ELM

Comparing Global and Local Accommodation: Rating and Response Time Data

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Abstract. This paper addresses the question to what extent global and local accommodation should be viewed as sharing the same underlying mechanism or whether they are distinct processes that only happen to share the same label. We present offline rating data and response times from a mouse-tracking experiment that directly compared global and local accommodation for five different triggers. The results show that globally accommodating a presupposition led to a larger decrease in acceptance than locally accommodating, and that response times for local accommodation were overall faster. While we take the results to be inconclusive with regard to the question about the underlying mechanism, we conjecture that the contexts tested here were more favorable for local accommodation, and that hence investigating how different contexts affect the relative ease of accommodation type is a promising avenue for future research.

Keywords. presupposition; accommodation; mouse-tracking

1. Introduction. Presuppositions are traditionally viewed as content that is taken for granted or backgrounded. However, this status does not map with full generality to a need for presuppositions to be directly satisfied in the preceding context. For instance, the utterance in (1) is intuitively acceptable even without the addressee having been aware of its presupposition, i.e. presuppositions can be accommodated.

(1)   Gordon **stopped** smoking.
       ⤳ *Gordon was smoking before*

The presupposition literature distinguishes different types of accommodation, most commonly between global and local accommodation. Global accommodation describes cases like (1) where the presupposition is interpreted at the root level and becomes part of the speaker's commitment. Local accommodation, on the other hand, can only occur under embedding, when the presupposition is interpreted under the scope of an operator and practically cancelled at the global level, as illustrated in (2).

(2)   Caitlin's birthday is next week, but I don't know whether Isabelle is planning a surprise party for her.
       If Caitlin **realizes** beforehand that Isabelle is planning a surprise party, then Isabelle will probably be very disappointed.
       ⤳ *If Isabelle is planning a surprise party and Caitlin realizes it, then Isabelle will probably be very disappointed*

The question we want to address in this paper is to what extent the shared label of 'accommodation' for (1) and (2) should be taken as indicative of a shared underlying mechanism. We present

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data from speeded acceptability judgments from a mouse-tracking experiment directly comparing global and local accommodation to see if they pattern similarly or not.[1]

The paper is structured as follows. Section 2 provides additional background on global and local accommodation. Section 3 presents the experiment and Section 4 concludes with the general discussion.

2. Background.

2.1. THEORETICAL. Although global and local accommodation are central concepts in semantic theory, the question of how they relate to each other is rarely discussed. One account of a unified treatment of accommodation comes from Krahmer & Beaver (2001). The authors propose to model different types of accommodation via an *A* operator that turns presupposed content into asserted content and can be inserted at different positions at LF. Applied to cases of global and local accommodation, this operator would then appear either at the highest level or within the scope of the relevant embedding operator, reducing the difference to one of syntactic position.

In contrast, von Fintel (2008) argues on conceptual grounds that global and local accommodation should be treated as separate mechanisms. His argument is that global accommodation is a hearer's cooperative reaction to a deficient context that does not match the requirements of an utterance, in response to which the hearer adjusts the context to prevent the conversation from crashing. Local accommodation, on the other hand, concerns changing the meaning of an utterance to be compatible with a context that is at odds with a global interpretation of the respective presupposition. On this view, global accommodation may then be considered more of a pragmatic process, whereas local accommodation is more semantic.

Lastly, Klinedinst (2016) proposes a mixed account that is relativized to the type of presupposition trigger under consideration, namely whether a trigger entails its presupposition in addition to presupposing it (e.g. *discover*) or not (e.g. *regret*). By virtue of entailing its presupposition, a trigger of this type will allow to be easily accommodated and simply be treated like asserted content regardless of the type of accommodation. In contrast, triggers that do not entail their presupposition are argued to have different sources of difficulty for global and local accommodation. Globally accommodating such a trigger requires adjusting a deficient context, as in von Fintel's (2008) view, whereas local accommodation may cause difficulty because the trigger is semantically idle - its presupposition gets cancelled such that it no longer contributes anything, resulting in a type of redundancy. While trigger variation is not the main focus of the present study, we included different triggers to explore Klinedinst's (2016) account, see below.

2.2. EXPERIMENTAL. Regarding previous experimental investigations of presupposition accommodation, the majority of studies has focused on global accommodation, with comparatively few examining local accommodation and - to our knowledge - none directly comparing the two. The consensus for global accommodation appears to be that there is a robust cost across various triggers and paradigms (see Schwarz 2019). A similar picture emerges for local accommodation, although based on a smaller range of evidence. Chemla & Bott (2013) showed that for negation in a truth-value judgment study, deriving a locally accommodated interpretation took longer compared to

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[1]We focus on the acceptability judgments here since the mouse-tracking data was inconclusive, but a summary plot can be found in the Appendix.

an interpretation where the presupposition projects. In line with this finding, Romoli & Schwarz (2015) report slower response times for local accommodation in the covered box paradigm. Local accommodation, like global accommodation, thus seems to be a costly process. The question we aim to address in the following experiment is whether one type may be more costly than the other, as such potential differences in cost provide potential evidence for viewing them as separate mechanisms.

3. Experiment.

3.1. MATERIALS & DESIGN. The experiment used stimuli modeled after the suspension contexts from Abusch (2010) as in (2) above and similar to materials in Mandelkern et al. (2019), but in short dialogues to approximate a conversational environment, shown in (3):

(3) Sample Item
    a. unembedded (=global accommodation) + satisfaction (=PSP met)
        A: Linda loves traveling,
            and last year she went to Vietnam.
        B: | She went to Vietnam **again** this year |, so
            she probably picked up some Vietnamese already.
    b. embedded (=local accommodation) + satisfaction (=PSP met)
        A: Linda loves traveling.
        B: Yeah - last year she went to Vietnam...
           | If she went to Vietnam **again** this year |, then
            she probably picked up some Vietnamese already.
    c. unembedded (=global accommodation) + ignorance (=PSP unmet)
        A: Linda loves traveling,
            but I don't know whether she's been to Vietnam before.
        B: | She went to Vietnam **again** this year |, so
            she probably picked up some Vietnamese already.
    d. embedded (=local accommodation) + ignorance (=PSP unmet)
        A: Linda loves traveling.
        B: Yeah - though I don't know whether she's been to Vietnam before...
           | If she went to Vietnam **again** this year |, then
            she probably picked up some Vietnamese already.

Each dialogue consisted of four clauses. The third clause was the target clause, highlighted here for the reader's convenience by framing (not shown to participants), and contained the presupposition trigger. As a first factor, we manipulated ACCOMMODATION TYPE by either using a root clause for the target connected to the following clause by *so* (global) or by having the target clause be the antecedent of a conditional followed by its consequent (local). Additionally, the second clause in the overall dialogue was either part of the first interlocutor's speech (global) or part of the second interlocutor's (local) in order to sidestep a potential global accommodation interpretation of the target clause in the local PSP unmet condition. As a second factor, the second clause of each dialogue either satisfied the relevant presupposition (PSP met) or not (PSP unmet).

There were 32 item sets, distributed in a Latin-square design, with four (types of) triggers

evenly split: *again*, *even*, *still*, and factive verbs. Factives were additionally split into a cognitive factive (*discover*) and an emotive factive (*regret*). 16 non-presuppositional filler items sharing features with the experimental items were added as controls, with half constructed to be rated good and half as bad. The full list of items can be found in the OSF repository associated with this publication (`https://osf.io/x4yad/`) as well as through the experiment link in the subsection below.

3.2. PROCEDURE. The experiment was implemented through PC-Ibex (Zehr & Schwarz 2018). Each trial began with a button displayed at the center bottom of the screen and large thumbs-up and -down icons at the top left and right respectively. Button click started a character-by-character unfolding of the text (at 60ms/char). 500ms before the end of the target clause, participants were prompted via the appearance of a 'green light' image to quickly indicate acceptability of the discourse so far by moving their cursor to one of the icons as the rest of the line continued to unfold. The initial choice had to happen within 2 seconds. Error messages were displayed if the cursor was moved too early or did not reach an icon within the time limit. Upon selection, the final clause unfolded, and participants could adjust their acceptability decision if so desired. A demo link can be found here: `https://farm.pcibex.net/r/cAXWxc/`.

3.3. PARTICIPANTS. 75 students from the University of Pennsylvania were recruited and received course credit as compensation. 7 participants were excluded due to the difference in acceptance rate of good and bad catch fillers being less than $\frac{1}{3}$, leaving 68 participants for data analysis.

3.4. PREDICTIONS. On the view that global and local accommodation originate from the same underlying mechanism, there is no immediate reason for them not to pattern together, barring other factors or assumptions. That is, global and local accommodation should show a comparable cost, whatever that cost may be. In contrast, evidence for a difference in costs would *prima facie* favor accounts that assume distinct mechanisms at play, as unified accounts don't come with an inherent explanation of such differences. (Conversely, not finding any differences in cost does not necessarily speak against distinct mechanism accounts, as the measure at hand could simply fail to differentiate costs, or qualitatively different costs need not map onto quantitative differences in the task.) Finally, if only triggers that entail their presupposition have a unified mechanism whereas triggers that do not entail their presupposition behave differently for global and local accommodation, we should see no difference in accommodation cost for *discover* as an entailing trigger and a potential difference in cost for *regret*, *even*, and *again* as non-entailing triggers (see Sudo 2012, Djärv et al. 2017). For *still*, there are no prior claims about its entailment status such that it will be put aside in this regard.

3.5. RESULTS. *Responses*. The average acceptance rate by condition for responses that did not change after the target clause was presented is shown in Figure 1. The first thing to note is that unmet conditions have a much lower acceptance rate than met conditions, indicating a general accommodation cost. This result is shown in our analysis (mixed effects logistic regression with sum coding) as a significant effect of Context (z = 15.22, p < .001***). Additionally, this accommodation cost is smaller for local accommodation than for global accommodation, as shown by a significant interaction between context and accommodation type in our model (z = 3.05, p < .01**).
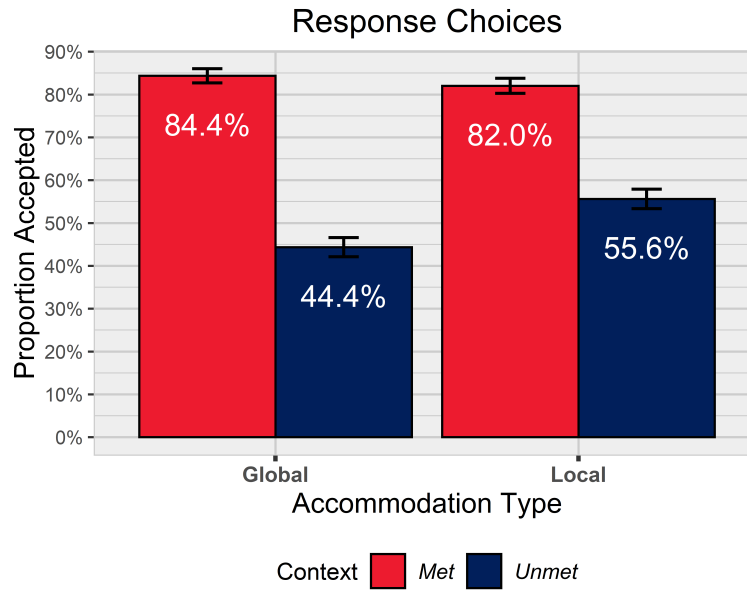
Response Choices

Figure 1: Response choices by condition with standard errors.

Looking at acceptance rates by individual triggers shown in Figure 2, we see that local accommodation is numerically clearly easier than global accommodation for all triggers but *discover*, which also has the smallest accommodation cost overall.
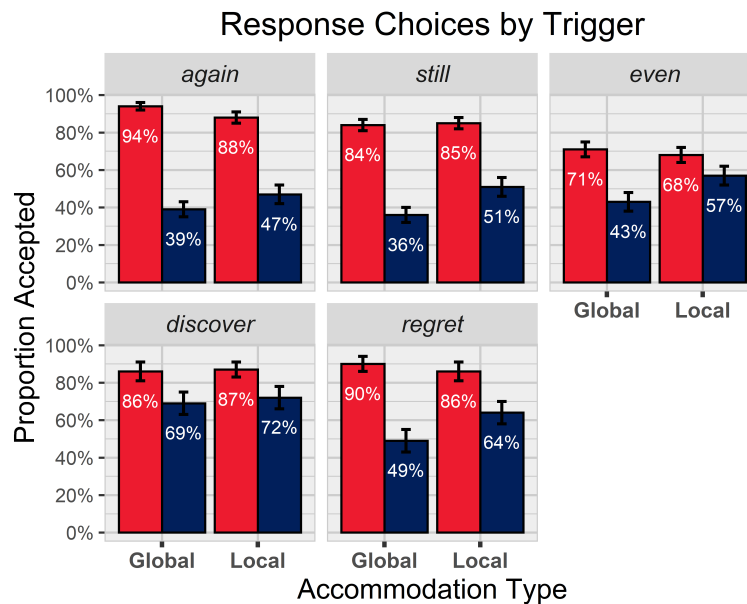
Response Choices by Trigger

Figure 2: Response choices by condition by trigger with standard errors.

Response Times. The average response times per condition, split by (initial) response choice, are shown in Figure 3. Trials where the cursor was moved before the signal was given or did not

reach one of the icons to indicate a response within the time limit were excluded (265 or 12% of trials). Looking at acceptances first, we see overall faster response times for local accommodation than global accommodation, both when the presupposition was met in the context and when it was unmet. For rejections, the data for met conditions should be taken with a grain of salt due to the small sample size (since less than 20% of responses were rejections here), but for unmet conditions local accommodation is again numerically faster than global accommodation. Interestingly, when we only look at unmet conditions, we can see that acceptances for local accommodation were faster than rejections, whereas response choice did not substantially affect global accommodation. This effect is supported by a significant interaction between accommodation type and response choice (z = 2.08, p < .05*) in a mixed effects linear regression model restricted to data for unmet conditions.
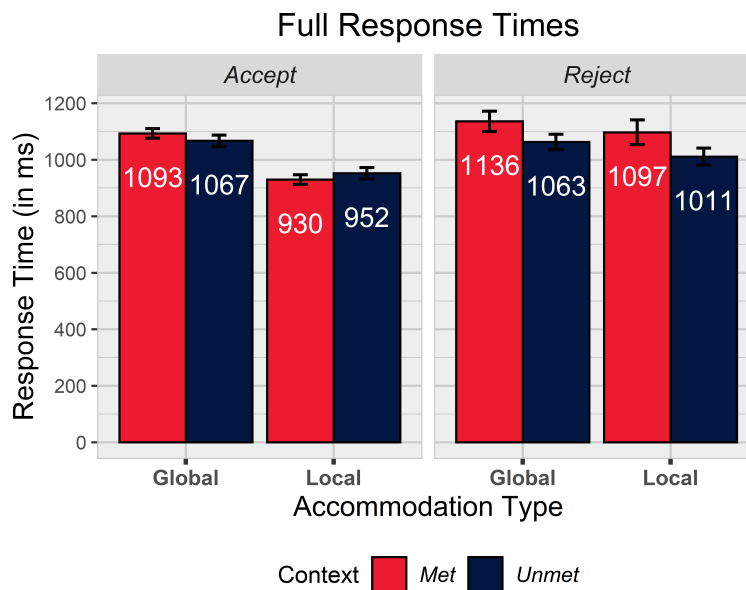

Figure 3: Response times by condition with standard errors.

3.6. DISCUSSION. The experiment provides evidence that - when directly compared - local accommodation is easier than global accommodation in our materials. This pattern was reflected in the acceptance rates as well as response times: first, when the respective presupposition was not met, acceptance responses for global accommodation showed a larger decrease than local accommodation; second, participants were faster to accept than to reject trials in the unmet condition for local accommodation, whereas latencies for global accommodation remained about the same. Taken at face value, the data would thus be more in line with a view on which global and local accommodation have different underlying mechanisms despite the shared label.

However, it is worth taking into account the materials used to investigate our research question. The comparison that allowed us to measure accommodation difficulty was between a prior sentence directly satisfying the presupposition in question and an explicit statement of ignorance regarding the presuppositional content. This comparison contrasts with prior investigations on both global accommodation, where the relevant difference is often between explicit satisfaction and a neutral

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statement that is agnostic (e.g. Tiemann et al. 2015), and local accommodation, where sentences are often presented out of context. These changes might have shifted the scales in favor of local accommodation, leaving open what the more general conclusion should be here. We will pick up this issue in the next section.

Additionally, it is also worth looking at the distribution of the individual triggers we tested. While the aggregated pattern of the results was also present for *again*, *still*, *even*, and *regret*, *discover* diverged from the other triggers by showing comparable costs for both accommodation types. Notably, *discover* was the only trigger in the set that had been categorized as entailing its presupposition. Such a split, if general, would thus support Klinedinst's (2016) account, according to which triggers that entail their presupposition allow a unified treatment while triggers that do not entail their presupposition may differ in the mechanisms for global and local accommodation.

In addition to how the results bear on our main question about the relationship between global and local accommodation, another interesting aspect is the relative ease of local accommodation. As laid out in Section 2.2, this pattern is unexpected based on prior studies. Possible explanations for this difference will be discussed in the next section.

4. General Discussion. This paper presented evidence from speeded acceptability ratings for global and local accommodation differing in their underlying mechanism, but only for triggers that do not entail their presupposition. Interestingly, for those triggers, local accommodation was easier than global accommodation. This finding raises the question of why prior studies such as Chemla & Bott (2013) and Romoli & Schwarz (2015) found local accommodation to come with a clear cost, in line with its characterization as a last resort strategy in the formal theoretical literature.

One obvious difference lies in the methodologies. Chemla & Bott (2013) used a truth-value judgment task and Romoli & Schwarz (2015) a covered box paradigm. While their argument is based on response time data from these methodologies, their tasks did not put participants under any time pressure to give their response. In contrast, in our experiment participants had to initiate their cursor movement while the target sentence was still unfolding and had little time once it was complete to indicate their response. The current data may thus be a more realistic representation of the on-line processing of local accommodation: longer response times in untimed studies might have been a reflection of participants who ultimately wind up with a local accommodation interpretation, but only arrive at it reluctantly. In contrast, by putting participants under time pressure in our task, such participants might have been more likely to simply reject the sentence in the case of local accommodation if this interpretation was not available to them right away. Redoing the studies from Chemla & Bott and Romoli & Schwarz under similar conditions might therefore be an interesting next step forward.[2]

However, an alternative explanation for why local accommodation was comparatively easy here, which we think is more likely to play a larger role here (though it's not necessarily incompatible with the previous possibility), relates to the role of context. Both Chemla & Bott (2013) and

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[2]A second notable difference between these two studies and the present one is the type of embedding. Both Chemla & Bott and Romoli & Schwarz used negation as the embedding operator, whereas here we used the antecedent of a conditional. However, as far as we are aware, there is no discussion of the difference between embedding operators affecting the rate of local accommodation, so there is no *prima facie* reason why negation should behave differently.

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Romoli & Schwarz (2015) investigated sentences in isolation without prior context. In contrast, our stimuli were both more naturalistic by using dialogues to approximate actual conversations and made the status of the relevant presupposition explicit. The characterization of local accommodation as a last resort strategy that incurs processing cost may thus be modulated by whether or not it is contextually motivated. As shown in the response choices, local accommodation still comes with a cost and leads to lower acceptance rates. However, making the choice to accept the sentence, indicating local accommodation, may not require much processing cost in itself, if the context supports such an interpretation.

Conversely, the relative ease of local accommodation compared to global accommodation may have also been due to features of the context. The standard characterization of global accommodation as a cooperative rescue strategy concerns cases when there is no information about whether a presupposition is true or not. In the cases tested here, the first speaker expressed explicit ignorance regarding the presupposition of the second speaker's utterance, which might have biased against taking it to be true. Overcoming this bias might have then stacked the cards against global accommodation. In contrast, since local accommodation does not involve the speaker committing to the truth of the presupposition in the first place, and they themselves had expressed their own ignorance in the previous clause, this additional hurdle did not exist in this case.

From this perspective, caution is warranted in interpreting the present results as providing a fully general comparison between accommodation types, insofar as the contexts may have been more beneficial for local accommodation than global accommodation. Rather, it seems necessary to gather data across different contexts before being able to conclusively answer the question of whether one type of accommodation is easier than the other (and if so, which). One concrete modification could be to use contexts that leave the truth of the presupposition open without expressing explicit ignorance, as is commonly used in the study of global accommodation. We might expect global accommodation to become easier in this case in the absence of bias, and local accommodation to become harder since the context no longer enforces it. Paying closer attention to the context might in turn lead to more insights into the nature of the different accommodation types and their underlying mechanism.

Appendix. The mouse-tracking data was analyzed using the R package 'mousetrap'. Figure 4 shows the normalized average trajectory by condition. The statistical analysis through the package did not yield any clear results. Since the experiment was run online, we relied on written instructions for participants to move their cursor in a less direct manner toward the response icon. Additionally, we showed an upward arrow between two bars to encourage participants moving upward before going toward the response icons.

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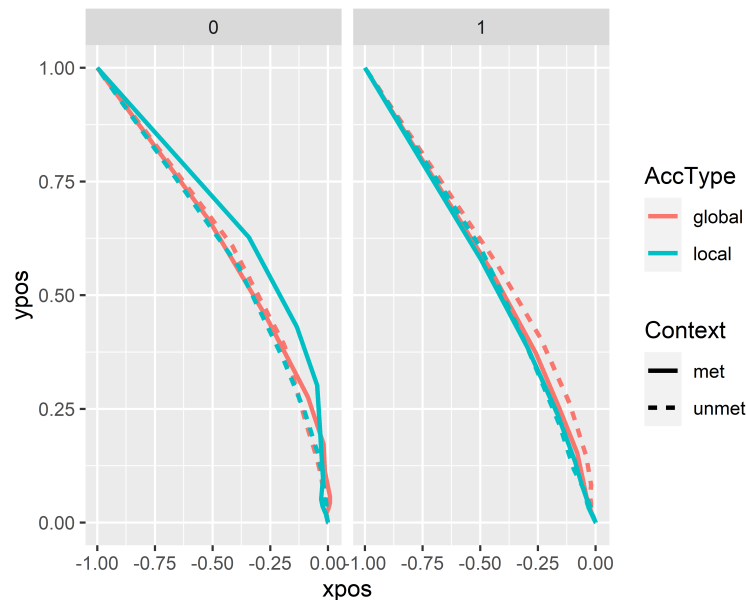
Figure 4: Mouse trajectories by condition and response choice.

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