

**Acquisition of scalar implicatures:
Evidence from adult Japanese L2 learners of English**

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To appear in Linguistic Approaches to Bilingualism

--Manuscript Draft--

Abstract

Our study investigates the second language acquisition of scalar implicatures some and all. We set out to answer two research questions based on three theoretical accounts, the lexical, pragmatic and syntactic accounts. In an experiment we include English and Japanese native speakers, and intermediate and advanced Japanese L2 learners of English. We used quantifiers some and all in 'Yes/No' questions in a context with sets of toy fruits, where pragmatic answers are expected, e.g., a 'No' response to the question 'Are some of the strawberries in the red circle?' (when a set of 14/14 strawberries are placed inside a red circle). Our individual results indicate that L2 learners are generally more pragmatic in their responses than native English speakers. But, there are neither significant differences between groups nor significant differences between L2 proficiency levels. We consider the implications of our findings for the acquisition of L2 semantics and pragmatics.

Keywords: Second language acquisition; Scalar implicatures; Conversational implicature; lexical account; pragmatic account; syntactic account

1. Introduction

The term *scalar implicature* (Grice, 1975; Horn, 1972) refers to implicatures based on a scale with members being higher than the others in informational strength. The generalization refers to a class of lexical entries (numerals, quantifiers, truth conditional operators, comparatives, modal operators) which are members of postulated scales. Examples of scales are provided in (1).

(1) Examples of Horn Scales

- . {*or, and*}
- . {*some, all*}
- . {*one, two, three,...*}
- . {*can, must*}

The role of the hearer is to consider the utterance and determine whether the speaker has been as informative as possible because typically the words uttered by the speaker go beyond the sentence level as they convey far more. The hearer may interpret what was said literally or invoke further interpretations. An example of such an utterance is in (2):

(2) Some of the bananas are in the kitchen.

Upon hearing the utterance in (2), the hearer can infer that the speaker is being as informative *as possible* and means the following in (3):

(3) Not all of the bananas are in the kitchen.

Logically speaking, *some* means *some and possibly all*. Typically, an implicature will be calculated, as in (3), and *some* will be compatible with only a proper subset (some but not all). The hearer has inferred that out of a set of bananas *some but not all* of the bananas are in the

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4 kitchen. If the speaker of (2) had wanted to refer to all of the bananas, he would have produced a
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6 more maximally informative utterance such as (4):
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9 (4) All of the bananas are in the kitchen.
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11 According to Grice (1975), when speakers intentionally say something irrelevant, unclear,
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13 blatantly false, or notably under- or over-informative, with the purpose of conveying a nonliteral
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15 meaning, they are said to have created a conversational implicature (e.g., scalar implicature in
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17 (2)).
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21 To date, there have been a number of first language (L1) studies that investigated
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23 children's interpretations of scalar terms (Chierchia, Crain, Guasti, Gualmini, & Meroni, 2001;
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25 Musolino & Lidz, 2002; Noveck, 2001) but only a handful of L2 studies (e.g., Lieberman, 2009;
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27 Slabakova, 2010) have examined the acquisition of scalar implicatures (hereafter SIs). This paper
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29 will present a study on adult second language (L2) acquisition of SIs. In order to investigate
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31 judgements of SIs we employ a task from Barner, Chow and Yang (2009). Barner et al. (2009)
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33 presented native English adult speakers with a set of eight strawberries and asked them the
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35 question '*Are some of the strawberries in the red circle?*' when there was a context that enforced
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37 a pragmatic reading, i.e., the implicature was derived when the complete set (8/8) of strawberries
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39 were inside a red circle. In this experiment, they found that they typically responded 'No' to the
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41 question with a context that enforced a pragmatic reading.
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48 The aim of our study is to find out whether Japanese-speaking L2 learners of English (at
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50 intermediate and advanced proficiency levels) perform like native speakers of English in their
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52 judgements of SIs in a pragmatically-enriched context. We shall call a context
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54 pragmatically-enriched when a question with a quantifier or numeral (e.g., *Are some/all/two of*
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56 *the strawberries in the red circle?*) is asked in reference to a clearly visible set of plastic toy
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4 fruits and a red circle. A felicitous question with *some* is when part of a set of fruits is placed
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6 inside the red circle by the researcher and the researcher asks the participant, e.g., ‘*Are some of*
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8 *the strawberries in the red circle?*’ (when 5 out of 8 strawberries appear in the red circle). The
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10 expected response is ‘Yes’. An infelicitous question with *some is* ‘*Are some of the strawberries*
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12 *....?*’ (when 8/8 strawberries appear inside the red circle).
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16 If the participant answers an infelicitous question with ‘Yes’, we define it as a logical
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18 response: It is logical to answer ‘Yes’ if one assumes *some* means *some and possibly all*.
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21 However, given that our task is pragmatically-enriched a pragmatic response ‘No’, might be
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23 more appropriate to the infelicitous *some* question, since *some* implicates *some but not all*. This
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25 reading is defined as a pragmatic response.
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29 Japanese, like most languages (von Fintel & Matthewson, 2008), has SIs, but importantly
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31 there is a subtle difference between English and Japanese. Japanese and English possess the
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33 non-partitive construction, e.g., ‘*All/Some strawberries are in the red circle*’. But, Japanese does
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35 not have the English equivalent of the partitive construction, e.g., ‘*All/Some of the strawberries*
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37 *are in the red circle*’, that indicates there is a set of strawberries and from the set ‘some of’ the
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39 strawberries are inside the red circle. Thus, we need to take into consideration the L2 learners’
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41 L1. For Japanese L2 learners of English, we might expect there to be some negative transfer
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43 (Haegeman, 1988) at lower levels of proficiency. In other words, if we present the same set of
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45 8/8 strawberries to Japanese learners and ask the infelicitous *some* question we may find
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48 Japanese L2 learners’ responses differ from English native speakers: They do not know 
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50 difference as they consider a partitive construction as an existential quantification and simply
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52 consider *some of the* to entail *some and possibly all* like in the non-partitive construction. We
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55 will return to the issue of transfer in our predictions for L2 learners and the Discussion section.
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4 In section 2 we provide details about the theoretical assumptions we adopt by outlining
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6 three accounts of SIs, the first of which is the Relevance Theory or pragmatic account (Carston,
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8 1998; Noveck, 2001; Wilson & Serber, 2004), the second known as the lexical account (based on
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10 Levinson, 2000; Chierchia, 2004) and the third which is a syntactic-based account of SIs
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12 (Chierchia, 2006; Fox, 2007). Section 3 discusses some of the previous L1 studies on SIs and
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14 section 4 gives an overview of Slabakova's (2010) L2 study. Section 5 presents the quantifiers in
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16 Japanese that are similar to the quantifiers *some* and *all* in English. Section 6 presents the
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18 experimental study and section 7 discusses the findings and the larger implications for second
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20 language acquisition of SIs.
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28 **2. Theoretical Accounts of Scalar Implicatures**

29 *2.1 The (Relevance Theory) pragmatic account of SIs*

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36 Grice's (1975) original idea of implicatures involved pragmatic rules stating that the
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38 speaker must obey the Cooperative Principle, as stated in (5):
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43 (5) The Cooperative Principle

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48 Make your contribution such as is required at the stage at which it occurs, by the accepted
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50 purpose or direction of the talk exchange in which you are engaged and to follow the Maxims of
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52 Quantity in order to be informative, in (6).
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55 (6)

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58 a.) Quantity 1: Make your contribution as informative as is required for current purposes of the
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4 exchange.

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7 b.) Quantity 2: Do not make your contribution more informative than is required.
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11 Sperber and Wilson's (1995) account of SIs is that all utterances are encountered in some
12 context and that utterances convey a number of implicatures. The speaker conveys a message to
13 the hearer and expects the hearer to evaluate and integrate information from the conversation
14 exchange. The hearer must assimilate the new information when combined with an existing
15 discourse context, for the least processing cost – that is, to the extent that it is relevant. Hearers
16 do not integrate completely new information because of the large effort required, and do not
17 integrate restated old information because it is not informative. In practice, though, any act by a
18 speaker that appears to be communicative has to be worth the hearer's effort to process it
19 (Tavano & Kaiser, 2009). An example is given in (7):
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33 (7) B: Are some of the bananas in the kitchen?
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35 A: Yes, *some* of them are.
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38 There is no reason to suppose that A in (7) is (scalar) implicating that *not all* of the
39 bananas are in the kitchen. A has simply replied to B by providing enough relevant information
40 (Green, 1995). For the pragmatic account, A's response to B is relevant enough – there is no
41 need to generate a scale since the expected level of relevance has been achieved. A scalar
42 implicature is derived only if the context does not supply enough relevance. However, for the
43 listener, the literal meaning in (7A) makes the meaning relevant enough to (7B).
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53 Under the pragmatic account of SI, SI is understood based on the Cooperative Principle.
54 However, under this analysis, SI is considered more effortful for a speaker to process. Thus, SI is
55 derived only if the context does not supply enough relevance.
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2.2 The lexical account of SIs

Under the lexical account the implicature in (7) above is that *some, not all* bananas are in the kitchen. In order to be informative in an utterance the speaker in (8a) must use the appropriate form in addressing the hearer so the hearer is able to infer that the speaker means (8b).

(8a) Some of the bananas are in the kitchen.

(8b) Some of the bananas are in the kitchen, *but not all are*.

The hearer understands from hearing (8a) that the speaker is not referring to all of the bananas unless the speaker is deliberately flouting the Maxims of Quantity. Typically, there is no reason to be less informative, thus the hearer bases her decision on the use of the quantifier *some*, meaning *not all*. The inference made by the hearer *but not all are* is a scalar implicature (Horn, 1972). In this case, *some* has a pragmatically-enriched meaning which is interpreted as *some but not all*.

Thus, Chierchia's (2004) lexical account assumes that scalar terms enter the sentence meaning both with their 'weak' (implicature-free) meaning and also with a 'strong' (implicature-laden) meaning. Implicature cancelation then involves the weak meaning, while otherwise the strong meaning is used. In other words, the syntactic/semantic computation and the pragmatic module are independent of each other but the calculation of the scales are operating recursively. According to Chierchia (2004), the pragmatic enriched meanings are not computed within a lower clause within a sentence (or an embedded clause) by the hearer once the speaker has completed the utterance, but rather implicatures are factored throughout the computation of meaning and are cancelled when the context demands there be no further calculation. Under this

view, the two systems interact with each other to produce the required inference.

2.3 *The syntactic account of SIs*

Chierchia (2006), Fox (2007) and Chierchia, Fox and Spector (2012) propose a syntactic account of SIs. They argue that the syntax of natural language has a covert grammatical operator which is optionally affixed to sentences, and that this operator is responsible for SIs (Fox, 2007). The operator is written as either *Exh* or *O* as abbreviations for Exhaustivity and Only, respectively. The syntactic account is designed to derive the *only* implicature generalization. In simple cases, the Neo-Gricean lexical account derives the same generalization.

- (9) The Exhaustivity Generalization: an utterance of a sentence, S, as a default, licenses the inference that (the speaker believes that) all of the scalar alternatives of S that are logically stronger than S are false (henceforth, the Exhaustivity Inference). The scalar alternatives of a sentence S, *Alt*(S), are the set of sentences that can be derived from S by replacing scalar items in S by their scale-mates.

Examples of how the Exhaustivity Generalization works are shown in (10-12)

- (10) ‘*Eight bananas are in the kitchen*’ is a scalar alternative of ‘*Seven bananas are in the kitchen*’. Since ‘*Eight bananas are in the kitchen*’ is logically stronger, the Exhaustivity Generalization tells us that the utterance ‘*Seven bananas are in the kitchen*’, as-a-default, licenses the inference that (the speaker believes) that *eight bananas are not in the kitchen*.

The scalar item in (10) could be explicitly stated using the operator *only*, as in (11).

- (11) Seven bananas only are in the kitchen.

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4 Scalar items can always be stated explicitly with the focus sensitive particle *only*, as long
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6 as the relevant scalar item bears pitch accent. This observation extends beyond numerals to all
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8 SIs, as illustrated in (12).
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11 (12)

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14 a.) Some of the bananas are in the kitchen.

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16 b.) Implicature: Only SOME of the bananas are in the kitchen.
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19 (adapted from Fox, 2007)
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21 The syntactic account predicts that implicatures are not generated if there is no focus on
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23 the SI, and if the context makes a different set of propositions salient, we do not get the
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25 implicature (or rather we arrive at a different implicature).
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28 We consider the theoretical accounts and their predictions for our study in section 6
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30 below. Sections 3 and 4 provide details of L1 and L2 studies respectively.
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36 **3. First language acquisition of SIs**

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41 A number of studies have found that, without considering the context or pragmatic
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43 relevance, children acquiring their native language are not sensitive to implicational meanings
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45 and treat the weaker, underinformative term in the scalar logically (Chierchia et al., 2001;
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47 Feeney, Scafton, Duckworth, & Handley, 2004; Guasti et al., 2005; Noveck, 2001; Smith, 1980).
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49 For example, Noveck (2001) replicated an experiment by Smith (1980) by presenting a series of
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51 statements in French with the existential quantifier *certaines* to L1 children. They were asked to
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53 either *Agree* or *Disagree* with each one of the statements. The results from the true informative
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55 factual universal statements (e.g., *Tous les oiseaux ont des ailes* ‘All birds have wings’; *Certaines*
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4 *enfants sont blonds* ‘Some children are blond’) were very similar, as both the children and adults
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6 do not differ in their responses by saying ‘Yes, I agree with this statement’. No differences were
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8 found either between the children and adults for the false (e.g., *Tous les oiseaux vivent dans des*
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10 *cages* ‘All birds live in cages’) and absurd statements (e.g., *Toutes les portes chanter* ‘All doors
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12 sing’; *Certaines histoires sont faites de bulles* ‘Some stories are made of bubbles’). However, the
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14 underinformative factual universal statements (e.g., *Certaines girafes ont de longs cous* ‘Some
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16 giraffes have long necks’) revealed that 7-8 year olds (89%) and 10-11 year olds (85%) gave
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18 more logical (*Yes, I agree* answers) than pragmatic answers (*No, I disagree* answers) compared
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20 with the adult native speakers (41%).
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26 Guasti et al. (2005) partially replicated Noveck’s (2001) study with 7-year-old children
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28 using informative and underinformative factual universal statements and obtained similar
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30 findings to those in Noveck’s study. Children accepted underinformative statements like *Some*
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32 *giraffes have long necks* 87% of the time whilst adults accepted them 50% of the time. The study
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34 by Feeney et al. (2004) produced different results from Noveck’s (2001) and Guasti et al.’s
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36 (2005) studies as they found no difference in the responses from the children (66%) and the
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38 adults (65%) to the pragmatically infelicitous *some* statements. The explanation they offer for
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40 their different findings is that the scope of the French quantifier *certaines* may be different in
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42 some respects to the English quantifier *some*.
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48 The collective findings from these studies show that children generally differ from adults
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50 when it comes to judgements about underinformative statements with *some*. Noveck (2001)
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52 states that children may appear to be more logical than adults on the task as the underinformative
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54 statements are treated more logically by children and treated more pragmatically by adults. For
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56 Papafragou and Musolino (2003), the results raise two questions:
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4 i.) Do children experience equal difficulty with all scalar terms or is this difficulty
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6 restricted to the kinds of scales studied so far?
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9 ii.) Why do linguistically competent children so often fail to derive scalar implicatures?
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14 Here we focus on the second question. Papafragou and Musolino (2003) suggest that one
15 possibility for why children fail to derive SIs is due to a genuine inability to engage in the
16 computations required to derive scalar implicatures. Another possibility is that this failure is due
17 to the demands imposed by the experimental task on an otherwise pragmatically aware child. In
18 order to address the second question, Papafragou and Musolino (2003) conducted an experiment
19 with another group of children under different experimental conditions. Their goal was to find
20 out if children could perform better on a task that is designed to test their pragmatic ability rather
21 than have to rely on real-world knowledge that children might not have access to. In other words,
22 children may have no difficulty in judging underinformative statements with *some* if the context
23 is pragmatically enriched.
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38 Papafragou and Musolino (2003) designed an experiment where Greek children had to
39 observe a number of toy horses playing in a meadow, then one by one the researchers had them
40 jump over a white fence until all the horses were on the other side of the fence, having jumped
41 over it. With the use of a puppet, a statement was made to describe the situation: an informative
42 felicitous statement is *All the horses jumped over the fence* and an underinformative statement is
43 *Some of the horses jumped over the fence*. As the weaker scalar term *some* is logically true in a
44 situation where all the horses had jumped over the fence, (it is true that some of them did too), it
45 is possible that child and adult participants would answer logically. However, if they consider the
46 situation then a pragmatic answer (i.e. *No, I disagree* answers) would be more appropriate
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4 because they can see that *all* (not *some*) jumped over the fence. The participants were asked to
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6 judge if the puppet had answered well rather than truthfully. They found that while the Greek
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8 adults rejected these types of sentences with 92.5% accuracy, the children only rejected them
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10 12.5% of the time. Part of the explanation the authors offer for their findings is that children may
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12 have not yet developed the ability to calculate pragmatic felicity on-line as it is too much of a
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14 processing load for them.
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19 Barner et al. (2009) investigated the L1 acquisition of numerals and quantifiers by
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21 2-year-old children. Children at 1-year of age spend months only knowing the numeral *one*.
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23 After their second birthday they are able to soon distinguish between *one* and the other numerals
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25 *two, three, four*. However, this is a gradual process where they understand that *two* applies to *two*
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27 *objects* and then after a short delay they later understand that *three* applies to *three objects* and so
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29 on. Some believe that children's first representations of *one* (and possibly other numerals) are
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31 embedded in a system of natural language quantifiers and determiners that includes words such
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33 as *all, some, a, many and most*. To test children's numeral comprehension, Barner et al. (2009)
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35 administered a Give-Number task, a Give-Quantifier task and a Truth-Value Judgement task.
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37 Here we discuss the Give-Quantifier task and the Truth-Value Judgement task.
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43 The stimuli for the Give-Quantifier task consisted of a red plastic circle and three sets of
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45 small plastic toy fruits (i.e., 8 oranges, 8 bananas, and 8 strawberries) that were presented in
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47 separate piles organized by kind. The researcher started by firstly introducing the fruits to the
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49 child to make sure that he could identify each type by asking questions such as "What is this
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51 called?" , "Do you know what this is?", "Can you say *banana*?" Once it had been established
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53 that the child knew the name of each type of fruit the researcher showed the child the red circle
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55 and asked him a question like "Could you put *all* of the bananas in the red circle?" Other
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4 quantifiers/determiners were tested using this procedure: *a, another, the other Xs, some, most, all,*
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6 *none* and *both*. For all quantifiers, the partitive construction was used where possible (e.g., *some*
7 *of the Xs*, instead of *some Xs*), to make clear that a subset of all items presented was being
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9 requested. The results show that overall the children demonstrated a good understanding of
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11 quantifiers, correctly placing all eight bananas in the red circle when the question with *all* was
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13 asked. They also showed that they could select less than eight bananas when the question with
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15 *some* was asked.
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21 For the Truth-Value Judgement task, the same red circle and sets of toy fruits were used
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23 as in the Give-Quantifier task. The fruits were presented in three separate piles of eight next to
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25 the red circle, as before. For each trial, the researcher moved a certain number of one kind of
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27 fruit into the circle and asked the child a Yes/No question using either a numeral or a quantifier.
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29 For example, after moving three bananas into the red circle, the experimenter asked, ‘Are *all of*
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31 *the bananas* in the red circle?’ As well as the quantifier or numeral, there are morphological cues
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33 to indicate to the child that the speaker is referring to more than one fruit, i.e., number marking
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35 on the noun *bananas* (plural –s) and main verb *are* (3rd person plural). The findings revealed that
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37 the children’s responses to the felicitous *all* Yes/No question were 100% accurate as they
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39 correctly answered ‘Yes’ when the complete set of eight bananas was placed inside the red circle.
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41 Around 30% of ‘Yes’ responses were given to the infelicitous *all* question when three bananas
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43 were placed inside the red circle. But more strikingly, when the infelicitous *some* Yes/No
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45 question was asked, with the complete set of eight bananas inside the red circle, around 55% of
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47 responses were ‘Yes’. In other words, most children required all eight objects to be in the circle
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49 for *all* but not for *some*, yet *some* was not strongly rejected with the answer ‘No’ when the
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51 complete set of eight was placed inside the red circle. The authors conclude that young children
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4 are less adept at calculating pragmatic implicatures than adults. They fail to realize the
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6 pragmatically-enriched context which should allow them to distinguish *some* from *all* since each
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8 set of fruit is visible to them throughout the experiment.
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11 The results from Barner et al.'s task and Papafragou and Musolino's (2003) task equally
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13 point to children's difficulty to invoke a weak alternative and a strong alternative and choose
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15 between the two. Again, this may be the result of the tasks being too demanding for children
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17 which demand a higher processing capacity (Reinhart, 2006). To summarize, the results from the
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19 statements without context (infelicitous *some*) and the contexts with pragmatic enrichment
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21 indicate that children do not necessarily lack the ability to process SIs but rather the difficulty
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23 lies in being able to process and pragmatically-enrich SIs. In other words, children at young ages
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25 may still not have fully developed the cognitive resources necessary to compute SIs in a
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27 pragmatically-enriched situation.
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34 There are a growing number of psycholinguistic studies that have examined the
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36 processing of SIs (e.g., Breheny, Katsos, & Williams, 2006; Bott & Noveck, 2004; Feeney et al.,
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38 2004; Huang & Snedeker, 2009; Storto & Tanenhaus, 2005; Tavano & Kaiser, 2009). Bott and
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40 Noveck (2004) examined the response times for truth-value judgments of sentences containing
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42 weak scalar quantifiers like '*Some elephants are mammals*'. For underinformative statements
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44 like these, participants' spontaneous judgments reveal how they are interpreting the sentence.
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46 'No' or false responses (a pragmatic response) indicate an upper-bounded interpretation since it
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48 imposes an additional boundary on the upper end of the scale (see Figure 1a), while 'Yes' or true
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50 responses (a logical response) indicate a lower-bounded one when the inference is cancelled or
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52 never calculated (see Figure 1b).
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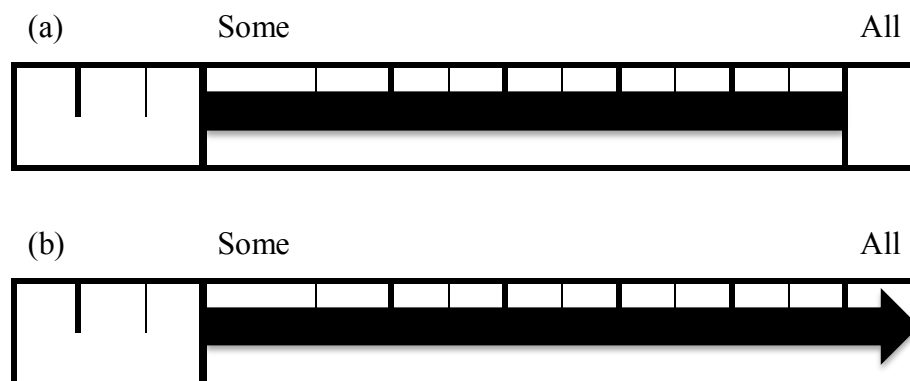


Figure 1. Two interpretations of *some*. (a) Upper-bounded reading: *some* is typically interpreted with a pragmatic inference that excludes *all* (b). Lower-bounded reading: the semantics of *some* can be described as referring to a ray of along a quantity scale.

(adapted from Huang & Snedeker, 2009)

The authors found that the native French participants who judged the statements (in French) to be false took longer than those who judged them to be true. The authors attribute this difference to the time that it takes to generate the implicature. A similar data pattern has emerged in several other studies measuring speeded truth-value judgments of underinformative usages of *some* (De Neys & Schaeken, 2007; Posada & Noveck, 2003). Breheny et al. (2006) used a phrase-by-phrase self-paced reading task to examine the effects of context on the generation of implicatures for both *some* and *or*. This task has greater temporal resolution and places fewer demands on the participants. In the case of *some*, Breheny et al. found that scalar terms embedded in upper-bounded contexts were read more slowly than those in lower-bounded contexts, suggesting that the pragmatic inference involves an additional process which is not

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4 automatically triggered across all utterances (Experiment 1). These differences may be specific
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6 to the stimuli used by the study. Native speakers of Greek were presented with the
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8 upper-bounded or lower-bounded context seen in (13) and (14) (in Greek) and their reading
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10 times were compared during two critical regions following the quantifier.
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13
14 (13) context supporting SI: Mary asked John whether he intended to host all his relatives in his
15
16 tiny apartment. John replied that he intended to host some of his relatives. The rest would stay in
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18 a nearby hotel.
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23 (14) context not supporting SI: Mary was surprised to see John cleaning his apartment and she
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25 asked the reason why. John told her that he intended to host some of his relatives. The rest would
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27 stay in a nearby hotel.
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31 (13) provides an upper-bounded context, because *John* replies to a question with the
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33 quantifier *all*. They found that those who encountered the term in the upper-bounded context
34
35 showed delays in reading the quantified phrase (*some of his relatives*), suggesting that the scalar
36
37 implicature was calculated at this initial period. In contrast, those who encountered the term in
38
39 the lower-bounded context demonstrated delays in the following region, in which the proper
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41 subset was explicitly referred to (*the rest would stay*), suggesting that the upper-bounded
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43 inference had not yet been made in the initial period.
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48 Tavano and Kaiser (2009) employed a visual-world eyetracking task where adult native
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50 English participants were only shown one visual scene at a time, and were asked to perform a
51
52 picture-verification task. The participants were presented with Picture-All conditions and
53
54 Picture-Some conditions. The Quantifier-Some-Picture-All condition is the one where all five
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56 apples in the picture (the complete set) are red but the statement features infelicitous *some* in
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4 (15).
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7 (15) This is a picture of apples. Some of them are red.
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9 Participants' eye movements were recorded as they looked at pictures and listened to the
10 sentences while engaged in the task. Participants were asked to indicate whether the sentences
11 they heard were a 'good description' of the corresponding picture, and responded 'Yes' (good
12 description) or 'No' (not a good description) by pressing buttons on an Eyelink input unit.
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18 Tavano and Kaiser predicted that the participants would reject the picture in the
19 Quantifier-Some-Picture-All condition as being a good description by responding 'No,' given
20 that *some* is underinformative. However, 52 of 119 responses were the pragmatic response 'No'
21 and 67 of 119 responses were the logical response 'Yes'. This is an unexpected result since
22 previous studies have found that adults tend to be more pragmatic in their responses. When they
23 examined each participant's answers, they found that 9 participants were pragmatic responders
24 and 14 were logical responders. On the face of it, one might conclude that the logical responders
25 failed to calculate the implicature, but Tavano and Kaiser found in a debriefing after the
26 experiment that nearly all (22 out of 24) participants expressed awareness of the implicature.
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29 Participants who answered logically often volunteered this information as part of an explanation
30 for how they answered. The long reaction times of the logical responders also reflect that the
31 implicature was processed. Tavano and Kaiser argue that these findings "suggest that logical and
32 pragmatic responses do not clearly indicate whether participants actually processed an
33 implicature or notthe logical responders and pragmatic responders actually had equal
34 response times when examined by responder type" (2010: 222-223). Noveck and Posada (2003)
35 suggest that the cost for processing the implicature, relative to its informative value, is low for
36 some people whilst high for others. But, this explanation cannot adequately describe why some
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4 participants processed the implicature and subsequently cancelled it and gave a logical response.
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9 **4. Second language acquisition of SIs**

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14 Recently, there has been a growing interest in the area of L2 knowledge of implicatures
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16 (Dekydtspotter & Hathorn, 2005; Dekydtspotter, Sprouse, & Meyer, 2005; Lieberman, 2009;
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18 Slabakova, 2010). Slabakova (2010) replicated Noveck's (2001) experiment (see discussion
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20 above) and Feeney et al.'s (2004) second experiment in order to investigate the L2 acquisition of
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22 SIs by adult Korean speakers of English. Her main goal was to test two theoretical accounts, the
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24 lexical account and the pragmatic account, to see which one could best describe the performance
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26 of L2 learners in judging SIs. Four groups participated in her first experiment: English native
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28 speakers, Korean native speakers, intermediate and advanced Korean learners of English. Korean
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30 native speakers were included as Slabakova wanted to establish a baseline for the perception of
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32 implicatures by Korean adults. Korean is reported to have quantifiers that function much the
33
34 same way as quantifiers in English. If there are L1 transfer effects one might expect that the
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36 Korean L2 learners would be accurate in their judgements of English *some* since there is a direct
37
38 one-to-one mapping of the Korean quantifiers *ilbu/etten* to English quantifier *some*. The
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40 quantifier *etten* can have a partitive (e.g., *some of the cookies*) or non-partitive reading (e.g.,
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42 *some cookies*) whilst the quantifier *ilbu* only has the former interpretation. The test items in the
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44 experiment were the same test items used by Guasti et al. (2005) in their study. All the factually
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46 universal and factually existential statements were administered to the participants as a written
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48 statement evaluation task. The participants were instructed to read each statement and either
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50 circle *Agree* or *Disagree* with each one.
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4 The results from Slabakova's (2010) study revealed that the English native speakers and
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6 the Korean native speakers gave more logical responses (*Yes, I agree* responses) to the
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8 infelicitous statement *Some giraffes have long necks* (55.4% and 61.2% respectively) in
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10 comparison with the Korean L2 learners of English (intermediate = 41.8%, advanced = 39.2%).
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12 The Korean L2 learners, regardless of their proficiency level in English, derived implicatures
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14 more often than the two native speaker groups. The findings may look like the learners were
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16 responding at chance (50%), particularly on infelicitous *some* items, but statistical analyses show
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18 that over 50% of individuals in each proficiency group chose pragmatic answers over 75% of the
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20 time.
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26 In Slabakova's second experiment there were four groups (English native speakers,
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28 Korean native speakers, intermediate and advanced Korean learners of English) with some of the
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30 same participants from the first experiment. The main purpose of the second experiment was to
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32 find out if a pragmatically-enriched context would lead learners to more pragmatic responses
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34 (meaning less logical responses) to infelicitous statements with *some*. The participants were
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36 shown a series of pictures with written sentences below each picture. All of the pictures formed a
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38 story that featured a girl who interacted with two out of three, or with three out of three objects.
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40 In the infelicitous *some* story the girl is seen eating all three candies on the kitchen table and her
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42 mother asks "What have you been doing with the candies?" and the girl replies that she ate *some*
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44 of the candies. Clearly, the use of *some* is underinformative in the situation as the girl ate *all* of
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46 the candies. The girl wanted to conceal the fact that no more candies were left as her mother may
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48 get angry with her, so by using *some* she is actually lying about the number of candies she has
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50 eaten. The participants were asked to either *Agree* or *Disagree* with each factual statement. The
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52 findings once again show that the L2 learners gave mainly pragmatic answers (around 90% for
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4 both proficiency groups) rather than logical answers (10% or less) to infelicitous *some*
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6 statements. Again, an individual analyses of the results revealed that 85% or more of the learners
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8 gave pragmatic answers to infelicitous *some* statements. All the participants were accurate in
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10 their responses on the felicitous *some and all* sentences. Conversely, the English native speakers
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12 and Korean native speakers provided less pragmatic answers as some of the responses were
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14 logical. However, the native speaker groups tended to provide more pragmatic responses to
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16 statements in comparison with the first experiment.
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21 Slabakova (2010) argues that the results from her two experiments support the lexical
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23 approach as the pragmatic approach cannot explain easily why L2 learners would be less logical
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25 in their responses to infelicitous *some* statements. The fact that L2 learners derived more
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27 implicatures cannot be accounted for under the pragmatic account as they are seen to be more
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29 effortful for the learner to process. Instead, Slabakova (2010) believes that L2 learners lack the
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31 processing resources to undo automatic pragmatic interpretations as “it takes processing
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33 resources to calculate a meaning, compare it to a situation, and then discard this meaning in favor
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35 of another. The more processing resources an individual possesses, the easier it is to keep in
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37 short term memory and compare the alternative meanings for the same sentence. The
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39 performance of the Korean learners of English is in support of this explanation” (p. 2458). L2
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41 learners have the cognitive resources to calculate SIs. Furthermore, Slabakova suggests that
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43 perhaps L2 learners do not conjure up alternative contexts where a default logical answer would
44
45 be expected. An alternative context would require further processing effort on the part of the L2
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47 learners; therefore, they derive L2 implicatures more often than the native speaker groups. It is
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49 also inaccurate to state that L2 learners are more sensitive to context while speaking their second
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51 language than they are when speaking their native language.
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In sum, the findings from Slabakova's experiments demonstrate that intermediate L2 learners are no different from more advanced L2 learners in evaluating statements with and without context. This is a somewhat surprising finding given that many studies in the SLA literature commonly find differences between proficiency levels. We also explore the role of proficiency (if any) in pragmatically-enriched contexts in our experiment, presented in section 6.

5. Japanese quantifiers

This section provides details about Japanese quantifiers as it is important to understand the use of quantifiers in Japanese in relation to the L2 acquisition of *some* and *all*. According to three Japanese native speaker informants, Japanese has the following items that are more or less similar to the items in English, illustrated in (16) and (17):

(16) Akai maru no naka ni banana ga ikutsuka arimasu ka
 red circle-POSS inside of banana-NOM some to be Q

‘Are some bananas in the red circle?’

(17) Akai maru no naka ni banana ga zenbu arimasu ka
 red circle-POSS inside of banana-NOM all to be Q

‘Are all bananas in the red circle?’

The quantifier *ikutsuka* (some) in (16) has a non-partitive reading; with no additional context, it is very difficult to obtain a reading that it implies that *some bananas* are part of a set like the partitive reading ‘*some of the bananas*’, as discussed in the Introduction. Even with additional context it is likely Japanese native speakers would prefer the non-partitive interpretation. This is an important point to make because in our task we only use the partitive

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4 construction. If less proficient Japanese learners of English transfer the non-partitive
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6 interpretation from the L1, we might expect a number of them to answer ‘Yes’ to the infelicitous
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8 *some* question ‘*Are some of the bananas in the red circle?*’ (8/8 bananas are in the red circle)
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10 whereas native English speakers’ responses would likely be ‘No’. In other words, despite the
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12 difference in meaning between ‘*some*’ and ‘*some of*’ for English native speakers, there may be
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14 no distinction for L2 learners whose L1 does not have both meanings. For this reason, Japanese
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16 is a good L1 to study because we can make clear predictions about how L2 learners would
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18 respond to infelicitous *some* questions.
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26 **6. The present study**

27 *6.1 Participants, materials and procedure*

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33 The experiment used the English version and Japanese version of the Truth-Value
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35 Judgement task created by Barner et al. (2009). Four adult groups were recruited for our study;
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37 15 English native speakers, 15 Japanese native speakers, 15 intermediate L2 learners and 22
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39 advanced L2 learners. Information about the participants is in Table 1.
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46 Table 1. Native speaker groups (English & Japanese) and Japanese L2 learners of English

	Participants in each group	Mean age	Mean age of English onset
English native speakers	n=15	37.7 years	-
Japanese native speakers	n=15	22.2 years	-
Japanese L2 learners of English	Intermediate n=15	19.1 years	12 years
	Advanced n=22	19.8 years	12 years

The proficiency levels of the L2 learners are based on their recent Test of English for International Communication scores. Our main aim was to see if L2 learners would perform more pragmatically or more logically than native speakers on a pragmatically-enriched task. The stimuli consisted of a red plastic circle and three sets of small plastic toy fruits (i.e., 14 oranges, 14 bananas, and 14 strawberries)¹ that were presented in separate piles organized by kind. This is illustrated in Figure 2.

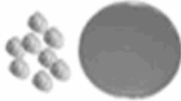
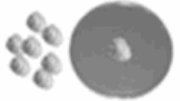

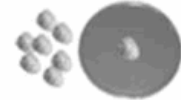
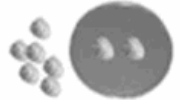




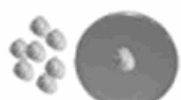



Quantifier	Question	Number of fruit presented		
<i>a</i>	"Is there a strawberry in the red circle?"			
<i>some</i>	"Are some of the strawberries in the red circle?"			
<i>all</i>	"Are all of the strawberries in the red circle?"			
<i>one</i>	"Is one strawberry in the red circle?"			
<i>two</i>	"Are two strawberries in the red circle?"			

Figure 2. Quantifiers, numerals, questions and number of fruit presented to participants

6.2 Research questions

Our research questions are as follows:

- 1.) Do Japanese L2 learners of English provide more ‘pragmatic’ responses than ‘logical’ responses to factual infelicitous *some* questions with pragmatically- enriched contexts?
- 2.) Are there any differences between the proficiency levels of the L2 learners in their responses?

A native English speaker administered the English version of the task to the English native speaker group and the Japanese L2 learner groups. A native Japanese speaker ran the Japanese version of the task for the Japanese native speaker group. The instructions and questions were all conducted in English (for the English version) and in Japanese (for the Japanese version). Each set of fruit was a maximum of fourteen. Each participant was asked to arrange a time to participate in the experiment. The length of the task was about 15 minutes. The researcher first introduced the participant to the fruits to make sure that she could distinguish the different kinds, e.g., ‘*these are strawberries*’. As the task used simple instructions and high frequency words there was no issue with the L2 participants not knowing how to perform the task or not knowing the vocabulary associated with the task. The fruits were always visible to the participants throughout the experiment and were presented in three separate piles of fourteen next to the red circle. For each trial, the researcher moved a certain number of one kind of fruit into the circle and asked the participant a Yes/No question using either a numeral or a quantifier. For example, after moving 2/14 strawberries into the red circle, the researcher asked, ‘*Are all of*

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4 *the strawberries in the red circle?* The felicitous answer is ‘No’ as only two out of the set of
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6 fourteen are inside the red circle; a ‘Yes’ response is infelicitous. Conversely, if the researcher
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8 had placed 14/14 fruits in the red circle, the answer ‘Yes’ is felicitous as no strawberries remain
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10 outside the red circle; a ‘No’ response is infelicitous. The same question was asked using *some*.²
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14 The fruits were always returned to their original piles or position outside the red circle after each
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16 trial. The order of conditions was varied between participants.
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21 6.3 Predictions

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26 The theoretical accounts of SIs predict the following:

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31 The English native speaker group:

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33 Given the context of our task (sets of fruits) and the partitive construction ‘*some of ...*’ used in
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35 the infelicitous *some* question ‘*Are some of the strawberries in the red circle?*’, the lexical
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37 account predicts that English native speakers will provide pragmatic responses as they calculate
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39 the implicature. As the sets of fruits are visible to all the participants throughout the experiment
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41 it should be clear that if 14/14 strawberries are moved into the red circle the pragmatic response
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43 ‘No’ would be more appropriate than a logical ‘Yes’ response. Barner et al. (2009) found that
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45 native English speakers gave the pragmatic answer ‘No’ over 80% of the time when they were
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47 asked the infelicitous *some* question (8/8 strawberries in the red circle).
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53 Both the pragmatic and syntactic accounts predict logical answers. Native English
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55 speakers will give a logical answer ‘Yes’ to the infelicitous *some* question ‘*Are some of the*
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57 *strawberries in the red circle?*’ if they fail to calculate the implicature or if the scalar item bears
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4 no pitch accent.
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9 The Japanese native speaker group:

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11 Recall in Japanese that there is only the non-partitive *some* question ‘*Akai maru no naka ni*
12 *banana ga ikutsuka arimasu ka*’ (Are some bananas in the red circle?). There is no partitive
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14 equivalent as there is in English. The lexical account predicts that Japanese native speakers will
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16 provide pragmatic responses if they calculate the implicature in the task. The pragmatic account
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18 predicts that Japanese native speakers will give more logical answers if *some* means *some and*
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20 *possibly all*. The syntactic account predicts logical responses will be preferred.
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29 The Japanese L2 learners:

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31 The implications of the three SI accounts for L2 acquisition make different predictions.
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- 36 i.) The lexical account predicts that L2 learners (in general) will provide less logical
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38 ‘Yes’ answers (hence more pragmatic ‘No’ responses) to SIs with and without
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40 context because less processing effort is required on the part of the L2 learners. A
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42 logical interpretation would require further processing than a pragmatic interpretation
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44 under this account because the inference would first have to be cancelled before the
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46 weaker sense of the word was processed.
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- 53 ii.) The pragmatic account predicts that L2 learners will provide less pragmatic answers
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55 (hence more logical ones) compared with English native speakers. We might expect
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58 L2 learners of English to have a preference for a logical reading, compared with
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4 native speakers, since in Japanese, it is difficult to obtain a partitive reading. This
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6 means a non-partitive existential meaning appears to be the same as a logical reading.
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9 For example, if 14/14 bananas are placed inside the red circle and the infelicitous
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11 *some* question is asked, the L2 learners must process the question and take into
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13 account the context before they give their answer ‘Yes’ or ‘No’. In English the
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15 question ‘*Are some of the bananas in the red circle?*’ refers to a specific set of
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17 bananas, i.e., the bananas placed inside the red circle. As learners have less
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19 processing resources available to them in the L2 (Slabakova, 2010), it is in some
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21 sense ‘easier’ for them to respond with a logical ‘Yes’ answer. In addition, the lack of
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23 a partitive construction in Japanese may mean L1 transfer effects are partly the reason
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25 for the learners’ preference for a ‘Yes’ response.
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34 iii.) The syntactic account predicts that there should be no differences between the L2
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36 learners and native English speakers as less pragmatic answers (hence more logical
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38 ones) are predicted due to the covert grammatical operator *Exh* and lack of pitch
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40 accent on the SI.
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45 All the SI accounts predict that for the felicitous *all* question ‘*Are all of the bananas in*
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47 *the red circle?*’ (when 14/14 bananas appear inside the red circle) English controls, Japanese
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49 controls and L2 learners will give a ‘Yes’ response; a ‘No’ response is not predicted because it
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51 should be clear from the context of the task *all* is the appropriate quantifier.
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6.4 Group and individual results

The findings from the experiment are illustrated in Figures 3-6. The ‘Yes’ responses to the questions ‘*Is there alone strawberry in the red circle?*’ and ‘*Are some/all/two of the strawberries in the red circle?*’ are presented as percentages in Figure 3 for the English native controls, Figure 4 for the Japanese native controls, Figure 5 for the Japanese intermediate L2 learners and Figure 6 for the Japanese advanced L2 learners. The important findings are how all groups responded to the felicitous *all* question (when 14/14 fruit appeared in the red circle) and the infelicitous *some* question (when 14/14 fruit appeared in the red circle).

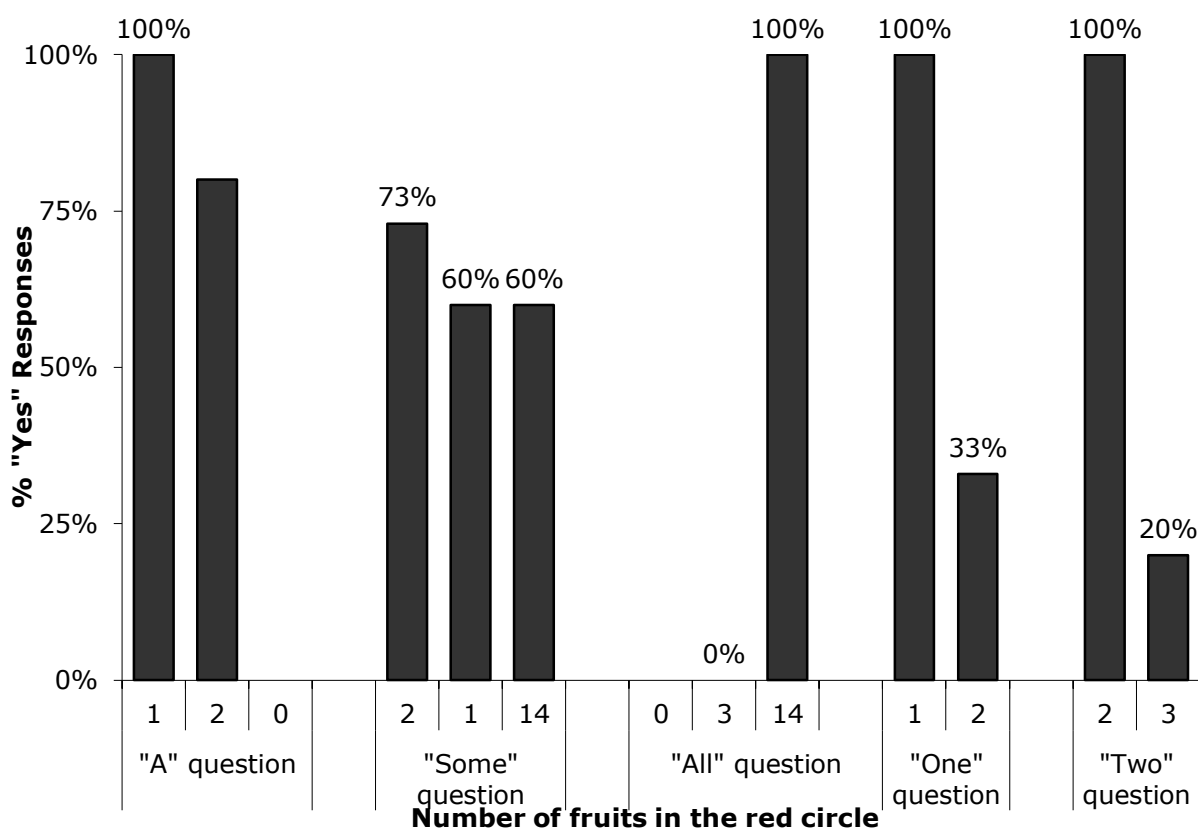


Figure 3. ‘Yes’ responses of English native speakers (n=15): set size of 14

Figure 3 shows that for the felicitous *all* question the native speakers gave a ‘Yes’ response 100% of the time. For the infelicitous *some* question, the native controls responded ‘Yes’ 60% of the time. The native English speakers gave more logical than pragmatic answers.

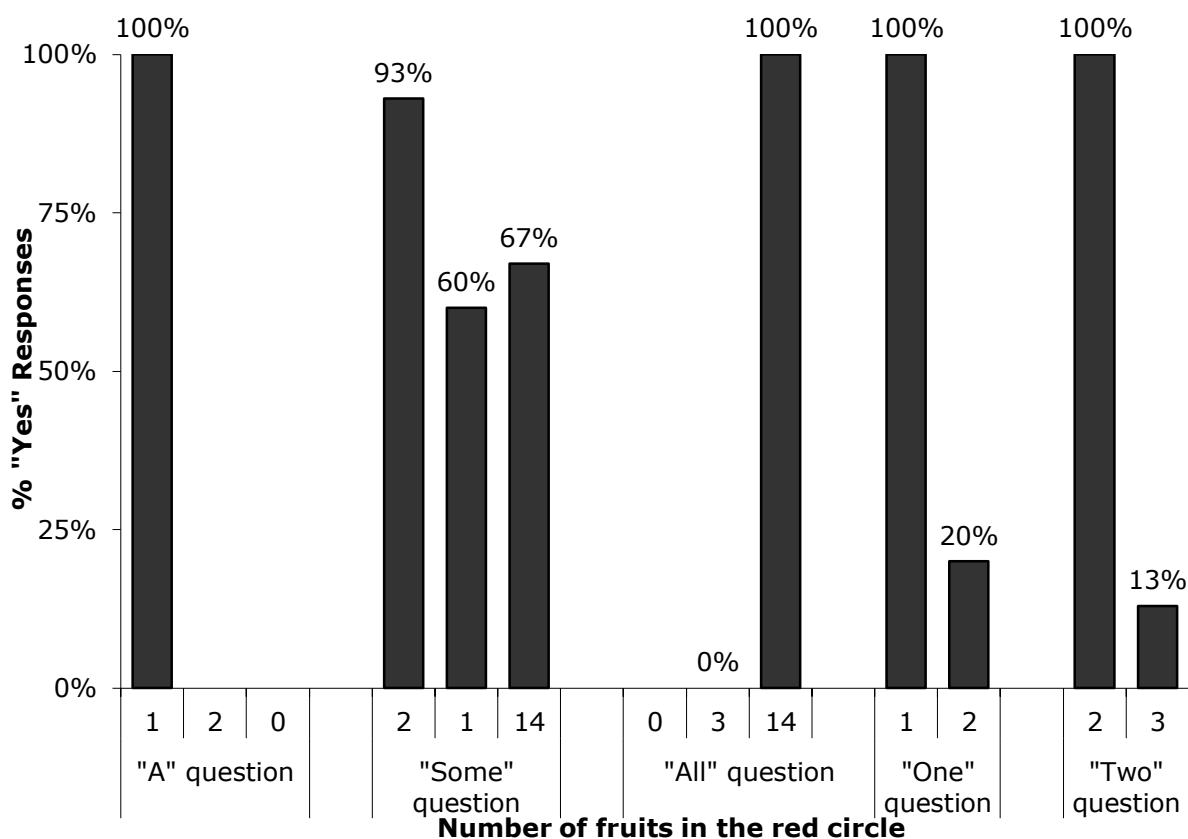


Figure 4. ‘Yes’ responses of Japanese native speakers (n=15): set size of 14

Figure 4 reveals that the Japanese native speakers performed like the English native speakers on the felicitous *zenbu* (all) question as they provided a ‘Yes’ response 100% of the time. They gave a ‘Yes’ response to the infelicitous *some* question 67% of the time. The native Japanese speakers generally provided logical responses in the task that was presented to them in Japanese.

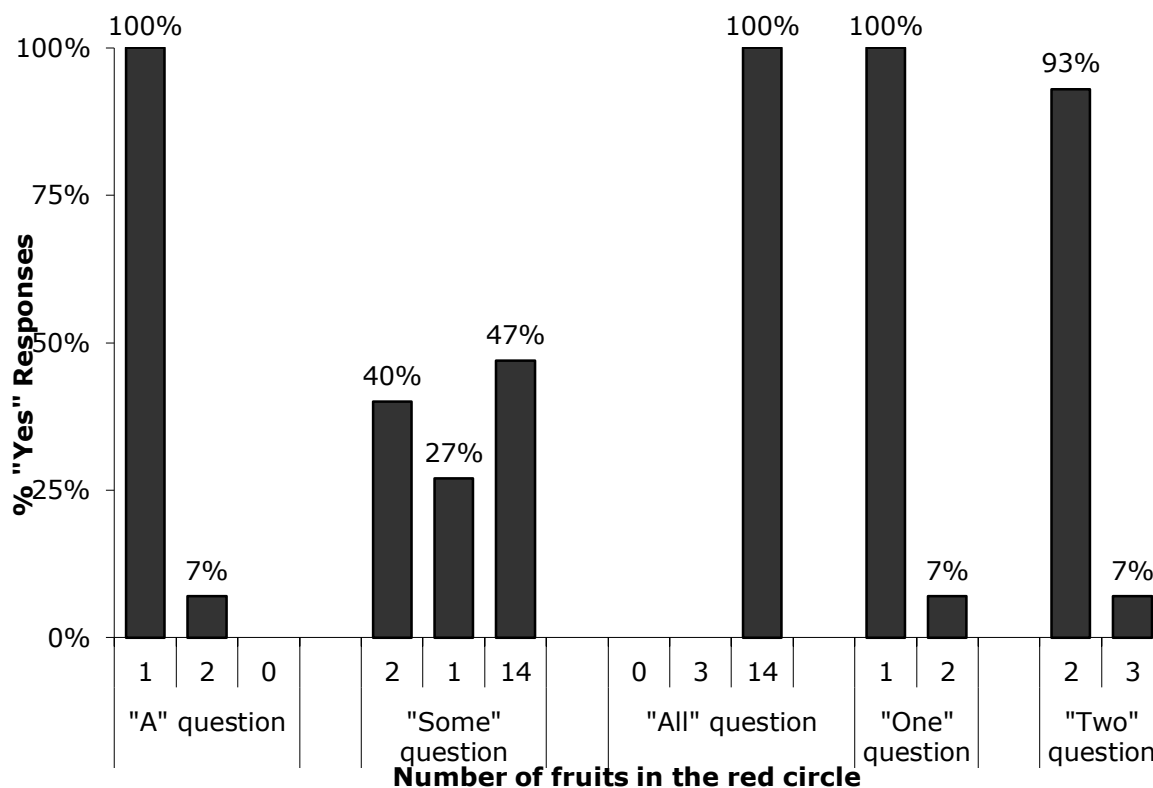


Figure 5. 'Yes' responses of Japanese intermediate L2 learners of English (n=15): set size of 14

Figure 5 provides details about the intermediate L2 learners. They performed like the English controls as they responded 'Yes' to the felicitous *all* question 100% of the time, as predicted. However, for the infelicitous *some* question, the learners responded rather differently from the native English controls as they gave 47% 'Yes' responses, 13% less than the English controls. In other words, the intermediate learners provided more pragmatic responses in comparison with the native English speakers.

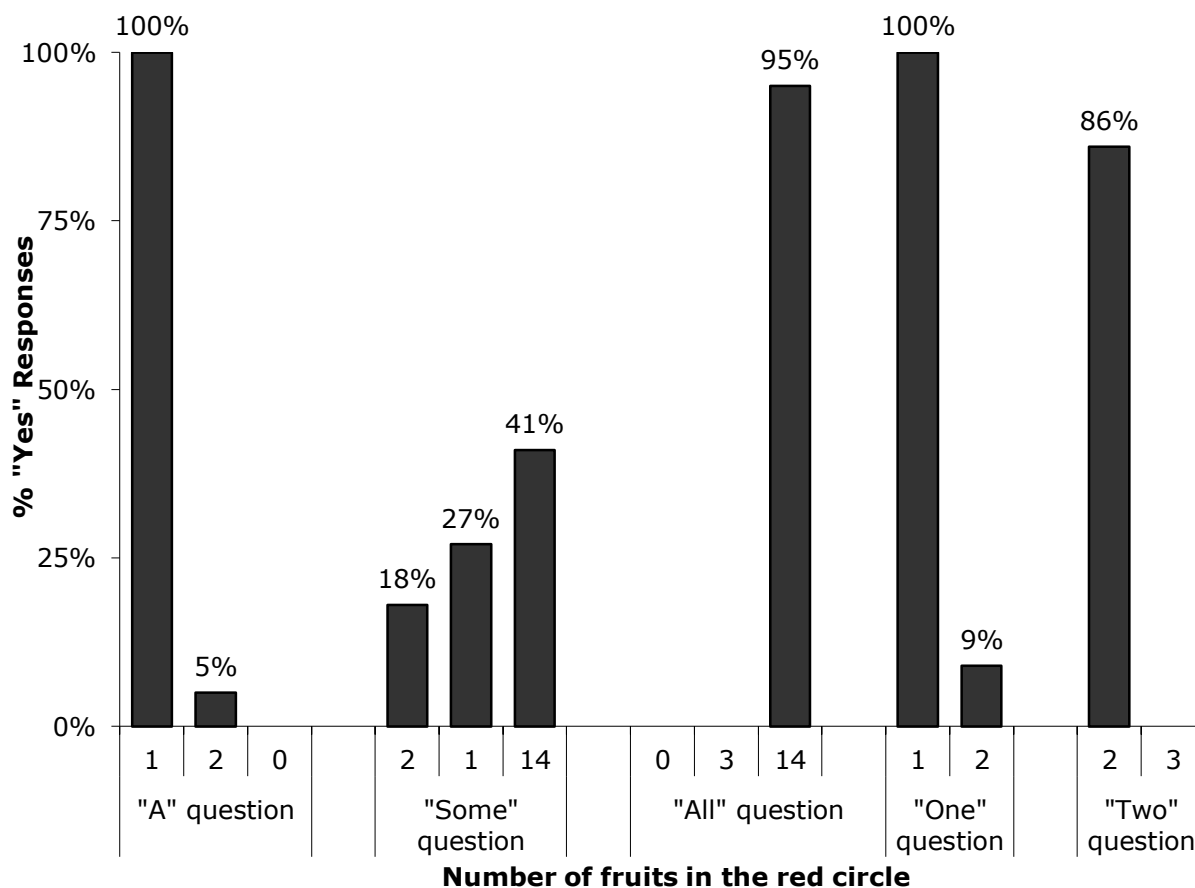


Figure 6. 'Yes' responses of Japanese advanced L2 learners of English (n=22): set size of 14

The results shown in Figure 6 are consistent with the other groups' performances for the felicitous *all* question as they answered 'Yes' 95% of the time. But, like the intermediate learners, the advanced learners tended to answer 'Yes' (41%) to the infelicitous *some* question less often than the native English controls.

To summarize, the results from the experiment show that for the 'Are some of the ...?' (14/14) question, where a 'Yes' response is logical but infelicitous, the Japanese L2 learners give more pragmatic responses (intermediate = 53% and advanced = 59%) than logical responses compared with English native speakers (40%) and Japanese native speakers (33%). In the other test categories the L2 learners performed the same as the native speaker groups.

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4 Following Tavano and Kaiser (2009), we debriefed several of the participants upon
5 completion of the experiment to recall why they had answered ‘Yes’ to the ‘*Are some of the ...?*’
6 (14/14) question. For those (English and Japanese) native speaker participants who had answered
7 logically it seems that they had considered it to be an appropriate response because logically it is
8 true that *some of the strawberries* are in the red circle even though *all* would be a more accurate
9 description of the context. Some of the L2 participants remarked that perhaps there are more
10 strawberries that are not visible but hidden from view and thus a logical response seemed more
11 appropriate. To find out whether the observed differences between the L2 learners and the native
12 speakers (English and Japanese) are significant we ran one-way ANOVAs with two factors,
13 group and condition. We first compared the native English speakers with the two L2 groups and
14 then compared the Japanese native speakers with the two L2 groups in the felicitous *all* condition
15 (14/14) and the infelicitous *some* condition (14/14). In the felicitous *all* condition Bonferroni
16 post-hoc tests showed that there were no significant differences between the English native
17 speakers, the intermediate L2 learners and the advanced L2 learners ($F_{(2,51)} = 0.673, p > 0.05$). For
18 the infelicitous *some* condition, no significant differences were found between the three groups
19 ($F_{(2,51)} = 0.638, p > 0.05$). For the Japanese native speakers, intermediate L2 learners and the
20 advanced L2 learners, Bonferroni post-hoc tests in the felicitous *all* condition revealed that there
21 were no significant differences between the three groups ($F_{(2,51)} = 0.673, p > 0.05$). Likewise, in
22 the infelicitous *some* condition no significant differences were found in the Bonferroni post-hoc
23 tests between the three groups ($F_{(2,51)} = 1.217, p > 0.05$).

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53 Despite no significant differences between all the groups in the infelicitous *some*
54 condition, individual results show that the participants in each L2 proficiency group tended to
55 provide more pragmatic answers than their native speaker (English and Japanese) counterparts.
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The individual results provided in Table 2 are divided into the number of those participants who gave pragmatic responses and those who gave logical responses.

Table 2. Number of ‘Pragmatic’ and ‘Logical’ individuals per participant group

	Number of participants who chose pragmatic answers	Number of participants who chose logical answers
English native speakers	6	9
Japanese native speakers	5	10
Japanese intermediate L2 learners	8	7
Japanese advanced L2 learners	13	9

These judgements show that for both native speaker groups more individuals provided logical answers than pragmatic ones. The intermediate and advanced L2 learners (21 out of 37 participants) considered the context and they responded by answering ‘No’ to the infelicitous ‘*Are some of the ...?*’(14/14) question. However, 16 participants responded ‘Yes’, a logical response.

7. Discussion

The findings from our study revealed mainly logical responses from the native English group despite a context-rich situation. This was not predicted by the lexical account as it was thought that native English speakers would likely answer ‘No’ when a pragmatically-enriched context along with the partitive construction were used (as was found in the Barner et al. 2009

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4 study). Recall, that the native English speakers stated in the debriefing that *all* is more
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6 informative given the context but *some* is logically possible. Since more ‘Yes’ than ‘No’
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8 responses were generally provided it lends support to the pragmatic account. That is, the native
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10 English speakers either:
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16 a.) do not generate a scale since the expected level of relevance has been achieved by the
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18 hearer as *some* means *some and possibly all*.
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21 b.) do generate a scale where *some* > *all* is considered but cancel the implicature.
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26 The native Japanese speakers provided more logical ‘Yes’ responses than pragmatic ‘No’
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28 responses. This was predicted because both *zenbu* (all) and *ikutsuka* (some) are non-partitive
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30 constructions that are likely to lead to logical responses in Japanese. To be specific, *ikutsuka* is
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32 interpreted as a simple existential quantification.
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36 The general group pattern of results followed the lexical account prediction for the L2
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38 learners as more pragmatic answers ‘No’, to the infelicitous *some* question, were supplied than
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40 logical answers ‘Yes’. The lexical account predicts that less processing time is required, as a
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42 logical interpretation would take longer than a pragmatic interpretation. In order to reach a
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44 logical reading the inference would first have to be cancelled before the weaker sense of the
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46 word was processed. In other words, 21 of the 37 L2 learners are able to calculate the implicature
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48 and avoid further processing costs by not considering alternative contexts for logical answers.
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53 The results from the experiment have provided an interesting insight into Japanese L2
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55 learners’ responses to the infelicitous *some* question as the individual results revealed that they
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57 provided more pragmatic answers than logical answers compared with the native English speaker
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4 individuals. They interpret *some* to mean *some but not all*, the more informative (and stronger)
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6 pragmatic interpretation. We predicted that because the Japanese version of the question is
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8 similar to the English non-partitive reading ‘*Are some strawberries...?*’, Japanese L2 learners
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10 may transfer the Japanese interpretation which would lead learners to produce more logical
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12 responses rather than pragmatic responses. In fact, 10 out of the 15 Japanese native speakers
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14 provided logical answers. However, 9 out of the 15 native English speakers also gave logical
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16 answers, despite the use of the partitive construction to infer sets. Thus, in the case of the L2
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18 learners the issue of L1 transfer seems to be a moot point.
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24 Our findings have addressed the two research questions, and the results relating to the
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26 first one are discussed below.
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- 31 1.) Do Japanese L2 learners of English provide more ‘pragmatic’ responses than ‘logical’
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33 responses to factual infelicitous *some* questions with pragmatically enriched contexts? –
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41 Clearly, some of the L2 learners responded like the native English controls, but possible
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43 reasons for why more L2 participants provided pragmatic responses than logical responses,
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45 compared with the native English controls, are as follows. It could be that the pragmatic
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47 responders accessed the partitive reading, e.g., *some of the bananas*, and generated a scale with
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49 *some > all* whilst the logical responders did not, albeit the partitive construction implies that
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51 there is a larger set and is more liable to give rise to a ‘*not all*’ inference (cf. Horn, 1997; Milsark,
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53 1977).
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58 Another explanation for the differences we find amongst the L2 learners is related to the
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4 perception of ‘*some of the*’. For those L2 learners who answered logically, it may be difficult
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6 to perceive the partitive as the question ‘*Are some of the bananas in the red circle?*’ was
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8 delivered by a native English speaker as naturally as possible, i.e., pace, intonation, stress and
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10 use of the weak vowel form schwa /ə/ in the words *some* /səm/, *of* /əv/ and *the* /ðə/. Perception of
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12 the definite article becomes more difficult for L2 learners when it is reduced to a weak form (see
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14 Sudo & Kiritani, 1997). If learners failed to perceive ‘*of*’ and ‘*the*’ they would only hear ‘*Are*
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16 *some bananas in the red circle?*’ in which case a logical answer ‘Yes’ would be appropriate as
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18 *some* (and *possibly all*) of the bananas are in the red circle.
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24 If perception was not a problem then perhaps comprehension was. L2 learners may not
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26 know that there is a difference in meaning between ‘*Are some of the bananas in the red circle?*’
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28 and ‘*Are some bananas in the red circle?*’ though they only heard the former question. They may
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30 not be aware of the function of the partitive construction in the former question.
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34 The perceptual and/or comprehension explanations may offer reasons for why we find
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36 logical and pragmatic responders within the L2 groups. However, as no significant differences
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38 were found between the native English speakers and the L2 learners perhaps, like the native
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40 English speakers, those learners who answered logically either a.) do not generate a scale since
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42 the expected level of relevance has been achieved by the hearer as *some* means *some and*
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44 *possibly all* or b.) do generate a scale where *some* > *all* is considered but cancel the implicature.
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51 We now move on to the second research question, which is repeated below.
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56 2.) Are there any differences between the proficiency levels of the L2 learners in their
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58 responses? - No
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4 Our findings are somewhat unexpected as many L2 studies typically find significant
5 differences between their L1 control group(s) and their L2 learners in the acquisition of syntax
6 and morphology (e.g., Hawkins & Chan, 1997; Prévost & White, 2000). Nevertheless, it is clear
7 from our study that intermediate and advanced Japanese L2 learners do not differ significantly
8 from each other in their responses. The Japanese participants in our study and the Korean
9 participants in Slabakova's (2010) study performed similarly to each other in L2 English in that
10 they, as individuals, chose more pragmatic responses than logical responses to infelicitous *some*
11 questions.³
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23 Limitations of our study include firstly not carefully controlling the delivery of the
24 questions in the experiment in the English version of the task. According to the syntactic account,
25 if there is pitch accent on *some* it is more likely that the implicature will be generated. If all the
26 questions had been recorded then every participant would have heard exactly the same set of
27 questions. But, since the researcher asked the questions there may have been subtle differences
28 between the way the questions were delivered to each of the participants. Indeed, there may have
29 been occasions where the researcher inadvertently produced pitch accent on *some* and this in turn
30 led to more pragmatic responses from the L2 learners. Secondly, we did not include non-partitive
31 questions like '*Are some bananas in the red circle?*' for the purpose of comparing participants'
32 answers to both partitive and non-partitive interpretations. A future study should include both
33 partitive and non-partitive questions.
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50 In conclusion, our findings are largely consistent with Slabakova's (2010) in that L2
51 learners can derive implicatures. In our experiment we found that when L2 learners were
52 presented with set sizes of fourteen fruits they diverged from the English and Japanese native
53 speaker groups; they provided more pragmatic responses than logical responses, though the
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4 differences were not significant. Therefore, overall, we believe that L2 learners avoid having to
5 perform more processing for logical answers as it is more effortful and respond pragmatically.
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7 However, it is not clear from our study if some L2 learners do process the implicature and cancel
8 it because they think a logical response is more appropriate. In order to find out whether logical
9 responses take longer than pragmatic responses, and thus perhaps show that the implicature is
10 processed and cancelled, future studies need to employ reaction time experiments (e.g., White &
11 Juffs, 1998).
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23 **Acknowledgements**

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28 We wish to thank Gunma Prefectural Women's University for providing funding for travel
29 expenses to MIMS (Multilingual Individuals and Multilingual Societies) 2010 conference in
30 Hamburg, Germany. We are grateful to the audiences at the J-SLA (Japan Second Language
31 Association) 2009 annual conference and MIMS 2010 conference for helpful comments,
32 feedback and advice. Furthermore, we thank the following people:- David Barner for allowing us
33 to use the English and Japanese versions of his Truth-Value Judgement task; Yahiro Hirakawa
34 and Teruhiko Fukaya for invaluable comments regarding scalar implicatures in Japanese; Carol
35 Jaensch for recruiting native speaker controls; all the participants from Gunma Prefectural
36 Women's University and the University of Essex for making this study possible. Finally, we
37 appreciate two anonymous reviewers' comments and suggestions and helpful advice and
38 guidance provided to us by Roumyana Slabakova. All remaining errors are our own.
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25 26 Notes

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30 ¹ The original study conducted by Barner et al. (2009) used sets of eight, but in a pilot version of our study we
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32 found that with sets of eight many of the L2 learners responded ‘Yes’ to the infelicitous *some* question. In a
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34 debriefing after the experiment we asked the learners why they answered ‘Yes’ and they responded that since the
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36 sets were small ‘Yes’ seemed like an appropriate response. For this reason we decided to increase each set of fruit to
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38 fourteen.

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42 ² For the quantifiers (*all, some*), the partitive construction was used (e.g., *some of the Xs*, instead of non-partitive
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44 *some Xs*).

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48 ³ One crucial difference between our experiment and Slabakova’s (2010) experiment is that we used quantifiers in a
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50 question format in our task, whereas Slabakova employed quantifiers in statements. One anonymous reviewer
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52 suggests that maybe implicatures are not generated in questions. However, Hirschberg (1985) argues that
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54 implicatures can be generated in questions. L1 studies have employed questions in their tasks such as Barner et al.
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56 (2009) and Barner, Brooks and Bale (2011). We believe that if implicatures were not generated in our experiment we
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58 would have gotten far more logical responses from the native speaker groups and the L2 learners.
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