On the mass/count distinction in Hebrew: Language acquisition and language change

Hacohen, A.; Schaeffer, J.

Published in:
Journal of Child Language Acquisition and Development

Citation for published version (APA):
On the mass/count distinction in Hebrew: Language acquisition and language change

Aviya Hacohen
Ben-Gurion University of the Negev

Jeannette Schaeffer
University of Amsterdam

Abstract
This study reports experimental results on the mass/count distinction in adult and child Hebrew (aged 4;0-17;11). A surprising acquisition pattern revealed no sensitivity to the mass/count distinction before age 7;2. Near-convergence was later reached, only to disappear again for teenagers. We argue that these data reflect the growing unimportance of the grammatical mass/count distinction in Hebrew. Using an adaptation of Barner and Snedeker’s (2005) Quantity-Judgment Task, we examined five different noun types, corresponding to five experimental conditions: substance-mass (kemax ‘flour’), count (efronot ‘pencils’), flexible-mass (niyar ‘paper’), flexible-count (niyarot ‘papers’), and object-mass (rihu ‘furniture’).

Our data show that Hebrew-speaking adults are essentially identical to the English-speaking adults in Barner and Snedeker’s study. In contrast, Hebrew-speaking children evince a dramatically different behavioral pattern from both Hebrew-speaking adults and English-acquiring children. English-acquiring children show sensitivity to the mass/count distinction at age 4, whereas Hebrew-speaking children are not yet adultlike even at 17 years old. Furthermore, our data uncovered a surprising developmental trajectory, with children aged 10-11;6 behaving more adultlike than teenage participants.

We suggest that these results may reflect a process of language change currently taking place in Hebrew. We further propose two possible sources for this change. The first involves the fact that the grammaticization of mass/count in Hebrew is rather marginal, as indicated by the relative paucity of syntactic structures that encode the distinction. Alternatively, our data may reflect a change process involving a relaxation of obligatory number-marking in cardinality contexts.

Keywords Mass/Count distinction; Quantity judgments; Language development; Hebrew; Crosslinguistic Variation, Language Change

1 Bio: Ben-Gurion University of the Negev, Department of Foreign Literatures & Linguistics, Beer Sheva 84105, Israel. Dr. Hacohen’s interests include the reciprocal relationship between linguistic theory and experimental psycholinguistics, as well as the (a)typical development of syntax and the semantics/pragmatics interface. Corresponding author: aviya@bgu.ac.il

2 Bio: University of Amsterdam, Faculty of Humanities, Department of Dutch Linguistics, Spuistraat 1341012 VB Amsterdam, The Netherlands. Prof. Schaeffer’s research is concerned with the role of different language components and of cognition in language acquisition, and how these interact. Email: j.c.schaeffer@uva.nl
1. Introduction

In this paper, we report results of an experiment that explored the mass/count distinction in adult and child Hebrew (aged 4;0-17;11). Adopting Barner and Snedeker’s (2005) experimental methodology, we tested how Hebrew speakers use singular/plural morphology to distinguish nouns that quantify over individuals from nouns that do not. We found that Hebrew-speaking adults performed in an essentially identical manner to the English-speaking adults in Barner and Snedeker’s study. The child data, on the other hand, revealed unexpected discrepancies between Hebrew and English: while the children in Barner and Snedeker’s study showed sensitivity to the mass/count distinction already by age 4, the Hebrew-speaking children we tested behaved very differently from both the Hebrew-speaking adults and Barner and Snedeker’s young English-acquiring participants. Furthermore, the Hebrew acquisition data uncovered a highly surprising developmental trajectory, with children in the 10-11;6 age group behaving more adultlike than the two (older) teenage groups. We propose that these results may reflect a process of language change currently taking place in Hebrew. We further propose two possible sources for the process. The first is due to crosslinguistic differences in the morphosyntactic encoding of the mass/count distinction in adult Hebrew with the pattern of development reflecting a process of language change, resulting from the internal intricacies of the Hebrew system, whereby the grammatical mass/count in Hebrew is becoming obsolete. Alternatively, our data may indicate a change process involving a relaxation of obligatory number-marking in cardinality contexts.

The structure of the paper is as follows: in this section we first provide an overview of mass/count in adult language as well as a brief survey of acquisition studies on the topic. The next section includes the hypotheses and predictions for the current studies. Section 3 presents a formulation of the hypotheses and predictions for the current study. This is followed by the methodology section and Section 4, which presents the findings. These findings are subsequently discussed and analyzed in Section 5. We conclude the paper with a general discussion in Section 6.

Before turning to the description of the current study, let us first present and discuss some theoretical background on the mass/count distinction in adult language, as well as some previous findings regarding the acquisition of this distinction.

1.1. The mass/count distinction in adult language

In a great number of languages around the world, nouns can be categorized as either mass or count. It is a well-established fact that languages may be typologically divided in terms of how they encode the mass/count distinction in their syntax. For example, in classifier languages such as Mandarin, nouns cannot co-occur directly with numerals. Regardless of whether they are mass or count, Mandarin nouns require a classifier if combined with a numeral, as the examples below illustrate:

3 Examples from Jing Lin (p.c.) and Bale and Barner (2012).
Without numerals, both mass and count nouns can occur in their bare forms, irrespective of reference (definite, indefinite, specific, generic, etc.) or number (singular, plural), as illustrated in (2):

(2)  

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Example (Mass)</th>
<th>Example (Count)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) shui</td>
<td>‘the water’</td>
<td>‘a/the child’ / ‘the children’</td>
</tr>
<tr>
<td>(b) haizi</td>
<td>‘footwear’</td>
<td>‘shoes’</td>
</tr>
</tbody>
</table>

In contrast, in number-marking languages (such as English and other Indo-European languages), the mass/count distinction affects the distribution of singular vs. plural morphology. Following Chierchia (1998), Krifka (1995), and Rothstein (2010), we assume that mass nouns in number-marking languages have the syntactic properties listed below:

(3)  

<table>
<thead>
<tr>
<th>Syntactic Properties</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) cannot be preceded by an indefinite article</td>
<td>*kaniti shalosh han’alot. bought-1sg three-f footprint.</td>
</tr>
<tr>
<td>(ii) cannot be preceded by numerals</td>
<td>*I bought three footwear.</td>
</tr>
<tr>
<td>(iii) need classifier/measure phrases to be quantized</td>
<td></td>
</tr>
<tr>
<td>(iv) cannot be pluralized</td>
<td></td>
</tr>
</tbody>
</table>

Some of these syntactic properties seem to hold for Hebrew as well, as is illustrated by the examples in (4), (5) and (6).

Since Hebrew does not have a lexically realized indefinite article, it follows that the first property is irrelevant for Hebrew. The second property, namely, that mass nouns cannot be counted directly (as opposed to count nouns) is exemplified in (4):

(4)  

<table>
<thead>
<tr>
<th>Example</th>
<th>Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) *kaniti shalosh han’alot.</td>
<td>bought-1sg three-f footprint.</td>
</tr>
<tr>
<td>(b) kaniti shalosh na’alaim.</td>
<td>bought-1sg three-f shoes</td>
</tr>
</tbody>
</table>

As for the third property, in order to be counted, mass nouns must occur with a classifier, whereas count nouns cannot occur with classifiers. This distribution is illustrated in (5):
(5) a. \textit{yesh li shalosh ma'araxot levush.} \\
there-is to-me three sets clothing \\
'I have three sets of clothing.'

b. \textbf{*yesh li shalosh ma'araxot xultsa/xultsot.} \\
there-is to-me three sets shirt/shirts \\
*'I have three sets of shirt(s).'

Finally, the examples in (6) demonstrate the fourth criterion, namely, that mass nouns cannot be pluralized. For comparison, we provide examples with count nouns, which can be pluralized.

(6) a. \textbf{*bigudim zolim yoter bakaic.} \\
clothing-plm cheap-plm more in-the-summer \\
*Clothings are cheaper in the summer.'

b. \textit{bgadim zolim yoter bakaic.} \\
clothes-plm cheap-plm more in-the-summer \\
'Clothes are cheaper in the summer.'

This set of distributional data, exemplified in (4)-(6) for Hebrew, works very similarly in English, as can be seen from the translation tier in each example.

In terms of reference, the distinction between mass and count nouns can be formulated according to two criteria, cumulativity and divisity. As first observed by Quine (1960), mass nouns refer cumulatively; if we combine two items that are referred to by a mass noun, the result can still be referred to by the same mass noun. For example, if we take two quantities of rice and put them together, what we get is still rice. This is not the case for count nouns: if we take two cats and put them together, the result could never be referred to as cat. The second criterion, divisity of reference (a term first introduced by Cheng 1973) is in a sense the mirror image of the first criterion, cumulativity. According to this criterion, mass nouns are divisive: if something is referred to by a mass noun, parts of that thing may also be referred to by the same mass noun. So, for example, any part of a quantity of rice is also referred to as rice. Conversely, parts of a cat could never be referred to as cat. This has led researchers to suggest that the mass/count distinction can be accounted for in terms of individuation (e.g., Quine, 1960; Bloom, 1994; Gordon, 1985). So while count nouns quantify over individuals, mass nouns do not.

In a similar spirit, Doron and Müller (2013) argue that the mass/count distinction reflects a cognitive distinction, namely between unstable and stable units: mass nouns denote entities that contain inherently unstable or vague units, whereas count nouns have in their denotation units that are stable in any given context. To support their claim, Doron and Müller provide data from Karitiana – a Tupi-Arikém language spoken in Rondônia, Brazil. They show that while this language has no number morphology, as illustrated in (7), the mass/count distinction is nonetheless distributionally encoded in Karitiana: count, but not mass, nouns may be modified by numerals, as can be seen in (8), where the (a) example illustrates numeral modification of count nouns and the (b) example demonstrates how plurality
is encoded via a modifier; while the example in (c) clearly shows that mass nouns in Karitiana cannot be modified by numerals:

(7) Maria Ø-nakam’at gooj
    Maria 3-decl-caus-make-nfut boat
    'Maria built some boat(s).'

(8) a. Myhin-t ’ejepo Ø-naakat i’ot-Ø
    one-obl stone 3-decl-cop-nfut participle-fall-cop.agr
    'One stone fell.'

   b. ’ejepo Ø-naaka-j i’ot-ot-Ø myhin-t myhin-t
    stone decl-cop-fut participle-fall-cop.agr one-obl one-obl
    'The stones will fall one at a time.'

   c. Myhin-t *(kilo-t) ouro na-aka-t i’ot-ot-Ø
    one-obl kilo-obl gold decl-aux-nfut participle-fall-con.cop
    'One *(kilo of) gold fell.'

This data, according to Doron and Müller, support the claim that “the mass/count distinction among nouns directly reflects the individuability of units”: count nouns are divisible into individual units, mass nouns are not. The criteria involving concepts such as cumulativity, divisity and individuability described above, however, do not always seem to provide the correct predictions. The first criterion, concerning cumulativity, fails to distinguish between mass nouns and plural count nouns, as both types are interpreted as cumulative (e.g., Pelletier, 1979; Gillon, 1996). As for the second criterion, involving divisity, numerous count nouns, such as string, rope, and cake, are certainly divisive. For example, if one were to take a piece of rope and divide it into two, each part of rope could still be referred to as rope. In this sense, nouns such as string, rope, and cake can be used as either count nouns (rope – ropes), or as mass nouns (a piece of rope), and are sometimes referred to as "flexible nouns" (cf. Barner and Snedeker, 2005). We will elaborate on this class of nouns below. An additional problem for this approach is found in mass nouns such as furniture, footwear, and silverware, which clearly refer to a group of individual objects. For the same reason, this class of mass nouns is problematic in terms of Doron and Müller’s cognitive individuability criterion. This failure is solved by a suggestion put forward in Gillon (1996), which uses individuation as a criterion, but claims that it is not the case that mass nouns refer to non-individuals, but rather that mass nouns are unspecified with respect to individuation. That is, according to Gillon (1996), count nouns indeed refer to individuals, while the reference of mass nouns is determined by world knowledge. Thus, according to this proposal, while both furniture and milk are linguistically categorized as mass nouns, our world knowledge distinguishes between them in terms of individuation, since we know from experience that furniture refers to distinguishable, individual items, while water does not. Chierchia (1998) expands on this notion in his claim that in fact all mass nouns refer to individuals and the only difference between count and mass nouns is in the plurality value of each noun type. Chierchia assumes
(following Link, 1983 and Landman, 1989) that the domain of discourse contains both singular and plural entities, and claims that count nouns refer to singular entities, or atoms, while mass nouns refer to sets of atoms. In other words, the difference between mass and count nouns is not in the real world, nor is it a difference in syntactic categories. Rather, the difference lies in the lexical denotation of each noun type in the sense that "mass nouns come out of the lexicon with plurality already built in" (p. 53). The tenets of this proposal are also assumed by Rothstein (2007).

Recently, Chierchia (2010) has put forth an alternative view according to which "a noun is count if there are at least some things it applies to that are clearly atomic (sometimes in an absolute sense, e.g., cat; while at other times in a relative sense, as with quantity of apples). "A noun is mass if all of its minimal instances/manifestations fall in the vagueness band (and can be construed as atomic or not, depending on how we choose to make things more precise.)" (pp. 38). In this sense, Chierchia argues that the syntactic mass/count distinction is arbitrary in the sense that it does not rely on or necessarily reflect the ontological object-substance distinction. This claim is strongly supported by data from Yudja, a language from the Tupi family, spoken in the Xingu Indigenous Territory in Brazil. Lima (2010) argues that the mass/count distinction is not grammaticalized in Yudja; all nouns can be counted when combined with a contextual atomic function fc that maps their basic denotation to a set of atoms. According to Lima (2010), Yudja nouns are unspecified for number, as the example below illustrates:

\[(9)\quad \text{ali} \quad \text{ba'ï} \quad \text{ixu.}\]

\[\text{child} \quad \text{paca} \quad \text{eat}\]

"The/a/child(ren) eat(s)/ate the/a paca(s)"

Literally: an undefined number of children eat(s)/ate an undefined number of pacas / amount of paca\(^4\)

Importantly, Lima (2012) provides experimental evidence that despite the absence of the syntactic mass/count distinction in their language, speakers of Yudja clearly make a conceptual distinction between "volume" and "number." An identical pattern was demonstrated by MacDonald (2010) for adult Korean learners of English. Data from this study show that Koreans make target-like judgments on both the Korean (L1) and English (L2) stimuli for count nouns, substance-mass nouns, and object-mass nouns, but vary in their judgments of mass/count flexible nouns. These findings strongly support Chierchia’s claim that the linguistic mass/count distinction does not depend on the conceptual (cognitive) distinction or vice versa. Although the proposals of Gillon (1996) and Chierchia (1998; 2010) seem to solve the problems posited by so-called “object-mass nouns” such as furniture, they fail to account for so-called "flexible" nouns such as string, which can be used as a count noun (one string, two strings), or as a mass noun (a piece of string). Barner and Snedeker (2005) experimentally show that for flexible nouns, it is the linguistic context (mass or noun syntax) rather than world knowledge, that determines speakers' judgments of what

\(^4\) Crucially, paca can be interpreted here as either count or mass.
is mass and what is count. Based on the results of their study, Barner and Snedeker (2005) propose an account of the mass/count distinction, according to which the distinction lies in the individuation entailments of each noun phrase. This is captured by the postulation of a grammatical feature, [+ individual], which licenses individuation. This feature is available either structurally, through count noun syntax (such as articles, plural morphology, etc.) or lexically, as in nouns like furniture, which are lexically retrieved with this feature as part of their denotation. According to this proposal, regular mass noun phrases fail to individuate, since the [+ individual] feature is unavailable to them both lexically and syntactically. This analysis views the mass/count distinction as a grammatical phenomenon, particularly driven by syntax (with the exception of object-mass nouns such as furniture, whose individuation feature is specified in the lexicon). This suggestion is further developed in Bale and Barner (2009), who propose that root nouns are underspecified with respect to mass/count (or "countability"). Root nouns, then, receive their count/mass specification when they combine with a functional head via a syntactic operation. Such an analysis is rooted in Borer's (2005) claim that each noun has a "bare" entry in the lexicon, unmarked for the mass/count distinction. This bare entry receives the correct mass or count value structurally. Nouns become count nouns when they are embedded in count syntax. In all other cases, nouns have a mass interpretation.

Thus, when addressing the topic of the mass/count distinction, it is important to acknowledge that there are (at least) two dimensions of analysis: the ontological substance/individual distinction, and the grammatical mass/count distinction (Joosten, 2003). Although ontological/cognitive properties such as substance, individuation, divisivity, and cumulativity play a role in the distinction between mass and count nouns, they cannot account for the full array of mass/count distinctions. Syntactic properties and structures are clearly needed.

In the current study, we adopt the view that grammatical countability is distinct from conceptual countability, and consequently that the acquisition task is to discover how these two types of countability are linked. Specifically, as Bale and Barner (2009) argue, the child must determine whether his or her language provides a syntactically expressed operator for expressing countability, namely, count syntax.

Two crucial consequences for acquisition emerge from this view. First, the acquisition of the mass/count distinction is an interface phenomenon, involving not only the syntax-semantics interface, but also the connections between the grammatical system and other cognitive systems. Second, it predicts a positive correlation between the rate of acquisition and crosslinguistic typological differences in the distribution of syntactic systems that encode the mass/count. In particular, it predicts that children acquiring languages with more salient and unambiguous count syntax will acquire the distinction earlier than children acquiring languages whose count syntax is relatively scarce and vague. We will return to these predictions in the discussion section.
Having discussed the theoretical background for the mass/count distinction, let us now look at some key studies that investigated the acquisition of the distinction.

1.2. The acquisition of the mass/count distinction in English

Over the past three decades, it has been shown that, at least for English, young typically-developing children acquire the mass/count distinction relatively early and without particular difficulty. This has been argued by, for example, Gordon (1985; 1988), who found that English-speaking 2-3 year olds obey pluralization restrictions, applying the plural morpheme only to count nouns. Also for English, Gathercole, Cramer, Somerville, and Jansen op de Haar (1995) have shown that when presented with unfamiliar objects accompanied by novel names, 3- and 4-year-olds extended the use of the novel noun to a new item of the same shape (but different material) if the object was named using count syntax (a blicket→blickets). If the item presented was introduced by using mass syntax, these children could extend the noun to a new item of the same substance (but of a different shape), i.e. some blicket→blicket. Similar results were reported by Soja and colleagues (Soja, 1992; Soja, Carey and Spelke, 1991; 1992) for English acquiring children aged 2;0-2;6.

More recent, and most relevant for the current investigation is the work of David Barner and his colleagues, and in particular, Barner and Snedeker (2005), whose experimental design we adopted and adapted to Hebrew in this study. Using a variant of Gathercole’s (1985) quantity judgment task, Barner and Snedeker set out to assess children’s knowledge of the mass/count distinction in English.

The first experiment tested the interpretation of object-mass nouns such as furniture, as compared to “classical” substance mass terms such as toothpaste and count nouns such as shoes. Each participant was presented with pictures of two characters and asked to judge which one of the characters had more. Importantly, one character was presented as having more individual items of the relevant noun, while the other character had more in terms of overall volume. So, for example, in the experimental item that tested furniture, one character had three little chairs and three little tables whereas the other character was shown to have one large table and one large chair. Note that the sum of the two large objects always comprised more in terms of overall material than the sum of the six small items of the same kind. An illustration is presented in Figure 1 below:

Figure 1. Illustration of experimental items (from Barner and Snedeker, 2005)

---

5 Object-mass nouns are also referred to as ‘fake-mass’ in Chierchia (2010).
A group of twelve monolingual English-speaking children (age 4;0-4;6, mean=4;3) and 16 monolingual adults was tested. The data revealed that in the count noun and the object-mass conditions (such as furniture), adults almost always based their judgments on number (93.8% and 97.9% respectively). Conversely, in the substance-mass condition, number-based judgments were never made. Child results revealed adultlike behavior on the count and object-mass items, with number-based judgments at 97.9% and 91.7%, respectively. In the substance-mass condition, the children (incorrectly) based their judgments on number 39.6% of the time6.

A second experiment tested quantity interpretations of flexible nouns such as string(s) and stone(s). As mentioned in the previous section, this type of noun can appear either in count or mass syntax. As in the first experiment, two characters were presented as having certain quantities of the relevant nouns. Unlike the first experiment, in the second one character was shown to have one large item and the other character had three little items of the same kind, as can be seen in the illustration below:

![Illustration of experimental items](from Barner and Snedeker, 2005)

Figure 2. Illustration of experimental items (from Barner and Snedeker, 2005)

The experimental items were manipulated in terms of their mass/count syntax between participants such that each participant was presented with either all the items in the count syntax version of the flexible noun (i.e., stones, strings, papers) or the mass version (i.e., stone, string, paper). Just as with the first experiment, a group of twelve monolingual English-speaking children (age 4;0-4;5, mean=4;2) and 16 monolingual adults was tested7.

Results show that the adults almost always based their judgments on number when the flexible noun appeared in count syntax (97%), but hardly ever if the noun was used in mass syntax (3%). The distinction was also apparent in the child data, with number-based judgments at 95% for flexible nouns appearing in count syntax and 25% for flexible nouns appearing in mass syntax8.

---

6 Clearly, when compared to adults, the children tend to base their judgment on number at a much higher rate even in the substance mass condition. It is interesting to note that the authors only address the fact that there is a significant difference between the rates of number-based judgments in the count and object-mass conditions on the one hand and the substance-mass condition on the other. They do not comment on the relatively high rate of number-based judgments in the substance-mass condition.

7 It is not clear whether these are the same participants as those in the first experiment.

8 Again, the authors do not address the issue of the high rate of number-based judgments in the flexible mass condition. They merely point to the fact that there is a clear distinction between performance on these two conditions.
Overall, Barner and Snedeker’s (2005) study shows that English acquiring 4-year-olds are aware of the mass/count distinction. However, note that these children do not yet seem to be adultlike in all conditions. As noted above, they base almost 40% of their quantity judgments on number in the substance-mass condition (vs. 0% for the adults), and 25% in the flexible mass condition (vs. 3% for the adults). Although Barner and Snedeker do not comment on this, these results suggest that the acquisition of mass noun syntax takes more time than the acquisition of count noun syntax. In contrast, the 4-4;6-year old English-acquiring children do perform adultlike on the object-mass nouns. Barner and Snedeker explain this by assuming that object-mass nouns are already specified with a [+individual] feature in the lexicon.

In sum, these experiments, as well as earlier experiments (e.g., Gordon, 1985; 1988; Gathercole et al., 1995; Soja, 1992; Soja, Carey and Spelke, 1991; 1992) have shown that 3-4 year olds are aware of the mass/count distinction and able to understand and manipulate the relevant syntactic mechanisms involved in the distinction, at least in English.

1.3. Hypotheses and predictions

Following Barner and Snedeker (2005) for English, we assume that in adult Hebrew, count nouns, such as efronot (‘pencils’), quantify over individuals, while mass nouns, such as kemax (‘flour’) do not. Following Chierchia (1998) for English, who argues that “[s]ingular common count nouns like dog are … true of individual dogs” (p. 345), we assume that in Hebrew, count nouns such as iparon (‘pencil’) are true of individual pencils, while mass nouns, such as kemax (‘flour’) are not. This is formulated below:

1.3.1. Hypothesis 1

Count nouns, such as efronot (‘pencils’), are true of individuals, while mass nouns, such as kemax (‘flour’), are not.

We further hypothesize that flexible nouns, such as niyar/niyarot (‘paper(s)’), are true of individuals when they appear in count syntax (i.e. niyarot-‘papers’), but not when they appear in mass syntax (i.e. niyar-‘paper’). This is formulated as Hypothesis 2 below.

1.3.2. Hypothesis 2

Flexible nouns, such as niyar/niyarot (‘paper(s)’), are true of individuals when they appear in count syntax (i.e. niyarot-‘papers’), but not when they appear in mass syntax (i.e. niyar-‘paper’).

Finally, as can be seen below, we hypothesize that ‘object-mass’ nouns, such as do’ar (‘mail’), are true of individuals.

1.3.3. Hypothesis 3

Object-mass nouns, such as do’ar (‘mail’), are true of individuals.

The prediction that follows from the hypotheses for adult Hebrew is thus the following:
1.3.4. Prediction 1
When asked lemi yesh yoter X? ('who has more X?'), Hebrew-speaking adults will base their judgments on number (of items) only if the stimuli contain a count noun, a flexible-count noun, or an object-mass noun. Otherwise, they will base their judgments on quantity/volume. An interesting question arises: to what extent can the findings of Barner and Snedeker (2005) for child English be generalized to other languages? Specifically, if English and Hebrew are relevantly similar, then we would predict that when asked lemi yesh yoter X? ('who has more X?'), Hebrew-speaking children age 4 and up will base their judgments on number if the stimuli contain a count noun, a flexible-count noun or an object-mass noun. Otherwise, Hebrew-speaking children older than 4 will base their judgments on quantity, rather than number of items. This prediction is formulated below.

1.3.5. Prediction 2
In a quantity judgment task, Hebrew-speaking children will behave similarly to the English-speaking children in Barner and Snedeker's study, i.e., already at age 4, they will base their judgments on number (of items) if the stimuli contain a count noun, a flexible-count noun, or an object-mass noun. Judgments on classical and flexible mass noun stimuli, on the other hand, will be based on quantity/volume, rather than number.

2. Methodology
2.1. Design and procedure
In order to test the predictions, we created a version of Barner and Snedeker's (2005) Quantity Judgment Task that was adapted to Hebrew. With this task we examined five different noun types, using five experimental conditions: count nouns (e.g., efronot 'pencils'), substance-mass nouns (e.g., kemax 'flour'), flexible-count nouns (e.g., niyarot 'papers'), flexible-mass nouns (e.g., niyar 'paper'), and object-mass nouns (e.g., do'ar 'mail'). Crucially, the flexible conditions test only the syntactic mass/count distinction, whereas in the classical mass/count conditions, the linguistic distinction may be facilitated by the ontological substance/object distinction. We will discuss this important issue further in Section 6.

There were four items per condition and 12 filler items, all randomly ordered. As illustrated in the figures below, for each item participants were presented with two characters, one with two large objects and the other with five small objects of the same kind. The fewer items always consisted of more overall volume. The verbal stimulus, lemi yesh yoter X? ('who has more X?'), was the same across items and items were all randomly arranged.
On the mass/count distinction in Hebrew

Hacohen and Schaeffer

a. Count example

Stimulus: lemi yesh yoter efronot?
to-who there-is more pencils
'Who has more pencils?'
Expected target: lakauboi.
to-the-cowboy
'The cowboy.'

b. Mass example

Stimulus: lemi yesh yoter kemax?
to-who there-is more flour
'Who has more flour?'
Expected target: lakauboi.
to-the-cowboy
'The cowboy.'

Figure 3. Example items from the Count and Mass conditions

c. Flexible-Count example

Stimulus: lemi yesh yoter niyarot?
to-who there-is more papers
'Who has more papers?'
Expected target: lasayas.
to-the-horseman
'The horseman.'

d. Flexible-Mass example

Stimulus: lemi yesh yoter niyar?
to-who there-is more paper
'Who has more paper?'
Expected target: lakauboi.
to-the-cowboy
'The cowboy.'

Figure 4. Items from the Flexible-Count and Flexible-Mass conditions

e. Flexible-Count example

Stimulus: lemi yesh yoter do’ar?
to-who there-is more mail
'Who has more mail?'
Expected target: lasayas.
to-the-horseman
'The horseman.'

Figure 5. Item from the Object-Mass condition
It is important to note that, as can be seen from the examples above, in the two flexible conditions (the flexible-count and the flexible-mass) the visual stimulus remains constant, while the verbal stimulus, i.e., count and mass syntax, is manipulated.

2.2. Participants
Forty-four typically developing monolingual Hebrew-speaking children aged 4;0-17;11, as well as a control group of six Hebrew-speaking adults participated in this study. The children were divided into the following age groups: 4;0-6;1 (N=9), 7;2-8;5 (N=7), 10;0-11;6 (N=9), 13;5-14;6 (N=10), 16;8-17;11 (N=10). Adult and child participants were recruited from two kibbutzim and one city, and the geographic area covered the north and the south of Israel. Each participant was tested individually by the author.

3. Findings
The data were coded such that responses based on number, i.e., judging the character with the larger number of items as having "more," were given a score of 1, regardless of the condition, that is, regardless of whether this was an expected/adultlike response or not. The opposite response, i.e., judging the character with the more overall volume as having "more," was given a score of 0. The results for the adults are presented in Figure 6 below:

![Figure 6](image1.png)

Figure 6. % of judgments based on number (Adults)

Now that the behavioral pattern for adult Hebrew is established, we can examine the child data. The results of the youngest age group, the 4;0-6;1 year olds, are presented in Figure 7 below:

![Figure 7](image2.png)

Figure 7. % of judgments based on number (Age 4;0-6;1)
The findings from the 7;2-8;5 year olds are presented in Figure 8 below:

Figure 8. % of judgments based on number (Age 7;2-8;5)

Results obtained for the next age group, aged 10;0-11;6, are presented in Figure 9:

Figure 9. % of judgments based on number (Age 10;0-11;6)

Figure 10 presents the performance of the young teenagers (aged 13;5-14;6):

Figure 10. % of judgments based on number (Age 13;5-14;6)

Finally, results for the last age group, the 16;8-17;11 year olds, are presented in Figure 11 below.
In order to make it easier to compare the results of the four groups, a summary is presented in the line graph below.

*Figure 11. % of judgments based on number (Age 16;8-17;11)*

Table 1 below summarizes results of between-group one-way ANOVAs that were conducted for the conditions that rendered non-adultlike performance by all children, namely the substance-mass and the two flexible conditions, as well as the pairwise comparisons between each child group and the adults in each of these conditions. A significant group effect was found in all three conditions.

*Figure 12. Proportional values of judgments based on number (by age group)*
Table 1

Performance of children vs. adults in the substance-mass and flexible conditions

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Substance-Mass</th>
<th>Flexible-Mass</th>
<th>Flexible-Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANOVAs</td>
<td>( F(5,46)=10.36^{***} )</td>
<td>( F(5,46)=8.98^{***} )</td>
<td>( F(5,46)=3.02^{*} )</td>
</tr>
<tr>
<td>4;0-6;1 vs. Adults</td>
<td>( F(1,46)=42.15^{***} )</td>
<td>( F(1,46)=35.96^{***} )</td>
<td>( F(1,46)=.00, p=1.00 )</td>
</tr>
<tr>
<td>7;2-8;5 vs. Adults</td>
<td>( F(1,46)=10.60^{***} )</td>
<td>( F(1,46)=13.47^{***} )</td>
<td>( F(1,46)=2.88, p=.10 )</td>
</tr>
<tr>
<td>10;0-11;6 vs. Adults</td>
<td>( F(1,46)=2.33, p=.13 )</td>
<td>( F(1,46)=5.01^{*} )</td>
<td>( F(1,46)=.49, p=.49 )</td>
</tr>
<tr>
<td>13;5-14;6 vs. Adults</td>
<td>( F(1,46)=11.11^{***} )</td>
<td>( F(1,46)=18.75^{***} )</td>
<td>( F(1,46)=7.70^{*} )</td>
</tr>
<tr>
<td>16;8-17;11 vs. Adults</td>
<td>( F(1,46)=7.61^{**} )</td>
<td>( F(1,46)=6.05^{*} )</td>
<td>( F(1,46)=3.90, p=.054 )</td>
</tr>
</tbody>
</table>

\(^{*} p<.01^{* * } p<.05^{* * * } p<.005^{**** } p<.001\)

4. Conclusions and Discussion

As predicted, adult Hebrew speakers always based their judgments on number of individual items in the two count conditions and in the object-mass (furniture) condition (at 100% for all three conditions). Conversely, they almost never based their judgments on number in the two mass conditions (0% for the substance-mass condition and 4% for the flexible-mass condition). Since the data (shown above in Figure 6) are so clear-cut, and no between-subject variability was observed (namely, all the participants showed exactly the same data), significance tests were unnecessary in this case.

Once the behavioral pattern for adult Hebrew has been established, we can examine the child data. The results of the youngest age group, the 4;0-6;1 year olds, presented in Figure 7, reveal that the children in this group almost always based their judgments on number in all conditions, constantly choosing the character with the greater number of items as having "more," regardless of the noun type in the stimuli.

Sensitivity to noun type starts to emerge with the 7;2-8;5 year olds, who show a distinction between the two count conditions and the object-mass on the one hand and the two mass conditions on the other, basing their judgments on number much more frequently in the two count and object-mass conditions (100% and 88% respectively) than in the two mass conditions (25% in the mass condition and 38% in the flexible-mass condition). These results are plotted in Figure 8 above.

Similar results were obtained for the next age group, aged 10;0-11;6, with a slight decrease—compared to the younger age group—of number-based judgments in the two mass conditions (20% and 34%), resulting in a sharper contrast between the two count and object-mass conditions on the one hand and the two mass conditions on the other. This can be seen in Figure 9.

Surprisingly, the near-adultlike distinction found for the two previous age groups becomes drastically less sharp for the group of young teenagers (age 13;5-14;6), with 48% and 65% number-based judgments in the mass and flexible mass conditions respectively, alongside an unexpectedly low rate of
number-based judgments in the flexible count condition (68%). Figure 10 presents these results.

Finally, results become slightly more adultlike again for the last age group, the 16;8-17;11 year olds; however, even these considerably older children clearly do not yet show convergence. Performance in the count and the object-mass conditions is adultlike, with 100% of the judgments based on number. As in the previous age group, here, too, number-based judgments are surprisingly low (77%) in the flexible count condition. Number-based judgments in the mass condition are relatively high at 38% and in the flexible mass condition, behavior is around chance, with 45% number-based judgments. These data are presented in Figure 11 above.

As can be seen from the line graph above (Figure 12), all of the child groups are adultlike in the count and the object-mass conditions, with number-based judgments at 100%. Conversely – if one disregards the youngest age group – who seem to base all their judgments on number, regardless of noun type – none of the children reach adultlike percentages in the other conditions, namely, the (substance) mass and the two flexible conditions. Interestingly, the second youngest age group (7;2-8;5) (and the youngest age group, for that matter) does distinguish between object-mass nouns (furniture) and substance-mass nouns (flour), with 100% of judgments based on number for object-mass nouns and around 50% of judgments based on number for substance-mass nouns.

As Table 1 above shows, a significant group effect was found in all three conditions. The t-tests in the mass condition revealed a significant difference between the adult controls and the children in all the age groups except the 10;0-11;6 year olds. Yet, even though the 10;0-11;6 year-olds do not show statistically significant different performance from the adults, they still judge substance mass nouns based on number 22% of the time, as opposed to 0% in the adult group. Thus, despite the fact that the 10;0-11;6 year-olds are clearly better than the other child groups, we cannot say that they are completely adultlike.

In the flexible-count condition, differences between the child groups and the adults were, for the most part, not significant. Nevertheless, there is a clear trend in the flexible-count condition that all children (except for the youngest ones, who base all their judgments on number) fail to base their judgment on number a fair amount of the time (10-32%), whereas adults base their judgments on number in this condition 100%. Interestingly, the teenagers (age groups 13;5-14;6 and 16;8-17;11) fail to base their judgments on number more often than the younger children, and thus seem less adultlike than their younger peers in the flexible count condition.

To sum up, we found that the mass/count distinction in Hebrew does not seem to emerge before the age of 6;1, as the children under the age of 6;1 tested here almost always based their judgments on number, regardless of noun type. The ability to distinguish between mass and count nouns was demonstrated, to some extent, by children between ages 7;2-11;6, only to become less adultlike again for the 13;5-14;6 year olds. Finally, the oldest children (aged 16;8-17;11) did demonstrate development towards convergence, as compared to the younger teenagers, with a considerable decrease of number-based judgments on the two mass conditions along with
some increase in the rate of number-based judgments in the flexible-count condition. Yet, even the oldest age-group still significantly differs from the adults on the substance-mass condition and the flexible-mass condition. In the flexible-count condition they do not reach adultlike percentages either. This is in sharp contrast to what was found for English-speaking children, who show significant sensitivity to the mass/count distinction already as early as age 4.9

5. General Discussion

Our data show that, in contrast to the relatively early sensitivity evinced by English-acquiring children, Hebrew-speaking children do not distinguish between count and mass nouns prior to age 6;1. The data of the youngest group suggest that these young Hebrew speakers have a general tendency to base their judgment of quantity on number, regardless of the noun type. This implies that Hebrew-acquiring children up to age 6;1 do not distinguish between mass and count nouns. As a strategy, then, they treat all nouns as count nouns, which may be the default or unmarked status of a noun10.

After the age of 6;1 (in our data from the age of 7;2 on), Hebrew-speaking children start to distinguish between count and mass nouns, basing their judgments on number of items generally more often in the count, flexible-count and object-mass conditions than in the (substance) mass and flexible-mass conditions.

Despite an apparent (though weak) sensitivity of the child population to the mass/count distinction starting from the age of 7;2, the distinction between mass versus count nouns is not nearly as clear-cut as for Hebrew-speaking adults, even in the oldest age group. In particular, in the mass and the flexible-mass conditions, which require volume-based judgments, a substantial percentage of judgments are not based on volume. Conversely, in four out of five of the child groups (all children but the youngest), a relatively large proportion of judgments in the flexible-count condition are not based on number. This indicates that the distinction between mass and count nouns for Hebrew-speaking children (even for 17/18-year-olds) is far from discrete, and may be even non-existent. This strongly contrasts with the behavior of the Hebrew-speaking adults, who employ a clear grammatical distinction between mass and count nouns. A highly interesting fact is that up to age 10, the children show clear development towards adultlike performance, whereas the teenagers (age 10 and up) distort this trend and move away from adultlike performance.

As an explanation for the children’s behavior, we propose that these unexpected results reflect a process of change currently taking place in Hebrew. We further propose two possible sources for the process. The first is

9 As an anonymous reviewer has pointed out, Barner and Snedeker’s original procedure used actual scenes, while we use pictorial depictions in the current study. Though this is clearly a significant difference between our experiment and Barner and Snedeker’s, it cannot conceivably explain the fact that even the oldest children in our sample performed non-adultlike.

10 See Chiarelli, El Yagoubi, Mondini, Bisiacchi, and Semenza (2011) for evidence from processing that count may be the default value of nouns. But cf. analyses by Borer (2005), Chierchia (1998; 2010), and Rothstein (2007) (among others) for arguments in favor of mass being some sort of default.
related to the fact that the grammaticization of the mass/count distinction in Hebrew is rather marginal, as reflected by the relative paucity of syntactic structures that encode the distinction in Hebrew. Alternatively, our data may reflect a change process that involves obligatory number marking in cardinality contexts becoming optional.

Let us begin with the second hypothesis. While there is numerosity in the world, grammaticalized plural marking significantly varies crosslinguistically, and even within the same language. As a general rule, plural number-marking on the noun in cardinality contexts is obligatory in adult Hebrew, as illustrated by the examples below:

(10) a. *shlosha kadurim/*kadur
    three ball-pl.m/*ball-ø

b. *sheva rof’ot/*rof’a
    seven physician-pl.f/*physician-ø.f

c. *xameshesre mitot/*mita
    fifteen bed-pl.f/*bed-ø.f

d. *shisim sfarim/*sefer
    sixty book-pl.m/*book-ø.m

However, there are certain cardinality contexts which do allow for the omission of such plural marking, for example:

(11) a. *shlosha shkalim/shekel
    three Shekel-pl.m/Shekel-ø

b. *xamisha anashim/ish
    five man-pl.m/man-ø

c. *esrim shanim/shana
    fifteen year-pl/year-ø

It is not clear what licenses these omissions, but crucially, the number of nouns that allows them is very restricted. Perhaps what the experimental results indicate is a relaxation in the younger population’s grammar of the restriction that requires obligatory marking in adult cardinality contexts. In other words, what the acquisition data may demonstrate is that the younger population overgenerate the null marking of plurality to contexts where plurality marking is in fact obligatory. It is interesting to note that the overgeneration does not occur 100% of the time; rather, there is a clear element of optionality such that the children optionally allow plural marking to be omitted.

Hence, one possible source for the change is that the younger Hebrew-speaking population is allowing for optional plural-marker omission in cardinality contexts where plural-marking is obligatory in adult Hebrew. To be clear, the proposal here is not that the children assume that singular stone and singular flour are really plurals that lost their plural marking – such singular/mass contexts are irrelevant for the proposal. The relevant contexts are only plural contexts that in the adult grammar are obligatorily
marked for plurality. The developing grammar, in contrast, allows for the omission of the plural marker in such contexts.  
Alternatively, as mentioned above, the change may be related to the status of grammaticalized mass/count distinction in Modern Hebrew. Let us now explore this alternative account.

As opposed to English, Hebrew syntax does not offer many cues regarding the mass/count distinction. English morphosyntax marks the mass/count distinction by a variety of structures, including indefinite articles; numerals; modification by quantifiers such as much/little/less (for mass nouns) vs. many/few/fewer (for count nouns); modification by quantifiers such as each, every (only available for count nouns), and pluralization. All these distinguishing mechanisms are illustrated below in (12)-(17) where the (a) and (b) sentences exemplify mass and count nouns, respectively:

(12) Indefinite articles
   a) *a flour
   b) a flower

(13) Numerals
   a) *one/two/three/four/five/six/... sands
   b) one/two/three/four/five/six/... shoes

(14) Quantifiers – much/little/less
   a) much/little/less milk
   b) *much/little/less chair(s)

(15) Quantifiers – many/few/fewer
   a) *many/few/fewer milks
   b) many/few/fewer chairs

(16) Quantifiers – each/every
   a) *each/every silver
   b) each/every bottle

(17) Pluralization
   a) flour - *flours
   b) flower – flowers

In contrast, the only prominent structures distinguishing mass/count in Hebrew are pluralization and numerals, as described in the introduction. This is summarized in the table below:

---

11 Crucially, this proposal says nothing about the status of the mass/count in the young grammars.
Table 2

Encoding of the mass/count distinction (English vs. Hebrew)

<table>
<thead>
<tr>
<th>Structure/Language</th>
<th>ENGLISH</th>
<th>HEBREW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indefinite article distinguishes mass/count</td>
<td>✓</td>
<td>-</td>
</tr>
<tr>
<td>Quantifiers uniquely select for mass/count</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>(much/little/less vs. many/few/fewer, each, every only with count nouns)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Pluralization restricted to count nouns</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Numerals</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Thus, in English, the distinction is quite ubiquitous, both in terms of the variety of different syntactic structures that encode it and in terms of the prevalence and frequency of these structures in the language, offering the English acquiring child an abundance of unambiguous cues regarding the mass/count distinction. This is in sharp contrast to what Hebrew offers. Neither indefinite articles, nor any of the quantifiers illustrated above distinguish between mass and count nouns in Hebrew, as illustrated in (18)-(21) below, where the (a) and (b) sentences exemplify mass and count nouns respectively.

First, and most importantly, Hebrew does not have an (overt) indefinite article that can distinguish between mass and count nouns, as illustrated by the example in (18):

(18) a. orit oxelet orez.
   Orit eat-sgf rice
   'Orit is eating rice.'
  
   b. orit oxelet Ø tapuax.
   Orit eat-sgf (an) apple
   'Orit is eating an apple.'

Moreover, the Hebrew counterpart of both much and many is harbe, which modifies both count and mass nouns, as in the example below:

(19) a. lo nish'ar harbe orez ba'aron.
   no left-3pl much rice in-the-cupboard
   'There isn't much rice left in the cupboard.'
  
   b. lo nish'aru harbe tapuaxim basal.
   no left-3pl many apples in-the-basket
   'There aren't many apples left in the basket.'

Out of this entire list of quantifiers that distinguish mass nouns from count in English, the only reliable distinction in Hebrew comes from kol ('each/every'), which may modify count nouns but not mass nouns. We further discuss this point below.
The same applies for a little and few, which in Hebrew are both expressed by *ktsat*:

(20)

a. *toxal ktsat orez!*
   
   eat-2sgmfut a-little rice
   
   'Eat a little rice!' 

b. *toxal ktsat tapuxim!*
   
   eat-2sgmfut few apples
   
   'Eat a few apples!'

Finally, *paxot* is the Hebrew equivalent of both less and fewer:

(21)

a. *ata tsarix le'exol paxot orez beyom.*
   
   you-sgm need-sgm eat-inf less rice in-day
   
   'You should eat less rice every day.'

b. *ata tsarix le'exol paxot tapuxim beyom.*
   
   you-sgm need-sgm eat-inf less apples in-day
   
   'You should eat fewer apples every day.'

As the examples above demonstrate, the only prevalent, widespread syntactic mechanism that distinguishes mass from count nouns in Hebrew is pluralization. An additional mechanism available in Hebrew is the use of numerals, which is closely tied to pluralization.

We should mention here that Standard Hebrew does have a small number of structures that supposedly select for either mass or count nouns. These include the negative polarity item *af* (as in *af yeled/shulxan/mita* ‘no boy/boy/table/bed’ versus *#af kemax/melax/orlez* #‘no flour/salt/rice), and the quantifier *me‘at* (‘few’), which, according to Standard Hebrew, disfavours a mass context, thereby contrasting with *ktsat* (‘a little’), which selects for a count noun. However, though these contrasts might hold prescriptively in Standard Hebrew, according to the author’s native intuitions and corroborated by several native speaker informants, in colloquial Hebrew the judgments are far from clear-cut and certainly do not provide a reliable marker for the mass/count distinction. Another relevant quantifier is *rabim* (‘many’), which is only grammatical with plural count nouns. Nonetheless, *rabim* is rarely used in colloquial speech and certainly never in teenage everyday speech. In that respect, then, it makes little sense to consider it a strong distinguishing mechanism. One quantifier that can indeed be considered a relatively reliable marker for the mass/count distinction is the quantifier *kol* (‘each/every’), which may modify count nouns but not mass nouns. Yet, even *kol*, albeit more reliable than the previously mentioned structures, is still not as unambiguous in terms of its distinguishing power as the indefinite article or the English quantifiers discussed above.

---

13 As mentioned in footnote 11, there is also ‘each/every’, which are restricted to singular count nouns, but these are clearly not as central and prevalent in the language as pluralization is.

14 We thank an anonymous reviewer for pointing this out.
Hence, it is quite clear that, overall, Hebrew does not provide the same number of robust grammatical mechanisms that can help distinguish mass from count nouns. Furthermore, Hebrew nouns appear to be relatively flexible in terms of mass/count categorization, even when it concerns pluralization. As Doron and Müller (2013) point out, many mass nouns in Hebrew carry plural morphology (-im for masculine and -ot for feminine), as can be seen below:

\[(22)\]

- **a. máyim** *(may)*
  - water-pl
  - water
- **b. atik-ot** *(atika)*
  - antiquities-pl
  - antiquities
- **c. shimurim** *(shimur)*
  - canned goods
  - canned goods
- **d. shmarim** *(shemer)*
  - yeast-pl
  - yeast

Similarly, it has become increasingly common, particularly in recent years, to see mass nouns used in count syntax, for example:

\[(23)\]

- **a. basar** *(meat’)*
  - >>
  - **bsaraim** *(meat-plu)*
- **b. lexem** *(bread’)*
  - >>
  - **lexamim** *(bread-plu)*
- **c. rexev** *(vehicle’)*
  - >>
  - **rexavim** *(bread-plu)*
- **d. dam** *(blood’)*
  - >>
  - **damim** *(blood-plu)*

Support for the suggestion that the syntactic mass/count distinction is not very central in Modern Hebrew comes from the fact that the child results on the classical mass and count nouns are almost always more adultlike than on the flexible nouns. Recall from the methodology section that, crucially, the flexible conditions test only the syntactic mass/count distinction, whereas in the classical mass/count conditions, the linguistic distinction may be facilitated by the conceptual substance/object distinction. Thus, in the absence of any conceptual cues, Hebrew-speaking children often fail to correctly associate the correct syntactic structure with the particular mass/count interpretation. Additional support for this account comes from English-acquisition data, which reveal precisely the converse dissociation, with young children (mean age 4;3) performing more adultlike on flexible nouns than on classical mass/count NPs (cf. Barner and Snedeker, 2005). This suggests that the English-acquiring children rely more on the syntactic cues than on the cognitive/conceptual cues that distinguish mass from count nouns.

Hence, Hebrew, as opposed to English, is quite opaque with respect to the mass/count distinction, supplying the learner with few and rather unreliable syntactic cues regarding the mass/count status of nouns. The paradigm to be learned is therefore opaque enough to generate variation within and across speakers. In light of the specific intricacies of the Hebrew mass/count paradigm we argue that the grammatical mass/count distinction in Hebrew is undergoing a natural process of change. Following Lightfoot (1991; 1999)
and Pearl (2007) for L1 acquisition, as well as work on Creole languages (Mufwene 2001, 2008; DeGraff 1999; Aboh 2009, 2011), we propose that the results of our study may represent an example of language change resulting from individual learners’ misconvergence on the probability distribution of the adults. In the words of Pearl (2007), these data demonstrate a case of “imperfect learning” and hence may eventually lead to language change. Specifically, as we have shown earlier, adult Hebrew does not provide the child with enough unambiguous data regarding count versus mass syntax (see Table 2 and the discussion in the introduction above). Therefore, and especially given the ambiguity associated with the cues that are available (namely, pluralization), it is no surprise that individual Hebrew-acquiring children are unable to perfectly converge on the adult grammar. Such imperfect acquisition within individual learners over time may potentially lead to language change within the population of individuals.

To take this idea of imperfect acquisition even further, recall from the introduction section that the mass/count distinction can be characterized as a phenomenon at the interface between grammar and cognition. Several language acquisition studies show that interface phenomena are notoriously vulnerable when more than one language is involved (see Sorace and Filiaci, 2006 for second language acquisition and Hulk and Müller, 2000, and Müller and Hulk, 2001 for bilingual acquisition). This suggests that contact with another language during development has particularly significant effects on interface phenomena.

Recall that pluralization is essentially the only major mechanism in Hebrew that distinguishes between mass and count nouns. Nevertheless, it seems, based on a number of native speakers’ intuitions, that in general teenage Hebrew speakers more freely pluralize mass nouns than younger children and adults do. If this is indeed the case, then the main distinguishing linguistic mechanism, namely pluralization, no longer sets apart mass from count for teenagers, consequently rendering the mass/count distinction in this community effectively non-existent.

It is important to note at this point that although plural marking in Hebrew is in fact quite salient,15 it is nonetheless irrelevant to the issue of the mass/count distinction. Specifically, the mere fact that plural marking exists, does not in and of itself entail that it reliably distinguishes mass from count nouns, even if it is salient in the realm of AGR. In other words, we are not arguing that plural marking in general is not robust, but rather that its role as a distinguishing mechanism for mass/count is diminishing.

Support for the suggestion that the mass/count distinction is no longer a part of the teenagers’ grammar comes from the fact that judgments of the flexible count (68%) and the flexible mass (70%) conditions in the 13;5-14;6 age group is virtually identical, and not far from chance.

The fact that the older teenage group in our study is slightly more adultlike (but still significantly different!) than the younger teenagers could be

---

15 Hebrew has plural marking on adjectives, both predicative and attributives, on verbs, and on demonstratives, all agreeing in both number and gender and with distinct plural marking.
attributed to the fact that the latter have received more explicit instruction at school regarding the grammatical mass/count distinction in English. In sum, based on data from this study, we can argue that the importance of the linguistic mass/count distinction in English facilitates its acquisition in English-speaking children. In contrast, it is the (growing) unimportance of the Hebrew mass/count distinction, resulting from the relative paucity of triggers and/or cues in the Hebrew input that makes the acquisition of the mass/count distinction more laborious, causing Hebrew-acquiring children to lag far behind their English-acquiring peers. The Hebrew teenagers’ performance suggests that Hebrew may be undergoing a language change: it is shifting from being a language of the English type, in which the mass/count distinction is associated with grammatical properties, towards having a system in which the distinction involves the root-noun, on par with languages such as Halkomelem and Blackfoot (cf. Wiltschko, 2012). Hence, two possible predictions emerge: 1) if, indeed, according to the first hypothesis, Hebrew is in the process of becoming a language with optional plural marking across the board, then the prediction is that Hebrew-speaking teenagers will allow omission of plural marking in all cardinality; 2) alternatively, if the second proposal is on the right track and Hebrew is in the process of “losing” its grammatical mass/count distinction, then we expect that Hebrew-speaking teenagers will allow pluralization of mass nouns at a rate significantly higher than what is acceptable in the adult grammar. Whether one or the other turns out to be true is left for future research to determine.

References


Pelletier, F.J. (2012). Lexical nouns are neither mass nor count, but they are both mass and count. In D. Massam (Ed.), *A cross-linguistic exploration of the count-mass distinction* (pp. 9-26). Oxford: Oxford University Press.


APPENDIX I: Mass/count items

<table>
<thead>
<tr>
<th>Condition I: Count noun</th>
<th>Condition IV: Flexible-count noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. lemi yesh yoter efronot?</td>
<td>13. lemi yesh yoter xevel?</td>
</tr>
<tr>
<td>Who has more pencils?</td>
<td>Who has more rope?</td>
</tr>
<tr>
<td>2. lemi yesh yoter kadurim?</td>
<td>14. lemi yesh yoter glida?</td>
</tr>
<tr>
<td>Who has more balls?</td>
<td>Who has more ice-cream?</td>
</tr>
<tr>
<td>3. lemi yesh yoter kosot?</td>
<td>15. lemi yesh yoter nijar?</td>
</tr>
<tr>
<td>Who has more cups?</td>
<td>Who has more paper?</td>
</tr>
<tr>
<td>4. lemi yesh yoter tikim?</td>
<td>16. lemi yesh yoter pitsa?</td>
</tr>
<tr>
<td>Who has more bags?</td>
<td>Who has more pizza?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition II: Flexible-count noun</th>
<th>Condition V: Object-mass noun</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. lemi yesh yoter xavalim?</td>
<td>17. lemi yesh yoter rihut?</td>
</tr>
<tr>
<td>Who has more ropes?</td>
<td>Who has more furniture?</td>
</tr>
<tr>
<td>6. lemi yesh yoter glidot?</td>
<td>18. lemi yesh yoter sakum?</td>
</tr>
<tr>
<td>Who has more ice-creams?</td>
<td>Who has more silverware?</td>
</tr>
<tr>
<td>7. lemi yesh yoter nijarot?</td>
<td>19. lemi yesh yoter doar?</td>
</tr>
<tr>
<td>Who has more papers?</td>
<td>Who has more mail?</td>
</tr>
<tr>
<td>8. lemi yesh yoter pitsot?</td>
<td>20. lemi yesh yoter bigud?</td>
</tr>
<tr>
<td>Who has more pizzas?</td>
<td>Who has more clothes?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition III: Substance-mass noun</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9. lemi yesh yoter orez?</td>
<td></td>
</tr>
<tr>
<td>Who has more rice?</td>
<td></td>
</tr>
<tr>
<td>10. lemi yesh yoter xalav?</td>
<td></td>
</tr>
<tr>
<td>Who has more milk?</td>
<td></td>
</tr>
<tr>
<td>11. lemi yesh yoter kemax?</td>
<td></td>
</tr>
<tr>
<td>Who has more flour?</td>
<td></td>
</tr>
<tr>
<td>12. lemi yesh yoter batsek?</td>
<td></td>
</tr>
<tr>
<td>Who has more dough?</td>
<td></td>
</tr>
</tbody>
</table>