The Interpretation of Null and Overt Pronouns in Japanese: Grammatical and Pragmatic Factors

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Abstract

Pronoun interpretation in English has been demonstrated to be sensitive to an interaction between grammatical and pragmatically-driven factors. This study investigated the interpretation of pronouns in Japanese, which has both null and overt forms. Thirty-two native speakers of Japanese participated in a passage completion experiment with transfer-of-possession contexts, varying prompt type, aspect, and topic/nominative-marking of the previous subject. Two judges annotated the referents of the matrix subjects and coherence relations in the completed passages. Japanese overt pronouns were revealed to pattern closely with English overt pronouns in their sensitivity to pragmatic factors, whereas Japanese null pronouns were predominantly governed by grammatical position. Somewhat surprisingly, topic-marking did not influence reference or coherence relations. The data suggest distinctive patterns of interactions between grammatical and pragmatic factors in the interpretation of null and overt pronouns in Japanese, and cast doubt on the existence of a division of labor between the two forms.

Keywords: Japanese pronoun interpretation, discourse processing, cross-linguistic language processing

Introduction

Previous work (Stevenson, Crawley, & Kleinman, 1994; Arnold, 2001; Rohde, Kehler, & Elman, 2006, 2008) has shown that pronoun interpretation in English is driven by the interaction of grammatical and pragmatic biases. For instance, Rohde et al. (2006) showed that pronoun interpretation differs in transfer-of-possession passages that vary by verbal aspect between perfective (1) and imperfective (2).

(1) John$_{\text{SOURCE}}$ handed a book to Bob$_{\text{GOAL}}$
    He _____

(2) John$_{\text{SOURCE}}$ was handing a book to Bob$_{\text{GOAL}}$
    He _____

The context sentences in (1) and (2) contain two possible referents for the pronoun, one that appears in subject position and fills the Source thematic role (*John*), and one that appears as the object of a prepositional phrase and fills the Goal thematic role (*Bob*). The results of a passage completion experiment revealed significantly more interpretations of pronouns to the Source referent (the grammatical subject) in the imperfective condition as compared to the perfective condition. Rohde et al. also found that the influence of aspect in pronoun interpretation was correlated with certain relationships inferred to hold between the two clauses (henceforth 'coherence relations'), suggesting that a shift in the distribution of coherence relations induced the shift in the distribution of pronoun interpretations.

Following Stevenson et al. (1994), Rohde et al. (2008) ran passages with pronoun prompts like (1) against those with 'free' prompts (3).

(3) John handed/was handing a book to Bob.
    _____

Results showed more references to the Source and more Source-biased coherence relations in the pronoun condition than in the free condition, indicating that pronouns overlay a grammatical subject bias on top of the pragmatic biases that were revealed by the aspect manipulation.

Present Study

Null pronouns in Japanese occur most commonly in subject position, but occasionally in object positions as well (Ueno & Polinsky, 2009). Overt pronouns also exist, but occur less commonly than the null forms (Martin, 1976).[1]

The interpretation of Japanese null pronouns has been claimed to be analogous to the interpretation of overt pronouns in other languages without a null form (e.g., Kuroda, 1965; Kameyama, 1985; inter alia). The GIVENNESS HIERARCHY (GH) of Gundel, Hedberg, and Zacharski (1993) makes this claim as well, and further predicts that the Japanese null and overt forms should display a 'division of labor' effect whereby the preferred referents of the two forms fall into complementary distribution. These predictions result from the fact that the six cognitive statuses that comprise the GH participate in an implicational hierarchy, and are thus expected to give rise to scalar implicatures. According to the GH, English overt pronouns and Japanese null pronouns require referents of the highest status (IN FOCUS), whereas Japanese overt pronouns occupy the second highest status (ACTIVATED).

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[1] The Japanese third person overt pronouns (e.g., *kare* 'he', *kanojo* 'she') are generally considered to be direct translations of their English counterparts, and appear to be becoming incorporated into daily Japanese at an increasing rate. A corpus count of *Asahi Shimbun* (popular Japanese newspaper) articles shows that out of 11,073,167 sentences, *kare* was used 28,795 times and *kanojo* 14,209 times (Amano & Kondo, 2000).

Whereas overt pronouns are compatible with both ACTIVATED and IN FOCUS referents, Grice's (1975) Maxim of Quantity ('say as much as you need to say') predicts that the informationally-stronger null form should be used for IN FOCUS referents, in turn predicting that overt pronouns will be used only for referents that are ACTIVATED but not IN FOCUS, creating the division-of-labor effect.

A relatively small number of experimental studies have been performed on the interpretation of null pronouns. Working within Centering Theory, Walker, Iida, and Cote (1994) reported an influence of grammatical/information-structural factors found in a referent-choice experiment, including higher salience for topic-marked (-*wa*; cf. Kuno, 1973) than nominative/subject-marked (-*ga*) referents. A recent study by Christianson and Cho (2009) suggests that topical arguments in Odawa are more likely to be realized as null pronouns than non-topical arguments. Experiments performed by Alonso-Ovalle et al. (2002) offered mixed support for a division-of-labor effect between null and overt pronouns in Spanish. In a written questionnaire study, for instance, null pronouns referred to the previous subject 73.2% of the time whereas overt pronouns did 50.2% of the time; while null pronouns clearly incorporated a stronger subject bias, the referents of the two forms were not strictly in complimentary distribution. Further, whereas an acceptability judgment task found that participants rated sentences with unambiguous references to the previous subject as being more acceptable when a null pronoun was used (4.19 on a 5-point scale) as compared to when an overt pronoun was used (3.57), the overt pronoun cases were still deemed to be relatively acceptable.

Taken together, the foregoing work gives rise to a series of questions that the present study seeks to answer. First, we ask whether the behavior of Japanese null and/or overt pronouns patterns with that of English overt pronouns in displaying sensitivity to pragmatic subsequent-mention biases, or whether their interpretation is determined primarily by other (e.g., grammatical) factors. This question can be addressed by employing a passage completion task that uses the same aspect manipulation employed by Rohde et al. (2006). The second question is whether null and overt Japanese pronouns exhibit a division-of-labor effect such that, for instance, a demonstrated subject bias for null pronouns corresponds to a commensurate non-subject bias for overt pronouns. This question will be answered using a manipulation that varies prompt type between null pronoun, overt pronoun, and free. Third, we ask whether topic-marked antecedents attract more pronominal references than subject-marked antecedents. We will answer this question by varying the morphological marking on the first mentioned referent of the preceding clause, specifically between subject/nominative marking (-*ga*) and topic marking (-*wa*). Lastly, we ask whether any grammatical biases that are revealed to be associated with these referential forms affects the distribution of ensuing coherence relations, as Rohde et al. (2008) found for English. This question will be answered by having judges annotate the completions with respect to coherence relations and comparing the resulting distributions across prompt types.

Methods

We followed the passage completion task design used by Rohde et al. (2006, 2008) using Japanese stimuli.

Participants

Thirty-two native speakers of Japanese recruited from the San Diego area participated in the study. Participants were reimbursed for their time.

Materials

The experiment employed a 3x2x2 design that varied prompt type (Null-pronoun[2]/Overt-pronoun[3]/Free), aspect (Perfective/Imperfective[4]), and topic/nominative-marking of the context sentence subject (-*wa*/-*ga*), as shown in (4).

(4) Stimuli

太郎は/が 次郎に 本を渡した/渡している ところだった。
Taro-wa/ga Jiro-ni hon-o watashita/watashi-te-iru
    tokoro-datta.
Taro-TOP/NOM Jiro-to book-ACC handed/hand-INF-ASP
    scene-was
'Taro handed/was handing a book to Jiro.'

主語省略/彼は/自由_____
shugo-shoryaku/kare-wa/jiyu
subject-omission(Null)/he-TOP(Overt)/free(Free)

The 60 experimental stimuli each had context sentences with different transfer-of-possession verbs. The Source referent ('Taro' in (4)) always appeared in subject position, and the Goal referent ('Jiro') was the dative/'to'-marked indirect object of the sentence. All verbs described physical transfer events (e.g., 'hand', 'throw').

Fillers consisted of 40 context sentences, containing transitive or intransitive non-transfer verbs in the perfective

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[2] The 'subject-omission' prompt was used to indicate the presence of a null pronoun. A pilot study revealed that most participants were capable of continuing such prompts appropriately, which was confirmed in the actual study.

[3] All overt pronoun prompts were topic-marked. This was done because the pilot study revealed that nominative-marked overt pronouns tend to be used to express an embedded subject of a complex sentence rather than a matrix subject. Topic-marking the pronoun resolved the issue.

[4] Imperfectivity is not as straightforward to encode in Japanese as in English, since -*teita* 'was ~ing' is ambiguous between a perfective and imperfective reading depending on the verb (or VP) with which it co-occurs. Because transfer-of-possession verbs typically express achievement events as a default, the more natural interpretation of -*teita* with these verbs is perfective. We therefore use *tokoro* ('was in the scene of') to 'stretch out' instantaneous events and make an imperfective reading of achievement events possible, in a manner similar to what the English progressive does to achievement events.

or imperfective aspect. The transitive verbs varied between active and passive voice, and adverbs, names, and gender-unambiguous overt pronouns served as prompts. The 100 sets of sentences instantiating the 12 (3x2x2) experimental conditions were placed in a Latin square design to create 12 parallel lists of 100 sentences, such that no one participant saw more than one sentence from each set.

Task

Using a web-based interface, participants were asked to write continuations for the 100 passages. They were instructed to imagine a natural continuation to the story, writing the first continuation that came to mind and avoiding humor.

Data Analysis

Following previous studies on English, we focused our analysis on the interpretation of matrix subjects. Identifying the matrix subject can be less straightforward in Japanese than in English, however, since Japanese clauses may contain multiple null elements, and are characterized by flexible and head-final word order. It therefore proved useful to translate the continuations into English, thereby recovering the referents of null elements. For instance, if the original sentence in Japanese said 'felt happy because passed exam', detectable null pronouns were postulated, as in '(s/he) felt happy because (s/he) passed (her/his) exam' in the relevant English translation. The first author (who is a native speaker of Japanese) then underlined the likely matrix subject of the given sentence for the subsequent annotation processes.

Two trained judges, who were native speakers of Japanese but were blind to the experimental hypotheses, annotated the referent of the matrix subject of each continuation sentence with respect to five categories: Source ('Taro' in (4)), Goal ('Jiro'), Theme ('book'), Other, and Unsure. The judges were instructed to do the annotation separately, without talking to each other. The first author compared their annotations and discarded the cases the judges did not agree on, as well as the cases in which participants did not omit a subject even though they were given a null pronoun prompt. The tokens discarded in this way constituted about 15% of the data.

The remaining tokens were then given back to the judges for annotating the coherence relations that held between each context sentence and continuation, as shown below (Hobbs, 1990; Kehler, 2002; Rohde, 2008).[5]

Elaboration: continuations that provide additional details about the eventuality described in the context sentence
e.g., *Taro handed a book to Jiro. He did so slowly and carefully.*

Explanation: continuations that describe the cause of the eventuality described in the context sentence
e.g., *Taro handed a book to Jiro. He no longer had a use for it.*

Occasion: continuations that describe an eventuality that initiates from the end state of affairs of the eventuality described in the context sentence
e.g., *Taro handed a book to Jiro. He began reading it.*

Result: continuations that describe the effect or result of the eventuality described in the context sentence
e.g., *Taro handed a book to Jiro. He thanked him for the gift.*

The judges resolved disagreements through discussion.

Results

Reference

ANOVAs were run on the percentage of Source referents as a function of the total number of Source and Goal referents. Prompt type, aspect, and topic/nominative marking were used as factors. There was a significant main effect of prompt type [$F_1(2, 31) = 74.11$, p<.0001; $F_2(2, 59) = 64.10$, p<.0001]. Subsequent Tukey HSD posthoc comparisons found significant differences in order of Null > Overt > Free by both participants and items, i.e., Null pronouns were most Source-biased, followed by Overt pronouns, followed by Free prompt continuations. There was also a significant main effect of aspect [$F_1(1, 31) = 15.81$, p<.0001; $F_2(1, 59) = 21.02$, p<.0001], indicating that Imperfectives yielded more Source referents than Perfectives. Figure 1 shows the proportion of Source and Goal referents for each prompt type and aspect (collapsed over topic/nominative-marking) averaged across participants. The null pronoun conditions had about 80% Source referents irrespective of aspect, while Overt and Free conditions varied by aspect. Pairwise comparisons between Imperfectives and Perfectives within each prompt type revealed significant differences for Overt pronoun [$t_1(31) = 3.70$, p=.0008; $t_2(59) = 3.95$, p=.0002] and Free [$t_1(31) = 1.59$, ns; $t_2(52)^6 = 3.47$, p=.0011][7] conditions, but not for Null conditions.

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[5] Although there are several other coherence relations which sometimes occurred – e.g., 'Violated Expectation' and 'Parallel' – we analyzed only these four.

[6] Some degrees of freedom vary due to missing cells.

[7] The lack of significance by subjects in the Free prompt condition was due in part to the fact that the analysis included all continuations, as opposed to only those in which participants started their continuation with something other than a pronoun (i.e., a proper name). When name continuations only were compared, the aspect distinction yielded a marginal effect by participants [$t_1(23) = 2.02$, p=.0551] and remained significant by items [$t_2(43) = 2.56$, p=.0141].
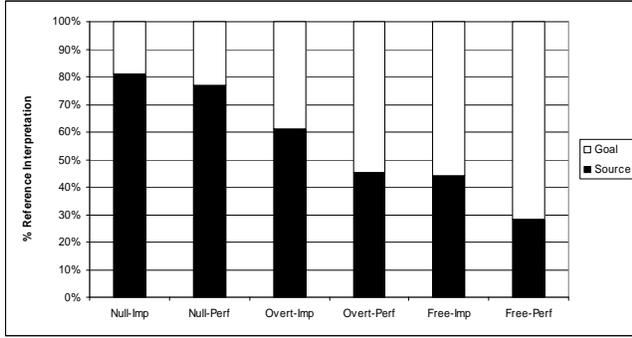
Figure 1: Proportion of Source and Goal referents for all conditions (collapsed over topic-marking).

Mirroring Rohde et al. (2008), overt pronouns led to significantly more subject mentions of the Source than free prompts. We further divided the free prompt continuations according to their matrix subject type, namely, Null pronouns, Overt pronouns, and Names, and performed the same ANOVA as above. The results yielded significant main effects of aspect [$F_1(1, 31) = 4.01$, p=.0462; $F_2(1, 59) = 6.02$, p=.0149] and subject type [$F_1(2, 31) = 67.59$, p<.0001; $F_2(2, 59) = 43.40$, p<.0001]. Subsequent Tukey HSD posthoc comparisons found significant differences in order of Null > Overt > Free by participants and Null > Overt, Free by items, which shows the highest proportion of Goal referents for Name continuations, again consistent with Rohde et al.

Unlike aspect, however, there were no significant main effects or interactions involving topic-marking. Figure 2 shows the proportion of Source and Goal referents for each prompt type and topic/nominative-marking (collapsed over aspect) averaged across participants. Pairwise comparisons between Topics and Nominatives within each prompt type revealed no significant differences for any prompt type, but there was a marginal difference in Null continuations [$t_1(30) = 1.70$, p=.0989; $t_2(57) = 1.87$, p=.0665] that favored subject referents in the topic condition.
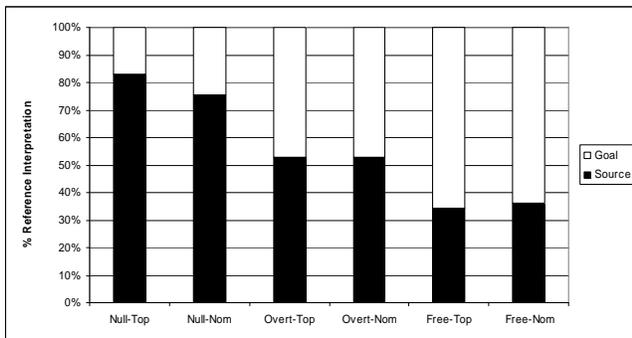

Figure 2: Proportion of Source and Goal referents for all conditions (collapsed over aspect).

Coherence Relations

Figure 3 shows the Source/Goal referent count for each coherence relation (collapsed over 12 experimental conditions) averaged across participants.
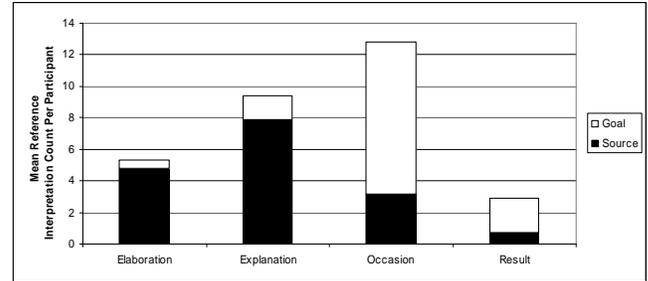

Figure 3: Mean Source/Goal referent count for each coherence relation (collapsed across conditions).

Figure 4 shows the referent biases as proportions between Source- and Goal-referential completions. As has been previously reported for English (Rohde et al., 2006), Elaboration and Explanation are highly Source-biased whereas Occasion and Result are highly Goal-biased.
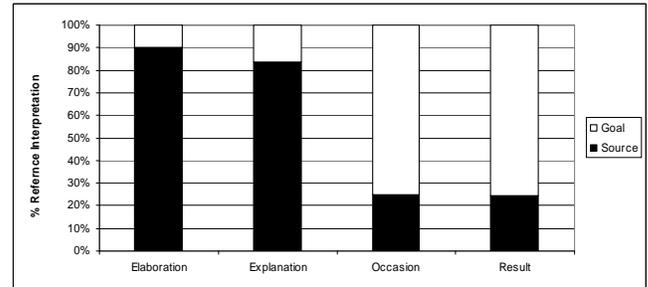

Figure 4: Proportion of Source/Goal referents for each coherence relation (collapsed over conditions).

For our statistical analysis, we collapsed the proportion of Elaboration and Explanation (Source-biased relations) on the one hand and Occasion and Result (Goal-biased relations) on the other hand for each participant's continuations, and conducted repeated measures ANOVAs on the proportion of Source-biased relations over Source- and Goal-biased relations. There was a significant main effect of prompt type [$F_1(2, 31) = 25.94$, p<.0001; $F_2(2, 59) = 22.34$, p<.0001; Tukey HSD: Null > Overt > Free by participants, and Null > Overt, Free by items], suggesting that Null prompt conditions were most Source-biased. There was also a significant main effect of aspect [$F_1(1, 31) = 9.75$, p=.0018; $F_2(1, 59) = 9.54$, p=.0021], suggesting that Imperfectives yielded more Source-biased relations than Perfectives (Figure 5). Pairwise comparisons between Imperfectives and Perfectives within each prompt type revealed significant differences for Overt pronoun prompt conditions [$t_1(31) = 3.68$, p=.0009; $t_2(59) = 3.82$, p=.0003] and marginal by-item significance for Free prompt

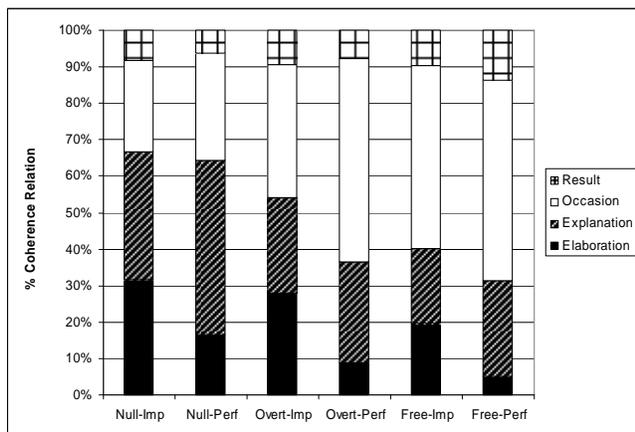conditions $[t_1(31) = 1.64$, ns; $t_2(44) = 1.90$, p=.0637]^8, but non significance for Null conditions.^{9}

Figure 5: Proportion of coherence relations for all conditions (collapsed over topic-marking).

Figure 6: Proportion of coherence relations for all conditions (collapsed over aspect).

As was the case for reference, ANOVAs revealed no main effects or interactions involving topic marking. While Figure 6 indicates a small numerical trend of more Source-biased relations for topic-marked than nominative-marked Overt and Free continuations, pairwise comparisons between Topics and Nominatives within each prompt type revealed no significant or marginal differences.

In summary, the distribution of coherence relations generally followed the pattern found for reference, being consistent with previous studies in English (Rohde et al., 2006, 2008).

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[8] As was the case for reference, the mixed results for the Free prompt condition were due in part to the fact that the analysis included all continuations, as opposed to only those in which participants started their continuation with something other than a pronoun (i.e., a proper name). When only Name continuations were compared, there was a marginal difference between Imperfectives and Perfectives by participants $[t_1(20) = 1.98$, p=.0619] and a significant one by items $[t_2(32) = 2.05$, p=.0483].

[9] Posthoc observation revealed that the proportion of Elaborations within the Source-biased relations was consistently higher for Imperfectives than Perfectives for all prompt types. ANOVAs run on the proportion of Elaboration over Elaboration and Explanation relations revealed a significant main effect of aspect $[F_1(1, 31) = 28.29$, p<.0001; $F_2(1, 59) = 30.63$, p<.0001] with no other statistically-supported main effects or interactions. Imperfective conditions had a uniformly higher proportion of Elaboration than Explanation relations across prompt types; pairwise comparisons between Imperfectives and Perfectives within each prompt type revealed significant differences for all types except for Free prompts by subjects [Null: $t_1(23) = 2.42$, p=.0240; $t_2(39) = 2.54$, p=.0151; Overt: $t_1(24) = 3.36$, p=.0026; $t_2(39) = 3.06$, p=.0040; Free: $t_1(17) = 1.70$, p = .1069; $t_2(28) = 2.36$, p=.0256]. Participants were therefore more likely to elaborate an event described as ongoing (imperfective) than one described as completed (perfective), indicating an effect of aspect on coherence that is independent of the choice of subsequently mentioned entity.
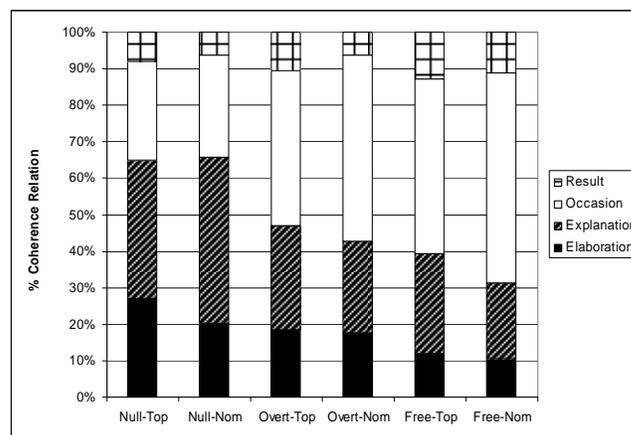
Discussion

We are now in a position to answer the four questions posed in the introduction to the paper. First, we asked whether the behavior of Japanese null and/or overt pronouns patterns with that of English overt pronouns in displaying sensitivity to pragmatic subsequent-mention biases, or whether their interpretation is determined primarily by other (e.g., grammatical) factors. The results indicate that Japanese null pronoun interpretation is not analogous to English overt pronoun interpretation as previous researchers have suggested. Instead, null pronouns were most strongly and uniformly Source-biased for both interpretation and coherence relations, apparently being driven predominantly by grammatical position and without showing sensitivity to the aspect manipulation. Instead, overt Japanese pronouns patterned with English in demonstrating such sensitivity, with Imperfective conditions yielding more Source referents and Source-biased coherence relations. Further, overt pronouns led to significantly more mentions of the Source than free prompts, demonstrating that, like English overt pronouns, Japanese overt pronouns overlay a subject bias on top of pragmatically-driven ones. Indeed, the results for Japanese overt pronouns mirrored those of Rohde et al. (2006, 2008) for English pronouns quite closely.

The second question we asked is whether null and overt Japanese pronouns exhibit a division-of-labor effect such that a demonstrated subject bias for null pronouns would correspond to a commensurate non-subject bias for overt pronouns. The answer is no; both null and overt pronouns displayed a subject bias, and hence their referents were not in complimentary distribution. Although the nature of the biases were different – overt pronouns overlay a subject bias on top of pragmatically-driven subsequent-mention biases as measured in the free prompt condition, whereas null pronouns appear to have a more grammaticalized subject bias that is impervious to pragmatic expectations – both pronominal forms were used to refer to Sources more often

than Goals. It therefore appears that the use of an overt pronoun does *not* implicate that the referent is an entity other than what the preferred referent would have been if a null pronoun had been used (i.e., the subject). At first blush, these patterns nonetheless appear consistent with those found for Spanish by Alonso-Ovalle et al. (2002), although further comparison is difficult since the experimental tasks and manipulations carried out were very different.

The third question we asked was whether topic-marked antecedents attract more pronominal references than subject-marked antecedents. The answer again was no. Perhaps surprisingly, there was no significant influence of topic marking across prompt types.

Lastly, we asked whether any grammatical biases that are revealed to be associated with these referential forms affects the distribution of ensuing coherence relations, as Rohde et al. (2008) found for English. This is clearly the case. Although the null and overt pronouns were always fully ambiguous between the available Source and Goal referents, their appearance in a prompt biased the continuation toward mentioning the previous subject referent first, which in turn biased the participants toward continuing the story using a Source-biased coherence relation. Further, while the aspect manipulation in the null pronoun condition created differences in the distribution of Source-biased relations – imperfectives resulted in a greater number of Elaborations, at the expense of Explanations (see footnote 9) – it did not change the allocation between Source- and Goal-biased relations, in accord with the fact that the aspect manipulation resulted in no difference in the distribution between Source and Goal referents.

Several experiments suggest themselves as ways of confirming the conclusions arrived at in this paper. One is to see whether the lack of effect of pragmatic bias for null pronouns holds across different verb types. Whereas we manipulated aspect on a single type (transfer of possession), we could also vary the verbs themselves, choosing types that are known to yield substantially different subsequent-mention biases. Contexts employing object-biased implicit causality verbs, for instance, would offer strong test for the subject bias associated with null pronouns. Likewise, the lack of effect of topic-marking could be further examined by comparing reference in contexts in which nominative-marked subject referents compete with topic-marked object referents. Such studies remain for future work.

Acknowledgments

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