That's the Meaning: Interpretation of Definite and Demonstrative Descriptions in L2-English

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1. Introduction

There has been much research in recent years on the second language (L2) acquisition of English articles by speakers of article-less first languages (L1s), such as Korean, Russian, or Chinese (see, among many others, Thomas, 1989; Murphy, 1997; Ionin, Ko, & Wexler, 2004; Trenkic, 2008; Ko, Ionin, & Wexler 2010; and the papers in García-Mayo & Hawkins, 2009). It is well-known that such learners make many errors in their production of English articles, including errors of both article omission and article misuse. In contrast, relatively little is known about how L2-English learners *interpret* English articles in comprehension. The present study focuses on whether L2-English learners assign the same semantic representation to definite expressions as do native English speakers (in particular, whether they can distinguish definites from demonstratives), and whether learners' production and comprehension of determiners are influenced by the same semantic factors.

1.1. Background: article semantics in second language acquisition

In prior research (Ionin et al. 2004, Ko et al. 2010), we investigated the semantics that L2-English learners from article-less L1s assign to the English articles *the* and *a*. The target semantics of *the* and *a* (based on Heim, 1991) are given in (1a) and (1b), respectively. In prior work, we found that L2-English learners overuse *the* in place of *a*, in a non-random manner: in Ko et al. (2010), we found that overuse of *the* was significantly greater with presuppositional than with non-presuppositional indefinites. The semantics of presuppositionality, from Ko et al. (2010) (based on Heim, 1991), is given in (1c).[1]

(1) a. <u>Definiteness</u>: A sentence of the form [def A] B presupposes that there exists at least one individual which is A and that there exists at most one individual which is A, and asserts that the unique individual which is A is also B.

b. <u>Indefiniteness</u>: A sentence of the form [indef A] B asserts there exists at least one individual which is both A and B.

c. <u>Presuppositionality</u>: A sentence of the form [pres A] B presupposes that there exists at least one individual which is A, and asserts that there exists at least one individual which is both A and B.

As an illustration of the concepts in (1), consider first a sentence with a singular NP, such as *I saw the/a dog*. For a native English speaker, *the dog* has the semantics of definiteness (1a), so it can be felicitously uttered only if a unique, salient dog is presupposed to exist, as in (2a). The singular NP *the dog* is not felicitous if multiple dogs are presupposed to exist, as in (2b) (or if no dogs are presupposed

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[1]   In our earlier work (Ionin et al., 2004), we also found overuse of *the* with specific indefinites (but not with non-specific indefinites), where *specificity* was defined as *speaker intent to refer*. The tasks used in the present study did not test for specificity, so we leave this issue aside.

to exist). In contrast, *a dog* carries no presuppositions, per the semantics of indefiniteness in (1b), so it can be felicitously used even if multiple dogs are presupposed to exist, as in (2b).

On the hypothesis of Ko et al. (2010), L2-English learners from an article-less L1 optionally allow *the dog* to have the semantics of presuppositionality in (1c), essentially treating *the dog* as equivalent to *one of the dogs*. This hypothesis was supported by the fact that in contexts similar to that in (2b), L1-Korean L2-English learners overused *the* to refer back to one member of a previously mentioned set (in contrast, learners did not overuse *the*, but correctly used *a*, in non-presuppositional indefinite contexts, where no set was previously mentioned). At the same time, the learners accurately supplied *the* in anaphoric contexts where *the* is grammatical, such as (2a). Ko et al. argued that the learners fluctuated between two different analyses of *the*: treating *the* as a marker of definiteness vs. as a marker of presuppositionality. The same pattern of behavior was also found for L2-English learners from other article-less L1s, including Serbo-Croatian (Ko, Perovic, Ionin, & Wexler, 2008).

(2) a. The pet shop had one dog and one cat. I bought <u>the dog</u>.
    b. The pet shop had three dogs and three cats. I bought <u>a/#the dog</u>.

Consider next how the concepts in (1) apply to plural NPs. With plurals, uniqueness translates to maximality, so that *the dogs* denotes the maximal set of dogs presupposed to exist in the discourse (see Heim, 1991, for more discussion of how to implement the relationship between uniqueness and maximality). Thus, in (3a), *the dogs* must denote the entire set of previously mentioned dogs (i.e., all five of them). In contrast, the indefinite *some dogs* can denote a plural subset of the previously mentioned set, namely two, three, or four dogs (in principle, *some dogs* could also denote all five dogs, but this reading is ruled out by the pragmatic implicature that *some* means *not all* – Grice 1975, and much subsequent literature). On Ko et al.'s proposal, if learners assign the semantics of presuppositionality to *the*, they should treat *the dogs* as denoting a subset of the previously mentioned dogs, essentially using *the dogs* to mean *some (or possibly all) of the dogs*.

(3) a. The pet shop had five dogs and three cats. I bought <u>the dogs</u>. [=all 5 dogs]
    b. The pet shop had five dogs and three cats. I bought <u>some dogs</u>. [=2, 3 or 4 dogs]

On Ko et al.'s analysis, the source of L2-learners' misanalysis of *the* as presuppositional is access to semantic universals. Presuppositionality is a real semantic concept, which has been argued to play a role in natural language semantics (Diesing, 1992; von Fintel, 1998), as well as in child language acquisition (Wexler, 2011, reinterpreting the data in Maratsos, 1976). Building on Ionin et al. (2004), Ko et al. (2010) argued that L2-English learners from article-less L1s fluctuate between different possible semantic analyses of English articles: definiteness, specificity, and presuppositionality.

1.2. *Definites vs. demonstratives*

In the present paper, we consider another possible analysis that learners might give to English definite articles: namely, that of demonstratives. Article-less languages like Korean, Chinese and Russian have demonstrative expressions, and it is possible that, as an initial hypothesis, L2-English learners treat definite descriptions as equivalent to demonstrative descriptions (e.g., interpreting *the dog* as equivalent to *that dog*). This hypothesis would be consistent with many (though not all) uses of definite in anaphoric contexts, as shown in (4). The semantics of definites vs. demonstratives has not, however, received much attention in prior studies of L2-acquisition of article semantics.

(4) I saw a dog. <u>The/that dog</u> was barking.

In the present paper, we adopt the semantic proposal of Wolter (2006) (see also related earlier proposals by King, 2001, and Roberts, 2002), on which definites and demonstratives have very similar semantics, in that both denote uniqueness/maximality, as in (1a). The difference is in the domain relative to which uniqueness/maximality is computed, as stated in (5). On Wolter's analysis, both *the dog* and *that dog* denote the unique x, such that x is a dog in situation s; for *the dog*, uniqueness is

defined relative to the default situation, whereas for *that dog*, uniqueness is defined relative to a non-default situation parameter. Combining Wolter's semantic proposal with the semantics of uniqueness adopted in (1a), we have the semantic entries in (6a) and (6b), respectively, for definite and demonstrative expressions. Wolter's definition of a 'default situation' is given in (6c); for all the cases we consider, the default situation is equivalent to the discourse situation.

(5) Descriptive generalization (Wolter, 2006, p. 76):
    a. Definite descriptions refer uniquely relative to the situation corresponding to the discourse context. (=default situation)
    b. Demonstrative descriptions refer uniquely relative to a salient situation distinct from the discourse context. (=non-default situation)

(6) a. A sentence of the form [the$_n$ A] B presupposes that there exists a unique individual which is A in s_n and asserts that the unique individual which is A is also B in s_n.
    b. A sentence of the form [that$_n$ A] B presupposes that there exists a unique individual which is A in s_n, **where s_n is non-default**, and asserts that the unique individual which is A is also B in s_n.
    c. "A default situation is the situation relative to which the main predicate is interpreted: Given a sentence A, a situation variable s is a default situation just in case it is bound in A. Otherwise s is a non-default situation." (Wolter, 2006, p. 63)

Wolter's proposal has a number of empirical consequences. Consider first definite and demonstrative descriptions on their deictic uses, as in (7a) (from Wolter 2006). Here, the default situation (the discourse context) is the art gallery, which contains multiple paintings; uniqueness is not satisfied in the default situation, so, per (6a), use of *the* is infelicitous. On the other hand, the non-default situation made salient by the pointing gesture contains only one painting; therefore, per (6b), use of a demonstrative is felicitous.[2] Consider next anaphoric uses of definite and demonstrative descriptions, as in (7b) (from Roberts, 2002; cited in Wolter, 2006). Here, the default situation (the discourse context) contains two women, so once again, use of *the* is infelicitous. The non-default, immediately salient situation – made salient by recency of mention – contains just one woman, and use of a demonstrative is therefore felicitous (note that *this/that woman* in (7b) must denote the woman who entered from stage right, that is, the one most recently mentioned).

(7) a. In an art gallery [speaker points at a painting]:
    <u>That/this/#the painting</u> is beautiful.
    b. A woman entered from stage left. Another woman entered from stage right.
    <u>This/that/#the woman</u> was carrying a basket of flowers.

Wolter's proposal also has consequences for the use of definite vs. demonstrative determiners with semantically unique descriptions, as in *the/#that mother of John*, and *the/#that tallest person in the room*. Wolter explains the infelicitousness of demonstrative descriptions in such contexts in terms of markedness: demonstrative descriptions are inherently more marked than definite descriptions, and are used to signal that uniqueness is being established in a non-default situation. With semantically unique descriptions, definite descriptions are automatically felicitous because uniqueness is satisfied in the default situation (relative to the world of context); there is no reason to use the more marked demonstrative description (but see Wolter, 2006, on cases where demonstratives *can* be used with semantically unique descriptions, as in *that mother of John*, to signal emotive uses).

Finally, we note that there are many contexts where both *the* and *that* are possible, because the discourse situation coincides with the immediately salient situation – (4) above is a case in point. There are also many contexts in which the discourse situation – relative to which uniqueness is

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[2] The examples in this section contain both *that* and *this*. See Wolter (2006) on the different conditions for use of the two demonstratives. In our study, we examine interpretation of *that* only.

computed for *the* – can be established in multiple ways. Consider (8) as an illustration.[3] In the case of *that/those*, uniqueness/maximality must be established relative to the immediately salient situation, which contains just the unique dog wagging its tail in (8a), and just the two dogs wagging their tails in (8b). The demonstrative expression *that dog / those dogs* unambiguously refers just to the tail-wagging dog(s). In the case of the definite expression *the dog(s)*, uniqueness/maximality is established relatively to the discourse situation, but what the discourse situation is depends on how far back in the discourse the speaker chooses to go. One possibility is to treat the discourse situation as the entire paragraph in (8a) or (8b). In that case, the discourse situation contains all four dogs; in the case of a singular definite, *the dog* in (8a), uniqueness cannot be established, and (8a) should be a case of presupposition failure (similarly to (2b)). In the case of a plural definite, *the dogs* in (8b), the maximal referent is the entire group of four dogs: (8b) then asserts that all four dogs suddenly started barking.

However, it is also possible that the speaker treats the discourse situation as defined by the second sentence of the paragraph: in that case, the discourse situation becomes identical to the immediately salient situation, and contains just the tail-wagging dog(s). In that case, *the dog* in (8a) will denote the unique dog which is wagging its tail, while *the dogs* in (8b) will denote the two dogs who are wagging their tails, rather than all four dogs.

(8) a. I saw four dogs outside. One of the dogs ran up to me and started wagging its tail. Then <u>the/that dog</u> suddenly started barking.
   b. I saw four dogs outside. Two of the dogs ran up to me and started wagging their tails. Then <u>the/those dogs</u> suddenly started barking.

Intuition suggests that, used with a definite, (8a) is perfectly felicitous, with *the dog* denoting the tail-wagging dog, and that (8b) is also felicitous, as well as ambiguous: *the dogs* might refer back to the two tail-wagging dogs, or to all four dogs. As will be discussed below, this intuition is supported by our experimental findings with native English speakers. Thus, there appears to be more flexibility in how uniqueness/maximality is computed for definite (it depends on what is considered as the discourse situation for any given context) than in how uniqueness/maximality is computed for demonstratives (where the immediately salient situation is obligatorily chosen).

We next turn to Korean, the native language of the learners in our study. Korean lacks definite determiners, but has demonstratives. Demonstrative descriptions in Korean behave like those in English, in terms of establishing uniqueness in the immediately salient situation rather than the discourse situation, as shown in (9). Korean has three demonstrative determiners: *i* 'this', *ce* 'that over there' and *ku* 'that' (close to hearer or known to both speaker and hearer), see Sohn (1999, p. 210). All three behave like English *this/that* in deictic environments (compare (9a) to (7a)); while *ce* can only be used deictically, *ku* and *I* can also be used anaphorically, and once again, they behave like English demonstratives (compare (9b) to (7b)). In Korean translations of English texts, including in instructional materials, both *the* and *that*, when used anaphorically, are translated as *ku* (see also Cho, 1999 for more discussion of *ku*, and evidence that it is freely used in anaphoric contexts). Thus, both input and instruction may lead L1-Korean L2-English learners to (at least initially) equate both *the* and *that* with the demonstrative *ku*. Therefore, we hypothesize that L1-Korean L2-English learners might (initially) misinterpret English definite as demonstratives.

(9) a. In an art gallery [Speaker points at a painting]:
   i/ce/ku   kulim-i   alumtapta
   this/that/that   picture-nom   beautiful
   'This/that painting is beautiful.'
   b. [A woman entered from stage left. Another woman entered from stage right]
   ku/i   yeca-nun   kkoch   pakwuni-lul   tulko   issessta.
   that/this woman-top   flower   basket-acc   carry-comp   was
   'That/this woman was carrying a basket of flowers.'

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[3]   Examples such as (8) are not discussed in Wolter (2006), and the surrounding discussion corresponds to our interpretation of Wolter's proposal. We are grateful to Lynsey Wolter (p.c.) for discussion.

2. The study

The present study was designed to examine L2-English learners' interpretation of definite descriptions in comprehension, addressing the research questions in (10).

(10)   a.   How do L1-Korean L2-English learners interpret definite descriptions in comprehension?
Do they treat *the* as marking uniqueness/maximality relative to the discourse context (target analysis)?
Or Do they treat *the* as marking uniqueness/maximality relative to a non-default context (treating definites as demonstratives, due to L1-transfer)?
Or Do they treat *the* as marking presuppositionality (as has been found for production)?

          b.   Is L1-Korean L2-English learners' analysis of definites the same in production as in comprehension?

2.1. Participants and tasks

The participants in this study were 33 L1-Korean L2-English learners, all students at a U.S. university [age (in years): M=27.2 (range: 20-42); age of U.S. arrival (in years): M=25.4 (range: 18-42); length of residence (in months): M=22.2 (range: 1-96)]. Seven native English controls, students at the same university, were included for comparison. All participants took three tasks, in the following order: a picture-based comprehension task; a proficiency cloze test; and a forced-choice elicited production task. The comprehension task, which required participants to draw objects, was administered using paper and pencil. The other two tasks, as well as a language background questionnaire, were administered via a web-based survey tool.

The proficiency test was a multiple-choice cloze test with a maximum score of 40; the same test was used in several recent studies, including Ionin and Montrul (2010), who found it to be highly reliable. On the basis of performance on the cloze test, we divided the L2-learners into two levels: 17 learners with advanced proficiency (mean cloze test score of 33.3, range 31 to 36) and 16 learners with intermediate proficiency (mean cloze test score of 26.5, range 26 to 30). The native English speakers performed at ceiling (mean cloze test score of 38.3, range 37 to 40).

Although the comprehension task was administered before the production task, we report on the production task first. The production task is a close replication of the one used by Ko et al. (2010), and provides a baseline which ensures that the learners in this study are comparable to those in Ko et al., in terms of distinguishing definites and indefinites, as well as being affected by presuppositionality.

2.2. Forced-choice elicited production task: format and results

The forced-choice elicited production task used the same format as the task in Ko et al. (2010). Participants read a series of dialogues and filled in the blank in one of the last sentences in each dialogue with *the, a,* or -- (no article). The task had 36 items, divided into nine categories of four items each. We focus on five of the categories: four categories testing singular indefinites (target: *a*), and one category testing singular definites (target: *the*). The other four categories, whose focus was on generic vs. specific readings of plural and mass NPs, are not directly relevant and will not be discussed.

The four categories of indefinite items crossed presuppositionality and context (extensional vs. intensional); the 16 items in these categories were taken directly from Ko et al. (2010). The examples in (11a-d) illustrate the four categories; for reasons of space, we report a condensed version of the contexts, see Ko et al. for the full version. The two presuppositional indefinite contexts (11a-b) set up a salient set (of puppies, in this case) through prior mention, and then use the singular NP to refer back to a member of this set; L2-English learners are predicted to overuse *the* in place of *a* in these contexts.

In the two non-presuppositional indefinite contexts (11c-d), there is no previous mention of the relevant set, and learners are expected to be accurate at supplying *a* with the target NP. In (11b, d), the target NP occurs in the scope of an intensional operator such as *want*, whereas in (11a, c), the target sentence does not contain any intensional operators. Ko et al. (2010) found that presuppositionality was connected to overuse of *the* in both extensional and intensional contexts, although the effect of presuppositionality was somewhat larger in intensional contexts. The distinction between extensional and intensional contexts is not directly relevant for our study.

Finally, (11e) provides an example of a definite anaphoric context, where uniqueness is established and the target NP is definite; this category was included as a control, to ensure that learners would correctly use *the* when the conditions on definiteness are satisfied.

(11)   a.   <u>indefinite presuppositional extensional context</u>: This pet shop had five puppies and seven kittens … finally, he got (a, the --) puppy.
       b.   <u>indefinite presuppositional intensional context</u>: Amy knows that this pet shop has five puppies and six kittens … she definitely wants to buy (a, the, --) puppy.
       c.   <u>indefinite non-presuppositional extensional context</u>: [no prior mention of kittens]… then he was walking home, and he found (a, the --) kitten in the street.
       d.   <u>indefinite non-presuppositional intensional context</u>: [no prior mention of pets]… My mother decided to get me (a, the --) pet!
       e.   <u>definite anaphoric context</u>: I went to a bookstore yesterday and bought two magazines and an interesting new book… I read (a, the, --) book all night.

The results of the production task are reported in Table 1. The native speakers performed as expected, supplying *the* in the definite context (11e), and *a* in the four indefinite contexts (11a-d). In contrast, both groups of L2-English learners overused *the* in the presuppositional indefinite contexts more than in the non-presuppositional indefinite contexts, and this difference was particularly pronounced for intermediate L2-learners. At the same time, both groups of learners used *the* more in the definite context (11e) than in any of the four indefinite contexts.

Table 1
Production task results: mean % of choice of 'the', 'a', and -- ('null'), by category

Context	Natives speakers (N=7)	Advanced L2-learners (N=17)	Intermediate L2-learners (N=16)
(11a) presuppositional, extensional	**7% the** 93% a	**21% the** 79% a	**42% the** 58% a
(11b) presuppositional, intensional	**7% the** 93% a	**21% the** 78% a, 1% null	**53% the** 42% a, 5% null
(11c) non-presuppositional, extensional	**4% the** 96% a	**9% the** 91% a	**14% the** 83% a, 3% null
(11d) non-presuppositional, intensional	100% a	**3% the** 96% a, 1% null	**11% the** 80% a, 9% null
(11e) definite anaphoric	**93% the** 7% a	**87% the** 11% a, 3% null	**73% the** 23% a, 3% null

Following Ko et al. (2010), we conducted a repeated-measures ANOVA on L2-learners' performance on the four indefinite categories, with presuppositionality and context (extensional vs. intensional) as the two within-subjects variables, and proficiency level as the between-subjects

variable.[4] The dependent measure was the proportion of *the* overuse. There was a significant effect of proficiency level ($F(1,31)=8.0$, $p=.008$), due to the fact that the intermediate L2-learners overused *the* significantly more than the advanced L2-learners. There was a significant effect of presuppositionality ($F(1,31)=21.5$, $p<.001$), due to more overuse of *the* with presuppositional than with non-presuppositional indefinites. Presuppositionality interacted marginally with proficiency level ($F(1,31)=3.6$, $p=.066$), indicating that the effect of presuppositionality was bigger for the intermediate learners than for the advanced (but statistically significant for both). Context did not have a significant effect, and did not interact with proficiency level, but there was a significant interaction between presuppositionality and context ($F(1,31)=4.4$, $p=.044$): the presuppositionality effect was bigger in intensional than extensional contexts (but significant in both), just as found by Ko et al. (2010). There was no three-way interaction between proficiency, context and presuppositionality.

To sum up, the results of the production task replicate the findings of Ko et al. (2010): L1-Korean L2-English learners overuse *the* with presuppositional indefinites, especially at the lower proficiency levels. The results on the definite context suggest that learners do know that *the* must be used to mark uniqueness/maximality; however, performance on presuppositional indefinite contexts indicates that learners also optionally use *the* to mark presuppositionality without maximality.

2.3. Picture-based comprehension task: format and results

The picture-based comprehension task was loosely based on Modyanova and Wexler (2007), who used a similar format with child L1-learners, in an act-out task. In the picture-based comprehension task, the participants viewed pictures of objects (each picture consisted of eight objects, four of one type and four of another) and were asked to draw geometric shapes on the objects. Each item included three lines of text above the pictures: an introductory line naming all the objects and two command lines (line1 and line2) asking participants to draw geometric shapes upon some of the objects. Sample items (text only) are given in (12a-c) and (13a-c). Figures 1 and 2 display the items from (12b) and (13b), respectively, complete with pictures and sample participant responses.

The test instrument consisted of 32 items, arranged into a 16-page booklet with two items per page (plus a front page with instructions and example items). The 32 items were broken down into eight conditions, four items per condition, and were blocked and randomized for order of presentation. The objects and the geometric shapes were randomized across conditions. Here, we focus on six of the conditions, which crossed number (singular vs. plural) with NP type (demonstrative vs. definite vs. indefinite). The other two conditions were distracters.

2.3.1. Singular conditions: items and results

We first discuss the three singular conditions, illustrated in (12). The items in these conditions all had the same format: line1 asked participants to act upon "one X", where X stands for a lexical noun (e.g., 'one balloon' in (12a), 'one cup' in (12b), etc.); line2 then asked participants to act upon "that X" (12a) or "the X" (12b) or "a X" (12c), using the same lexical NP as line1.

(12)   a.   <u>Demonstrative singular condition:</u>
                Here are four balloons and four cups.
              1.   Please draw a triangle on one balloon.
   2.   Now, please draw an arrow below that balloon.

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[4]   The definite context (11e) was not included in the analysis, since it was set up differently from the four indefinite contexts, and had a different target article. The native speakers were not included in the statistical analysis, since the variability in the native speaker group was much lower than in the L2-groups; comparing the native speakers and the L2-learners directly would violate the assumptions of an ANOVA. A separate repeated-measures ANOVA on just the native speaker group did not find any significant effects.

b. <u>Definite singular condition:</u>
Here are four cups and four houses.
1. Please draw a circle around one cup.
2. Now, please draw an arrow above the cup.

c. <u>Indefinite singular condition:</u>
Here are four cars and four balloons.
1. Please draw a line below one car.
2. Now, please draw a star on a car.

In coding participants' responses, we looked first of all at whether they acted upon the right type of object: for example, on balloons, not cups, in response to both lines in (12a), on cups, not houses in response to both lines in (12b), and so on; we also looked at whether participants paid attention to number and acted upon only one object at a time, in response to both line1 and line2 in the singular condition (e.g., drawing circles around two or more cups in response to (12b) would be a number error). 100% of the items conformed to both criteria, there being no errors of either object type or number. We next scored each response to line2 as either 'same' or 'different', depending on whether the participant acted upon the same object in response to line2 as in response to line1. A sample 'same' response is shown in Figure 1a, where the participant drew both geometric shapes (a circle, line1 in (12b), and an arrow, line2 in (12b)), on the same cup. A sample 'different' response is shown in Figure 1b, where the participant drew one shape (a circle, line1) on one cup, and the other shape (an arrow, line2) on a different cup (a 'different' response always involved a different object of the right type – that is, a different cup in (12b), not a house).

Consider next the predicted responses for the definite and demonstrative singular conditions, in light of Wolter's proposal of definites and demonstratives. For native English speakers, both definite and demonstrative singular NPs must refer uniquely, picking out the unique referent of the relevant type in the situation. For demonstratives, the relevant situation is the non-default, immediately salient situation, made salient by the response to line1: for example, in (12a), the participant has drawn a triangle on one balloon in response to line1, and the non-default situation now contains just that balloon. Uniqueness is automatically satisfied, and the participant is expected to act upon the same balloon in response to line2 as in line1. Turning to definites, uniqueness is computed relative to the default (discourse) situation. In this case, there are potentially two ways of establishing the discourse situation: the participant may take the entire situation, which contains all eight objects in the picture, to be the discourse situation; or, the participant may take just the situation created in response to line1 (e.g., the situation containing just the circled cup for (12b)) as the discourse situation (this case is parallel to example (8a) discussed earlier). If the discourse situation is taken to contain all eight objects, there is no unique referent for *the cup*. The only way for a native English speaker to pick out a unique cup is to narrow the discourse situation to just the circled cup. Thus, the expected response to the definite singular condition is identical to that in the demonstrative singular condition: in both cases, native English speakers are expected to act upon the same object in response to line2 as in response to line1.
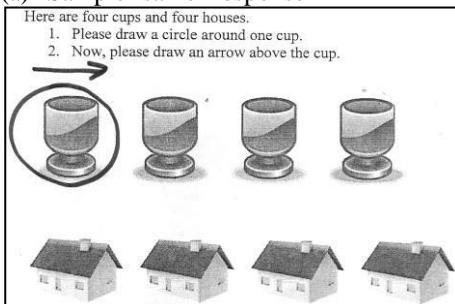
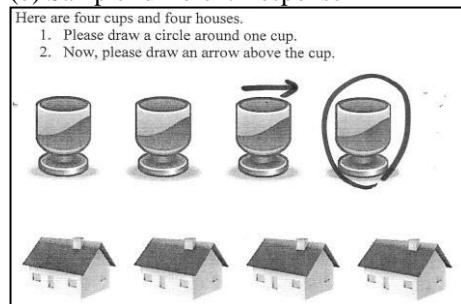(a) Sample 'same' response   (b) Sample 'different' response

Figure 1. Sample pictures for the definite singular condition, with sample responses (for item (12b)).

Consider next what might be expected from L2-English learners who have a non-target analysis of English definite. Suppose that learners give to definite descriptions the same analysis as to demonstrative descriptions, interpreting 'the cup' in (12b) as 'that cup', and computing uniqueness relative to the immediately salient situation; in this case, learners are expected to act upon the same cup in response to line2 as in response to line1, exactly like native English speakers. In the case of singulars, in this task, the definite and the demonstrative analysis of 'the' give the same result. In contrast, suppose that the learners treat definites as if they were presuppositional, assigning them the semantics of presuppositionality without uniqueness: in that case, 'the cup' for the learners would be equivalent to 'one of the cups', and they would be expected to act upon any of the four cups, at random. The chance of acting upon the same cup in response to line2 as in response to line1 would be 25%.

Table 2 summarizes the predicted responses to a singular definite NP (*the cup* in (12b)), depending on whether learners interpret *the cup* as definite (target analysis); as demonstrative (equivalent to *that cup*); or as presuppositional (equivalent to *one of the cups*). As shown in Table 2, the only analysis which predicts non-target-like performance is the presuppositional analysis of *the*. We assume that learners always have a target-like analysis of demonstratives, since demonstratives in English work just like those in Korean, and L1-transfer should lead learners to interpret 'that balloon' in (12a) in a target-like fashion.

Table 2
Predicted responses for the singular demonstrative and definite conditions

Analysis	Expected response for:	
	that balloon (12a)	*the cup* (12b)
that=demonstrative, the=definite (target)	SAME balloon	SAME cup
that=demonstrative, the=demonstrative	SAME balloon	SAME cup
that=demonstrative, the=presuppositional	SAME balloon	chance behavior: SAME cup: 25% DIFFERENT cup: 75%

Finally, we briefly consider what may happen with singular indefinites, such as *a car* in (12c); since indefinites do not presuppose uniqueness, there is no reason for native English speakers to act upon the same car in response to line2 as to line1; in principle, they may act upon any one of the four cars, at random. Chance performance would result in 25% of the responses to line2 being on the same object as in line1, and 75% of the responses to line2 being on one of the other three objects.[5] The indefinite condition is essentially a control condition, included to ensure that learners do not disregard the determiner form entirely: if learners disregard the form of the determiner, they should give a similar proportion of 'same' vs. 'different' responses in all three singular conditions. Our results indicate that learners do in fact pay attention to the form of the determiner.

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[5]   Another possibility is that native speakers would have a preference for acting on a different car in response to line2 than in response to line1 in (12c). In production, indefinites are not normally used with semantically unique descriptions: for example, it is infelicitous to say *a mother of John* or *a tallest person in the room*, or to use *a dog* on second mention of a previously mentioned dog. Heim (1991) suggests that speakers obey the 'Maximize Presupposition' principle, which dictates that the definite article *the* should be used whenever its presuppositions have been met. While it is not entirely clear how this principle would play out in comprehension, the following is a possibility: native English speakers, upon reading *a car* in (12c), might think that it should not denote the same car as the one they already acted upon, because if the 'narrator' who is giving the instructions intended them to act upon the same car, the narrator would have obeyed 'Maximize Presupposition' and directed them to act upon *the car*, or, alternatively, *that car*. The fact that the narrator has used an indefinite might be taken as an indication that the participants are intended to act upon a different car. By this reasoning, we would expect native English speakers to give a 'different' response nearly all the time, rather than 75% of the time, as expected by chance. Our results on indefinites indeed indicate that native English speakers, as well as advanced L2-English learners, are obeying 'Maximize Presupposition' in comprehension, and opting for a 'different' response to singular indefinites at above-chance levels; in contrast, intermediate learners perform at chance. For reasons of space, we do not discuss this finding in any detail, but leave it as a subject for future research.

The results for the three singular conditions are given in Table 3. These results show essentially identical performance between native speakers and L2-learners: both groups treat singular definite and demonstratives, but not singular indefinites, as denoting uniquely. The learners are clearly not adopting a presuppositional analysis of 'the': they don't act upon any cup at random, as would be expected on this analysis, but rather nearly always act upon the 'same' cup. The results in the singular conditions do not, however, allow us to tease apart the definite analysis from the demonstrative analysis: as shown in Table 2, both analyses predict action on the 'same' object. To tease these two analyses apart, we need to examine performance in the plural conditions, as discussed below.

Table 3
Performance in the singular conditions: mean % of 'same' vs. 'different' responses to line 2

Condition	demonstrative singular (12a)			**definite singular** (12b)			indefinite singular (12c)		
	NS	Adv	Intr	**NS**	**Adv**	**Intr**	NS	Adv	Intr
%SAME response	100%	100%	95%	**100%**	**94%**	**94%**	7%	7%	25%
%DIFFERENT response	--	--	5%	**--**	**6%**	**6%**	93%	93%	75%

Note. NS = native speaker; Adv = Advanced L2-learners; Intr = Intermediate L2-learners.

2.3.2. Plural conditions: items and results

We now turn to the three plural conditions, illustrated in (13). The items in these conditions all had the same format: line1 asked participants to act upon "two Xs", where X stands for a lexical noun (e.g., 'two balloons' in (13a), 'two books' in (13b), etc.); line2 then asked participants to act upon "those Xs" (13a) or "the Xs" (13b) or "some Xs" (13c), using the same lexical NP as line1.
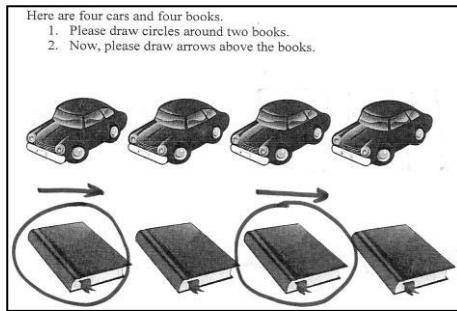
(13) a. Demonstrative plural condition:
Here are four pens and four balloons.
1. Please draw arrows above two balloons.
2. Now, please draw triangles on those balloons.

b. Definite plural condition:
Here are four cars and four books.
1. Please draw circles around two books.
2. Now, please draw arrows above the books.

c. Indefinite plural condition:
Here are four knives and four cars.
1. Please draw arrows below two cars.
2. Now, please draw stars on some cars.

In coding participants' responses, we looked first of all at whether they acted upon the right type of object: for example, on balloons, not pens, in response to both lines in (13a), on books, not cars, in response to both lines in (13b), and so on; we also looked at whether participants paid attention to number and acted upon exactly two objects in response to line1, and on two or more objects in response to line2, in accordance with the plural morphology (e.g., drawing an arrow above only one book in response to (13b) would be a number error). There were no errors with number, and only two errors with object type (0.2% of the data), which were discarded from further analysis.

We next scored each response to line2 as 'same', 'all' or 'different', depending on which objects were acted upon in response to line2. A 'same' response was one in which the participant acted upon exactly the same two objects in response to line2 as in response to line1; a sample 'same' response is shown in Figure 2a, where the participant drew both geometric shapes (circles, line1 in (13b), and arrows, line2 in (13b)), on the same two books. An 'all' response was one in which the participants

acted upon all four objects of the right type in response to line2; a sample 'all' response is given in Figure 2b, where the participants drew circles around two books in response to line1, but drew arrows above all four books in response to line2. A 'different' response (not pictured) would be any other kind of response to line2, as long as it involved two or three objects of the right type: for example, for (13b), a 'different' response would involve circles around two of the books, and any of the following: arrows above the two uncircled books; or, arrows above one of circled books and one of the uncircled books; or, arrows above one of the circled books and the two uncircled books; or, arrows above both circled books plus one of the uncircled books.

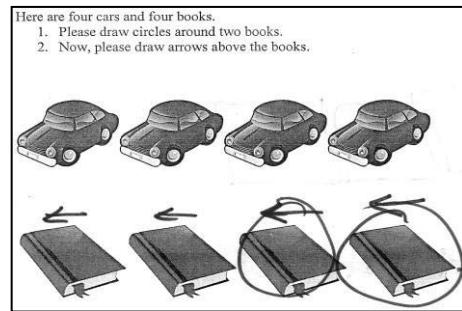(a) Sample 'same' response   (b) Sample 'all' response

Figure 2. Sample pictures for the definite plural condition, with sample responses (for item (13b)).

Consider next the predicted responses for the definite and demonstrative plural conditions, in light of Wolter's proposal. For native English speakers, both definite and demonstrative plural NPs must refer maximally, picking out the maximal referent of the relevant type in the situation. For demonstratives, the relevant situation is the immediately salient situation, made salient by the response to line1: for example, if, in response to (13a), the participant has drawn arrows above two balloons in response to line1, the non-default situation now contains just those two balloons. The maximal element in the immediately salient situation is therefore those two balloons, so the participant is expected to act upon the same two balloons in response to line2 as in line1. Turning to definites, maximality is computed relative to the default (discourse) situation. How the discourse situation is computed depends on how far back in the discourse the speaker goes (this case is parallel to example (8b), discussed earlier): the discourse situation may be taken to contain all eight objects in the picture, or alternatively, just the two objects (in the case of (13b), just the two books) previously acted upon. Depending on how the discourse situation is construed, the maximal referent in the discourse situation for (13b) is either all four books, or the two circled books. For plurals, unlike for singulars, the demonstrative and definite conditions are expected to elicit different responses from native English speakers – 'same' for demonstratives, but either 'all' or 'same' (pictured in Figure2) for definites.

Consider next what might be expected from L2-English learners who have a non-target analysis of English definite. Suppose that learners give to definite descriptions the same analysis as to demonstrative description, interpreting 'the books' in (13b) as if it were 'those books', and computing maximality relative to the immediately salient situation, which contains the two books with circles around them. If learners treat definites as demonstratives, they are expected to give the 'same' response to both definites and demonstratives, and not the 'all' response.

Suppose that the learners instead treat definites as if they were presuppositional, assigning them the semantics of presuppositionality without maximality: in that case, 'the books' for the learners would be equivalent to 'some or all of the books', and they would be expected to act upon any plurality of books in the picture – any two books, or any three books, or all four books – at random. Assuming equal probability of acting upon any plurality of books, learners have 11 options to choose from (six sets of two books each, four sets of three books each, one set of all four books), and the probability of acting upon the same two books in response to line2 as in response to line1 is therefore $1/11$ or 9%; the probability of acting upon all four books is also 9%; the probability of acting upon a different set of two or three books is 9/11, or 82%.

Table 4 summarizes the predicted responses to a plural definite NP (*the books* in (13b)), depending on whether learners interpret *the books* as definite (target analysis); as demonstrative (equivalent to *those books*); or as presuppositional (equivalent to *some or all of the books*). As shown in Table 4, both the demonstrative and the presuppositional analyses of *the* should lead to non-target-like performance, but to different patterns of performance. Again, we assume that L1-transfer leads to learners always having a target-like analysis of demonstratives.

Table 4
Predicted responses for the plural demonstrative and definite conditions

Analysis	Expected response for:	
	those balloons (13a)	*the books* (13b)
those=demonstrative, the=definite (target)	SAME two balloons	ALL four books or: SAME two books
those=demonstrative, the=demonstrative	SAME two balloons	SAME two books
those=demonstrative, the=presuppositional	SAME two balloons	chance behavior: SAME two books: 9% ALL four books: 9% DIFFERENT two/three books: 82%

Finally, we briefly consider what may happen with plural indefinites, such as *some cars* in (13c); since indefinites do not presuppose uniqueness, there is no reason for native English speakers to act upon the same two cars in response to line2 as to line1; in principle, they may act upon two or three cars, at random. Given that *some* implies *not all*, we do not expect participants to act upon all four cars in the plural indefinite condition; assuming equal probability of acting upon any two or three cars, the chance of acting upon the same two cars in response to line2 as in response to line1 is 10% (but see footnote 5). Once again, the indefinite condition is a control condition, included to ensure that learners do not disregard the determiner form entirely, and do not indiscriminately give the 'same' or 'all' response across all conditions.

The results for the three plural conditions are given in Table 5. These results show very different performance from learners vs. native speakers in the definite condition. Native speakers treat plural definites and plural demonstratives differently, giving only the 'same' response to demonstratives, and allowing both 'same' and 'all' responses, with an overwhelming preference for the 'all' response, in the case of definites. In contrast, L2-learners at both proficiency levels treat plural definite and demonstratives identically, opting for the 'same' response in both cases.

Table 5
Performance in the plural conditions: mean % of 'all', 'same', 'different' responses to line 2

Condition	demonstrative plural (13a)			**definite plural** (13b)			indefinite plural (13c)		
	NS	Adv	Intr	**NS**	**Adv**	**Intr**	NS	Adv	Intr
%ALL response	--	2%	5%	**82%**	**3%**	**--**	--	--	--
%SAME response	100%	97%	95%	**18%**	**97%**	**95%**	--	4%	6%
%DIFFERENT response	--	1%	--	**--**	**--**	**5%**	100%	96%	94%

Note. NS = native speaker; Adv = Advanced L2-learners; Intr = Intermediate L2-learners.

The learners do not adopt a presuppositional analysis of definites, as indicated by the overwhelming, near-ceiling preference for the 'same' response. The fact that learners pay attention to the determiner form is made clear by performance in the indefinite condition, where learners, like native speakers, overwhelmingly opt for a 'different' response (see also footnote 5).

3. Discussion
3.1. Summary of findings

To summarize our main findings, we have seen that native English speakers, but not L2-English learners, made a clear distinction between definites and demonstratives in the comprehension task. The performance of the native English speakers is fully consistent with Wolter's (2006) analysis of definites and demonstratives: the native speakers treat plural definites as denoting the maximal set in the discourse context (i.e., all four books, or cups, or balloons in the picture), and they treat plural demonstratives as denoting the maximal set in the immediate situation made salient by the previous action (i.e., the two books, or cups, or balloons just acted upon). The L1-Korean L2-English learners, in contrast, treat plural definites and demonstratives identically, opting for the maximal set in the immediately salient situation in both cases, and hence acting upon just the two objects previously acted upon, rather than all four objects. We note that learners' responses are not erroneous: learners are doing nearly all of the time what native speakers are doing 18% of the time, that is, they are choosing a response which is in principle available to native speakers. However, learners' preferences are clearly different from native speakers: while native speakers strongly prefer to interpret definites with respect to the entire discourse situation, learners overwhelmingly prefer to interpret definites with respect to the immediate discourse situation, identically to demonstratives. [6]

In the case of singular NPs, the definite and demonstrative analyses give the same result, since the only way to establish uniqueness is to restrict the domain to the object that was previously acted upon. Thus, although the learners performed in an apparently target-like manner with singular definites, this context does not allow us to tease apart the definite analysis from the demonstrative: it is possible that the learners were interpreting *the cup* as meaning *that cup* and still acting upon the appropriate object.

We now review our research questions in (10). The answer to (10a) is that, in comprehension, the learners interpret definite descriptions as demonstrative descriptions, treating *the* as a marker of uniqueness/maximality relative to a non-default context; they do not treat *the* as either marking uniqueness/maximality relative to the discourse context (the target analysis), or as marking presuppositionality without maximality. The answer to (10b) is that the learners' analysis of definites appears, at least on the surface, to be different in production vs. comprehension: in production, the learners often treated *the* as marking presuppositionality (overusing *the* with presuppositional indefinites), whereas this analysis was not adopted in comprehension. No such comprehension-production asymmetry has been attested for child L1-acquisition: young English-acquiring children have been found to overuse *the* with indefinites in a presuppositional environment (Maratsos 1976, interpreted by Wexler 2011), and they have also been found to interpret definites as presuppositional in an act-out comprehension task (Modyanova & Wexler, 2007). This L1/L2 difference provides further evidence that the L2-learners' demonstrative analysis is due to the influence of the L1 (as pointed out by an anonymous reviewer, the difference could, in principle, be traceable to the different ages of L1

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[6] An uninteresting alternative explanation of this finding would be that learners complete the task mechanically, trying to do as few actions as possible: drawing on two objects takes less time and effort than drawing on four objects, and that is why learners choose this response. Evidence against this alternative explanation comes from one of the distracter categories in the test, which used plural definites on first mention, as in (i): here, the only way to establish maximality for *the bananas* in line1, in either a default or a non-default context, is to act upon all four bananas (since no subset of the bananas has been made salient). Indeed, the learners were quite accurate here, acting upon all four objects 88% of the time (compared to 100% from native speakers). Thus, learners are quite willing to act upon multiple objects.

(i)   Here are four bananas and four houses.
        1. Please draw squares around the bananas.
        2. Now, please draw stars on three houses.

Another piece of evidence that learners are not trying to minimize effort comes from performance in the plural indefinite condition: here, an appropriate response is acting upon any two or three objects (not all four, since *some* implies *not all*). If learners are trying to minimize the amount of drawing, they should always act upon two objects in response to *some*; however, we find that learners in fact act upon three objects in 35% of their responses to the indefinite plural condition. Thus, it seems quite unlikely that learners' avoidance of the 'all' response in the definite plural condition results from unwillingness to do extra drawing.

vs. L2-learners; however, it is not clear how age alone could be responsible for the demonstrative analysis adopted by the L2-learners).

We believe that the surface asymmetry between L2 production and comprehension is actually a side effect of learners' demonstrative analysis of *the*, rather than an effect of task type; we turn to this next.

3.2. Competition between analyses

Consider again the five main categories under consideration. The three relevant categories from the production task are presuppositional indefinite (14a), non-presuppositional indefinite (14b), and definite (14c) (we are ignoring the differences between extensional and intensional indefinite contexts, since performance was similar across the two). The two relevant categories from the comprehension task are definite singular (14d) and definite plural (14e).

(14)   a.   <u>production task, non-presuppositional indefinite context</u> (11c,d): [no prior mention of kittens]… then he was walking home, and he found (a, the --) kitten in the street

        b.   <u>production task, presuppositional indefinite context</u> (11a,b): This pet shop had five puppies and seven kittens … finally, he got (a, the --) puppy.

        c.   <u>production task, definite anaphoric context</u> (11e): I went to a bookstore yesterday and bought two magazines and an interesting new book… I read (a, the, --) book all night.

        d.   <u>comprehension task, definite singular context</u> (12b)
            Here are four cups and four houses.
            1.   Please draw a circle around one cup.
            2.   Now, please draw an arrow above the cup.

        e.   <u>comprehension task, definite plural context</u> (13b)
            Here are four cars and four books.
            1.   Please draw circles around two books.
            2.   Now, please draw arrows above the books.

Consider next possible analyses that learners might assign to *the*: they might correctly treat *the* as marking uniqueness/maximality relative to the discourse context (the target, *definite* analysis); they might treat *the* as equivalent to *that/this/that/those*, marking uniqueness/maximality relative to the immediately salient context (the *demonstrative* analysis); or they might treat *the* as equivalent to *one/some of the*, marking presuppositionality without maximality (the *presuppositional* analysis). Let us consider how these analyses apply to the five contexts in (14). For the context in (14a), none of the three analyses (definite, demonstrative, or presuppositional) should lead to *the* use, since there is no individual kitten, and no set of kittens, which is presupposed to exist. In the presuppositional indefinite context (14b), if learners analyze *the* as either definite or as demonstrative, they should not use *the*: uniqueness is clearly not established in the context, with prior mention of five puppies and no way to restrict the domain to just one puppy. On the other hand, if learners analyze *the* as presuppositional, they should use *the* in (14b), since the conditions on presuppositionality have been met here: a set of five puppies is presupposed to exist.

Turning to the definite anaphoric context in (14c), here both the definite and the demonstrative analyses should result in use of *the*: in this context, uniqueness of a particular book is established both in the discourse context, and in the immediate situation (and indeed, *that* would be grammatical in this context). The presuppositional analysis also should lead to use of *the*, since a set of books is presupposed to exist (and furthermore happens to contain only one member). As shown in (1), definiteness (1a) entails presuppositionality (1c): if a set with exactly one member is presupposed to exist, it follows that a set with at least one member is presupposed to exist. Thus, whatever analysis of *the* learners adopt – definite, demonstrative, or presuppositional – they should correctly use *the* in the context in (14c).

Let us turn next to the context in (14d), the singular definite context from the comprehension task. As already discussed, both the definite and the demonstrative analyses of *the* should lead learners to

act upon the same cup in response to line2 as in response to line1; the presuppositional analysis, in contrast, should lead them to act upon any one of the four cups, at random. In the context in (14e), the plural definite case, only the demonstrative analyses of *the* should lead learners to consistently act upon the same two books in response to line2 as in response to line1. The definite analysis should lead them to act upon either all four books or the two 'same' books, and the presuppositional analysis – upon any plurality of books, at random.

Table 6 summarizes this discussion, showing how each analysis applies to each context, and summarizes the study findings in the last column. Based on this table, we can make the following generalization: as long as the context is compatible with a demonstrative analysis, learners uniformly adopt this analysis, acting upon the 'same' one or two objects in comprehension (contexts (14d-e)) and using *the* in production (context (14c)). If the context is not compatible with a demonstrative analysis, but is compatible with a presuppositional analysis (context (14b)), use of *the* still occurs, but it is not as high. If the context is not compatible with any of the analyses (context (14a)), use of *the* is quite low.

Table 6
Summary of performance, across tasks

Context	Presuppositional analysis?	Definite analysis?	Demonstrative analysis?	Learners' behavior
(14a) production, non-presuppositional indefinite	non-presuppositional context: do not use *the*	indefinite context: do not use *the*	non-demonstrative context: do not use *the*	low use of *the*
(14b) production, presuppositional indefinite	**presuppositional context: use *the***	indefinite context: do not use *the*	non-demonstrative context: do not use *the*	**some use of *the***
(14c) production, anaphoric definite	**presuppositional context: use *the***	**definite context: use *the***	**demonstrative context: use *the***	**high use of *the***
(14d) comprehension, singular definite	act upon one of four objects at random	**act upon same object**	**act upon same object**	**act upon same object**
(14e) comprehension, plural definite	act upon any two/three objects at random	act upon all four objects, or same two objects	**act upon same two objects**	**act upon same two objects**

What appears to happen is that the demonstrative analysis overrides all other analyses whenever it is applicable: as shown by the performance in the comprehension task, the definite and presuppositional analyses are not adopted. As shown by the production task, when the demonstrative analysis is not applicable but the presuppositional analysis is (context (14b)), the presuppositional analysis is adopted, but only part of the time. We cannot tell what might happen in a context which is compatible with a definite but not a demonstrative analysis in production, since our production task did not include such contexts.

A possible explanation for why the demonstrative analysis overrides all others is that the demonstrative analysis alone is supported by L1-transfer: the L1-Korean L2-English learners have demonstratives in their L1, but not determiners with the semantics of definiteness or the semantics of presuppositionality. Therefore, whenever the context allows for a demonstrative, learners interpret *the* as demonstrative; but when the context does not allow for a demonstrative, learners entertain other possible semantic analyses of *the*, such as definite or presuppositional.

On this view, the apparent discrepancy between the comprehension and production task findings is actually an artifact of the fact that in the comprehension task, unlike in the production task, all test contexts were compatible with a demonstrative analysis of *the*. This proposal predicts that, given the right contexts, the demonstrative analysis should also override other analyses (definite and

presuppositional) in production, exactly as was found for comprehension. For example, consider the context in (15a), which is similar to the context in (7b). Here, uniqueness is established in the immediately salient situation (a unique lion is made salient by recency of mention), so *that* is felicitous, but uniqueness is not established in the discourse situation (which contains two lions), so *the* is infelicitous. If L2-English learners treat *the* as having a demonstrative analysis, they should produce *the lion* in (15a), using it on par with *that lion*, unlike native English speakers. However, when the demonstrative analysis is not applicable, as with a semantically unique description in (15b), learners can still adopt an alternative analysis of *the* as definite or presuppositional, and hence allow *the* in (15b). Our prediction is that in (15a), learners will use *the* and *that* interchangeably, giving a demonstrative analysis to both; but in (15b), learners will correctly disallow *that* (since demonstratives are bad in this context, in Korean as well as English), but allow *the*, giving to it a definite analysis or a presuppositional analysis. The predictions concerning (15a-b) were tested in a follow-up study, and were largely supported (Ionin, Baek, Kim, Ko and Wexler, under review).

(15) a. One of the lions was sleeping… the other lion was playing with a ball. Roger liked **that/#the lion more.**
      b. I met the/#that author of my favorite book.

4. Conclusion

The study reported here provides novel information about how L2-English learners from an article-less L1 interpret English determiners in context. While prior research focused primarily on production, and on the competition between distinct semantic analyses (such as definiteness vs. presuppositionality), the present study looked at comprehension as well as production, and considered the pragmatics of definiteness (namely, the domain relative to which uniqueness/maximality is computed). A number of open questions remain, which need to be investigated in follow-up studies. First, as discussed above, it is important to establish whether the demonstrative analysis overrides other analyses in production as well as comprehension (see Ionin et al., under review). On a more conceptual level, it is important to develop further the proposal that the demonstrative analysis overrides other analyses. Finally, it is important to test L2-English learners from other L1s, in order to determine whether the 'demonstrative analysis' is due specifically to transfer from Korean, or is present for L2-English learners from any article-less L1s. It is also important to establish whether the 'demonstrative' analysis is present for learners whose L1s have definite articles, or whether it is overridden by L1-transfer of definite article semantics.

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