly holds for affixal clitics, where functional material is dominated by an adjoined PWd: $[[lex]_{PWd} fnc]_{PWd}$. A critical component required to build this representation in the L2 is that a PWd must directly dominate a syllable in the L1. For example, we saw in the preceding section that French speakers can build the representation required for Spanish plural, $[[noun]_{PWd} PL]_{PWd}$, because, in French, a PWd directly dominates a syllable when that syllable is not parsed into a foot in the assignment of stress: $[[gáR]_{Ft} s\tilde{o}]_{PWd}$ ‘boy’. The category PWd is unique in its ability to organize both lexical and functional material. The category PPh, by contrast, can only directly dominate a syllable when that syllable is functional. Thus, the free clitic representation required for English articles, $[ART [noun]_{PWd}]_{PPh}$, cannot be built from L1 licensing relations employed for lexical material. It follows that if the L1 grammar does not already permit a syllable to link directly to PPh, it will be impossible to construct this licensing relation under condition (18a) of minimal adaptation.

In Goad and White (2009), we argued that this situation characterizes the acquisition of English articles by Turkish speakers: Turkish does not support free clitics and, thus, minimal adaptation is not available. If the PTH is a Full Transfer Partial Access theory of acquisition, then the free clitic representation required for English articles should be permanently out of reach for Turkish speakers. Seemingly consistent with this, in section 4.1.2, we observed that performance on English DPs containing adjectives, where the L1 affixal clitic representation could not be employed, was considerably worse than performance on DPs without adjectives, where it could be. However, closer look at the data from individual learners revealed that the performance of two participants, one advanced and one intermediate, was on target: both produced a substantial number of target-like forms and no statistically significant difference was observed between their performance on DPs with and without adjectives.¹⁷ From this, we

¹⁷ Neither of these learners stood out from the others on demographic grounds, for example, age of acquisition. In view of this, one might question how a learner who has only achieved an

concluded that the PTH must be modified so that it is, in fact, consistent with the Full Transfer Full Access Hypothesis (Schwartz & Sprouse, 1996), even if the building of the necessary representation for articles is available only for a minority of L2ers.

If this is indeed the case, we must strive to explain why acquisition of new constructions in the phonological domain is commonly reported to lag behind the syntactic domain. In the area of prosodic phonology, Goad and White (2009) propose that this is due to learners having to acquire the syntax of new functional material before they can determine how to prosodically represent it because the same morphosyntactic element can be prosodified differently across grammars (e.g., articles in Turkish vs. English).

5. Prosodic effects on the perception, comprehension and processing of functional elements

Thus far, our discussion of prosodic transfer has focused solely on production. Indeed, the PTH, defined in (7), was introduced specifically to account for certain difficulties that L2ers have with the *production* of functional morphology. One question that arises is whether there is evidence for the operation of prosodic transfer in other modes, specifically, in the perception, comprehension or processing of functional material. We examine each of these below.

5.1 Perception

The PTH attributes variable suppliance of inflectional morphology in production to the conditions under which prosodic constraints from the L1 grammar can or cannot be redeployed in the L2. An important question we have not addressed is whether variable suppliance could instead reflect variable detection of the relevant morphology in the input. This is less likely to be the case with agreement and plural morphology in English than with past tense and participial morphology: the former are marked by the perceptually salient *s~z*, arising from their high spectral centre of gravity and amplitude in the noise portion (Shadle, 1991), while the latter are marked by the less salient *t~d*. Further, unlike *t~d*, *s~z* have robust internal cues for place and manner, which ensures that they are less likely to be masked by surrounding segments (Wright, 2004).

intermediate level of proficiency could build the free clitic representation required for articles in the L2. We believe that this reflects the problem that standardly-used proficiency tests, which tap into syntactic and lexical knowledge, do not always provide an accurate assessment of phonological abilities. To assess phonological skills, we have more recently used the Versant Test (Pearson Education Inc.), which examines various aspects of L2 oral language proficiency: <https://www.pearson.com/english/versant.html>.

The question of whether variable suppliance of inflection could be due to variable detection is explored in work by Klein and colleagues for past tense. They observed that learners of English whose L1 is Chinese, Spanish or Russian failed to consistently perceive the difference between inflected and uninflected verbs (Klein et al., 2004; Pugach, Stoynezhka, Solt, & Klein, 2004; Solt et al., 2004), particularly after oral and nasal stops (Adams, 2004). Pugach et al. (2004) report that detection of past tense ranged from an average of only 58% for *d* for low proficiency learners to 70% for *t* for high proficiency learners.

Although variable detection of inflection no doubt poses a challenge for learners, it is unlikely to account for the production patterns we have attributed to the PTH, given the types of asymmetries that have been observed. Consider, for example, the results in Goad et al. (2003) and Austin et al. (2019) on 3SG agreement and plural morphology. Although these morphemes are both marked by the perceptually salient *s~z*, deletion is nonetheless observed. Most importantly, deletion has been shown to be tied to the representation of inflection in the interlanguage grammar. In Goad et al. (2003), the learners in the across-the-board deletion group showed near zero rates of suppliance of agreement morphology for inflected verbs but moderately high rates of suppliance of clusters ending with *s/z* in monomorphemic parallels: if variable detection of the segments marking inflection were responsible for failure to supply the morphology, the same pattern would be observed with clusters in monomorphemic words.¹⁸ Similarly, the learners in the variable deletion group in Goad et al. (2003) and the learners in Austin et al. (2019) showed a difference in suppliance rates depending on the length of the stem to which agreement and plural morphology were required to attach; as many of these cases involve the same right-edge segmental context (e.g., [ks] in short-stemmed *cooks* vs. long-stemmed *hikes*), the potential for greater masking of the inflection with long-stemmed regulars, where more deletion was observed, is minimal.¹⁹

¹⁸ This may be questioned: Plag, Homann, and Kunter (2017) find that [s] at the right edge of monomorphemic words is longer than inflectional [s]. Although a difference between these two types of words is consistent with the prosodic approach taken here, we highly doubt that native speakers, let alone L2ers, are sensitive to such subtle differences in duration unless, perhaps, they are presented with pairs of stimuli to directly compare, for example, *tax* vs. *tacks*.

¹⁹ Pierce and Ionin (2011) examine whether the inability to accurately perceive English articles could underlie some of the difficulties that Korean and Mandarin L2ers have. Participants were asked to transcribe spoken English grammatical sentences containing definite, indefinite and zero articles in various positions in the sentence. For both groups and all positions, the majority of responses where articles were present in the target involved supplying an article (ranging from 76% to 92%, with one exception at 65%), either the correct one or a substitution (*the* for *a* and vice versa). This suggests to us that prosodic factors are not implicated, since articles were in fact detected, even if the appropriate article was not always used.

5.2 *Comprehension*

Although it is unlikely that misperception can account for the effects we have attributed to the PTH, there is some evidence that miscomprehension can. Recall from (7) that the PTH was defined with reference to production only. Indeed, in earlier work, we proposed that native language prosodic constraints do not act as a filter on comprehension (Goad & White, 2006: 246). The intended interpretation of this claim was that prosodic constraints do not block the establishment of the necessary syntactic representations in the interlanguage grammar. To illustrate, consider the case of Mandarin-speaking learners of English tense. On our view, the absence from the L1 grammar of the affixal clitic representation required to prosodically represent English tense would not prevent retrieval from UG of the appropriate syntactic feature, [*upast*], missing from the L1 grammar (according to Hawkins & Liszka (2003)). In other words, L2ers can provide an appropriate morphosyntactic analysis for functional elements. What holds them up in production is that they cannot necessarily arrive at an appropriate prosodic representation. Where possible, L1 prosodic structure is used to realize L2 inflectional elements. When it cannot be used, learners resort to alternative solutions, such as deletion. Indeed, as pointed out by Borer and Rohrbacher (1997) for L1 acquisition, the fact that it is functional morphology that is omitted suggests that learners must have made the relevant syntactic analysis.

Although we maintain the view that prosodic constraints do not impede syntactic comprehension, preliminary work by Lieberman (2013) suggests that the PTH can be operative in comprehension as well as in production. Lieberman hypothesizes that when learners hear an inflected form, they strive to build a prosodic representation for it. If their grammar lacks the appropriate representation, they will either fail to comprehend the inflection altogether or they will use whatever structure they can transfer from the L1, leading to comprehension failure in certain circumstances and success in others. In this way, prosodic transfer effects in comprehension, as in production, should be language specific, determined by L1 prosodic constraints on functional morphology.

Lieberman examines the comprehension and production of 3SG agreement morphology by French- and Spanish-speaking learners of English (low- to high-intermediate proficiency), using a sentence interpretation task and a story recall task. According to Lieberman, both L1 grammars organize agreement as an internal clitic. Accordingly, learners should show a stem shape asymmetry: English inflection should be more accurately comprehended after short stems than after long stems.

If the PTH operates in comprehension as well as in production, patterns of behaviour in the two modes should be parallel. The results, summarized from Lieberman (2013) in Table 1, show that this prediction is supported for most learners. Two Spanish (S3, S5) and three French participants (F1, F6, F7) fail to both comprehend and produce inflection, regardless of stem shape; four learners (S1, S4, F2, F3) show a stem-shape asymmetry in both comprehension and production: long-stemmed ‘feels’ is comprehended and produced without the final inflection,

while short-stemmed ‘fills’ is target-like; and, finally, one learner (S2) is target-like in both comprehension and production. For two learners, comprehension is ahead of production: F4 and F5 show a stem-shape asymmetry in comprehension but omission for both long and short stems in production. An asymmetry in this direction is not entirely unexpected; comprehension is commonly held to be ahead of production, in both L1 and L2 acquisition.

	Comprehension		Production	
	Patterns	Participants	Patterns	Participants
Omission (long and short stems)	/fijl/ ‘feels’ /fil/ ‘fills’	S3, S5, F1, F6, F7	[fijl] ‘feels’ [fil] ‘fills’	S3, S5, F1, F4, F5, F6, F7
Omission (long stems only)	/fijl/ ‘feels’ /filz/ ‘fills’	S1, S4, F2, F3, F4, F5	[fijl] ‘feels’ [filz] ‘fills’	S1, S4, F2, F3
Target-like	/fijlz/ ‘feels’ /filz/ ‘fills’	S2	[fijlz] ‘feels’ [filz] ‘fills’	S2

Table 1. Performance on English agreement morphology by Spanish- and French-speaking learners (adapted from Lieberman, 2013)

These results demonstrate that prosodic transfer impacts comprehension as well as production. They also show that difficulties with inflection in English-like languages, where clusters often arise from the addition of inflection, cannot be attributed to articulatory challenges. Although the latter has already been demonstrated by the finding that many learners reduce clusters in inflected words and not in monomorphemic parallels (see Bayley, 1996; Goad et al., 2003; Hawkins & Liszka, 2003), evidence that does not rely solely on production is particularly convincing. In sum, the findings presented in Table 1 call for a revision to the definition of the PTH beyond constraining the production of functional morphology. We return to this shortly.

5.3 Processing

We have seen so far that L2 production and comprehension are constrained by transfer of prosodic representations from the L1. Assuming that on-line sentence processing draws on grammatical knowledge (see VanPatten & Jegerski, 2010, for a summary of the issues), we expect to see effects of prosodic transfer in processing as well. In this section, we provide evidence for this from the processing of articles in the interlanguage of Turkish-speaking learners of English.

In section 4.1.2, we observed that Turkish speakers have difficulties producing target-like English articles, especially in DPs containing adjectives, where the L1 affixal clitic representation for indefinite *bir* is unsuitable. If L1 prosodic representations are implicated in L2 on-line processing, there should be observable effects of processing on DPs containing unstressed articles and adjectives. A study by Prévost, Goad, and Steinhauer (2011) provides support for this position, using electroencephalography, a neuroimaging technique that analyses minute changes in the electrical activity of the brain. Prévost et al. show that impaired processing of DPs with adjectives is visible through the presence of a neurocognitive pattern that differs from the pattern observed for native speakers of English. Furthermore, it differs from the pattern observed for constructions that are ill-formed on some other dimension, namely, word order.

Stimuli involved pairs of sentences that differed only in whether indefinite *a* was stressed or not. L2ers and native speakers showed a robust effect in all stressed conditions when compared with their unstressed counterparts (e.g., *Kristin fought a bear* vs. *Kristin fought a bear*), indicating that both groups could detect the difference between stressed and unstressed articles. The electrophysiological correlate observed was the N100-P200, which signifies detection of physical characteristics of auditory input, in this case, the increased pitch, intensity and duration associated with stress on the article.

The critical conditions involved sentences with DPs containing stressed vs. unstressed articles and following adjectives (e.g., *Kristin fought a wild bear* vs. *Kristin fought a wild bear*). For the Turkish group, the former sentence type is well-formed (it corresponds to the word order and stress profile observed in constructions with stressed *bir*), whereas the latter is ill-formed (unstressed *bir* cannot precede an adjective). The Turkish group alone showed a sustained positivity in the 500-900 ms time window of sentences like *Kristin fought a wild bear*, which Prévost et al. hypothesize signifies detection of the prosodic anomaly in Turkish speakers' processing of the unstressed article + adjective combination.²⁰

Finally, to ensure that Turkish speakers' responses to sentences like *Kristin fought a wild bear* is truly prosodic and not a reaction to the word order, sentences with word order violations were also presented to participants (e.g., *Kristin fought a/a bear wild*). Both the English and Turkish participants showed a P600 in these sentences, which is a widely-attested correlate of some types of syntactic anomaly.

Most importantly, for the Turkish speakers, the neurocognitive pattern observed in sentences like *Kristin fought a wild bear* was qualitatively different from that in sentences like *Kristin fought a bear wild*, confirming that only the former reflects a prosodic effect. This is consistent with prosodic transfer impacting processing: Turkish speakers respond differently

²⁰ A reviewer suggests that this result might indicate a syntactic effect rather than a prosodic one, as other research establishing prosodic effects in on-line processing has found right anterior negativity effects (e.g., Eckstein & Friederici, 2005; Steinhauer, Alter, & Friederici, 1999). However, these studies focus on prosodic boundaries rather than on prosodic structure and it is not clear that the same effects should be expected in both cases.

from English speakers to unstressed article + adjective + noun constructions in English, because the prosodic structure required to represent these constructions is illicit in their L1 grammar.²¹

6. Discussion and conclusion

Let us return to the puzzle we raised in section 2, namely the discrepancy that many adult L2ers show between variable suppliance of inflectional morphemes in obligatory contexts and target-like knowledge of the syntactic reflexes of the categories that house them. We have argued that the variability is constrained by prosodic structure, affecting morphology but not syntax. The contribution of the PTH is to propose that apparent problems with inflectional morphology are not necessarily problems with morphology as such. Rather, the interface between prosody and morphosyntax is the source of difficulty: transfer of constraints from the L1 makes it difficult or impossible to construct appropriate prosodic representations for L2 morphology, often leading to deletion or substitution, and thereby giving the impression that L2 morphology is somehow defective.

Probing variable suppliance from a phonological perspective has led to some understanding of the conditions under which functional morphology can appear, namely when it can be prosodically licensed as per the L1 grammar. This perspective accounts for a cluster of non-target behaviours, beyond deletion, that are unexpected under approaches that assume that difficulties in the functional domain pertain principally to morphology or the lexicon and its interface with syntax (in the case of inflectional morphology) or to syntax and its interface with semantics and discourse (in the case of articles).

We have traced changes in our conception of the PTH, from Full Transfer No Access: the L1 fully and permanently constrains interlanguage representations (section 4.1), to Full Transfer Partial Access: the L1 representation can be minimally adapted in specific ways (section 4.2), to Full Transfer Full Access: learners are sometimes able to abandon the L1 representation (section 4.3). In other words, prosodic transfer is expected to constrain earlier and later stages of L2 acquisition but not necessarily permanently.

We have also seen that prosodic transfer not only affects production, but comprehension and processing as well. This calls for a revision to the definition of the Prosodic Transfer Hypothesis in (7) to reflect this:

- (23) Prosodic Transfer Hypothesis (revised):
 Prosodic structure transferred from the L1 grammar constrains production,
 comprehension and processing of L2 functional morphology.

²¹ Furthermore, the Turkish speakers in our production studies did not produce English sentences showing Turkish word order, with the adjective preceding the article. This provides indirect evidence that the effect reported here is indeed due to prosodic transfer.

The revised definition in (23) is, of course, broader in scope than the original definition. However, while our goal has been to attempt to account for a wide range of effects observed in L2ers' treatment of inflectional morphology and function words, the PTH cannot—and does not seek to—replace every account of L1 difficulties in the functional domain. For example, Ionin, Ko, and Wexler (2004) argue that L2ers whose L1s lack articles will, at least initially, fluctuate in their choice of articles in L2 English, as they work out which semantic feature (specificity vs. definiteness) determines English article choice. Prosody is not involved in choosing between semantic features and cannot explain this kind of article choice. Nevertheless, a learner of English who substitutes one article for the other must also produce the article. Stressing the substituted article would demonstrate non-target understanding of prosodic constraints on articles, in addition to semantically based fluctuation, highlighting the fact that most linguistic constructions are multi-faceted, thereby impacting multiple types of linguistic knowledge.

Finally, we should point out that the focus of the PTH has been on transfer at the level of the prosodic word and phonological phrase, that is, where prosody impinges on morphosyntax. However, this is not the only domain of grammar where prosody has effects. Prosody may affect clausal and sentential levels as well, with or without transfer, with interpretive consequences. For example, recent work on the effects of prosody on L2 syntax has looked at cross-linguistic differences in how languages mark focus. Some languages primarily use prosody to indicate focus, whereas others use word order. Klassen (2015) and Zubizarreta and Nava (2011) have investigated how L2ers (Spanish/English) are affected by having to change the main device for marking focus from prosody to syntax or vice versa. At issue is whether L2ers are able to acquire novel mappings between prosody and syntax, and whether they are able to change from one to the other when the L1 and L2 work differently. Both studies suggest that acquiring the prosodic marking of focus can be challenging, at least at the intermediate level, when the L1 marks focus syntactically.

Other recent investigations of the effects of prosody on L2 sentence interpretation have focused on the interpretation of ambiguous sentences, which have typically—up to now—been considered only from a syntactic, discourse or processing perspective. Location of prosodic breaks and constituent length have been shown to affect ambiguity resolution in L2ers, as well as in native speakers. See, for example, Dekydtspotter, Donaldson, Edmonds, Liljestrand Fultz, and Petrush (2008) and Goad, Guzzo, and White (submitted) for prosodic effects on relative clause interpretation in French and English, respectively, where the position of the prosodic break and/or constituent length have been shown to determine high versus low attachment preferences for relative clauses. In addition, White et al. (2017) and Goad et al. (2018) show that interpretation of null and overt pronouns in Italian can be affected by pauses between clauses and stress on overt pronouns, such that speakers move away from the expected choice of pronoun antecedents.

In conclusion, there has been considerable interest in linguistic interfaces in L2 research in recent years, particularly the relationships between syntax, the lexicon, semantics and

discourse. With some exceptions, less attention has been paid to how prosody interfaces with these components of the grammar. In our own research, we have attempted to redress the balance, by considering the role of prosody in explaining L2 production, comprehension and processing.

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References

- Adams, K. (2004, May). Variability in the perception of past tense *-ed* by L2 learners of English. Paper presented at SUNY/CUNY/NYU 5, Stony Brook, NY.
- Austin, G., Chang, H., Kim, N., & Daly, E. (2019). Prosodic transfer across constructions and domains in L2 inflectional morphology. Unpublished manuscript, University of Southern Queensland, Sookmyung Women's University, and Pai Chai University.
- Bayley, R. (1996). Competing constraints on variation in the speech of adult Chinese learners of English. In R. Bayley & D. R. Preston (Eds.), *Second language acquisition and linguistic variation* (pp. 97–120). Amsterdam: John Benjamins.
- Borer, H. & Rohrbacher, B. (1997). Features and projections: Arguments for the full competence hypothesis. In E. Hughes, M. Hughes, & A. Greenhill (Eds.), *BUCLD 21: Proceedings of the 21st annual Boston University Conference on Language Development* (pp. 24–35). Somerville, MA: Cascadilla Press.
- Bruhn de Garavito, J. (1986). *El muchacha tiene tres balon: Number and gender in the Spanish of a group of francophone learners* (Master's thesis, Concordia University, Montreal, Canada).
- Buckley, M. (2005). Prosodic constraints and the syntax-phonology interface: The phonology of object clitics in L2 French. In A. Brugos, M. R. Clark-Cotton, & S. Ha (Eds.), *BUCLD 29: Proceedings of the 29th annual Boston University Conference on Language Development* (pp. 122–133). Somerville, MA: Cascadilla Press.
- Cabrelli Amaro, J., Campos Dintrans, G., & Rothman, J. (2018). The role of L1 phonology in L2 morphological production: L2 English past tense production by L1 Spanish, Mandarin, and Japanese speakers. *Studies in Second Language Acquisition*, 40, 503–527.
- Charette, M. (1991). *Conditions on phonological government*. Cambridge: Cambridge University Press.
- Chomsky, N., & Halle, M. (1968). *The sound pattern of English*. New York: Harper & Row.

- Dekydspotter, L., Donaldson, B., Edmonds, A. C., Liljestrands Fultz, A., & Petrush, R. A. (2008). Syntactic and prosodic computations in the resolution of relative clause attachment ambiguity by English-French learners. *Studies in Second Language Acquisition*, 30, 453–480.
- Dell, F. (1984). L'accentuation dans les phrases en français. In Dell, F., Hirst, D., & Vergnaud, J.-R. (Eds.), *Forme sonore du langage* (pp. 65–122). Paris: Hermann.
- Demuth, K. (2014). Prosodic licensing and the development of phonological and morphological representations. In A. Farris-Trimble & J. Barlow (Eds.), *Perspectives on phonological theory and development: In honor of Daniel A. Dinnsen* (pp. 11–24). Amsterdam: John Benjamins.
- Duanmu, S. (2000). *The phonology of Standard Chinese*. Oxford: Oxford University Press.
- Dulay, H., & Burt, M. (1974). Natural sequences in child second language acquisition. *Language Learning*, 24, 37–53.
- Eckstein, K., & Friederici, A. D. (2005). Late interaction of syntactic and prosodic processes in sentence comprehension as revealed by ERPs. *Brain Research. Cognitive Brain Research*, 25, 130–143.
- Erguvanli, E. E. (1984). *The function of word order in Turkish grammar*. Berkeley: University of California Press.
- Feldscher, C., & Durvasula, K. (2017). Excrescent stops in American English. *Proceedings of the Linguistic Society of America*, 2, 20, 1–15.
- Gerken, L. (1996). Prosodic structure in young children's language production. *Language*, 72, 683–712.
- Gerken, L., & McIntosh, B. (1993). The interplay of function morphemes and prosody in early language. *Developmental Psychology*, 29, 448–457.
- Goad, H., Guzzo, N. B., & White, L. (submitted). Parsing ambiguous relative clauses in L2 English: Learner sensitivity to prosodic cues.
- Goad, H., & White, L. (2004). Ultimate attainment of L2 inflection: Effects of L1 prosodic structure. In S. Foster-Cohen, M. Sharwood Smith, A. Sorace, & M. Ota (Eds.), *EUROSLA Yearbook 4* (pp. 119–145). Amsterdam: John Benjamins.
- Goad, H., & White, L. (2006). Ultimate attainment in interlanguage grammars: A prosodic approach. *Second Language Research*, 22, 243–268.
- Goad, H., & White, L. (2008). Prosodic structure and the representation of L2 functional morphology: A nativist approach. *Lingua*, 118, 577–594.
- Goad, H., & White, L. (2009). Prosodic transfer and the representation of determiners in Turkish-English interlanguage. In N. Snape, Y.-k. I. Leung, & M. Sharwood-Smith (Eds.), *Representational deficits in SLA: Studies in honor of Roger Hawkins* (pp. 1–26). Amsterdam: John Benjamins.
- Goad, H., White, L., & Bruhn de Garavito, J. (2011). Prosodic transfer at different levels of structure: The L2 acquisition of Spanish plurals. In N. Danis, K. Mesh, & H. Sung (Eds.),

- Proceedings of the 35th Annual Boston University Conference on Language Development: Online Proceedings Supplement.*
- Goad, H., White, L., Garcia, G. D., Guzzo, N. B., Mortazavinia, M., Smeets, L., & Su, J. (2018, September). Pronoun interpretation in L2 Italian: prosodic effects revisited. Paper presented at Generative Approaches to Language Acquisition – North America (GALANA) 8, Indiana University, Bloomington, IN.
- Goad, H., White, L., & Steele, J. (2003). Missing inflection in L2 acquisition: Defective syntax or L1-constrained prosodic representations? *Canadian Journal of Linguistics*, 48, 243–263.
- Grimshaw, J., & Rosen, S. T. (1990). Knowledge and obedience: The developmental status of the binding theory. *Linguistic Inquiry*, 21, 187–222.
- Hawkins, R. (2000). Persistent selective fossilisation in second language acquisition and the optimal design of the language faculty. *Essex Research Reports in Linguistics*, 34, 75–90.
- Hawkins, R., & Franceschina, F. (2004). Explaining the acquisition and non-acquisition of determiner-noun gender concord in French and Spanish. In P. Prévost & J. Paradis (Eds.), *The acquisition of French in different contexts* (pp. 175–205). Amsterdam: John Benjamins.
- Hawkins, R., & Liszka, S. (2003). Locating the source of defective past tense marking in advanced L2 English speakers. In R. van Hout, A. Hulk, F. Kuiken, & R. Towell (Eds.), *The interface between syntax and lexicon in second language acquisition* (pp. 21–44). Amsterdam: John Benjamins.
- Haznedar, B., & Schwartz, B. D. (1997). Are there optional infinitives in child L2 acquisition? In E. Hughes, M. Hughes, & A. Greenhill (Eds.), *Proceedings of the 21st Annual Boston University Conference on Language Development* (pp. 257–268). Somerville, MA: Cascadia Press.
- Herschensohn, J., & Gess, R. (2018). Acquisition of L2 French object pronouns by advanced anglophone learners. *Languages*, 3(2), 15.
- Huebner, T. (1985). System and variability in interlanguage syntax. *Language Learning*, 35, 141–163.
- Ionin, T., Baek, S., Kim, E., Ko, H., & Wexler, K. (2012). *That's not so different from the*: Definite and demonstrative descriptions in second language acquisition. *Second Language Research*, 28, 69–101.
- Ionin, T., Ko, H., & Wexler, K. (2004). Article semantics in L2 acquisition: The role of specificity. *Language Acquisition*, 12, 3–69.
- Jun, S.-A., & Fougeron, C. (2000). A phonological model of French intonation. In A. Botinis (Ed.), *Intonation: Analysis, modelling and technology* (pp. 209–242). Dordrecht: Kluwer.
- Kabak, B., & Vogel, I. (2001). The phonological word and stress assignment in Turkish. *Phonology*, 18, 315–360.
- Kaye, J. (1990). 'Coda' licensing. *Phonology*, 7, 301–330.

- Klassen, J. (2015). *Second language acquisition of focus prosody in English and Spanish* (Doctoral dissertation, McGill University, Montreal, Canada).
- Klein, E., Stoynezhka, I., Adams, K., Rose, T., Pugash, Y., & Solt, S. (2004). Past tense affixation in L2 English: The effects of lexical aspect and perceptual salience. In A. Brugos, L. Micciulla & C. E. Smith (Eds.), *Proceedings of the 28th Annual Boston University Conference on Language Development: Online Supplement*.
- Kornfilt, J. (1997). *Turkish*. London: Routledge.
- Lamontagne, J., & Goad, H. (submitted). Weight and prominence in French: An examination of corpus data from a Laurentian variety.
- Lardiere, D. (1998). Case and tense in the 'fossilized' steady state. *Second Language Research*, 14, 1–26.
- Lardiere, D. (2000). Mapping features to forms in second language acquisition. In J. Archibald (Ed.), *Second language acquisition and linguistic theory* (pp. 102–129). Oxford: Blackwell.
- Lardiere, D. (2003). Second language knowledge of [±past] vs. [±finite]. In J. Liceras, H. Zobl & H. Goodluck (Eds.), *Proceedings of the 6th Generative Approaches to Second Language Acquisition Conference (GASLA 2002): L2 Links* (pp. 176–189). Somerville, MA: Cascadilla Press.
- Lardiere, D. (2007). *Ultimate attainment in second language acquisition*. Mahwah, NJ: Lawrence Erlbaum.
- Lieberman, M. (2013, January). The importance of comprehension to a rounded view of second language acquisition. Paper presented at the Department of Linguistics, University of Utah, Salt Lake City, UT.
- Lyons, C. (1999). *Definiteness*. Cambridge: Cambridge University Press.
- McCarthy, J., & Prince, A. (1995). Prosodic morphology. In J. Goldsmith (Ed.), *The handbook of phonological theory* (pp. 318–366). Oxford: Blackwell.
- Nespor, M., & Vogel, I. (1986). *Prosodic phonology*. Foris: Dordrecht.
- Öztürk, B. (2005). *Case, referentiality and phrase structure*. Amsterdam: John Benjamins.
- Paradis, C., & Deshaies, D. (1990). Rules of stress assignment in Québec French: Evidence from perceptual data. *Language Variation and Change*, 2, 135–154.
- Peperkamp, S. (1997). *Prosodic words*. The Hague: Holland Academic Graphics.
- Pierce, L., & Ionin, T. (2011). Perception of articles in L2 English. In L. Plonsky & M. Schierloh (Eds.), *Selected proceedings of the 2009 Second Language Research Forum* (pp. 121–128). Somerville, MA: Cascadilla Press.
- Plag, I., Homann, J., & Kunter, G. (2017). Homophony and morphology: The acoustics of word-final S in English. *Journal of Linguistics*, 53, 181–216.
- Prévost, A.-E., Goad, H., & Steinhauer, K. (2011). Prosodic transfer: An event-related potentials approach. In M. Wrembel, M. Kul, & K. Dziubalska-Kołaczyk (Eds.), *Achievements and perspectives in SLA of speech, Vol II* (pp. 217–225). Frankfurt: Peter Lang.

- Prévost, P., & White, L. (2000). Missing surface inflection or impairment in second language acquisition? Evidence from tense and agreement. *Second Language Research*, 16, 103–133.
- Pugach, Y., Stoynezhka, I., Solt, S., & Klein, E. (2004, May). L2 perception and production of the English past: The role of L1 and L2 phonology. Paper presented at SUNY/CUNY/NYU 5, Stony Brook, NY.
- Robertson, D. (2000). Variability in the use of the English article system by Chinese learners of English. *Second Language Research*, 16, 135–172.
- Scullen, M. E. (1997). *French prosodic morphology: A unified account*. Bloomington: Indiana University Linguistics Club.
- Schwartz, B. D., & Sprouse, R. (1996). L2 cognitive states and the full transfer/full access model. *Second Language Research*, 12, 40–72.
- Selkirk, E. O. (1980). The role of prosodic categories in English word stress. *Linguistic Inquiry*, 11, 563–605.
- Selkirk, E. O. (1996). The prosodic structure of function words. In J. Morgan & K. Demuth (Eds.), *Signal to syntax: Bootstrapping from speech to grammar in early acquisition* (pp. 187–213). Mahwah, NJ: Erlbaum.
- Shadle, C. H. (2012). The acoustics and aerodynamics of fricatives. In A. Cohn, & M. K. Fougeron (Eds.), *The Oxford handbook of laboratory phonology* (pp. 511–526). Oxford: Oxford University Press.
- Skrzypek, D. (2009). The formation of the definite article in the Nordic languages. *Lingua Posnaniensis*, 51, 65–76.
- Snape, N., & Kupisch, T. (2010). Ultimate attainment of second language articles: A case study of an endstate second language Turkish-English speaker. *Second Language Research*, 26, 527–548.
- Solt, S., Pugach, Y., Klein, E., Adams, K., Stoynezhka, I., & Rose, T. (2004). L2 perception and production of the English regular past: Evidence of phonological effects. In A. Brugos, L. Micciulla, & C. E. Smith (Eds.), *Proceedings of the 28th Annual Boston University Conference on Language Development* (pp. 553–564). Somerville, MA: Cascadilla Press.
- Sorace, A. (2011). Pinning down the concept of “interface” in bilingualism. *Linguistic Approaches to Bilingualism*, 1, 1–33.
- Steinhauer, K., Alter, K., & Friederici, A. (1999). Brain potentials indicate immediate use of prosodic cues in natural speech processing. *Nature Neuroscience*, 2, 191–196.
- Thibault, L., & Ouellet, M. (1996). Tonal distinctions between emphatic stress and pretonic lengthening in Quebec French. *International Conference on Spoken Language Processing-1996*, 2, 638–641.
- Trenkic, D. (2007). Variability in L2 article production – beyond the representational deficit vs. processing constraints debate. *Second Language Research*, 23, 289–327.

- Tsimpli, I. M., & Mastropaviou, M. (2007). Feature interpretability in L2 acquisition and SLI: Greek clitics and determiners. In J. Liceras, H. Zobl, & H. Goodluck (Eds.), *The role of formal features in second language acquisition* (pp. 143–183). New York: Lawrence Erlbaum.
- Ueyama, M. (2000). *Prosodic transfer: An acoustic study of L2 English vs. L2 Japanese* (Doctoral dissertation, University of California Los Angeles).
- Underhill, R. (1976). *Turkish grammar*. Cambridge, MA: MIT Press.
- VanPatten, B. & Jegerski, J. (2010). Second language processing and parsing: The issues. In B. VanPatten & J. Jegerski (Eds.), *Research in second language processing and parsing* (pp. 3–24). Amsterdam: John Benjamins.
- White, L. (2003). Fossilization in steady state L2 grammars: Persistent problems with inflectional morphology. *Bilingualism: Language and Cognition*, 6, 129–141.
- White, L. (2008). Some puzzling features of L2 features. In J. Liceras, H. Goodluck, & H. Zobl (Eds.), *The role of features in second language acquisition* (pp. 300–326). Mahwah, NJ: Lawrence Erlbaum.
- White, L. (2009). Grammatical theory: Interfaces and L2 knowledge. In W. Ritchie & T. Bhatia (Eds.), *The new handbook of second language acquisition* (pp. 49–68). Leeds, UK: Emerald Group Publishing Limited.
- White, L., Goad, H., Su, J., Smeets, L. Mortazavinia, M., Garcia, G. D., & Guzzo, N. B. (2017). Prosodic effects on pronoun interpretation in Italian. In M. LaMendola & J. Scott (Eds.), *BUCLD 41: Proceedings of the 41st annual Boston University Conference on Language Development* (pp. 744–752). Somerville, MA: Cascadilla Press.
- Wright, R. (2004). A review of perceptual cues and cue robustness. In B. Hayes, R. Kirchner, & D. Steriade (Eds.), *Phonetically based phonology* (pp. 34–57). Cambridge: Cambridge University Press.
- Zec, D. (2005). Prosodic differences among function words. *Phonology*, 22, 77–112.
- Zubizarreta, M. L., & Nava, E. (2011). Encoding discourse-based meaning: Prosody vs. syntax. Implications for second language acquisition. *Lingua*, 121, 652–669.