

**Definiteness and argument position in the interpretation of bare nouns:
From L1 Mandarin to L2 English***

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ABSTRACT. This study investigated the hypothesis that nouns in article-less languages are not ambiguous with respect to definiteness, and that this unambiguity is evident in the interpretation of ungrammatical ‘bare’ (i.e. article-less) singular nouns in L2 English. In order to probe the interpretation of such bare nouns, we administered an acceptability judgment task to intermediate L2 learners of English whose native language was Mandarin, with sentences containing bare singular nouns in different syntactic positions and discourse contexts. We found that bare subjects were most acceptable in contexts that required definites, while bare objects were equivalently acceptable across contexts. We conclude that the interpretation of bare nouns in L2 English is not ambiguous, but rather follows a systematic pattern determined by argument position and discourse context.

KEYWORDS: articles, definiteness, L2 acquisition, bare nouns

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1. Introduction

It is well known that L1 speakers of languages without definiteness-marking articles have difficulty acquiring the English article system. This difficulty is particularly apparent in production, where it manifests as misuse of English articles, such as substituting definite *the* for indefinite *a*, as in (1) (see also Ionin, Ko & Wexler 2004; Ionin & Montrul 2010; Zdorenko & Paradis 2011), and article omission, or using ungrammatical ‘bare’ singular noun phrases, as in (2) (see also Goad & White 2006, 2009; Robertson 2000; Trenkic 2009).

(1) *She take the bath.* (White 2008)

(2) *So Ø brain is already shaped.* (White 2003)

In this chapter we investigate the interpretation of ungrammatical bare nouns in L2 English, thus focusing our analysis on the *omission* of definite and indefinite articles, rather than misuse or substitution. We begin with a brief introduction to the issues that form the theoretical backdrop of our investigation into the L2 acquisition of determiners, taking the status of bare noun phrases in the article-less L1 as the starting point.

1.1. A look at (in)definiteness in article-less languages

In order to understand why and how bare noun phrases (NPs) are used in L2 English, it is useful to ask how bare NPs behave in the article-less L1. A number of semanticists have attempted to answer this question. Löbner (1985) speculated that bare NPs in article-less languages are simply ambiguous between definite and indefinite interpretations. A more nuanced view was proposed by Heim (2011): in article-less languages, bare NPs are semantically indefinite (i.e. they are

equivalent to English indefinites), but since they do not compete with definite nouns, they do not carry the implicatures carried by English indefinites, and therefore have a wider range of felicitous uses. Both of these proposals agree that bare NPs in article-less languages cover the logical space of both the English indefinite and the English definite, and that they are therefore ambiguous between definite and indefinite interpretations. We group both of these views under the name *ambiguity hypothesis* (AH).

However, some studies probing the semantics of bare NPs in article-less languages have found that, contrary to the AH, the use of bare NPs is constrained by factors like discourse context and syntactic position (e.g. Dayal 1999, 2004, 2017, 2018 in Mandarin, Russian and Hindi; Yang 2001 and Jiang 2012 in Mandarin). We term the notion that bare NPs in article-less languages are not ambiguous with respect to definiteness the *unambiguity hypothesis* (UH).

To demonstrate the restrictions on the interpretation of bare NPs in article-less languages, we will use three contexts designed to diagnose the (in)definiteness of NPs, drawing on the semantic literature on these topics: (i) anaphoricity (Heim 1982; Kamp 1981), (ii) partitive specificity (Enç 1991), and (iii) discourse referent introduction (Heim 1982; Kamp 1981). First, we will demonstrate how these contexts restrict NP interpretation in English, before setting up these contexts in Mandarin, which is the first language of the participants in the current study.

1.2. Diagnosing (in)definiteness in English

In a context of anaphoricity (3a), the cardinality of the set of contextually salient possible referents of a singular NP is restricted to only one. As a follow-up to (3a), (3b) must have a

definite NP; otherwise, the sentence is infelicitous. In other words, when the antecedent denotes a unique entity, a definite is needed to refer back to it.

(3) a. *A student and a teacher are talking.*

b. *The/#A student is holding a pen.*

(4a) sets up a context of partitive specificity, where the cardinality of the set of contextually salient possible referents of an NP is greater than one. As seen in (4b), in order to refer back to one of the previously introduced cats, an NP must be indefinite, or the sentence will be infelicitous. The definite is ruled out because there is no single unique cat.

(4) a. *There are many cats in the house.*

b. *A/#The cat is scratching a couch.*

Finally, in a context of discourse referent introduction, no contextually salient possible referents have been introduced yet. As seen in (5), in this context, indefinite NPs are preferred over definite NPs:

(5) *Many years ago, an/#the old woman used to live in this house.*

We see, based on (3-5) above, that in (i) a context of anaphoricity, definite NPs are preferred, while in contexts of (ii) partitive specificity and (iii) discourse referent introduction, indefinite NPs are preferred.

1.3 The (in)definiteness of Mandarin bare nouns

We can now create these same contexts in Mandarin in order to probe the interpretations of Mandarin NPs without articles (i.e. ‘bare’ NPs). In (6) we have an anaphoric context, where the bare NP *xuesheng* ‘student’ in (6b) refers back to the student introduced by the indefinite *yi ge*

xhuesheng ‘one CLF student’ in (6a).¹ This suggests that bare NPs are interpreted as definite in this context.² But this example in itself would not be surprising if bare NPs in Mandarin were simply ambiguous with respect to definiteness, because they would then be acceptable in all contexts.³

(6) a. *Yi ge xuesheng he yi ge laoshi zai shuohua.*

one CLF student and one CLF teacher PROG talk

b. *Xuesheng wo zhe yi zhi gangbi.*

student hold PROG one CLF pen

‘A student and a teacher are talking. The student (lit: student) is holding a pen’.

In (7) we have a context of partitive specificity, which we have seen privileges indefinites over definites in English. The introductory sentence in (7a) introduces a plurality of cats. The use of the bare NP to refer back to one of these cats in (7b) is infelicitous. This is the expected behavior of NPs that presuppose uniqueness. This suggests that bare NPs are still interpreted as definite, even in this context which requires indefinite NPs. In fact, the numeral ‘one’ *yi* and a classifier would need to be added before ‘cat’ *mao* in order to convey an indefinite interpretation and make the sentence felicitous.

¹ The judgments reported in this section are from our own informants, but see Jiang (2012) for confirmation.

² In a recent paper Jenks (2018) claims that Mandarin bare NPs are not acceptable in anaphoric contexts except in subject position. Dayal and Jiang (2020) challenge this claim on the basis of a broader set of facts, while accepting the core data in Jenks’ study. Since we are restricting ourselves to subject position in this section, these complications do not affect the point of the discussion.

³ By using an antecedent sentence with two distinct indefinites, the possibility of referring back with a pronoun instead of a full NP is ruled out.

(7) a. *Wuzi li you hen duo mao.*

house inside have very many cat

b. #(*Yi zhi*) *mao zai zhua yi ge shafa.*

(one CLF) cat PROG scratch one CLF couch

‘There are many cats in the house. A/#The cat (lit: cat) is scratching a couch.’

Finally, we see in (8) that in a context of discourse referent introduction, bare NPs are dispreferred. Although this diagnostic is not as strong as the other two, it adds to the view that Mandarin bare NPs are interpreted as definite and do not comfortably take on the role of indefinites.⁴ The numeral ‘one’ *yi* and a classifier would need to be added in order to convey an indefinite interpretation and render the NP clearly felicitous.⁵

(8) *Hen duo nian qian, #(yi wei) nianlao de nvren ceng zhu zai zhe dongfangzi-li*

very many year before (one CLF) old DE woman used.to live LOC this CLF house-in

‘Many years ago, a/#the old woman (lit: old woman) used to live in this house.’

In summary, the three diagnostics presented in (6-8) demonstrate that Mandarin bare NPs are preferred in a context in which English definites are preferred (6), and dispreferred in two contexts in which English indefinites are preferred (7-8). Based on these three diagnostics, we propose that Mandarin bare NPs are not ambiguous with respect to (in)definiteness, but are in

⁴ We can get some sense of the intuitions at play by comparing bare plurals with overt indefinites in English: *Many years ago, old women/some old women used to live in this house. They worked on a nearby farm.* Dayal (1999, 2004) notes that in languages like Hindi that allow both bare singulars and bare plurals, bare plurals are better at introducing discourse referents than bare singulars, but not as good as indefinites formed with the numeral ‘one’. Mandarin, of course, does not make a distinction between singular and plural nouns but Law & Syrett (2017) provide experimental evidence showing a preference in Mandarin for overt indefinites over bare NPs in such contexts. See footnote 6.

⁵ It is possible that a sentence like *Many years ago, king ruled in this country* could be accepted under a contrastive reading juxtaposing monarchy with democracy. By using entities that may not be standard or expected, we force a choice between a bare and an indefinite, and avoid this confound.

fact semantically definite (following Yang 2001, Dayal 2004, Jiang 2012, 2018).⁶ Note, however, that the NPs of interest in (3-8) were all in subject position. Therefore, our proposal so far is restricted to NPs in subject position.

1.4. *The role of syntactic position*

Dayal (2011) has pointed out that when a bare NP is in direct object position in languages like Hindi, the definite interpretation generated by the semantics is overridden by another interpretation, i.e. ‘pseudo-incorporation’ (see also Huang 2018 for Mandarin). When a bare NP in direct object position is pseudo-incorporated into its verb, the entire verb phrase (VP) is interpreted as an activity, analogous to English *bar-tending* or *rock-throwing*. For example, as seen in (9), a Mandarin sentence that translates literally to English ‘Anu is looking after child’ gets interpreted as ‘Anu is babysitting’ or ‘Anu is doing childcare’. In this way, a bare NP that would otherwise be definite can be rendered felicitous even in a context that prefers indefinites.

(9) *Anu zheng-zai zhaokan xiaohai.*

Anu right.now-PROG look.after child

‘Anu is babysitting/doing childcare.’

Luckily, the effects of pseudo-incorporation on the interpretation of bare objects can be teased apart by examining a context where the pseudo-incorporated interpretation is blocked. This occurs when the referent of a bare NP is already salient in the discourse context, which then

⁶ These studies establish that Mandarin bare NPs are kind denoting terms. Kind terms are typically classified with definites. Plural kind terms can have a type of indefinite reading but that does not make them bona fide indefinites. See Carlson (1977), Chierchia (1998) and Dayal (2004) for important diagnostics that distinguish between the indefinite readings of NPs with overt indefinite determiners or numerals and the apparent indefinite readings of plural kind terms.

renders the pseudo-incorporated interpretation infelicitous (Dayal 2011). This is illustrated in (10) below, where the same sentence as in (9) is preceded by a sentence that introduces five salient children into the context (10a). Here, (10b) must mean ‘Anu is looking after the child’. Consequently, the sentence is rendered infelicitous, because the bare NP as a definite requires that there be a unique child, which is contradicted by (10a).

(10) a. *Zheli you wu ge xiaohai.*

here exist five CLF child

b. *#Anu zheng zai zhaokan xiaohai.*

Anu right.now PROG look.after child

‘There are five children here. #Anu is looking after the child.’

In summary, we have seen that bare NPs in Mandarin do not behave ambiguously with respect to definiteness; rather, they generally behave like definite NPs (see Yang 2001 and Jiang 2012 for further evidence), with the caveat that bare objects can be pseudo-incorporated into the verb though only when the referent is not already salient in the context. This collection of observations is the basis of what we are calling the *unambiguity hypothesis*, or UH (see Dayal 2017, 2018 for further details).

2. Articles in second language acquisition

In this section we consider the different implications for the L2 acquisition of articles that the AH and UH make and relate them to the current literature on the topic.

2.1. L2 article acquisition from the perspectives of AH and UH

There is by now substantial literature experimentally supporting the view that the presence or absence of determiners in the L1 is a crucial factor in the L2 acquisition of determiners, especially from the viewpoint of production. In brief, learners whose L1 has articles do significantly better than those whose L1 does not.⁷ We will review some of these studies in Section 2.2 but it would be fair to say that most of the studies do not question the premise that bare NPs in the article-less L1 are ambiguous between definite and indefinite. In order to contextualize the findings of these studies, we will first lay out the different expectations for the L2 acquisition of determiners from the perspectives of the AH and the UH. If the AH is correct in its claim that bare nouns in article-less languages are ambiguous, and under the assumption that learners transfer⁸ this ambiguity in the process of L2 acquisition, the challenge in acquiring definite and indefinite L2 articles would be to lexically separate a distinction that is not morpho-syntactically encoded in their L1. From the perspective of the AH, it is therefore reasonable to expect that the acquisition of the definite and the indefinite article should be equally difficult. From the perspective of the UH, on the other hand, expectations are more nuanced.

⁷ A reviewer suggests that this finding may be explained via the Full Transfer/Full Access Hypothesis (FTFA, Schwartz & Sprouse 1996). While we agree that this finding is likely the result of L1 influence, we do not want to commit to the FT/FA for the following reason: the FT/FA is a highly specific formulation of transfer based on the Principles and Parameters model of Universal Grammar. It explicitly states that “the entirety of the L1 grammar... is the L2 initial state” and that “all the principles and parameters as instantiated in the L1 grammar immediately carry over as the initial state of a new grammatical system on first exposure to input from the target language” (Schwartz & Sprouse 1996, pg.41). It is not clear to us that the UH and its consequences for either the L1 or the L2 can be articulated in terms of a UG principle or parameter. Therefore, we prefer to rely on the broader concept of L1 influence or L1 transfer.

⁸ We use the term here (and in subsequent mentions) in its broader sense, i.e. not in the strict sense of transfer of grammatical features.

Assuming that the UH is correct with respect to the facts in article-less languages, an L2 learner transferring the characteristics of bare nouns in the L1 onto the L2 might exhibit the following error patterns: article omission errors in the L2 would be predicted to be more frequent in definite than in indefinite contexts. Taking this a step further, we have seen in Section 1.4 that bare nouns in Mandarin can be pseudo-incorporated in object position. Therefore, instead of drawing on their understanding of bare nouns as definites more generally, the learner's L2 grammar may also be syntactically sensitive. That is, it would not be surprising to find that the differential interpretations of bare nouns in different syntactic positions in the L1 grammar play a role in L2 acquisition. There would then likely be asymmetries in the errors that occur in subject and object position, for example. From the perspective of the UH, we expect there to be a difference between the L2 acquisition of definites and indefinites, restricted by syntactic position.

Let us remind ourselves that as far as the adult grammar of Mandarin is concerned, the AH has been shown to be empirically flawed (Section 1.3). Thus, regardless of the particular theoretical explanations one may favor, the UH is supported by the L1 facts. The question we are interested in probing is whether and how the UH is reflected in the L2 acquisition of determiners. To contextualize the concrete predictions that we set out to test (described in Section 3.2), we briefly review relevant L2 literature. In doing so, we restrict ourselves to issues related to omission rather than misuse of articles since that is the focus of the study we report on in this chapter.

2.2. Article omission in L2 development: Systematicity vs. randomness

The acquisition of determiners has been widely studied in both L1 and L2 development, albeit from diverse theoretical approaches and with varying results (e.g. Huebner 1983, 1985; Master 1987; Parrish 1987; Thomas 1989; among many others). For this reason, we do not provide a comprehensive review of this literature. We focus, rather, on those studies that are particularly relevant to the issue of how *bare nouns* are (mis)used in L2 English, thus highlighting those results that bear on article *omission*, even though this may not have been the main focus of these studies.

In an overview study Trenkic (2009) writes that article omission is rife in L2 production, but that it shows a systematicity that generally follows discourse and pragmatic principles, rather than occurring randomly (as would be predicted by the AH). One of these principles is linked to the saliency of the NP, whereby the higher its saliency in the discourse, the more likely the article will be dropped. Trenkic links this to the Information Load Hypothesis (Almor 1999, 2005; Almor & Nair 2007) and ascribes it to processing factors, rather than grammatical representation. Trenkic's (2007, 2009) own proposal, based on analyses of Serbian, Thai and Chinese learners of L2 English, is that in addition to discourse and pragmatic principles, L2 articles are misanalyzed as adjectives at earlier stages of acquisition, thus also addressing issues of representation. Other contexts where Trenkic notes higher degrees of article omission are: topic vs. non-topic position, for definite articles; subsequent vs. first mention; and when speakers are referring to objects present in the immediate environment. Trenkic's observations and explanations are specific to production, which is highly vulnerable to working memory constraints and processing factors. It should be noted that Trenkic does not directly address an

asymmetry in the omission of articles in definite vs. indefinite environments. However, what clearly emerges in her discussion is that article omission does not occur randomly but is systematic, and, in her view, governed by a combination of discourse, processing and grammatical principles.

In a study that, similar to ours, looks more directly at article omission, Robertson (2000) tests a group of L2 speakers of English whose L1 is Mandarin. He uses a production task that was designed to elicit nouns in definite and indefinite contexts (Brown 1995). Robertson reports his results separately for what he calls “echo contexts” and “non-echo contexts”. Echo contexts function as comprehension checks and contain reformulations of a previous NP. These, he claims, are more representative of the grammatical representation of the learner than if the utterances were simply a repetition of a previously encountered NP. The utterances produced in the echo contexts are more revealing as they show a higher percentage of article omission overall (both definite and indefinite) than in non-echo contexts. But of particular interest to us is that in the echo contexts, Robertson finds a higher percentage of article omission (thus a higher percentage of bare nouns) when a *definite* article is required than when an *indefinite* is required. This result aligns with the predictions of the UH.

Similar to Trenkic, Robertson argues for systematicity of omission rather than optionality (i.e. randomness as would be predicted by the AH). He writes that this systematicity is reflective of a shift from discourse-oriented language (Mandarin) to syntax-oriented language (English), a claim that is similar to our hypothesis that speakers of article-less languages rely in part on the semantic function of bare nouns in the L1 as they develop target-like use of articles in the L2.

More evidence that article omission follows a distinct pattern, rather than a random one, is found in Schönenberger (2014) who sets out to test Ionin and colleagues’ Fluctuation

Hypothesis (FH: Ionin et al. 2004). The FH posits an Article-Choice Parameter set to either definiteness or specificity in languages with articles. L2 learners whose L1 does not have articles are then predicted to fluctuate between the two settings for a certain period of time until they converge on the correct one for the L2. Schönenberger tests the FH by investigating the L2 English of three groups: an L1 German group which shares the parameter setting of the L2 English; and two groups of L1 Russian speakers, one with more advanced L2 English proficiency than the other. Under the FH, the Russian groups would not have the Article Choice Parameter set, yet would still have access to it. Schönenberger found evidence for transfer of the L1 parameter setting in the German group, but reports that her results show only partial evidence for the FH.

The contrast between definiteness and specificity central to the FH is orthogonal to the claims of the UH, and we will not address it further here. Instead, we note one particular result in Schönenberger's study pertaining to the differential omission of definite vs. indefinite articles, a contrast that *is* relevant to the UH. She reports that article omission (i.e. selecting "no article" in the forced-choice article selection task) in the Russian groups was systematic, "occurring more often in contexts where nouns are perceived as clearly definite" (pg. 102). This in turn leads her to raise the question: *are learners of an L1 without articles in general more likely to omit articles with definites?*⁹

In an early study investigating the acquisition of articles in L2 Spanish by L1 Quechua speakers, Sanchez & Gimenez (1998) also found an asymmetry in the omission of articles. In particular, the definite article (*el/la*) tended to be omitted at a higher rate when the noun was in a prepositional phrase, compared to when it was in subject position. Only in object position did the

⁹ This asymmetry in definite vs. indefinite article omission was also present in Ionin et al. (2004), though it might have been restricted to particular nouns such as "mother" and "father" which can be used as names.

omission of the definite article not appear to be systematic. This led them to conclude that omission of the definite article is influenced by the particular argument position occupied by the noun. This claim is similar to that of the UH, that syntactic position will play a role in the appearance of L2 bare nouns.

Systematicity and asymmetries in definite vs. indefinite article omission were also present in data collected by Zdorenko & Paradis (2011). This study tested child L2 learners coming from a variety of L1 backgrounds, some with articles (Spanish, Arabic), some without (Mandarin, Cantonese, Hindi, Urdu and Punjabi). While overall the children were more accurate in their production of *the* than of *a*, the authors found, similar to the adult data in Schönenberger (2014) and in Robertson (2000), that article omission was higher in definite contexts than in indefinite contexts.

What is of note in all of these studies is that they point to systematicity of L2 article omission, rather than randomness, and more importantly, to definite environments, rather than indefinite ones. This aligns with the predictions of the UH for L2 acquisition, to which we turn next.

3. The Study

We propose that the systematicity observed in article omission can be derived from the UH claim that bare NPs in the article-less L1 are definite, and that L2 learners generally follow the L1 pattern of using bare nouns in definite contexts. This would also entail that bare nouns in the L2 are (erroneously) interpreted as definite during comprehension. The studies we cited in Section

2.2 all focused on L2 *production*, but to our knowledge, no study has directly examined the interpretation of bare NPs in L2 English *comprehension*, which is the aim of our study.

We test the proposal that restrictions on the interpretation of bare NPs in Mandarin (as described by the UH) guide the interpretation of ungrammatical bare singular NPs in L2 English. This proposal contradicts the AH, which would predict an even distribution in the acceptability of bare NPs in L2 English across contexts. The study described in this chapter was the first of a set of four experiments probing the interpretation of bare nouns in L2 English. It consisted of an acceptability judgment task (AJT) designed to establish whether and in what specific contexts and positions intermediate learners of L2 English whose L1 is Mandarin would accept bare nouns.

Our research questions are:

RQ1: Will Mandarin-speaking learners of L2 English show differential acceptability of ungrammatical bare nouns in English, based on the patterns in the L1, whereby bare nouns are preferred in definite over indefinite contexts?

RQ2: Will there be differential treatment of L2 English bare nouns in subject position compared to object position, due to mitigating effects in the L1 such as pseudo-incorporation?

3.1. Methodology

3.1.1. Participants

52 native speakers of Mandarin Chinese who were L2 learners of English (age 18-54, $M = 26.62$, $SD = 8.43$) were given financial compensation for participating in the experiment. All

participants were residents of New York City, and had arrived in the US from China between the ages of 13 and 49 ($M = 23.02$, $SD = 8.05$). Participants' length of residence in the US at the time of testing ranged from less than one year to 17 years ($M = 3.60$, $SD = 3.54$). Note that most participants lived in predominantly Chinese communities in Queens, New York where the dominant language is Mandarin, so residence in these communities does not necessarily entail English immersion to the same degree as living in a more dominantly anglophone community might.

At the time of testing, all participants were enrolled in an intermediate-level English language class at one of two campuses of Queensborough Community College (QCC), City University of New York (CUNY), in Queens, New York. Participants had been placed in this class level based on the results of a battery of proficiency tests: a multiple-choice test focusing on grammar, vocabulary, sentence structure, reading, and listening (at one campus, this test was designed by CUNY faculty; the other campus uses the CaMLA English Placement Test: Walter & Hentschel 2013); an oral test of verbal ability administered by CUNY faculty; and an essay test designed by CUNY faculty. Participants were further screened with a questionnaire developed in our lab, which collected information pertaining to language exposure and self-reported proficiency. Only those respondents who reported no significant exposure to languages with articles (other than English), and reported their English proficiency as intermediate, were included in the study. This proficiency level was selected because we needed to ensure that the L2 participants had not fully acquired the English article system, yet could comprehend the stimulus sentences without too much difficulty. In addition to the L2 experimental group, a control group of 20 native English speakers was tested on a pilot version of the experiment

consisting of a subset of the stimuli. All of the native English speakers self-reported that they had no greater than beginner proficiency in any language other than English.

3.1.2. Stimuli

Each stimulus for the acceptability judgment task consisted of two English sentences: a context sentence followed by the target sentence. Stimuli were presented simultaneously in written and auditory form. The stimuli were grouped into 6 conditions: type of context (anaphoricity, partitive specificity, discourse referent introduction) by syntactic position of the bare NP in the target sentence (subject, object). Example stimuli from each condition can be seen in (11-13), with each bare NP underlined for clarity. ‘ANA-D’ is shorthand for the anaphoricity context, with ‘D’ signifying that this is a context in which definites are preferred; ‘PAS-I’ is shorthand for the partitive specificity context, with ‘I’ signifying that this is a context in which indefinites are preferred; and ‘DRI-I’ is shorthand for the discourse referent introduction context, another context in which indefinites are preferred.

- (11) *ANA-D*
- a. *Subject*: A student and a teacher are talking. Student is holding a pen.
 - b. *Object*: A necklace and a bracelet are on sale. A woman is buying necklace.
- (12) *PAS-I*
- a. *Subject*: There are many cats in the house. Cat is scratching a couch.
 - b. *Object*: There are many shirts in the store. A girl is buying shirt.
- (13) *DRI-I*
- a. *Subject*: The beach is sunny today. Child is wearing a hat.
 - b. *Object*: The lawn needs more plants. A worker is planting tree.

Five stimuli were presented from each condition for a total of 30 experimental stimuli. Also included were 30 grammatical control stimuli, of the same form as the experimental stimuli, but with no bare NPs (e.g. *A boy and a girl are playing. The boy is throwing a ball*), in order to ensure that the L2 learners generally accepted bare NPs to an equivalent degree as grammatical NPs, and therefore had not fully acquired the English article system. Finally, we included 60 filler stimuli, which also contained two sentences but were of different structures than the experimental stimuli. 30 filler stimuli were grammatical, and 30 filler stimuli were ungrammatical. In total, each experimental participant gave acceptability judgments on 120 stimuli.¹⁰ Auditory stimuli were recorded in a sound-attenuating booth by a native English speaker from the northeastern United States using neutral prosody.

¹⁰ A reviewer points out that using multiple experimental lists, rather than a single list for all participants, would have allowed us to better control the confounding effects of the lexical variation of stimuli between conditions (Cewart, 1997). We agree, and we will design our follow-up experiments with this consideration in mind. In our analysis of this first experiment, however, we mitigate these confounding effects by using mixed effects models (see Section 3.3), which allow us to model the stochastic variability of participant responses caused by the idiosyncratic features of each stimulus using random intercepts (Singmann & Kellen, 2018).

3.1.3. Procedure

The experiment was conducted in a quiet room either at the Graduate Center, CUNY, or in an empty classroom at QCC. In order to ensure comprehension of the task, all communication between the participant and the experimenter was conducted in Mandarin. Stimuli were presented in pseudo-random order on a tablet computer running E-Prime 2.0 (Schneider, Eschman & Zuccolotto 2002). During each trial, participants were simultaneously presented with a written English stimulus on the tablet screen, and an auditory recording of the same stimulus through headphones at a comfortable volume. Then, they selected their acceptability rating on a 6-point Likert scale which appeared on the tablet screen with endpoints labeled in Mandarin (非常好 ‘very good’ and 非常差 ‘very bad’), as is common practice (see, for example, Liu & Keusch 2017). At the beginning of the experiment, they were given the following instructions, again in Mandarin: 请对每一对英语句子进行评分, 从 ‘非常好’ 到 ‘非常差’。 ‘Please rate each pair of English sentences on the scale from “very good” to “very bad”.’ Then the participant performed six practice trials with sentences unrelated to the experimental stimuli, after which they were prompted to ask the experimenter any questions they had, in order to ensure comprehension of the instructions. Participants were given a short break after each third of the experiment (after 40 trials and after 80 trials). The entire session lasted approximately 30-40 minutes.

3.2. Predictions

The predictions of the UH are summarized in Table 1. Each row summarizes the predictions by context within each syntactic position. For bare subjects, the UH predicts that ratings should be higher in ANA-D, the definite context, than in PAS-I and DRI-I, in which indefinites are preferred. For bare objects, the UH also predicts that ratings should be higher in ANA-D than in PAS-I. However, DRI-I should also have relatively high ratings because, as seen in Section 1.4, this context allows pseudo-incorporation.

Each column summarizes the predictions by syntactic position within each context. The UH predicts that bare subjects and bare objects should have equivalent ratings in the ANA-D and PAS-I contexts, but that bare objects should have higher ratings than bare subjects in the DRI-I context, because bare objects will be rendered acceptable via pseudo-incorporation, while bare subjects will remain definite.

	ANA-D	PAS-I	DRI-I
Bare subject	✓	✗	✗
Bare object	✓	✗	✓

Table 1. Predictions from the UH for relative acceptability ratings in the six experimental conditions. Check marks indicate relatively higher ratings caused by felicity, and Xs indicate relatively lower ratings caused by infelicity.

3.3. Analyses

First, in order to test whether the L2 learners had acquired the English article system, rating data from both ungrammatical (including bare nouns) and grammatical control (no bare nouns) conditions were fitted with a cumulative link mixed effects model using the `ordinal::clmm()` function in R (Christensen 2019; R Core Team 2019) with condition (grammatical, ungrammatical), group (L2 learner, native speaker), and their interaction as fixed effects, and random intercepts by participant and by item. The ungrammatical condition and the L2 learner group were coded as the baseline level of each factor. We compared the fit of this model to that of the null, intercept-only model using the likelihood-ratio test. The Wald test was used to test for the significance of fixed effects, and the Tukey HSD test was used to test for significant differences between conditions using the `emmeans::emmeans()` function in R (Lenth 2020) at an alpha level of .05.

Next, to test our main predictions (described in Section 3.2), rating data from L2 learners on ungrammatical conditions only were fitted with a cumulative link mixed effects model using the same function in R and the same random intercepts described above, but with fixed effects of syntactic position (subject, object), discourse context (ANA-D, PAS-I, DRI-I), and their interactions. Subject position and the ANA-D context were coded as the baseline level of each factor. Again, the fit of this model was compared to that of the null, intercept-only model using the likelihood-ratio test, and the significance of fixed effects and differences between conditions were tested using the same methods described above.

4. Results

4.1. Overall acceptability of bare nouns

As seen in Figure 1, although the L2 learners did rate the ungrammatical stimuli ($M = 4.78$, $SD = 1.41$) as less acceptable than the grammatical stimuli ($M = 4.92$, $SD = 1.46$), this difference was much smaller than that seen in the native speakers ($M_{ungram} = 2.15$, $SD_{ungram} = 1.41$; $M_{gram} = 5.14$, $SD_{gram} = 1.13$). Moreover, unlike the native speakers, the L2 learners rated ungrammatical stimuli far above the midpoint of the scale (3.5).

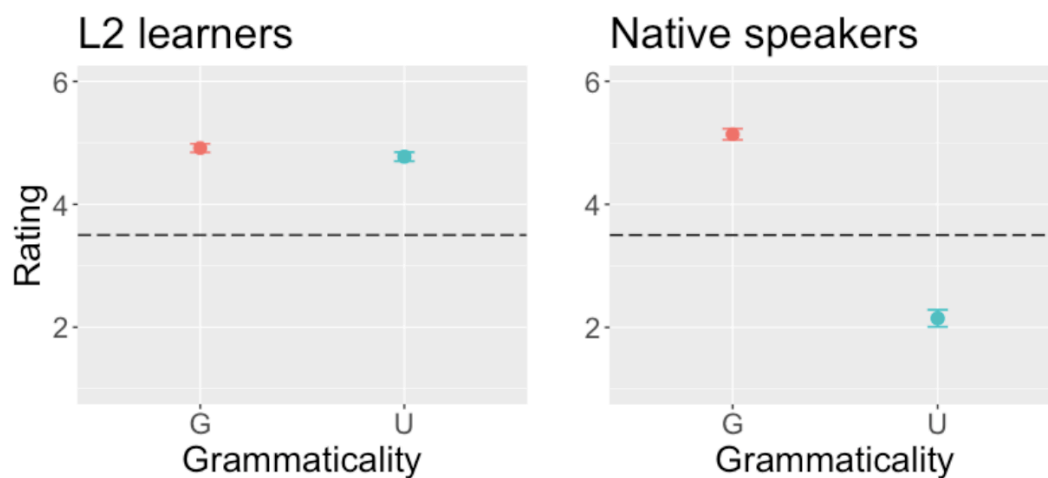


Figure 1. Mean acceptability ratings by grammaticality among L2 learners and native speakers with 95% confidence interval error bars. The dotted black line represents the midpoint of the acceptability scale.

The cumulative link mixed effects model described in Section 3.3 was a significantly better fit to the data than the null, intercept-only model ($\chi^2(3) = 210.96$, $p < .001$). As seen in Table 2, the

main effect of grammaticality was not significant, but the main effect of group and the interaction between grammaticality and group were significant.

	Estimate	Std. Error	z-value	p-value
Condition (Gram)	0.24	0.13	1.75	.08
Group (Native)	-3.48	0.32	-11.03	< .001
Condition:Group	3.59	0.23	15.62	< .001

Table 2. Cumulative link mixed effects model fit to rating data by L2 learners and native speakers on ungrammatical and grammatical stimuli.

Post hoc tests revealed that native speakers' ratings of ungrammatical stimuli were significantly lower than their ratings of grammatical stimuli ($p < .001$), and significantly lower than L2 learners' ratings of both ungrammatical stimuli ($p < .001$) and grammatical stimuli ($p < .001$). L2 learners' ratings of ungrammatical stimuli did not significantly differ from their ratings of grammatical stimuli ($p = .24$). Based on these results, we conclude that the L2 learners generally accepted bare NPs as grammatical in English, unlike the native speakers.

4.2. Acceptability of bare nouns by discourse context and syntactic position

Next we test our main predictions by examining the acceptability of bare NPs by context and syntactic position. As seen in Figure 2, bare subjects in the ANA-D context ($M = 5.08$, $SD = 1.31$) were rated higher than those in the PAS-I context ($M = 4.23$, $SD = 1.67$) and the DRI-I context ($M = 4.57$, $SD = 1.50$). Moreover, bare subjects in the DRI-I context were rated higher than those in the PAS-I context. For bare objects, no clear differences were found between the

three contexts ($M_{ANA-D} = 4.90$, $SD_{ANA-D} = 1.38$; $M_{PAS-I} = 5.02$, $SD_{PAS-I} = 1.34$; $M_{DRI-I} = 4.85$, $SD_{DRI-I} = 1.38$).

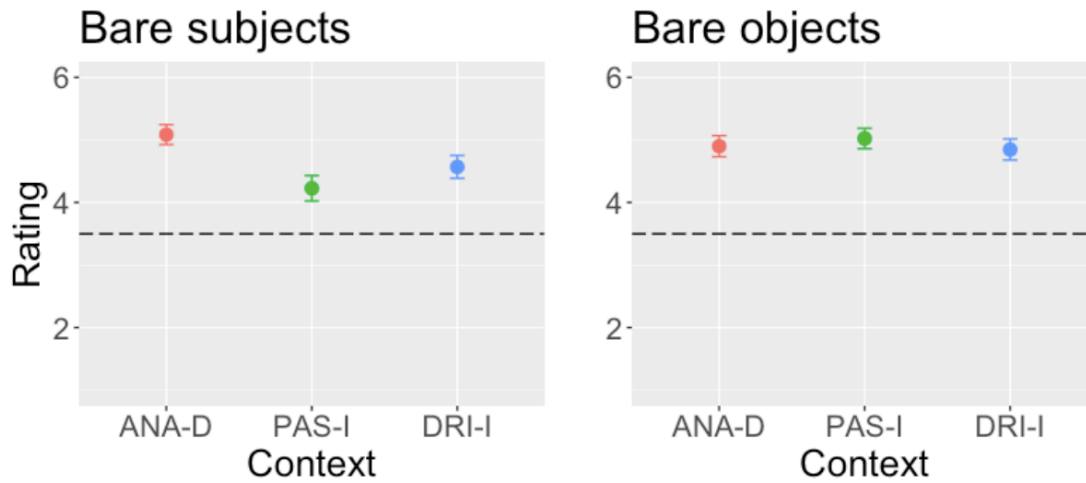


Figure 2. Mean acceptability ratings by discourse context and syntactic position among L2 learners with 95% confidence interval error bars. The dotted black line represents the midpoint of the acceptability scale.

The cumulative link mixed effects model described in Section 3.3 was a significantly better fit to the data than the null, intercept-only model ($\chi^2(5) = 18.46$, $p < .01$). As seen in Table 3, there were significant main effects of context (PAS-I and DRI-I, compared to ANA-D), and a significant interaction between position and context (PAS-I). There was no significant main effect of position or significant interaction between position and context (DRI-I).

	Estimate	Std. Error	z-value	p-value
Position (Object)	-0.34	0.30	-1.13	.26
Context (PAS-I)	-1.28	0.30	-4.23	< .001
Context (DRI-)	-0.88	0.30	-2.92	< .01
Position (Object):Context (PAS-I)	1.47	0.42	3.45	< .001
Position (Object):Context (DRI-I)	0.77	0.43	1.80	.07

Table 3. Cumulative link mixed effects model fit to rating data by L2 learners on ungrammatical stimuli.

Post hoc tests revealed that bare subjects were rated significantly higher in the ANA-D context than the PAS-I context ($p < .001$) and the DRI-I context ($p = .04$). In the PAS-I context, bare subjects were rated significantly lower than bare objects ($p < .01$). Bare subjects in the PAS-I context were also rated significantly lower than bare objects in the ANA-D context ($p = .02$). No other pairwise comparisons revealed significant differences.

5. Discussion

To summarize our main findings:

- (i) Bare subjects were significantly more acceptable in the definite context (ANA-D) than in the two indefinite contexts (PAS-I and DRI-I);
- (ii) Bare objects were equivalently acceptable across all three contexts;
- (iii) Bare subjects and bare objects were equivalently acceptable in the definite context (ANA-D);

- (iv) Bare objects were significantly more acceptable than bare subjects in the PAS-I context; and
- (v) There was no significant difference between bare subjects and bare objects in the DRI-I context, although the interaction between position and context (DRI-I) seen in Table 3 suggests a tendency for the negative effect of the DRI-I context to be mitigated for bare objects. However, this interaction was not significant ($p = .07$).

Table 4 summarizes these findings in relation to our predictions. The greater acceptability of bare subjects in the definite context compared to the two indefinite contexts (the first row in Table 4) is consistent with our prediction that bare subjects would be interpreted as definite. Moreover, the equivalent acceptability of bare subjects and bare objects in the definite context (the first column in Table 4) is consistent with our prediction that bare objects would be interpreted as definite in anaphoric contexts.

The X with the single asterisk in Table 4 signifies that the difference in the acceptability of bare subjects between the ANA-D and DRI-I contexts was relatively small, and that the difference between bare subjects and bare objects in the DRI-I context was not significant. The weakness of these two effects arises from the relatively higher acceptability of bare subjects in the DRI-I context, which might be explained by the fact that the DRI-I context is a relatively weaker diagnostic of (in)definiteness than the other two contexts (see Section 1.3 and the references cited there).

	ANA-D	PAS-I	DRI-I
Bare subject	✓	✗	✗*
Bare object	✓	✓**	✓

Table 4. Summary of relative acceptability ratings in the six experimental conditions.

Check marks and Xs without asterisks indicate strong significant effects consistent with our predictions; one asterisk indicates a weaker effect consistent with our predictions; and two asterisks indicate a strong significant effect in the *opposite* direction of our predictions.

The equivalent acceptability of bare objects across all three contexts, and the significantly greater acceptability of bare objects compared to bare subjects in the PAS-I context, were inconsistent with our predictions. We see from the check mark with two asterisks in Table 4 that both of these unexpected findings can be understood as arising from the relatively high acceptability of bare objects in the PAS-I context. Recall that the UH predicted bare objects to be infelicitous in the PAS-I context, because pseudo-incorporation should have been blocked and bare objects should have been interpreted as definite in this indefinite context. In the following two subsections, we explore two possible explanations of this unexpected result, and propose follow-up experiments designed to test each of these possibilities.

5.1. Definiteness and the singular-plural distinction

The first possible explanation relates to the role of number distinction in the noun phrase. In introducing the partitive specificity diagnostic in Section 1.2, we focused on singular noun

phrases. However, moving to the plural form affects this diagnostic in significant ways. The plural version of (4) admits both indefinite *and definite* noun phrases:

- (14) a. *There are many cats in the house.*
b. *Some/The cats are scratching a couch.*

While both the indefinite and the definite are felicitous, there is a crucial difference in interpretation. The indefinite has an implicature that only a subset of the cats in the house are scratching the couch, while the definite conveys the information that all the cats are. That is, the plural definite has a maximality implicature.¹¹

Crucially, Mandarin is known not to make number distinctions in the noun phrase (Yang 2001; Jiang 2012, 2018; among many others). As such, our characterization of (7) (repeated below) as infelicitous holds only for the intended singular interpretation. It would be perfectly acceptable under the plural interpretation *The cats are scratching a couch*, referring to the totality of cats. It is possible, therefore, that bare objects in the PAS-I context were generally accepted because participants misanalyzed them as plural.

- (7) a. *Wuzi li you hen duo mao.*
house inside have very many cat
b. *#(Yi zhi) mao zai zhua yi ge shafa.*
(one CLF) cat PROG scratch one CLF couch

‘There are many cats in the house. A/#The cat (lit: cat) is scratching a couch.

A forthcoming picture-point experiment will test the possibility that the felicity of bare objects in the PAS-I context was maintained through the availability of a plural, maximal interpretation. In

¹¹ The maximality in the interpretation of plural definites is characterized as an implicature since it is not strictly required that every single cat be engaged in the activity, as would be required if the universal *every cat* were used instead. This phenomenon has been studied under the label of pragmatic slack (Brisson 1997, 2003; Lasersohn 1999; Schwarz 2013; among others).

this experiment, participants will be given sentences with a bare NP in either subject position or object position, and asked to choose between three pictures which represent three alternative interpretations of the bare NP. One picture will represent an indefinite singular interpretation, another will represent an indefinite plural interpretation, and the third will represent a definite plural, or maximal, interpretation. An example picture array for a stimulus with a bare object is displayed in Figure 3. If the UH is correct that bare objects tend to be interpreted as definite in this context, but felicity is maintained through a plural interpretation, the rightmost (definite plural) picture will be the most likely to be selected.¹²

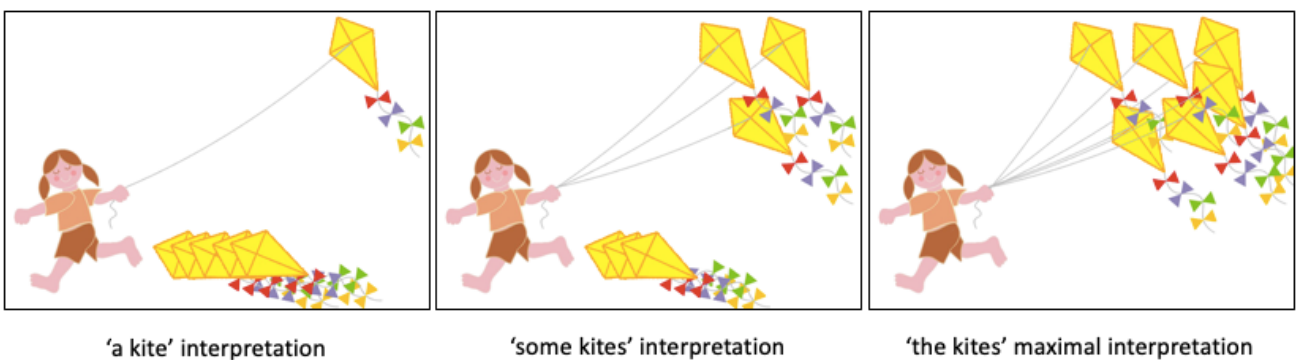


Figure 3. Example picture array from the forthcoming picture-point experiment for the stimulus sentence *The girl flew kite.*

If this hypothesis is supported, the question would remain why bare objects lend themselves to plural interpretations while bare subjects do not. One possibility is that in our stimuli, which used the present progressive tense on all verbs, the inflection on the copula encoded the fact that the

¹² A reviewer points out that asking participants to interpret sentences with ungrammatical bare singular nouns would be confusing for someone who already knows that English requires articles for singular nouns. Although the results reported in Section 4.1 demonstrate that our participants generally have *not* acquired this knowledge, for any participants who have, the viability of the task will be maintained by asking participants to “Select the picture that *best* matches the sentence, even if the sentence sounds odd, or none of the pictures match it very well.”

subject was singular, but did not do the same for the object. This extra information regarding the number of the subject might have been utilized by our participants to restrict the interpretation of the subjects to singular, while the objects remained open to either a singular or plural interpretation. Another possibility is that from a processing perspective, subject position is more prominent than direct object position, so participants were more likely to utilize information regarding the subject than the object in their selection of acceptability ratings. Forthcoming data from the picture-point experiment will help tease apart these potential explanations.

5.2. Definiteness and topicality

On the other hand, if our participants did interpret bare objects as singular in the PAS-I context, this would suggest, contra the UH, that the patterns we observed in the interpretation of bare nouns are not reflective of (in)definiteness, per se, but rather of topicality.¹³ Cross-linguistically, nouns in subject position tend to be more strongly associated with topicality than those in other syntactic positions. Mandarin, in particular, is known to be a topic prominent language where the first constituent, often the subject, functions as a topic (Li & Thompson 1976).¹⁴ Given that topicality is associated with definiteness, this could explain why bare subjects seemed to be interpreted as definite by our participants, while bare objects apparently admitted both definite and indefinite interpretations.

A follow-up acceptability judgment task will test this possibility by teasing apart syntactic position from topicality. The design of this experiment will be nearly identical to the

¹³ Two classic references on the issue of topics are Li & Thompson (1976) and Reinhart (1981).

¹⁴ Yang (2001) has argued that Mandarin subject bare NPs can be interpreted as indefinite when they are preceded by another expression; see the final paragraph in this subsection.

experiment reported here, except that we will include bare nouns in two positions that were not included in the first experiment: indirect object position (e.g. *The boy is giving girl a gift*), and subject position but preceded by an explicit topic (e.g. *Outside, boy is kicking a ball*). Indirect objects are not canonically associated with topicality. Therefore, if the acceptability of bare nouns in indirect object position tends to pattern with that of bare subjects, this would suggest that the results we have seen so far are driven by the semantic definiteness of bare NPs (as posited by the UH), rather than by discourse topicality. On the other hand, if bare indirect objects tend to pattern with bare direct objects, this would suggest that the pattern in the acceptability of bare subjects is driven by the topicality of this syntactic position, rather than by the semantics of NPs more generally.

The second condition designed to distinguish topicality from syntactic position will focus on the subject itself. Yang (2001) argues that appearances notwithstanding, Mandarin bare nominals in subject position are not necessarily definite. Following Li and Thompson (1976), she treats Mandarin as a topic prominent language, where the first constituent functions as a topic. She relates the perceived definiteness of subjects to topicality and provides the following minimal pair as evidence:¹⁵

¹⁵ This is in keeping with the parallel drawn between English bare plurals and Mandarin bare nominals which are unmarked for number (see footnotes 4 and 6).

(15) a. *gou zai-jiao*

dog be-barking

‘*A dog/*Dogs/The dog/The dogs are barking’

[_{TOPIC} dog_i [_{TP} t_i [_{VP} is barking]]]

b. *waimian/yuanchou gou zai-jiao*

outside/far away dog be-barking

‘Dogs/A dog/The dog/The dogs are barking outside’

[_{TOPIC} outside [_{TP} dog [_{VP} is barking]]] (Yang 2001:32)

As (15) indicates, the indefinite reading of subject bare NPs peeks out if another expression functions as a topic. Given this fact, it would also be revealing to see if the bias towards definiteness for subjects shifts in the L2 grammar for English sentences with explicit topics in first position.

6. Conclusion

We examined the interpretation of ungrammatical bare NPs in L2 English by intermediate learners from an L1 Mandarin background. Our objective was to test the extension of the unambiguity hypothesis (UH), which proposes that bare NPs in article-less languages are semantically definite, to L2 acquisition, under the assumption that L1 patterns would guide this process. To our knowledge, the experiment reported here constitutes the first study of the *comprehension*, rather than *production*, of ungrammatical bare NPs in L2 English by L1 speakers of an article-less language. Moreover, although there is evidence for asymmetries in the

distribution of L2 English bare NPs (see Section 2.2), this study is the first to attempt to explain these asymmetries in terms of the semantics of NP (in)definiteness in the L1.

We contrasted the UH to the AH, which posits ambiguity in the (in)definiteness of bare nouns. Under the AH we would expect a random distribution of bare noun acceptability, irrespective of discourse context or syntactic position. The results of our study were clearly not consistent with the AH because the acceptability of ungrammatical English bare NPs was not equivalent across discourse contexts and syntactic positions. Rather, ungrammatical bare NPs in subject position were more acceptable when they occurred in contexts that required definites, following the pattern found in article-less languages, while bare objects received equivalent acceptability ratings across discourse contexts.

Although our results clearly demonstrate the presence of unambiguity in bare NP interpretation, they do not constitute unequivocal support for the UH as formulated above. Specifically, the prediction from the UH that bare objects in the PAS-I context would be relatively unacceptable, as would be expected for definite NPs, was not borne out. Although the relatively high acceptability of bare objects in this context could be explained as the result of ambiguity in the interpretation of number (Section 5.1), it is also possible that bare objects failed to demonstrate evidence for a definite interpretation because, unlike bare subjects, they lack a canonical association with topicality (Section 5.2). The follow-up experiments described in those sections will allow us to refine our understanding of the structure and limits of unambiguity in bare NP interpretation.

Importantly, our results demonstrate that factors like discourse context and syntactic position have predictable effects, not only on the use of bare NPs in L2 English, as already seen in the omission data of the production studies cited in Section 2.2, but also on the interpretation,

and therefore the comprehension, of L2 bare nouns. Taken together, this set of results points to a distinct systematicity in L2 “errors” in the semantic domain, much like that already uncovered in the syntactic domain.

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