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Variability in Second Language Indefinite Article Productions in End-State Speech

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ABSTRACT

Variability in the form of article (i.e., *a* and *the*) omissions and stressing has been attributed to a mismatch between first (L1) and second language (L2) prosodic and syntactic structures. An overlap between the L1 and L2 systems, on the other hand, is expected to contribute to native-like article productions. This case study aims to explore the role of L1 prosodic structure (Turkish, Spanish and English) and syntactic environment (nouns with and without adjectives) on article productions of two end-state L2 speakers and one Australian-English native speaker. The data consisted of a sentence imitation task and spontaneous speech recordings of these three speakers. Article use patterns in the data were coded as supplied and omitted, and indefinite article durations were excised and measured using PRAAT. The findings suggest that the presence of an adjective in the noun clause increases cognitive demand, since irrespective of the L1 background, all the speakers had longer indefinite article durations in contexts with an adjective. Second, the Turkish speaker, whose L1 has a different prosodic and syntactic structure from Spanish and English for encoding definiteness, had higher rates of article stressing and omissions in contexts with an adjective. Third, L1 prosodic constraints can be responsible for article stressing and omissions in end-state L2 speech since only the prosodic transfer hypothesis predicts a difference in article durations between the two syntactic environments within the interlanguage of the same speaker. Despite long years of exposure to and frequent daily use of the L2, the persistent difficulty in article productions, as reported in this paper, may imply the importance of age of acquisition in overriding certain L1 prosodic effects in acquiring an L2.

INTRODUCTION

Extensive research in the field of second language (L2) acquisition reports variability in morphophonological productions of functional material such as the English articles, *a* and *the*. Despite frequent daily use, L2 learners are largely reported to omit (e.g., *I am expecting *telephone call*, Goad & White, 2004:5), misuse (e.g., *She was holding *the fork*, Goad & White, 2006a:1) or stress articles inappropriately (e.g., *a* man and a* girl*, Goad & White, 2009:19). Variability in article use, on one hand, has been viewed to be syntactically driven (e.g., Trenkic, 2007; Trenkic & Pongpairoj, 2013; Trenkic, 2019). The Syntactic Misanalysis Hypothesis (SMH hereafter) claims that L2 learners coming from L1s such as Serbian and Turkish which lack DP and do not realize definiteness via an article system will fail to project DP and misanalyse articles as adjectives (Huebner, 1985; Trenkic, 2004; Trenkic, Mirkovic & Altman, 2014). Take the case of a blue mug placed on a table and the speaker wants the hearer to pass it over by requesting 'Pass me the blue mug'. If articles are syntactically misanalysed in the L2 English, then the speaker will regard the article of 'the' mug as redundant information since the information is pragmatically recoverable from the context (Trenkic, 2008: 9). Due to the increasing cognitive demand in expressing pragmatically redundant information, a higher rate of article omissions is expected in article adjective noun constructions than in article noun constructions (Trenkic, 2007: 314).

Article misuse in L2 in the form of omissions and stressing, on the other hand, is assumed to be phonologically driven. The Prosodic Transfer Hypothesis (PTH hereafter) (Goad, White & Steele, 2003; Goad & White, 2008) claims that learners with a low level of L2 proficiency may have persistent difficulty in supplying the functional material. The ones with a high level of L2 proficiency can mispronounce the functional element even when it is supplied. L2 speakers are assumed to possess the appropriate underlying feature specifications, but they may experience difficulty in mapping these abstract features on the corresponding surface forms. In such cases, abstract syntactic features may not be realized as morphophonological target forms even at very late stages of language acquisition due to mismatching prosodic systems. Both the SMH and PTH would offer specific predictions with respect to how end-state speakers prosodify articles in their speech. Thus, this paper sets off to test these predictions from a prosodic perspective.

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The prosodic perspective to inappropriate use of function morphemes bases its assumptions on the way functional (fnc) material is prosodified. While lexical (lex) material is considered to create a linear organization with a multilayered hierarchy of phonological units (Nespor & Vogel, 1986; Selkirk, 1980), where segments are organized into syllables (σ), syllables into feet (Ft), feet into prosodic words (PWd), and prosodic words into phonological phrases (PPh), the prosodification of functional (fnc) material is assumed to follow a non-linear fashion (see Figure 1). Functional morphology is claimed to receive one of the four status as its prosodic representation depending on its proximity to the lexical host (Selkirk, 1996):

Across languages, function words such as determiners or numerals, can be represented as independent prosodic words (see iv). The numeral *one*, for example, is prosodified as an independent word. The functional material receives the status of a free clitic when attached directly to the phonological phrase (PPh), rather than the lexical host (see i). Affixal clitics are adjoined to the prosodic word of their lexical host (see ii). Finally, internal clitics can appear inside the PWd, adjoined to the lexical host (see iii). Three of these prosodic representations will be relevant to this paper.

What gives rise to problems of mapping is the prosodic constraints transferred from the L1 grammar that shape L2 productions of functional morphology (Goad & White, 2019:6). That is, the overt morphological realization of the corresponding underlying L2 knowledge is mediated through L1-constrained prosodic representations. In the case of a mismatch between the L1 and L2 prosodic systems, provided that the necessary representations are available in L1, the learner may adapt these representations to build the prosodic licensing relations required for L2 either through combining L1 licensing relations or licensing L1 structures into new syntactic or prosodic domains (Goad & White, 2006b). If the required prosodic structure cannot be minimally adapted from L1 representations in this way, the PTH predicts higher rates of omissions, article stressing and pauses or fillers preceding or following the functional element even when it is supplied.

This case study contributes to the debate on variable production of articles by examining possible errors of omission and mispronunciation in the interlanguage of two end-state speakers of L2 English. The term *end-state* was first put forward by Selinker (1972) and for this study, it is taken as 'speakers whose linguistic system has reached a statis or ultimate attainment and seems to stop progressing' (van Patten & Benati, 2010:162). End-state or steady state L2 speakers coming from two different L1 prosodic systems were included in this study since they present an appropriate testing ground to check how persistent L1 prosodic effects are at very late stages of L2 acquisition. The main research question addressed is the extent to which syntactic and prosodic constraints contributes to shaping article productions. Although the two accounts make similar predictions for the advanced speakers who reached ultimate attainment in L2, they differ in the expected duration of articles in contexts with and without an adjective within the speech of the same speaker.

First, I will report previous work on variable productions of functional morphology by advanced L2 speakers. Following a description of prosodic representations of the indefinite articles in Spanish, English and Turkish, the research questions, predictions and the methodology of the current study will be presented. I will conclude with a discussion of the findings.

PREVIOUS WORK

Empirical work suggests that even speakers with an advanced level of proficiency in L2 exhibit errors of omission (Lardiere; 1998a; White, 2003) and mispronunciation (Goad & White, 2009; 2019; Snape & Kupisch, 2010) of function morphemes. To exemplify, *Patty*, a Chinese end-state speaker of L2 English, is reported to supply past tense (34.5%), 3rd person agreement (4.5%) and plural (8%) markers in her speech at lower rates than the past (78%) and plural morphology (84%) in her written correspondence (Lardiere, 1998a, b; 2000). The disassociation in *Patty's* suppliance of past tense morphology between her written emails and speech samples is explained through L1 constraints on the production of final consonant clusters (Lardiere, 2007). Similar findings come from a Turkish end-state L2 speaker of English, *SD*, who is reported to supply past and present morphology markers (averaging 80%), at a higher rate than articles (averaging 70%) which are at times substituted with numerals and other determiners (White, 2003). *SD* is highly accurate in treating demonstratives, quantifiers, and possessives as independent prosodic words by assigning them stress (Goad & White, 2004:13). However, the PTH cannot account for why she is more accurate in her use of the definite article than the indefinite article. In addition, *SD* supplies the definite (77%) and the indefinite article (70%) at a higher rate in constructions without an adjective when com-

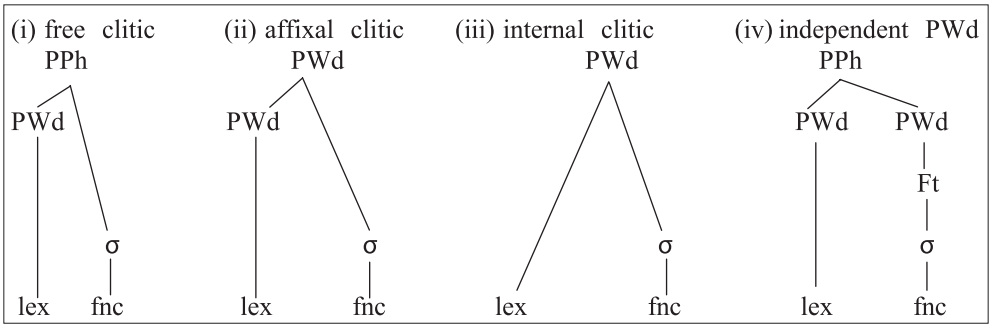

Figure 1. Prosodification of functional material (Selkirk, 1996)

pared to the definite (67%) and indefinite (49%) article suppliance rates in nominal constructions with an adjective. She assigns longer durations to articles especially when they are accompanied by an adjective. This finding suggests that she can be misrepresenting the article by treating it as a stressed element (Snape & Kupisch, 2010)[1].

Pauses and fillers can also disrupt the prosodic representations of the function morphemes. For instance, Turkish L2 speakers of English (n=18) with varying levels of language proficiency are reported to exhibit disrupted prosodic representations by inserting pauses and fillers following or preceding the articles (Goad & White, 2008). Goad and White (2009) explored article use patterns of Turkish learners of L2 English with varying levels of proficiency through a story telling task. The non-target productions of the articles included higher rates of article omissions, inappropriate substitutions of the indefinite article *a* with the numeral *one* and the definite article *the* with determiners such as *this* and *that* by learners with a low level of L2 proficiency. Learners with a higher level of L2 proficiency produced articles by assigning them stress especially in contexts with an adjective.

Initially, the PTH proposed that different inflections which are prosodified in the same way are expected to cause variability in the L2 interlanguage. For instance, functional material which establishes agreement on English nouns (i.e., plural inflection–*s*) and verbs (i.e., 3rd person singular –*s*) would be equally troublesome for L2 speakers of English unless their L1 allows for target like prosodic structure (Goad, et al., 2003:259). In the very recent version of the hypothesis, Goad and White (2019) suggests that errors of omission are confined to certain phonological contexts. That is, L2 learners are expected to be more accurate in using irregular past tense forms and in inflecting verbs which end in shorter rhymes. In addition, functional material can be inappropriately stressed and L2 speakers can substitute determiners in place of articles as a result of L1 prosodic constraints on L2. The prediction that shorter stems will be inflected at a higher rate than longer stems in marking agreement on nominal and verbal domains was backed up with data from Korean speakers learning English as an L2 (Austin, Chang, Kim & Daly, 2021). Although the hypothesis was first put forward to account for variability in speech production, now the recent version of the PTH claims that L2 learners may as well fail to comprehend and process inflectional morphology due to L1 prosodic constraints. Just like native English speakers, Turkish speakers of L2 English, for example, are reported to detect the stressed vs. unstressed indefinite article in article noun constructions in an online processing task. However, the L2 English speakers fail to show a similar neurocognitive correlate to the native English speakers when the article is presented in an unstressed manner in constructions with an adjective (Prévost, Goad & Steinhauer, 2011).

Both the PTH and the SMH expect variability in speech in the form of article omissions and stressing. From a prosodic perspective, article omissions are motivated due to not being able to adapt L1 licensing relations onto those of the L2. However, contradictory findings are reported from L2 learners of different L1 backgrounds. For instance, Pongpairoj (2008) analyzed the article use of L1 Thai (article-less language) and L1 French (articled language) speakers learning English as an L2. Both the Thai and French learners omitted articles more often in contexts with an adjective than those without an adjective in their written and spoken narratives. Trenkic (2007) reports that Serbian L2 learners of English omitted both the definite and the indefinite article more in adjectivally pre-modified contexts regardless of their level of proficiency despite the fact that the prosodic structure required for the L2 representations are available in L1 Serbian. Snape (2007) showed that learners, coming from article-less languages such as Japanese, with prosodic representations which can accommodate for the necessary licensing relations in L2 English, are still reported to omit articles, an error type which is not expected under the PTH.

From a syntactic perspective, article omissions are triggered by communication pressures of pragmatically redundant information. The SMH predicts higher rates of indefinite article omissions in contexts of old information and previous mention in discourse. In this sense, the current study predicts higher rates of indefinite article omissions in constructions with an adjective in the sentence imitation task than in the spontaneous speech samples since the presentation of pictures in the sentence imitation task makes the context already identifiable both for the speaker and the hearer. What is more, the syntactic misanalysis of articles as adjectives would bring about two prosodic consequences. First, the articles are expected to receive stress since just like adjectives, they will be prosodified as independent PWds in the tasks employed in this study. So, no difference in article durations is expected irrespective of the presence of an adjective in noun phrases within the same speaker. Second, utterances where the adjective precedes the article are expected since such an order is legitimate in L1 Turkish prosodic structure (Goad & White, 2009).

Despite all the criticism with respect to the comprehensiveness of the PTH and SMH, studies investigating the roots of article omissions and stressing are quite few in number. The possible stress assignment to the indefinite article in contexts with and without an adjective cannot be accounted for pragmatic or semantic explanations. In addition, much of the published previous work utilized inappropriate statistical analyses and lacked a control group of speakers for narrow acoustic analyses (e.g., Goad & White, 2004; Snape & Kupisch, 2010). The current case study attempts to contribute to the existing literature by examining the indefinite article suppliance rates, omissions and durations. The data come from two end-state L2 speakers, one with a matching L1 prosody, Spanish, and the other with a mismatching L1 prosody, Turkish, and a native Australian-English speaker. In the next section, the prosodification of the indefinite article(s) in English, Spanish and Turkish will be introduced.

Spanish, Turkish and English

A(n) Un(a) and *bir* are used as the overt morphological realizations of the indefinite articles in English, Spanish and Turkish, respectively. In singular contexts, masculine nouns receive *un* as in *un poeta* (a male poet) or *un hombre* (a man) and feminine nouns receive *una* as in *una poetisa* (a female poet) or *una mesa* (a table) in Spanish. The figure below

presents the prosodification of the indefinite article in article noun constructions in English, Turkish and Spanish:

As illustrated in Figure 2, the indefinite articles in English and Spanish are represented as free clitics that are directly joined to the phonological phrase (Selkirk, 1996; Zwicky, 1977)[2]. Turkish uses *bir* as its indefinite article (Kornfilt, 1997), which also acts as a numeral when stressed (Underhill, 1976). It has also been claimed that Turkish does not grammaticalize definiteness (Öztürk, 2005). Figure 3 presents the prosodification of the indefinite article in constructions with adjectives:

As given in Figure 3, the English and Spanish indefinite articles *a(n)/un(a)* precede the adjective and attach as free clitics in constructions with adjectives as in (a). Different from Spanish and English, the indefinite article *bir* is prosodified as an affixal clitic which is adjoined to the neighboring prosodic word in Turkish as in (b). The neighboring prosodic word, in this prosodic representation is, specifically, a noun, and not an adjective. When Turkish *bir* receives stress, it precedes the adjective and acts as a numeral which is prosodified as an independent word as in (c).

From a prosodic perspective, the assumption the PTH holds is that an L2 speaker of English coming from a first language prosody that does not match that of English would violate the hierarchy within these multiple layers as opposed to the L2 speaker coming from a first language with a matching prosody (Goad et al., 2003).

PRESENT STUDY

Research Question and Predictions

RQ: To what extent is article misuse in the form of omissions and stressing of the indefinite article phonologically and syntactically driven?

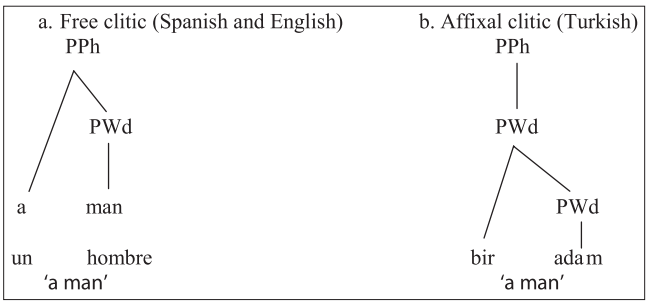

Figure 2. Prosodification of the indefinite article across Spanish, English and Turkish in article noun constructions

(i) Both the PTH and SMH predict that *Maria* (Spanish L1) and *Chloe* (English L1) would not show a difference in article omission rates across contexts and tasks.
(ii) Both accounts predict that *Sena* (Turkish L1) would omit articles more often than the native speaker especially in constructions with an adjective across tasks.
(iii) Both accounts would predict *Sena* to substitute determiners and numerals with the article and have illegitimate word order as adjective article noun constructions.
(iv) Both accounts predict that *Maria* and *Chloe* would not show a difference in article durations in both contexts and tasks.
(v) The PTH predicts that *Sena* would assign longer durations to the indefinite article in contexts with an adjective than in contexts without an adjective in both tasks, but The SMH predicts no statistical difference in *Sena*'s article durations regardless of the presence of an adjective in both tasks.

Following Goad and White (2019), the mismatch in the prosodification of the indefinite article between L1 Turkish and L2 English is predicted to lead to article mispronunciation (i.e., lengthened article durations) and omissions. Thus, the end-state Turkish speaker is predicted to be constrained by L1 prosodic features especially in constructions with an adjective if the L1 effects still persisted whereas the Spanish end-state speaker is expected to supply articles in L2 as non-stressed elements free of context constraints.

Procedure

The study was approved by the University Human Research Ethics Committee (ID: 5201100766D). The participants were recruited through flyers advertised in Sydney. Prior to testing, the recruited participants were asked to complete the Australian version of the Language Experience and Proficiency Questionnaire (LEAP-Q, Marian, Blumenfeld & Kaustianskaya, 2007) as an indicator of their self-reported level of language proficiency. Each participant was invited into a sound attuned test room equipped with two computers (one used for the stimulus display and the other for recording). The utterances were recorded using Pro Tools LE at a sampling rate of 44.1 K. Testing was conducted at one sitting and took about two hours and each participant was tested on a different day within the same week. The speech samples were later analysed using the phonetic analysis software PRAAT (Boersma & Weenink, 2018). At

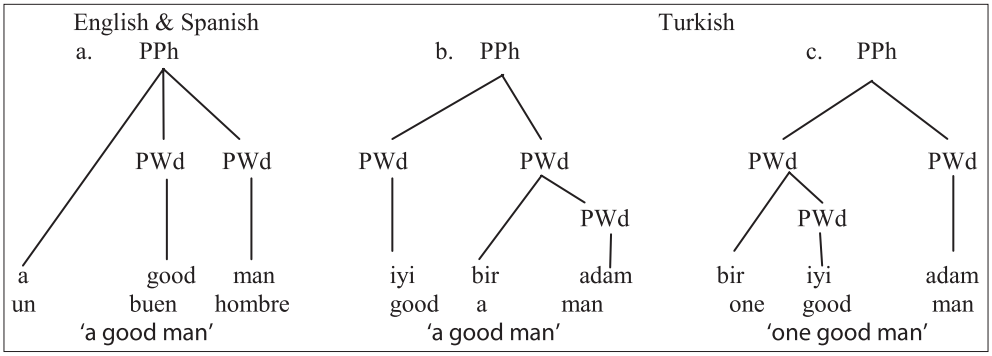

Figure 3. Prosodification of the indefinite article across Spanish, English and Turkish in article adjective noun constructions

the end of the session, the participants each received a gift card for their time.

Participants

Recruiting participants who reached ultimate attainment in L2 has been subject to a variety of criteria[3]. In this study, the participants were recruited on the basis of their level of proficiency, the exposure to English and the frequency of language use and length of stay in the target country. The Turkish-English speaker, *Sena*, aged 56, lived in Australia for 39 years and the Spanish-English speaker *Maria*, aged 39, for 12 years. The monolingual AE control, *Chloe*, was a 34-year-old-female born and raised in Australia. All the speakers held at least a master's degree in an English-speaking country. In order to determine whether the participants shared similar speech rates, their number of words per minute was taken as it is one of the most frequently used measures in the literature (Götz, 2013). This was calculated by dividing the total number of words by the length of speaking time in minutes. The speech rates of native speakers of English are shown in the literature to range between 120 and 260 words per minute (p.15). In interviews, this was reported to range from 160 to 210 words. When their speech rates were considered, *Sena* (156wpm), *Maria* (165 wpm) and *Chloe* (182wpm) can be characterized as medium-paced speakers.

Language background of the participants

The Australian version of the LEAP-Q, a self-reported measure of language background, was used to report language exposure and dominance of the speakers. The onset age of bilingualism was 12 for *Sena* and 17 for *Maria*[4]. All the participants reported that the language spoken at home was almost always English. They were asked to evaluate their knowledge of L1 and L2 on a scale from 1 to 10, in which **1** meant *none* and **10** meant *perfect*. The L2 speakers reported that they had almost no L2 accent in their L1s, but they had *considerable* L1 accent (rated as 6 out of 10) in their L2 English. They thought they were *almost always* (rated as nine out of ten) identified as a non-native speaker of English based on their English accent. Both L2 speakers stated that *they were 20* when they became fluent readers and speakers of L2 English. *Sena* resided in Australia for 39 years and *Maria* for 12 years.

Tasks

In the literature, article use in the interlanguage of end-state speakers has mostly been reported either via written correspondences or spontaneous speech productions (White, 2003; Snape & Kupisch, 2010; Lardiere, 2008). To contribute to the existing literature, a sentence imitation task and spontaneous speech samples were integrated into the data collection procedures of the current study.

Sentence Imitation Task

Each participant was asked to watch pictures which were accompanied by auditory stimuli on a computer screen. They were asked to repeat what they heard in the way they would say them. The sentences were recorded by one other female native speaker of Australian-English. The experiment consisted of 2 warm-ups, 32 test sentences and 4 filler items so that the participants would not be biased about the structures that they were being tested. Half of the test sentences had adjectives. Half of the test sentences in each construction had the target NP at the sentence initial position and the other half had the target NP at the postverbal position. The constructions with adjectives consisted of six syllables and those without an adjective had five syllables (see Table 1).

The phonological contexts preceding and following the article were chosen with respect to L1 constraints on segments and syllable complexity so that the phonological complexity would not affect the article duration, which is one of the indicative features of whether the article is stressed or not (Ladefoged, 2003).

Spontaneous speech recordings

Naturalistic speech samples from each participant comprised of about one-hour semi-structured interviews, in which each participant was encouraged to talk about her family, career and experiences in Australia. The interviews were conducted by the author.

Transcription and coding

First, utterances with an indefinite article obtained from the spontaneous speech samples of these three speakers were transcribed and coded as supplied or deleted in obligatory singular indefinite contexts with (n_{Sena}= 45, n_{Maria}=36, n_{Chloe}=47) and without an adjective (n_{Sena}= 48, n_{Maria}=33, n_{Chloe}=35). In (i), *Sena* used the indefinite article correctly in *a producer*; however, within the same utterance she omitted the article in *studio person.*

(i) And he was working as **a** producer there…. as…. **studio person**.

After excluding overlapping speech, a total of 216 speech files (half of them with adjectives) in obligatory indefinite contexts were included in the narrow acoustic analysis. 96 of them (32 files from each speaker) came from the sentence imitation task and the rest 120 of these speech files (40 files from each speaker) came from the spontaneous speech samples[5]. All the recorded utterances were saved in the wav format. The indefinite article constructions with and without an adjective were excised from the original recording and article durations were calculated. Following Snape and Kupisch (2010), the indefinite article durations over 100ms. were taken as evidence that the article was stressed. The reli-

Table 1. Stimuli examples in obligatory indefinite singular contexts

Construction	Stimuli
Article noun	A cat ran today Tom ate up a fat duck
Article adjective noun	A black cat ran today Tom ate up a fat duck

ability between the two coders on the durational measures (within +/-25ms.) was.85. The range in discrepancies was 0-33ms., with a mean of 12ms. (SD=9). The discrepancies were resolved by taking the average of the durational measures assigned by the two coders. There were no discrepancies in taking the frequency counts of supplied and deleted articles between the coders.

Analysis

Descriptive statistics in the form of frequency and percentage of article omissions, suppliance and durations in obligatory indefinite contexts were reported across constructions and tasks using SPSS 25 (IBM, 2017). Differences across speakers were reported through non-parametric measures since the number of participants does not allow for the use of parametric tests to draw generalizable conclusions.

RESULTS

The first two predictions were made with respect to article omissions of the three speakers. Table 2 summarizes the article use patterns in the form of suppliance and omissions in obligatory singular contexts in the spontaneous speech samples and the sentence imitation task:

None of the participants omitted the indefinite article in contexts with and without an adjective in the sentence imitation task. *Maria* and the native control *Chloe* supplied articles 100% of the time in contexts with and without an adjective in their spontaneous speech recordings, too. So, the prediction that the L1 Spanish and the native control would not differ in their rates of article omissions across tasks and contexts is verified. As given in Table 2, all the participants supplied at least 90% of the indefinite article in constructions without an adjective in their spontaneous speech samples. *Sena* did not reach a 90% accuracy rate in article use in constructions with an adjective. Her rate of suppliance in the same context dropped to 85%. Even though she dropped articles more in constructions with an adjective than those without an adjective, this difference was not statistically significant ($X^2(1,93) = 1.38$, $p = .24$). *Sena* did not statistically differ from the native control in her suppliance rate of articles in the article noun ($X^2(1,93) = .36$, $p = .55$) and the article adjective noun constructions ($X^2(1,83) = 1.02$, $p = .31$) in her spontaneous speech recordings. The conclusion to be drawn is that the L1 Spanish speaker was able to transfer the necessary prosodic licensing relations across contexts and tasks in her L2 speech. Yet, the Turkish L1 speaker was still struggling to establish the target prosodic licensing relations since she had a higher rate of article omissions in contexts with a prenominal modifier in her spontaneous speech. So, the second prediction was also borne out.

Both the PTH and the SMH predicted *Sena* to use determiners and numerals in place of the indefinite article and produce constructions such as *good a man*. However, this was not the case. There were no errors of illegitimate word order. None of the participants overused determiners or numerals in place of an article. *Sena's* article substitutions were limited to definite article overuse in indefinite contexts with and without an adjective. So, the third prediction did not hold for the Turkish L1 speaker in this study.

The last two predictions were made with respect to article misuse in the form of article stressing. Table 3 gives a breakdown of article durations across contexts, tasks and speakers:

Recall that if the infinite article duration exceeds 100ms., then the article is assumed to receive stress, suggesting that the target language prosodic licensing is disrupted. The fourth prediction was that *Maria* and *Chloe* would not show a difference in article durations across contexts and tasks. As summarized in Table 3, *Maria* had slightly shorter article durations in contexts with an adjective ($M = 46.5$ms., $Mdn = 46.5$ms.) and those without an adjective ($M = 47$ms., $Mdn = 42.5$ms.) in the sentence imitation task. This difference was not statistically significant ($z = .31$, $p = .76$). However, she assigned a longer duration to the indefinite article in constructions with an adjective ($M = 63.6$ms., $Mdn = 57.5$ms.) than those without an adjective ($M = 54.5$ms., $Mdn = 53$ms.) in her spontaneous speech productions. This difference was not statistically significant, either ($z = 1.10$, $p = .27$). A similar pattern was observed in the sentence imitation task and spontaneous speech recordings of the native speaker. On average, *Chloe* assigned longer article durations to constructions with an adjective ($M = 57.3$ms., $Mdn = 56$ms.) than those without an adjective ($M = 54.3$ms., $Mdn = 56$ms.) in the sentence imitation task. She had longer indefinite article durations in article adjective noun constructions ($M = 66.8$ms., $Mdn = 60.5$ms.) than in article noun constructions ($M = 48.5$ms., $Mdn = 49$ms.) in her spontaneous speech recordings, too. The difference between the article durations of the native speaker with and

Table 2. Article use patterns in obligatory indefinite contexts across tasks, contexts and speakers

Task	Article use pattern	Context	Speakers		
			Sena	Maria	Chloe
Spontaneous speech	Suppliance	Article noun	41/45 (91.1%)	36/36 (100%)	47/47 (100%)
		Article adjective noun	41/48 (85.4%)	33/33 (100%)	35/35 (100%)
	Omission	Article noun	4/45 (8.9%)	0/36 (0%)	0/47 (0%)
		Article adjective noun	7/48 (14.6%)	0/33 (0%)	0/35 (0%)
Sentence imitation	Suppliance	Article noun	16/16 (100%)	16/16 (100%)	16/16 (100%)
		Article adjective noun	16/16 (100%)	16/16 (100%)	16/16 (100%)
	Omission	Article noun	0/16 (0%)	0/16 (0%)	0/16 (0%)
		Article adjective noun		0/16 (0%)	0/16 (0%)

without an adjective was not statistically significant in the sentence imitation task (z=.51, p=.61) or in the spontaneous speech productions (z=1.72, p=.09). No statistically significant difference existed between *Maria* and *Chloe* in indefinite article durations in constructions without an adjective (z=-1.60, p=.11) in the sentence imitation task. However, the native speaker assigned statistically significantly longer durations than the Spanish speaker to the indefinite article in contexts with an adjective, (z=2.2, p=.009) in the same task. This was not a prediction made by either of the accounts. There was no statistically significant difference between *Maria*'s and *Chloe*'s article durations in constructions without an adjective (z=1.39, p=.17) and those with an adjective (z=.14, p=.90) in spontaneous speech samples. So, the fourth prediction was confirmed partially.

The last prediction had to do with article durations of *Sena* across contexts and tasks. On average, *Sena* had longer indefinite article durations in contexts with an adjective (M=83.7ms., Mdn=83.5ms.) than those without an adjective (M=76.1ms., Mdn=73ms.) in the sentence imitation task. This difference was not statistically significant (z=1.55 p=.12). Similarly, her article durations were shorter in utterances without an adjective (M=82.6ms., Mdn=75.5ms.) than those with an adjective (M=101.8ms., Mdn=92ms.) in her spontaneous speech recordings. This difference was statistically significant (z=2.89, p=.004). Article durations of the Turkish L1 speaker in the spontaneous speech recordings were compared with those of the native speaker. The difference in article durations of *Sena* and *Chloe* was statistically significant in article noun, (z=5.12, p<.001) as well as in article adjective noun contexts (z=3.03, p=.002). So, the last prediction was borne out in favor of the PTH.

To have an idea about how speech waves are visualized when the article is stressed, Figure 4 provides a visual representation of the utterance `Tom ate up a fat duck` uttered by *Sena* (101ms.).

Sena assigned either a rising or a steady pitch to her indefinite article productions when they exceeded 100ms. Next, Table 4 presents the number of (un)stressed articles produced in contexts with and without an adjective in both tasks:

None of the speakers stressed the indefinite article in article noun constructions except *Sena.* As given in Table 4, she stressed the indefinite article in constructions with an adjective in the sentence imitation task (18.8%) and in her spontaneous speech productions (35%) by assigning it a duration over 100ms. with a pitch rise. Still, *Sena* did not stress articles significantly more often than *Chloe* in constructions with adjectives in the spontaneous speech samples (X^2(1, 40)=2.45, p=.18) or in the sentence imitation task (X^2(1, 32)=.56, p=.52). All the article durations of *Maria* and *Chloe* were shorter than 100ms. in constructions with and without an adjective in the sentence imitation task. Although *Maria* assigned stress to the indefinite article in two constructions

Table 3. Indefinite article durations across contexts, tasks and speakers in means (SDs)

Task	Context	Speakers		
		Sena	Maria	Chloe
Spontaneous speech	Article noun	82.60ms. (24.93)	54.50ms. (14.13)	48.50ms. (12.73)
	Article adjective noun	101.75ms. (28.10)	63.65ms. (20.03)	66.85ms. (30.08)
Sentence imitation	Article noun	76.06ms. (12.45)	47ms. (15.98)	54.03ms. (14.83)
	Article adjective noun	83.75ms. (17.43)	46.50ms. (9.01)	57.37ms. (12.55)

Table 4. Frequency and percentages of stressed articles across contexts, tasks and speakers

Task	Context	Speakers		
		Sena	Maria	Chloe
Spontaneous speech	Article noun	1/20 (5%)	0/20 (0%)	0/20 (0%)
	Article adjective noun	7/20 (35%)	2/20 (10%)	0/20 (0%)
Sentence imitation	Article noun	0/16 (0%)	0/16 (0%)	0/16 (0%)
	Article adjective noun	3/16 (18.8%)	0/16 (0%)	0/16 (0%)

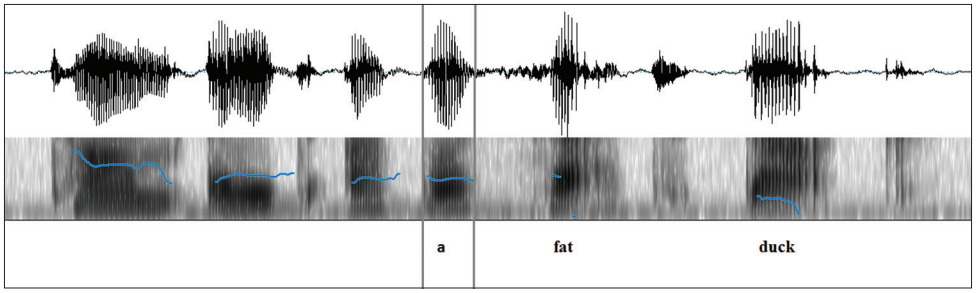

Figure 4. Article production by the Turkish-English speaker (101ms.)

with an adjective, she did not differ from the native speaker in her stress assignment to the article ($X^2(1, 40)=.2$, $p=.65$). To summarize, different from the Spanish L1 and the native English speaker, the Turkish L1 speaker omitted the indefinite article and assigned longer durations to the indefinite article in contexts with an adjective in spontaneous speech recordings.

DISCUSSION AND CONCLUSIONS

This case study investigated the role of L1 prosody on article omissions and stressing in the interlanguage of two end-state speakers, one coming from an articled first language, Spanish, and the other from an article-less one, Turkish, from a prosodic perspective. Recordings of a sentence imitation task and spontaneous speech samples from two end-state L2 speakers of English along with a monolingual English-speaking control were analyzed. Patterns of use (i.e., suppliance, omission and mispronunciation) in obligatory contexts with and without an adjective were compared across tasks within and between the speakers.

When the article suppliance rates in spontaneous speech recordings were considered, *Sena* supplied articles more often in contexts without an adjective (91%) than in contexts with an adjective (85%). The Spanish speaker, *Maria* and the native English control, *Chloe,* manifested no surface variability in article productions. Even when the article was present, *Sena*'s rate of native-like pronunciation of the article in constructions with an adjective fell down to 65% and *Maria*'s target like pronunciation dropped down to 90% in the same context in spontaneous speech recordings. In the sentence imitation task, on the other hand, the Spanish speaker treated the indefinite article as a non-stressed element 100% of the time in constructions with an adjective as opposed to the Turkish speaker, who treated the indefinite article target-like 81% of the time in the same context. As expected, transfer from L1 Spanish facilitated target-like pronunciation of the articles in contexts with and without an adjective. This probably shows that variability in the indefinite article use does not arise from a lack of underlying syntactic features, but rather from a mapping issue due to the mismatch between the L1 and L2 prosodic systems (Goad & White, 2019).

Both accounts predicted higher rates of article omissions by the Turkish L1 speaker. When van Patten and Benatis' (2010:28) 90 percent accuracy is set as threshold for mastery of functional material, both end-state speakers were near native like in their pronunciation and suppliance of the indefinite article in L2 English. If the Turkish speaker misanalysed the indefinite article as an adjective, article omissions would be higher in the sentence imitation task, where the referents were already identifiable and pragmatically redundant (Trenkic, 2007). Yet, the Turkish speaker omitted articles more often in contexts with a modifier in her spontaneous speech productions. It should also be noted that none of the speakers resorted to the *adjective article noun* word order or replaced the article with a numeral or a determiner. These findings suggest that the L1 prosodic effects did not interfere with the legitimate word order in L2.

Sena's longer article durations without a pitch fall can be linked to the effort she paid to adapt the existing L1 representations of numerals and determiners to license relations into a new prosodic domain in constructions with an adjective. A syntactic explanation could claim that articles are treated as adjectives; that's why, they are inappropriately stressed (Trenkic, 2019). However, the incidences of article stressing in the sentence imitation task are very few both for the Spanish and the Turkish speaker. The reason why *Maria* was lengthening articles in contexts with a modifier can be related to the possible transfer of *una* in Spanish which may receive stress when it acts as a numeral.

Similar to the findings of Snape and Kupisch (2010), the Turkish L1 speaker, *Sena*, in this study had difficulty constructing the L2 prosodic structure especially in *article adjective noun* constructions although her pronunciation of the indefinite article was more target-like than that of *SD*'s. When *Sena's* article use is compared to that of *SD*, *Sena* had fewer numbers of inappropriately stressed articles with a pitch rise across contexts. *Sena* mispronounced articles 35% of the time, whereas *SD* mispronounced them more than 80% of the time in contexts with an adjective. While *Sena* assigned stress to the article 5% of the time in constructions without an adjective, *SD* exhibited a similar pattern ten times more (55.6%) in the same context. The difference can be related to *Sena's* earlier onset of bilingualism, longer length of stay in the English-speaking country and a higher rate of exposure to L2 than *SD*. Yet, both Turkish L2 speakers of English had lower rates of accuracy in constructions with an adjective. *Maria* mispronounced only two articles in constructions with an adjective. The monolingual speaker did not exceed 100ms. or assign a rising pitch to the indefinite article productions in either context as predicted. This finding suggests that the prosodic representations of the end-state speakers coming from a mismatching prosodic system are still disrupted in certain contexts despite long years of residence in an English-speaking country and frequent daily use of L2 (White, 2003). The syntactic explanation cannot be ruled out in explaining why L2 speakers omit articles in constructions with an adjective. The SMH claims that learners who come from first languages that lack Definiteness would exhibit higher rates of omission and possibly higher rates of mispronunciation in the form of lengthened article durations since articles are claimed be treated as adjectives. Yet, the findings with respect to article misuse in the form of article stressing lend support to the PTH (Goad & White, 2008; 2009).

In conclusion, this paper undertook the study of a vulnerable domain, the acquisition of the indefinite article in the Australian context from a prosodic perspective. The aim was to test whether target prosodic licensing relations existed in the steady state L2 speech. Both the syntactic and prosodic differences may give rise to speech variability in the form of article omissions and stressing. The predictions of both accounts were verified except for two. For one, the native speaker had longer durations of article in contexts with an adjective. This was not a prediction made by the either of the accounts. The only prediction that could act in favor of the prosodic account was the difference in article

durations within the speech of the same speaker, the Turkish L1speaker. This paper concludes that prosodic structure and lack of D in Turkish may have resulted in article omissions and stressing especially in constructions with adjectives in the interlanguage of the end-state Turkish speaker. Even speakers who reached ultimate attainment at an L2 can be vulnerable to inappropriate pronunciation of the functional material despite long years of exposure to the target language.

END NOTES

1. Please refer to Adams and Munro (1978) for an in-depth discussion of acoustic correlates of stress.
2. It needs to be noted that the distribution of stress in Spanish is idiosyncratic (e.g., Quilis, 1993) and the bisyllabic indefinite article *una* as in 'una palabra' ('a word') can receive stress and form its own PWd. The syntactic context can determine whether or not the function word can receive stress (Hualde, 2006).
3. These criteria can vary on the basis of length of stay, exposure to and the frequency of use of the target language, proficiency level or longitudinal speech recordings over long intervals of time (see Han, 2004, for a thorough discussion).
4. *Sena*'s earlier onset of exposure to L2 was limited to one year of English instruction in Turkey. Just like Maria, she was intensely exposed to L2 English at the age of 17, after migrating to Australia.
5. After taking out overlapping speech, speaker hesitations and repairs in the spontaneous speech samples, the first 40 utterances with and without adjectives were analysed.

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