Acquisition and Processing of Mass Nouns in L2-English by L2 Learners from Generalized Classifier Languages: Evidence for the Role of Atomicity

Sea Hee Choi and Tania Ionin

1. Introduction

The count/mass distinction is a grammatical distinction encoded in the morphosyntax, but it is also related to the conceptual object/substance contrast. While objects (e.g., table) have boundaries are counted, substances (e.g., water) do not have boundaries and are not counted (e.g., Soja et al. 1992). It has been proposed that the object/substance contrast relates to the notion of atomicity: a noun is atomic iff it cannot be divided into smaller parts which still bear the property denoted by the NP (a part of a table is not a table); otherwise, it is non-atomic (any part of water is still water) (Landman 1989; Chierchia 2010).

This paper examines how atomicity affects the acquisition and processing of count and mass nouns by L2-English learners whose L1s (Korean and Chinese) are Generalized Classifier languages (GCLs) that do not have a fully grammaticized count/mass distinction. In particular, we examine whether such learners have difficulty with the indirect mapping between atomicity and count/mass morphosyntax, and whether the difficulty extends to online processing.

1.1. Cross-linguistic variation in the count/mass distinction

In English, there is a clear distinction between count and mass nouns. Count nouns cannot occur in bare singular form (e.g., *I bought desk), and can combine with the indefinite article and with plural marking (e.g., a desk, desks) while mass NPs can occur in a bare singular form (e.g., I bought water/furniture) and cannot take an indefinite article or plural marking (e.g., *an oil, *oils – except on a coerced count reading on which different kinds of oil are referred to).

In contrast, in GCLs such as Korean and Chinese, the count/mass distinction is not fully grammaticalized so that the use of the plural marker is optional, and bare singular nouns can be interpreted as either singular or plural (e.g., takja ‘table/tables’ in Korean, zhuozi ‘table/tables’ in Mandarin). Both count and mass nouns in GCLs combine with classifiers in order to be counted (e.g., han-ge-ui chaeksang ‘one-CL-of desk’ in Korean; yi-zhang zhuozi ‘one-CL desk’ in...
Mandarin) (Kim 2005; Cheng & Sybesma 1999). However, the two languages differ in their use of plural marking. The Mandarin plural marker \textit{-men} can be combined only with [+human] nouns and is mandatory only with proper nouns, whereas the Korean plural marker \textit{-tul} can be combined with both animate and inanimate nouns, and is obligatory in all definite contexts.

In English, atomicity is not directly mapped onto the count/mass distinction. For example, \textit{furniture} is a mass noun in English but is object-denoting rather than substance-denoting, and is atomic: there is a clear boundary between one piece of furniture and the next, and not all parts of furniture are furniture (a table is furniture, but a table leg is not). Nouns like \textit{furniture, jewelry, footwear}, etc. are called ‘fake mass nouns’ by Chierchia (2010), according to whom they are limited to plural marking, non-classifier languages like English. In contrast, in GCLs, the link between atomicity and the count/mass morphosyntax is more direct. In Korean, all atomic nouns, including \textit{furniture/jewelry}, optionally combine with plural marker \textit{-tul}, while non-atomic nouns like \textit{water} normally do not (Kim 2005; supported by experimental data in Choi, Ionin & Zhu, under review). In the case of Mandarin, Cheng & Sybesma (1998, 1999) argue that the count/mass distinction is reflected in the use of classifiers, with count and mass classifiers exhibiting different syntactic behavior. There is evidence that atomicity is reflected in the Mandarin classifier system. Nouns like \textit{jiaju ‘furniture’} or \textit{shoushi ‘jewelry’} occur with the count classifier \textit{jian}, rather than with a mass classifier.

1.2. Motivation for the study

Prior research has shown that atomicity influences quantity judgments for speakers of English as well as for speakers of Japanese, a GCL, and for L1-Japanese L2-English learners (Inagaki & Barner 2010, Inagaki 2014). In these studies, participants were shown two pictures of various objects (shoes, furniture) or substances (mustard): one picture of two large objects or portions (e.g., two large shoes, two large pieces of furniture, two large blobs of mustard), and one with six small objects or portions (e.g., six tiny shoes, six tiny pieces of furniture, six tiny blobs of mustard). They were asked “Who has more shoes / furniture / mustard?” All groups of participants selected the greater-volume picture for substances, but the greater-number picture for objects, including objects denoted by fake mass nouns like \textit{furniture}. This indicates that fake mass nouns are perceived as atomic and object-denoting despite their morphosyntax.

In Choi et al. (under review), we found that atomicity also plays a role in the L2-acquisition of English plural marking. Both L1-Korean and L1-Chinese L2-English learners were found to overuse the plural marker \textit{-s} with English atomic mass nouns (e.g., \textit{furniture}), but not with English non-atomic mass nouns (e.g., \textit{water}). In the case of L1-Korean L2-English learners, this result could be due to L1-transfer of the Korean plural marker \textit{-tul}, which is optionally used with all atomic nouns. However, given that the Mandarin plural marker \textit{-men} is restricted to [+human] nouns, whereas all our test items were [-human], L1-transfer cannot explain the performance of this group. Rather, we proposed that atomicity is a
semantic universal which affects the L2-acquisition of plural marking when the L1 lacks a grammaticized count/mass distinction. However, a limitation of Choi et al. is that this study used a very explicit task (sentence correction) and may not have succeeded in testing learners’ implicit knowledge.

R Ellis (1997, 2005) defines implicit vs. explicit knowledge as follows. Implicit knowledge is intuitive and not verbalizable, and can be accessed more rapidly; explicit knowledge is conscious, verbalizable knowledge which is accessed more slowly. Ellis shows that learners tend to do better on tasks that target explicit knowledge. Yet the ultimate goal of L2 acquisition is to develop implicit knowledge, and to use the L2 spontaneously and effectively (e.g., N. Ellis 1993; Hulstijn 2001; Segalowitz 2003; Segalowitz, Segalowitz, & Wood 1998).

Recently, many studies have begun using online processing tasks to tap into learners’ implicit knowledge: in online tasks, participants are under time pressure, and focus on meaning rather than form, which means that they are more likely to rely on their implicit knowledge (cf. Jegerski 2014, Keating & Jegerski 2015). To date, online tasks have been used to test adult L2-learners’ underlying sensitivity to a variety of morphosyntactic phenomena, such as grammatical gender (Grüter, Lew-Williams & Fernald 2012) and number agreement (Jiang, 2004, 2007; Jiang et al. 2011). However, no prior online studies have addressed the role of atomicity in the use of plural marking. The goal of the present study is to examine whether atomicity affects learners’ sensitivity to plural marking both offline and online.

2. Methodology

2.1. Tasks and procedure

The participants (both L2-learners and native English speakers (NSs)) were tested individually, in a single session, and were compensated for participation. After filling out the consent form, the participants were asked to complete a self-paced reading task (SPRT), followed by a grammaticality judgment task (GJT), a vocabulary-check task, a cloze test and a language background questionnaire. The vocabulary-check task and the cloze test were used only for L2-learners. All tasks were presented on a computer in a lab booth. The whole experiment lasted 30-40 minutes for the English NSs and 40-60 minutes for the L2-learners.

2.1.1. Materials

For the GJT and SPRT, the same materials were used, which consisted of 128 test items with 32 target sentences (4 conditions with 8 tokens per condition), 32 sentences for a different experiment (on definiteness) which will not be discussed here, and 64 fillers which were not related to any experiment. The target sentences were constructed by crossing the factor of atomicity (atomic vs. non-atomic mass nouns, e.g., furniture vs. sunlight) with the factor of (un)grammaticality (grammatical singular form vs. ungrammatical plural form), as illustrated in Table 1. The target region length in the ungrammatical conditions was always one or two letters longer than in the grammatical conditions. The target sentences were
used to construct two counterbalanced presentation lists, each consisting of eight grammatical and eight ungrammatical sentences; the items within each list were pseudorandomized.¹

<table>
<thead>
<tr>
<th>Condition</th>
<th>Sample Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atomic grammatical</td>
<td>At/the/store,/Mary/bought/furniture/for/her/family.</td>
</tr>
<tr>
<td>Atomic ungrammatical</td>
<td>At/the/store,/Mary/bought/furnitures/for/her/family.</td>
</tr>
<tr>
<td>Non-atomic grammatical</td>
<td>At/the/park,/Jill/enjoyed/sunlight/for/a/while.</td>
</tr>
<tr>
<td>Non-atomic ungrammatical</td>
<td>At/the/park,/Jill/enjoyed/sunlights/for/a/while.</td>
</tr>
</tbody>
</table>

### 2.1.2. Self-paced reading task (SPRT)

In the SPRT, the participants were first asked to read the instructions and complete six practice trials, prior to proceeding to the main experiment, which consisted of 128 sentences, as described above. Each test sentence began with a fixation point at the left corner of the monitor. The presentation was non-cumulative, and all the sentences were immediately followed by a yes/no comprehension question, as illustrated in Table 2. The comprehension question never included the target mass noun. The test items were divided in two blocks, with a break in between. The participants’ reading times (RTs) and responses to comprehension questions were recorded by the computer. The presentation of test materials and collection of data were done with E-prime, a software program developed by Psychological Software Tools (Pittsburgh, PA, USA).

| Target sentence: At the park, Jill enjoyed sunlights for a while. |
| Comprehension question: Was Jill in the house? (Expected Answer: No) |

### 2.1.3. Grammaticality judgement task (GJT)

The GJT used the same items as the SPRT; the SPRT was always completed before the GJT, in order to avoid any influence of the more explicit task on the more implicit one. In the GJT, the participants were asked to read the sentences and judge their grammaticality by selecting ‘yes’ or ‘no’. The GJT was presented via Google Forms, and was preceded by an instruction page and six practice items. The GJT was untimed.

¹ There were actually four presentation lists, necessitated by the construction of the experiment on definiteness (not discussed here). However, with regard to the atomicity experiment discussed here, two of the four lists were identical, as were the other two.
2.1.4. Vocabulary check task (L2-learners only)

To prevent any confounding effects of words unknown to the learners, we conducted a vocabulary-check task with both L2-groups. This task contained all the target words used in the SPRT and GJT. The participants were asked to choose the correct translation of each word into their L1, from a choice of three, as illustrated in Table 3. This task was presented via Google Forms.

Table 3 Sample items of the vocabulary-check for L2 learners

<table>
<thead>
<tr>
<th>(1) Korean sample item</th>
<th>(2) Mandarin sample item</th>
</tr>
</thead>
<tbody>
<tr>
<td>19. Apparel</td>
<td>19. Apparel</td>
</tr>
<tr>
<td>1. 나타나다 (appear)</td>
<td>1. 出现 (appear)</td>
</tr>
<tr>
<td>2. 의복 (apparel)</td>
<td>2. 服饰 (apparel)</td>
</tr>
<tr>
<td>3. 항고하다 (appeal)</td>
<td>3. 上诉 (appeal)</td>
</tr>
</tbody>
</table>

2.1.5. Cloze test (for L2-learners only)

A cloze test was given to the L2-learners to access their English proficiency. The test was taken from Ionin and Montrul (2010), based on a text passage adapted from American Kernel Lessons: Advanced Students’ Book, by O’Neill, Cornelius & Washburn (1991), with every sixth word replaced by a blank with three multiple-choice response options, for a total of 40 blanks. Given that the native speakers in Ionin and Montrul (2010) performed at-ceiling in this cloze test, we did not administer the cloze test to our English NS control group. The cloze test was presented via Google Forms.

2.2. Participants

Thirty-one L1-Korean L2-English learners, 39 L1-Chinese L2-English learners, and 36 English NSs initially participated, but two L1-Chinese L2-English learners were excluded from analysis due to low accuracy rates (<75%) on the comprehension questions in the SPRT.²

All participants were tested in the U.S. The learners were all born outside the U.S. (in Korea, vs. in mainland China and Taiwan); all came to the U.S. at age 16 or over (most were in their twenties upon arrival). The cloze test scores indicated that most learners were high intermediate to advanced in proficiency. The two learner groups did not differ from each other in proficiency (t(65)=-1.44, p=0.16). The information about participants is summarized in Table 4.

² We also planned to exclude learners scoring below 75% on the vocabulary check, but all learners scored above this cut-off.
Table 4 Information about participants

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean cloze test score (range)</th>
<th>Mean age at time of testing (range)</th>
<th>Mean length of stay in the U.S. in years (range)</th>
<th>Mean age of first exposure to English in the US (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>English NS controls</td>
<td>36</td>
<td>--</td>
<td>21 (18-31)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>L1-Korean L2-English learners</td>
<td>31</td>
<td>78% (63-90%)</td>
<td>27 (18-36)</td>
<td>6 (0.5-12)</td>
<td>24 (16-31)</td>
</tr>
<tr>
<td>L1-Chinese L2-English learners</td>
<td>37</td>
<td>78% (30-95%)</td>
<td>20 (18-25)</td>
<td>5 (0.5-9)</td>
<td>18 (16-24)</td>
</tr>
</tbody>
</table>

2.3. Predictions

Following the findings of Choi et al. (under review), we hypothesize that both L1-Korean and L1-Chinese L2-English learners map atomicity to the count/mass distinction in English. We further hypothesize that atomicity affects learners’ implicit as well as explicit knowledge. This gives rise to two specific predictions. **Prediction 1**: In the GJT, the learners will overaccept the plural marker -s with atomic mass nouns more than with non-atomic mass nouns. **Prediction 2**: In the SPRT, the learners will show sensitivity to the presence of an incorrect plural marker -s on non-atomic mass nouns, but not on atomic mass nouns.

3. Analysis

All the analyses were carried out using R, an open source programming language and environment for statistical computing (R Development Core Team 2014), and in particular, the lme4 package for linear mixed-effects models (Bates, Maechler, Bolker, & Walker 2014). For the post-hoc pairwise comparisons, the lsmeans function in R was used (Lenth 2016).

3.1. Grammaticality Judgment Task

The analysis of the GJT results was carried out using a mixed-effects logistic regression model, with grammaticality, atomicity, language group and the interactions between these three variables as fixed effects. The dependent measure was the percentage of acceptance: note that for NSs, acceptance is expected to be at, or close to, 100% for grammatical sentences, and at, or close to, 0% for ungrammatical sentences.

Following current guidelines in the psycholinguistics literature (Barr, Levy, Scheepers, & Tily 2013), initially a maximal model that included random
intercepts and slopes for all fixed effects and their interactions was constructed. However, as this maximal model failed to converge in most cases, the random effects structure was gradually simplified following the suggestions by Barr et al. The final model included by-subject and by-item random intercepts.

3.2. SPRT: reading times

No statistical analysis was done on the comprehension question accuracy, since the comprehension questions were used only to establish that the participants were paying attention. As noted above, two participants with less than 75% accuracy on the comprehension questions were excluded from analysis. For the remaining participants, the comprehension question accuracy was 95.1% for English NSs, 88.12% for the L1-Korean L2-English learners, and 87.12% for the L1-Chinese L2-English learners. These high accuracy rates suggest that the participants were engaged in reading for comprehension while performing the experimental task.

The statistical analysis was done on reading times for region 6 (target noun, critical region) and region 7 (spillover region). Following Jegerski (2014) and Keating & Jegerski (2015), RTs under than 100 ms, as well as RTs above 4000 ms for L2-learners or 3000 ms for English NSs were replaced with the lowest or highest values, respectively (100 ms for the lowest value, 4000ms/3000ms for the highest value). Across the experiment, on average this resulted in the replacement of 2.4% of trials in the critical regions (range = 2.2-3.1%).

The RTs were analyzed using a linear mixed-effects model with grammaticality, atomicity, language group and their interaction as fixed effects. Just as in the GJT, at first, a maximal model was built with random intercepts and slopes for all fixed effects and their interactions, but as this maximal model failed to converge in most cases, we gradually simplified the random effects structure. The final model included by-subject random slopes and intercepts and by-item random intercepts.

Since the ungrammatical forms were always one or two letters longer than the corresponding grammatical forms, and since both ungrammaticality and word length have been shown to increase RTs, the effect of word length was estimated from the entire dataset, and regressed from the raw reading times using a linear model (cf. Hofmeister 2010). This correction is conservative, but we chose this method to avoid any confounding effect between length and ungrammaticality. Only the length-regressed reading times were entered into the statistical analysis.

4. Results
4.1. Grammaticality Judgment Task results

Figure 1 reports the percentage of acceptance for each category, while Table 5 shows the mixed-effects logistic regression results. The results are very similar to those of Choi et al. (under review). The English NSs showed high acceptance rates in both grammatical conditions and low acceptance rates in both
ungrammatical conditions. In contrast, both L2-learner groups accepted *sunlight* more than *sunlights*, but made no distinction between *furniture* and *furnitures*.

The mixed-effects logistic regression results show main effects of grammaticality, atomicity and language group, and significant interactions among all three variables. The post-hoc pairwise comparisons show that there is a significant difference between non-atomic grammatical and non-atomic ungrammatical conditions for all groups (English NSs, $\beta^\wedge = -4.43$, $p<0.001$; L1-Korean L2-English learners, $\beta^\wedge = -2.21$, $p<0.001$; L1-Chinese L2-English learners groups, $\beta^\wedge = -2.7$, $p<0.001$). In contrast, there is no significant difference between atomic grammatical and ungrammatical conditions for the L1-Korean L2-English group ($\beta^\wedge = 0.06$, $p=1.0$) or the L1-Chinese L2-English learners group ($\beta^\wedge = 0.05$, $p=1.0$), only for the English NSs ($\beta^\wedge = -4.48$, $p<0.001$).

### 4.2. Self-paced reading Task results

Figures 2 through 7 show word-by-word RT averages in the three groups, while Table 6 show the mixed-effects model results. We plot raw RTs for easier
readability, but the statistical analyses were always performed on length-regressed RTs. The error bars in Figures 2 through 7 show standard error.

Figure 2 English NS Group: Atomic conditions, word-by-word mean RTs

Figure 3 English NS Group: Non-atomic conditions, word-by-word RTs

Figure 4 L1-Korean Group: Atomic conditions, word-by-word RTs

Figure 5 L1-Korean Group: Non-atomic conditions, word-by-word RTs
Table 6 shows the model estimates in milliseconds for the critical region (region 6), with negative values corresponding to a decrease in RTs. As this table shows, there was a main effect of grammaticality, a main effect of language group, and a main effect of atomicity. There were also significant interactions among all three factors. P-values were computed using Satterthwaite’s approximation for denominator degrees of freedom with the lmerTest package (Kuznetsova, Bruun Brockhoff & Haubo Bojesen Christensen 2014).

\[
\begin{array}{lcccc}
\text{Atomicity} & 0.16 & 0.066 & 2.5 & <.01** \\
\text{Grammaticality} & 0.17 & 0.069 & 2.5 & <.01** \\
\text{Language Group} & 0.31 & 0.13 & 3.1 & <.01** \\
\text{Atomicity x Grammaticality} & -0.047 & 0.10 & 1.7 & .09 \\
\text{Language Group x Atomicity} & -0.17 & 0.09 & -2.0 & <.05* \\
\text{Language Group x Grammaticality} & -0.16 & 0.08 & -2.0 & <.05* \\
\text{Language Group x Grammaticality x Atomicity} & 0.25 & 0.13 & 2.1 & <.05*
\end{array}
\]

The results of post-hoc pairwise comparisons further show that in the English NS group, there was no difference between atomic grammatical and
ungrammatical conditions at the critical region ($\beta^*=0.11$, $p=0.83$) while there was a significant difference between the non-atomic grammatical and ungrammatical conditions ($\beta^*=0.26$, $p=0.04$). For the L2-learner groups, there was no significant difference between atomic grammatical and ungrammatical conditions ($\beta^*=-0.12$, $p=0.87$ for the L1-Korean L2-English learners; $\beta^*=-0.16$, $p=0.41$ for the L1-Chinese L2-English learners), while there was a significant difference between non-atomic grammatical and ungrammatical conditions for the L1-Korean L2-English learners ($\beta^*=-0.30$, $p<0.01$) and a marginally significant difference for the L1-Chinese L2-English learners ($\beta^*=-0.21$, $p=0.06$). Even though the effect is marginal for the Chinese group, considering that the inferential analyses were conducted with the length-regressed RTs, which can reduce the effects, this result is seen as meaningful. Furthermore, there was no significant difference between the two learner groups in any of the four conditions (atomic grammatical, $\beta^*=-0.31$, $p=0.45$; atomic ungrammatical, $\beta^*=-0.26$, $p=0.87$; non-atomic grammatical, $\beta^*=-0.12$, $p=0.99$ and non-atomic ungrammatical, $\beta^*=-0.21$, $p=0.96$).³

To sum up, the NS and learner groups show very similar patterns in the critical regions, slowing down for ungrammaticality only with non-atomic nouns. However, the picture changes once we turn our attention to the spillover region (region 7). Table 7 shows the model results for the region 7.

<table>
<thead>
<tr>
<th></th>
<th>$\beta^*$</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atomicity</td>
<td>-0.027</td>
<td>0.07</td>
<td>-0.35</td>
<td>.72</td>
</tr>
<tr>
<td>Grammaticality</td>
<td>0.09</td>
<td>0.07</td>
<td>1.22</td>
<td>.22</td>
</tr>
<tr>
<td>Language Group</td>
<td>-0.35</td>
<td>0.13</td>
<td>2.7</td>
<td>&lt;.05*</td>
</tr>
<tr>
<td>Atomicity x Grammaticality</td>
<td>0.086</td>
<td>0.11</td>
<td>0.77</td>
<td>.43</td>
</tr>
<tr>
<td>Language Group x Atomicity</td>
<td>-0.27</td>
<td>0.10</td>
<td>-0.90</td>
<td>.36</td>
</tr>
<tr>
<td>Language Group x Grammaticality</td>
<td>0.22</td>
<td>0.10</td>
<td>2.1</td>
<td>&lt;.05*</td>
</tr>
<tr>
<td>Language Group x Grammaticality x Atomicity</td>
<td>-0.25</td>
<td>0.14</td>
<td>-1.8</td>
<td>.06</td>
</tr>
</tbody>
</table>

At region 7, there was a main effect of language group and an interaction between language group and grammaticality, as well as a marginal three-way interaction. Post-hoc pairwise comparisons show that there is a significant difference between atomic grammatical and ungrammatical conditions for the English NSs ($\beta^*=-0.31$, $p<0.001$), but no corresponding difference for the non-atomic conditions for NSs ($\beta^*=-0.12$, $p=0.85$). For the two learner groups, there were no significant of grammaticality for either atomic or non-atomic conditions

³ Both learner groups differed from NSs in most conditions, but given that NSs exhibited faster RTs than learners across the board, this is not a particularly informative result.
(L1-Korean L2-English learners, atomic conditions, $\beta^*= -0.12$, $p=0.89$; non-atomic conditions, $\beta^*= -0.04$, $p=0.99$; L1-Chinese L2-English learners, atomic conditions, $\beta^*= -0.09$, $p=0.98$; non-atomic condition, $\beta^*= -0.18$, $p=0.38$). Thus, in the spillover region, we see a clear difference between NSs and L2-learners.

5. Discussion

The results largely support our hypotheses and predictions. With regard to Prediction 1, the two learner groups showed the predicted performance in the GJT: they were sensitive to incorrect plural marking only for non-atomic mass nouns, not for atomic ones. In contrast, native English speakers were equally accurate with atomic as with non-atomic nouns.

Prediction 2 was largely supported by the SPRT results. While NSs showed sensitivity to incorrect plural marking with both atomic nouns (in the spillover region) and non-atomic nouns (in the target region)\(^4\), the two learner groups showed this sensitivity only with non-atomic nouns. The learners exhibited no slowdown when encountering incorrect plural marking on atomic mass nouns like furniture.

Given that the SPRT provides a measure of more implicit knowledge (Jegerski 2014, Jiang 2007), the parallel results obtained for the SPRT and the GJT indicate that atomicity affects learners at both implicit and explicit levels. As discussed by Jegeski (2014) and Jiang (2007), among others, online sensitivity can be observed only when the involved L2 knowledge has been highly integrated and is automatically available. Thus, the findings of this study suggest that learners have integrated the incompatibility of plural marking and non-atomic mass nouns into their grammar, but not the incompatibility of plural marking and atomic mass nouns.

A further question is why atomicity influences both L1-Korean and L1-Chinese L2-English learners in their acquisition and processing of mass nouns. Recall that atomicity is encoded by plural marking in Korean, but outside the plural marking system in Chinese (where it is, arguably, reflected in the use of classifiers, Cheng & Sybesma 1998, 1999). Thus, our findings clearly cannot be due to L1-transfer of the semantics of plural marking. Such transfer would lead L1-Chinese L2-English learners to restrict English plural marking to [+human] nouns; on the basis of English input, the learners would eventually allow plural marking with count [-human] nouns as well, but would have no particular reason to overgeneralize plural marking for atomic mass nouns. Thus, L1-transfer of plural marking should lead to different patterns for L1-Korean L2-English learners and L1-Chinese L2-English learners. The fact that we obtained identical patterns from the two groups speaks against this explanation.

\(^4\) It is possible that even English NSs are influenced by atomicity, in that they find furnitures less of a grammatical violation than sunlights, and take longer to slow down. However, this is necessarily a very tentative explanation.
Instead, we suggest that both groups are influenced by atomicity because it is a semantic universal, which can potentially be expressed in different ways in a language (e.g., via plural marking in Korean, but via the classifier system in Mandarin). Indeed, as discussed earlier, even speakers of English (a language which does not directly encode atomicity in the morphosyntax) are sensitive to atomicity when making conceptual judgments about quantity (Inagaki 2014).

The question remains open concerning whether the influence of atomicity is due to the fact that it is encoded somewhere in the L1 (in the case of Mandarin, in the classifier system), or simply the fact that it is a semantic universal, regardless of whether it is encoded in the L1. Another open question is whether speakers of a plural-marking, non-classifier language acquiring another plural-marking language (e.g., L1-Russian or L1-French L2-English learners) would also be influenced by atomicity, or would transfer the plural-marking system from their L1. Our present study convincingly shows that atomicity influences L2-English learners from generalized classifier L1s, and that this influence is present at both explicit and implicit levels. This finding opens up directions for further investigations into the role of atomicity in L2-acquisition.

References


