

Backgrounding and accommodation of presuppositions: an experimental approach

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Abstract. Recent research on presupposition has aimed to use techniques of experimental semantics and pragmatics to cast light on the processes that underlie projection and information packaging. Relatively little attention has so far been paid to the relation between the diversity of presuppositions with respect to information packaging and their projection behaviour. In this paper, we argue that information backgrounding and projection can be seen as closely related phenomena, and we present an experimental study investigating the behaviour of a variety of presupposition triggers. We interpret the results as evidence for the psychological reality of at least one of the theoretical distinctions between presupposition types posited in the literature (lexical versus resolution presuppositions), and consider their implications for the competing accounts of presupposition projection.

Keywords. Presupposition; backgrounding; accommodation; experimental pragmatics.

1. Introduction

Within the general field of experimental pragmatics, there has recently been an upsurge of interest in the investigation of presuppositions (Xue and Onea 2011, Amaral et al. 2011, Smith and Hall 2011, Chemla and Bott in press). At least two particular strands of research can be distinguished: one deals with presupposition projection and accommodation, and a second with the role of presuppositions in information packaging.

Research dealing with presupposition projection aims to ascertain how the information conveyed by the use of presupposition triggers is integrated into the hearer's situation model. It is classically diagnostic of presuppositions, versus other forms of content, that they project from under the scope of negation – that is, they continue to be conveyed even when their triggers are sententially negated (Levinson 1983, Chierchia and McConnell-Ginet 1990, among others). For example, both (1) and (2) are taken ordinarily to convey that John used to smoke, which is the presupposition associated with the trigger *quit*.

- (1) John quit smoking.
- (2) John didn't quit smoking.

However, it is also widely accepted that this form of projection need not take place. It is possible to continue (2) in a way that is judged felicitous by native speakers, but in which the presupposition is explicitly denied, as in (3). Crucially, such sentences are more coherent than explicitly self-contradictory sentences are, which suggests that the presupposition is not projecting to a global level.

- (3) John didn't quit smoking, because he never used to smoke.

Examples such as (3) are sometimes labelled instances of “local accommodation”, a term respecting the semantic analysis in which the presupposition is bound, or satisfied, at a local level and consequently does not project further (Heim 1983). From a psycholinguistic point of view, this raises various questions about how hearers process such sentences, such as how they establish to what level the presupposition should project, and by what procedure the correct interpretation is ultimately derived. There is at least a superficial parallelism here with the case of scalar implicature. In that domain, psycholinguistic investigation has similarly aimed to show how and when non-asserted content is also integrated into the hearer's situation model: for instance, whether this occurs by default or only under specific contextual conditions (for a review, see Katsos and Cummins 2010).

Another way of looking at presuppositions is to consider their use as a technique of information packaging. From this perspective, content that is presupposed is generally less addressable than content that is straightforwardly asserted: for example, the hearer cannot directly deny or object to a presupposition without giving rise to infelicity. This widely-shared intuition underlies the “Hey, wait a minute” test (Shanon 1976, von Stechow 2004), which exploits the perception that challenging a presupposition requires a metalinguistic manipulation that would be odd if it were used to challenge declarative content, as in (4).

- (4) A: Mary found out that John was lying.
 B: Hey, wait a minute! John wasn't lying.
 B: ?Hey, wait a minute! Mary didn't find out.

Note that this test is sensitive primarily to the informational status of the content rather than to the presence of a presupposition in the sense discussed above. Any content that is not at issue (Simons et al. 2011) can be objected to with “Hey, wait a minute”, whether this is a linguistically triggered presupposition or merely a prior commitment of the speaker (see Pearson 2010). For instance, in (5), it is possible to use “Hey, wait a minute” to address an assertion that is prefatory to another. In (6), it seems possible to address the assertion contributed by the first sentence in this way on the understanding that it is a prerequisite for a further assertion that has yet to be made. In both cases, the material objected to by B is not a presupposition in the sense of being linguistically triggered or projecting to a global level.

- (5) A: Bill had left the door open, so I went in.
 B: Hey, wait a minute! Bill didn't leave the door open.
- (6) A: You can overpower the guard, and then...
 B: Hey, wait a minute! I can't do that.

Given the wide variety of techniques available for information packaging through discourse structure (see e.g. Lambrecht 1994, Ward and Birner 2004) it seems reasonable to assume that

this is not simply a matter of a binary choice between foregrounded and backgrounded information, or information that is “at issue” or “not at issue”. Generally, if there is gradience in this matter, we can ask whether the presupposition triggers available in language differ in the extent to which they background information.

There are several reasons to expect differences among presupposition triggers in this respect. In particular, we wish to consider three possible reasons in more detail: the relation between presupposed and asserted content for different triggers, conceptual differences between sub-classes of triggers, and the reliability of the triggers as cues to accommodation. We discuss these in the following paragraphs.

First, as observed by Zeevat (1992), classes of linguistically-triggered presuppositions differ in their logical relation to the asserted content of their containing utterances. For instance, in (7), the presupposition that Rob saw Amy before is logically disconnected from the assertion that is made, namely that Rob saw Amy today. By contrast, in (8), the presupposition that Elaine is married is logically necessary for the asserted content of the sentence to make sense.

- (7) Rob saw Amy again today.
- (8) Elaine brought her husband to the conference.

Assuming that it is felicitous to deny a statement by denying its logical entailments, the presuppositions of (7) and (8) should differ in the extent to which they are backgrounded or not addressable. Specifically, denying the presupposition that Elaine is married entails the falsity of (8): whoever Elaine brought to the conference, it can't be her husband. By contrast, denying that Rob saw Amy before has debatable consequences for the falsity of (7) – we might accept (7) as generally or partially true if the declarative portion is true. It is useful to distinguish these with respect to the notion of Question Under Discussion (QUD). Roberts (1996) introduces this notion to characterise the question(s) raised in the context, which should be addressed in a felicitous dialogue continuation. Importantly, she considers a response to refer to the QUD if it entails an answer to the QUD, implicitly admitting the possibility that this relation might be indirect. Now, if we take the bald assertion of (7) or (8) to raise the truth or falsity of the relevant foreground content as the QUD in each case, we see that the presupposition-denying responses to (7) and (8) do not refer to the respective QUDs equally well. For (8), denying that Elaine is married does refer to the QUD (by implying that the foreground content is false); for (7), denying that Rob saw Amy before does not refer to the QUD. Hence there is a clear sense in which the presupposition of (8) may be more addressable than that of (7).

Secondly, many researchers have posited more elaborate differences between members of the family of presupposition triggers. Zeevat (1992) posits three classes of triggers: those such as definite descriptions that involve the retrieval of an entity from the environment; those which encode preconditions for their main declarative content; and those which involve the retrieval of an eventuality or entity that was previously salient in the discourse. Zeevat's underlying assumption, building on van der Sandt's (1988) work, is that presupposition triggers are essentially anaphoric in nature. These classes are distinguished, then, by the extent to which they

are anaphoric. However, alternative classifications have since been proposed which tend to cross-cut these class distinctions. Kadmon (2001) argues, based on considerations of projection behaviour, cancellability and context-dependence, for a continuum of presuppositions. She proposes that on one end of this continuum we find “hard-core” presuppositions like those of definite NPs and cleft constructions, i.e. presuppositions that do not disappear easily. Kadmon considers them to be entailed by the affirmative sentences containing their triggers. On the other end of the continuum she situates presuppositions that are highly context-dependent and hence are easily defeasible. This class is not associated with particular triggers; these presuppositions are preconditions for felicitous utterances in the sense that they must be taken for granted in interpretation, for example as a premise for a conversational implicature to be calculated. Von Stechow and Matthewson (2008) consider certain triggers to be more strongly presuppositional than others. They draw upon the work of Abusch (2010), who proposes a distinction between “soft” and “hard” presupposition triggers (the former, like *discover*, exhibiting context-dependence in their projectivity), and Simons (2006), who argues that items such as *too* and *again* serve no purpose within the sentence other than triggering a presupposition.

The precise implications of these various theories as to the informational-structural effects of presupposition triggers are complex. One way of assessing the “strength” of a presupposition trigger would be to measure the extent to which it renders its associated content backgrounded or not at issue. However, contrarily, if we consider a sentence with *too* or *again*, it is immediately evident that the speaker has gone out of her way to convey a presupposition, in that the trigger is an entirely optional part of the sentence and could be omitted, potentially also saving effort, if it was not intended (unlike a main verb such as *stop* which would have to be replaced). It could be argued that this invites comment and makes the presupposed material extremely addressable. Such cases diametrically contrast with cases such as (3), the paradigmatic examples of local accommodation, in which it could be argued that the use of an expression which happens to be a presupposition trigger (in this case *quit*) is often purely contextually motivated (for instance, the word was used by a prior speaker, or in a loaded question). In (3), the speaker clearly does not intend to convey a presupposition, but chooses to make this clear by explicitly disclaiming the presupposition that has been triggered, rather than avoiding the use of the trigger by a circumlocution. By contrast, if the speaker of (7) did not wish to convey a presupposition, they could simply have omitted the word *again*¹. Explicitly including this trigger could be argued to foreground the associated presupposition to a certain extent.

Thirdly, presuppositions can be exploited to convey information in an assertion-like fashion, by appeal to the use of *accommodation*. Lewis (1979), drawing upon the work of Stalnaker (1976), uses the term to describe the process whereby a sentence felicitously presupposes information that is not taken for granted in the context. Accommodation may repair misalignment between speaker and hearer that is due to the hearer not possessing information that is known to the

¹ Taken together with the claim of Simons (2006), this account predicts that local accommodation of presuppositions triggered by *too* and *again* is only possible if the presupposition trigger was activated in the prior discourse context and its reuse serves a metalinguistic function.

speaker and relevant to the current discourse. However, it is also freely exploited by speakers to convey new information, as in (9).

(9) I just found out that Fred is resigning.

Such examples demonstrate a clear tension between linguistic presupposition and backgrounding effects. Formally, this sentence asserts the speaker's discovery of a fact and presupposes the fact (that Fred is resigning). However, addressing (9) to a speaker who is unaware of this fact appears intuitively to serve the primary communicative purpose of conveying the fact itself, rather than telling the hearer about the recent change in the speaker's epistemic state (from not knowing to knowing). It seems at least as felicitous for a disbelieving hearer to respond "He isn't!" rather than "You didn't!", thus addressing the presupposed content directly; and, intuitively, the "Hey, wait a minute!" test does not obviously distinguish (9) from the direct declarative "Fred is resigning". It seems clear that the backgrounding effect of (9) with respect to its presupposition is, at best, extremely limited.

We might further ask whether the propensity of certain triggers or constructions to be used in this way influences hearers' expectations about their effect on information structure. (9) might also be used without appeal to accommodation, in a context in which everyone but the speaker already knew that Fred was resigning. Similarly, a question such as (10) is ambiguous between a reading in which the speaker is asking whether the hearer has access to a piece of information that is already known to the hearer, and one in which the speaker is querying the hearer's certainty about this proposition (cf. Perrault and Allen 1980: 168).

(10) Do you know that Christmas falls on a weekday this year?

Assuming that some presupposition triggers are more commonly exploited in this way than others, it should be rational for hearers to modulate their expectations about backgrounding effects accordingly. An optimal rational hearer would understand a trigger as being more or less likely to be backgrounding its presupposition, according to whether that trigger is more frequently used to draw attention to information that is already common knowledge, or to convey new information which should in principle be addressable.

With respect to both dimensions of enquiry – projection and backgrounding – recent research has made increasing use of experimental semantic and pragmatic techniques (Chemla and Bott in press, Xue and Onea 2011, Amaral et al. 2011, Smith and Hall 2011). Such approaches mitigate the risk of allowing our theoretical assumptions to colour our intuitions. Moreover, they enable us to make quantitative statements concerning such issues as which interpretation is preferred and to what degree information is backgrounded in a particular case. This fine-grained level of detail may not be reliably accessible to introspection.

In this paper, we present experimental work that targets the issue of backgrounding and its relation to typologies of presupposition triggers. However, the method we use also has potential

implications for analyses of projection behaviour. Before presenting details of our method and results, we first explore the potential relations between these two strands of enquiry.

2. Local accommodation and backgrounding

Consider again the example (3), repeated here as (11).

(11) John didn't quit smoking, because he never used to smoke.

From a formal perspective, this can be analysed as local accommodation: the presupposition of "quit" is bound locally and does not project to the discourse level. This analysis accounts for the robust intuitions that the two parts of the utterance cohere with each other, that the content of the two clauses is not contradictory, and that the coherence does not rely upon the speaker changing her commitments mid-sentence as in (12).

(12) John didn't quit smoking; actually he did, but then he started again.

From the perspective of information structure, we might analyse the utterance of (11) as first placing the information that "John used to smoke" in the background, and then addressing it. Given the presence of "because", we can reconstruct the QUD of the second clause as "why didn't John quit smoking?" Then the continuation, explaining that the presupposition of this question fails, entails an answer to the QUD. Crucially, in this case, it is the ostensibly backgrounded information that is addressed.

We can contrast this with a case in which local accommodation is seemingly more problematic, such as (13).

(13) Rob didn't see Amy again today, because he had never seen her before.

Once again, information is introduced and backgrounded in the first clause (that Rob saw Amy before), and then this information is denied in the second clause. Parallel to the previous case, we might treat "why didn't Rob see Amy again today?" as the QUD for the second clause. However, in this case, the presupposition-denying answer does not seem quite so satisfactory: although this entails the falsity of the claim "Rob saw Amy again today", it does not touch the claim "Rob saw Amy today".

One way to cash out this distinction might be as follows: the speaker of (11) denies that John gave up smoking, from which it follows that none of the inferences licensed by the claim that John gave up smoking can be drawn. The speaker of (13) denies that Rob saw Amy again today, but does not deny that Rob saw Amy today. Hence any inferences relying upon the premise that Rob saw Amy today, but not relying on the premise that Rob saw Amy before, still go through. It could thus be argued that the relevance of (13)'s contribution is comparatively limited, and specifically much less than that of the utterance (14).

(14) Rob has never seen Amy.

Schematically, it seems reasonable to identify cases of local accommodation as comprising a similar set of processes to those discussed above. There is necessarily a presupposition trigger, which upon its occurrence distinguishes what we might loosely call ‘foreground’ and ‘background’ information. However, in all these cases, the background is untrue (or the speaker does not wish to commit to it), and this must be explicitly indicated in the second clause. Thus the relevant items comprise a presupposition-triggering clause and a background-addressing clause.

Based upon this analysis, we might expect information backgrounding and local accommodation to be related as follows: if the presupposition trigger strongly backgrounds its presupposition (in the sense of making it unaddressable), this presupposition should be resistant to local accommodation. Under these conditions, it should be difficult for the speaker to go on to deny the presupposition in any way that could be judged as felicitous. Correspondingly, from the hearer’s point of view, the occurrence of the presupposition trigger (taken in conjunction with expectations about the speaker’s coherence) should be a reliable signal that the presupposition can project to the discourse level. On the other hand, a trigger that does not strongly background its presupposition makes it amenable for discussion. For this reason, such content may be more easily accommodated at the local level. Note that we make no claim here as to the process by which this takes place, but are referring merely to the ultimate interpretation.

Furthermore, if we consider the presupposition typology of Zeevat (1992), recall that the triggers in his second category encode preconditions for the declarative content of their corresponding utterances. We follow him in referring to these as *lexical* triggers. As argued above, such items have the property that their falsity entails the falsity of the utterance as a whole. Hence, a response or continuation that addresses the presupposition of a lexical trigger is automatically germane to the QUD. We therefore predict that the presuppositions of lexical triggers will be generally more addressable than the presuppositions of other categories of triggers since lexical triggers exert weak backgrounding effects, and correspondingly that these presuppositions are more amenable to local accommodation.

Our experimental work, discussed in the following section, is directed primarily at the issue of information packaging. From the above argument, we consider that results concerning the backgrounding effects of presupposition triggers should have implications for the issue of projection (although we do not attempt to demonstrate this relation empirically in this paper). In order to interpret our results in this way, we require one further assumption, which we will briefly discuss and attempt to defend. It is that a presupposition-denying response to a question involving a presupposition trigger, as in (15), can be glossed as a case of (implicit) local accommodation.

(15) A: Did John quit smoking?
B: No, he never used to smoke.

We make this claim on the basis of a similar argument to that for (11). B's response is coherent and does not appear self-contradictory. However, a simple "no" response to a question with a presupposition can readily be understood as an acceptance of the presupposition, as demonstrated in classic "loaded questions" such as (16) and (17). In such cases, circumlocutions are required if the respondent wishes to avoid appearing to accept the presupposition.

- (16) Have you stopped beating your wife yet?
 (17) Do you regret killing him?

Hence, the interpretation of B's "no" in (15) appears to be "No, it is not the case that John quit smoking", or similar. If this is correct, B's utterance as a whole may be treated as exhibiting local accommodation, in that B's apparent initial acceptance of the presupposition is clearly not intended to project to the discourse level.

Note that, if this analysis is fundamentally incorrect, then the experiment stands as an enquiry into the effects of certain presuppositions on information packaging. If the analysis is correct, then we can additionally interpret the results in terms of projection. We further explore the interplay between these domains in the general discussion.

3. Experiment: Acceptability of agreement/disagreement in case of presupposition failure

In our experiment, we investigated acceptability judgments for responses to polar questions that contained a range of presupposition triggers. We used four kinds of responses, which can be considered to form a 2x2 design crossing acceptance or rejection ("yes" versus "no") of the main proposition or of the presupposition. These responses involved either (i) responding "yes" and not denying the presupposition, (ii) responding "yes" but denying the presupposition, (iii) responding "no" but not denying the presupposition, or (iv) responding "no" and denying the presupposition. These response types are exemplified for a sample question in (18) and schematically represented in Table 1

- (18) Did Brian lose his wallet again?
 (i) Yes, he did lose his wallet again.
 (ii) Yes, although he never lost it before.
 (iii) No, he didn't lose it this time.
 (iv) No, because he never lost it before.

	Condition (i)	Condition (ii)	Condition (iii)	Condition (iv)
Main proposition	+	+	-	-
Presupposition	+	-	+	-

Table 1: Description of how conditions (i)-(iv) in Experiment 1 manipulate foreground and presupposition. + denotes positive response, - denotes negative response.

Our first prediction, based upon general considerations of information structure, was that the responses directly addressing the declarative or foregrounded content ((i) and (iii)) would be generally more acceptable than those which directly addressed the presuppositional or backgrounded content ((ii) and (iv)). In a pilot study (Cummins et al. in press), we demonstrated this pattern experimentally with simpler materials. However, in that study, the acceptability of some “foreground-addressing” responses was appreciably below ceiling, which cast some doubt on the plausibility of the materials in general and rendered it difficult to make generalisations about the effects of different triggers. Here we aimed to replicate the general pattern of that result while at the same time rectifying the problems associated with the materials and rendering it possible to compare triggers with greater confidence.

Based on the proposal of Zeevat (1992), which distinguishes lexical from resolution triggers, we drew further predictions as follows. Condition (iv) was expected to be more acceptable for lexical than for resolution triggers, as this involves rejecting the assertion on the basis of presupposition failure. Conversely, condition (ii) was expected to be more acceptable for resolution than for lexical triggers, as this involves accepting the assertion despite presupposition failure. Taking condition (iv) to correspond to the classic case of local accommodation, we thus expected to show that lexical triggers are more susceptible to local accommodation than are resolution triggers.

3.1. Materials

56 toy dialogues were used in the experiment. Of these, 32 were critical items and 24 were fillers. 8 triggers were tested. For each trigger, 4 different questions were created, and each participant saw each of these questions with a different type of response ((i)-(iv) above). To avoid effects due to the interaction of individual items with particular response types, four versions of the experiment were created, in which the matching of item to response type was permuted.

The triggers tested were as follows: *again*, *continue*, *only*, *regret*, *still*, *stop*, *too*, and the comparative construction “X is a better NP than Y”, as in (19). Note that the statement that “Y is an NP” is presuppositional in this construction at least insofar as it projects from under the scope of negation, as shown by (20).

- (19) Is Mary a better doctor than Bill?
(20) Mary isn't a better doctor than Bill.

Of the other items, *continue*, *regret*, *still* and *stop* can be regarded as lexical triggers, and *again* and *too* as resolution triggers. *Only* has a uniquely theoretically contested status which we do not attempt to adjudicate upon here (but see Horn 1996, Roberts to appear).

The full set of questions used is presented in the Appendix.

3.2. Participants

20 participants were recruited from the University of Cambridge (mean age 26, range 22-30, 13 were female). All were native English speakers. Five participants were randomly assigned to each permutation of the experiment.

3.3. Procedure

The experiment was administered on a computer using E-Prime, and responses were logged via keyboard. For each item, the question and answer were presented simultaneously on the screen, on distinct lines. Participants were asked to rate “how natural” the question-answer pair was, on a scale of 1-5, where 1 denoted ‘completely unnatural’ and 5 denoted ‘completely natural’. Response latencies were also recorded, but these are not analysed in the following, as no attempt was made to control for the length of the materials, which affects reading times.

3.4. Results

Mean naturalness ratings across the four conditions tested are presented in table 2 (standard deviations in parentheses).

Trigger	Condition (i) (+FG, +PS)	Condition (ii) (+FG, -PS)	Condition (iii) (-FG, +PS)	Condition (iv) (-FG, -PS)
<i>again</i>	4.50 (0.89)	2.15 (1.27)	4.50 (0.89)	2.70 (1.45)
<i>continue</i>	4.40 (1.19)	2.15 (1.18)	4.20 (1.36)	3.15 (1.31)
<i>only</i>	4.55 (0.69)	1.30 (0.92)	4.45 (1.15)	2.50 (1.47)
<i>regret</i>	4.35 (1.09)	1.55 (1.05)	4.70 (0.73)	3.55 (1.50)
<i>still</i>	4.40 (0.82)	1.90 (0.97)	4.30 (1.26)	3.15 (1.53)
<i>stop</i>	4.35 (1.09)	1.70 (1.17)	4.65 (0.67)	2.60 (1.43)
<i>too</i>	4.10 (1.37)	2.95 (1.43)	4.10 (1.25)	2.35 (1.35)
comparative	4.60 (0.75)	2.80 (1.36)	4.35 (1.23)	2.35 (1.18)
Overall	4.41 (1.01)	2.06 (1.18)	4.41 (1.10)	2.79 (1.41)

Table 2: Mean acceptability ratings (SDs) for conditions in experiment. +/-FG denotes accepting or not accepting 'foreground' or main propositional content. +/-PS denotes accepting or not accepting presuppositional content. All figures quoted to 2 d.p.

Mean naturalness ratings for conditions (i) and (iii) were above 4 for all items under test. We take this as an indication that the dialogue fragments present were generally acceptable to our participants, and gave rise to no particular infelicities in their interpretation.

With respect to our first prediction, continuations that did not attempt to address the presupposed material (conditions (i) and (iii)) were judged numerically more acceptable than those which did (conditions (ii) and (iv)). As the judgments were on a discrete scale, we compared the pairs of

conditions by pooling the results from (i) and (iii) and those from (ii) and (iv) and applying a Mann-Whitney U test. There was a significant preference for the non-presupposition-addressing continuations for each item (all $p < 0.01$). The pooled results are represented graphically in Figure 1.

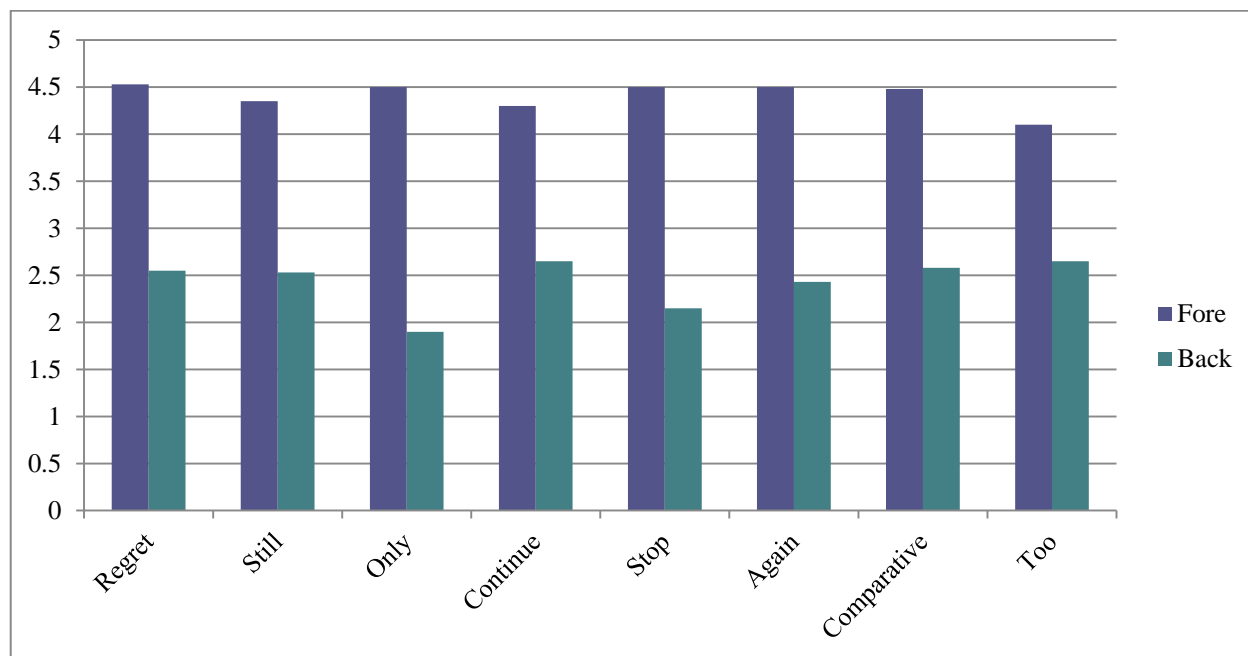


Figure 1: Naturalness ratings for foreground- and background-addressing continuations, by trigger. Triggers are ordered as in Figure 2 (see below).

With respect to our additional predictions, we compared the judgments for condition (ii) with those for condition (iv) for all triggers. In the case of *continue*, *only*, *regret*, *still* and *stop*, there was a significant preference (all $p < 0.01$) for condition (iv) – that is, the “no, because” condition, in which the question is answered in the negative on the grounds of presupposition failure. In the cases of *again*, *too* and the comparative construction, there was no significant preference between conditions (ii) and (iv). There was a slight numerical preference for condition (iv) in the case of *again* and a slight numerical preference for condition (ii) in the case of *too* and the comparative.

The results for conditions (ii) and (iv) across triggers are presented graphically in Figure 2.

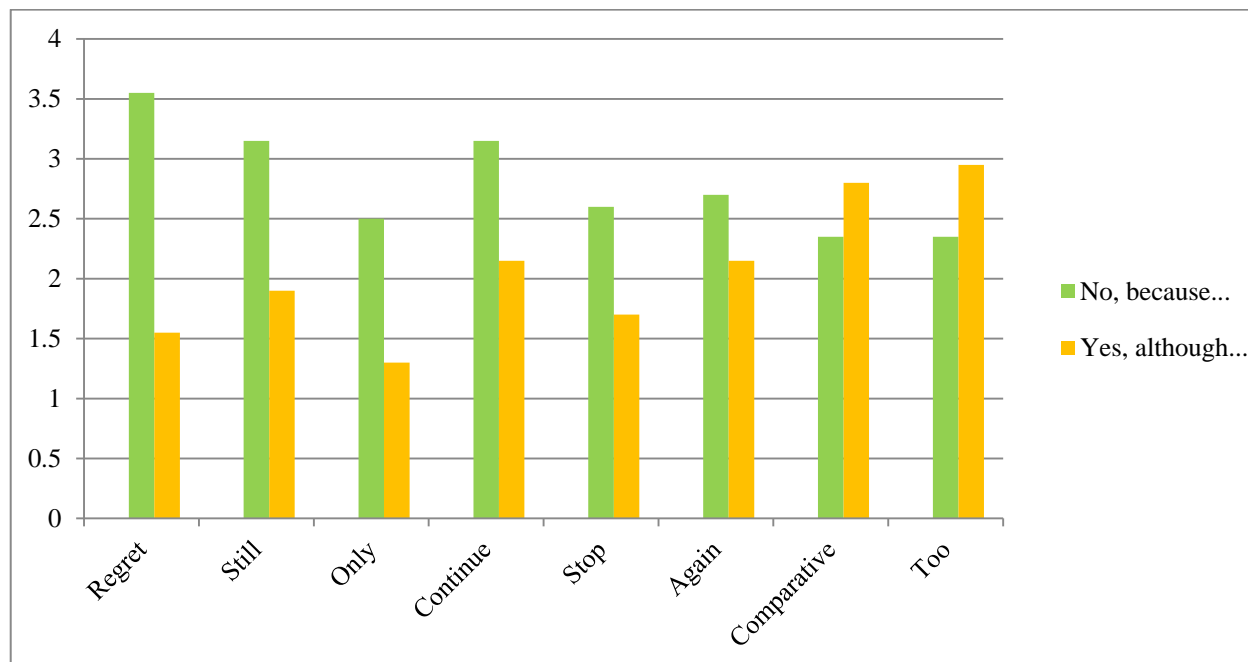


Figure 2: Results for conditions (iv) and (ii), respectively "No, because..." and "Yes, although..." across triggers. Triggers are arranged in order of decreasing preference for condition (iv) from left to right. The first five differences are each significant at the 0.01 level.

3.5. Discussion

The results of our experiment first show that the preference for foreground-addressing over background-addressing dialogue continuations can be documented in this type of naturalness rating task. Our participants robustly preferred responses in which the presupposition is not challenged over those in which it was, and this pattern applied for every trigger tested.

Based on the pattern exhibited in Figure 1, it is tempting to speculate that certain presuppositions exhibit stronger backgrounding effects than others, based on the apparent variation in the differences between the naturalness of foreground- and background-addressing responses. However, we wish to be very cautious in making this claim. First, there is also variability in the acceptability of foreground continuations, which is not theoretically predicted and may reflect some participants' perception of mild infelicity in some of our materials. This clearly may influence the size of the difference between foreground and background ratings. Secondly, as shown in Figure 2, there are very considerable differences between the two background conditions for some of the triggers under test, and any conclusions based upon an attempt to average these conditions should be treated with caution. That said, we do not consider that the variability exhibited in Figure 2 casts any doubt on the preference for foreground-referring continuations in general: note that the most acceptable background continuation (3.55 for *regret* in condition (iv)) is judged less natural than the least acceptable foreground continuation (4.10 for *too* in conditions (i) and (iii)).

Turning to our additional predictions, we note that there is a significant preference for condition (iv) over condition (ii) for all the lexical triggers under test, namely *continue*, *regret*, *still* and *stop*, as well as the theoretically contested *only*. Conversely, there is no significant preference for one condition above the other for the non-lexical triggers *again* and *too* or for the comparative construction. Some caution is appropriate in contrasting a difference that is significant with one that is not significant, as this difference is itself not necessarily meaningful. However, it is striking that the partition between the triggers on the basis of this significance result falls exactly as predicted on the basis of Zeevat's (1992) typology.

For the lexical triggers, as predicted, failure of the presupposition is regarded as sufficient reason to reject the utterance (or in this case to answer "no" to the question as a whole) in a coherent dialogue. Numerically speaking, it is quite striking that such a rejection is also regarded as plausible for the non-lexical items. It appears superficially that the difference between the lexical and non-lexical triggers in fact resides primarily in the judgments of condition (ii), which are generally higher for the latter of triggers. If this is indeed the locus of difference, it would be more accurate to say that, for the non-lexical triggers, presupposition failure is not a grave enough problem to warrant rejection of the utterance. Given the choice of a "yes" or "no" response to a question with a false presupposition, participants appear more willing to tolerate a "yes" when the presupposition is resolutive than when it is a prerequisite for the main declarative content. This result is hardly surprising, but it is encouraging to note that it is amenable to empirical verification.

4. General discussion

This study suggests that, first and foremost, it is possible to apply an experimental approach involving the naturalness rating of mini-dialogues to investigate the psychological correlates of presuppositions. From this perspective, this work fits into the burgeoning category of empirical approaches to presupposition, information packaging and projection. It succeeds in validating the intuitions that presupposed content is less addressable, and that among presuppositions a distinction should be made between lexical and resolution presuppositions in the sense of Zeevat (1992). Moreover, it shows that notions such as addressability are readily quantifiable by experimental methods, which contributes to the task of placing theoretically and introspectively motivated categorisations of presuppositions on a sound empirical footing.

Much work remains to be done, and both the theoretical discussion in section 1 and the analysis of our results in section 3 of this paper give some indication of the scope of the task. In the first place, we note that numerous further distinctions have been proposed between members of the class of presupposition triggers. Although our investigation was particularly targeted at the lexical/non-lexical distinction, our results are quite compatible with a view in which the triggers tested in fact belong to numerous distinct classes, or in which they are located at points of a continuum of triggers (distinguished for instance by strength of backgrounding effects, or by considerations related to the probability of projection). However, our study was a broad one, using relatively few distinct items for each trigger, so any attempt to distinguish individual triggers within this study runs into difficulties. We cannot, for instance, be entirely confident that

the set of contexts tested is equally representative of the usage of each trigger; the variability in the judgments of foreground-addressing responses suggests that our items may not be perfectly balanced. To do justice to an individual trigger, such as *only*, we would wish to consider a much wider range of contexts for this particular item, and compare the results to a correspondingly broad-based analysis of other triggers.

A further relevant consideration for future work is the variability that we document between triggers in their backgrounding effects. This raises important questions about the generalisability of experimental findings in this domain. If the distinction that we support between lexical and non-lexical triggers is robust, then it is quite possible that a study using only lexical triggers (or only resolution triggers) will draw conclusions that do not generalise to the full set of presupposition triggers. Similarly, our own study exhibits this limitation at a finer level of granularity: if there are in fact subcategories within the general category of “lexical triggers” that are not represented among our items, it is quite possible that these will exhibit different behaviour to that which we have documented. Given the lack of a single, general and uncontroversial theory of presuppositions, it is not really feasible to establish what constitutes a “representative” sample of triggers to study. In the absence of such a theory, experimental work should proceed with caution, in the hope rather than the certainty that the findings obtained will generalise to materials other than those tested.

With these caveats in place, we conclude by returning briefly to the topic of projection and accommodation. We argued earlier that condition (iv) in the study corresponds to a case of local accommodation. If this is so, then the variable acceptability of (iv) across triggers suggests that these can be more or less amenable to the local accommodation (or, pre-theoretically, the non-projection) of their presuppositions. This is particularly the case for lexical triggers such as *regret*, which yielded particularly high naturalness ratings for the “no, because...” response which denied its presuppositional complement. There appears to be variation even between lexical triggers in this respect, however.

It may appear that we are leaping to conclusions by supposing that the gradience in backgrounding effects can be interpreted as gradience in projection/accommodation. In particular, the existence of the former is perhaps more intuitive than the existence of the latter (see examples (9) and (10) above). However, it is our contention that these experimental materials involve implicit local accommodation. If this is correct, and at the same time local accommodation is not a gradient phenomenon, we might have expected ratings to be consistent across triggers despite any differences in backgrounding. That is, if a “no, because” response is felicitous if and only if the presupposition is locally accommodated, and all triggers are equally amenable to local accommodation, then the acceptability of such a response should be identical for all triggers. That this is not the case suggests (subject to the caveats above concerning the dangers of comparing individual triggers within this study) that some presupposition triggers are systematically more amenable to local accommodation than others.

If interpreted in this way, our results have implication for theories of projection, in two particular respects. Recall that presupposition projection can broadly be treated in two rather distinct ways:

either using a dynamic semantic approach, typically drawing upon the work of Heim (1983), or using a pragmatic approach, first considered by Stalnaker (1976). A live debate in this area concerns whether there is a preference for global accommodation, and if so, whether that is a semantic attribute or some kind of pragmatic default (Chemla and Bott in press). A related question is how general this hypothesised preference is, across the full range of presuppositions and triggers. Our results suggest, in the first place, that there are striking differences between the behaviour of distinct triggers, particularly between members of the lexical and resolution classes. This casts doubt on the viability of a unified approach in which all presupposition triggers receive a broadly similar semantic or pragmatic analysis.

Secondly, the existence of gradient effects in information backgrounding suggests a role for contextual factors: it seems inevitable that discourse participants will use knowledge about common ground, QUD, etc. in order to understand to what extent a particular proposition is addressable. If this gradience goes across to the domain of projection, as we argue, it strongly suggests that context may also be playing a central role in determining projection behaviour. Methodologically, this implies that we should explore the possibility that differences in triggers' projection behaviour could be attributable to pragmatic factors, such as aspects of their typical distribution, before we resort to positing a multiplicity of semantic accounts to accommodate these differences. Of course, it remains possible that there are indeed profound differences between triggers that need to be captured at the level of semantic analysis. Much more empirical work must be done, with both deeper and wider coverage, before these matters can be adjudicated with any confidence on the basis of psycholinguistic data.

5. Conclusion

We have aimed to illustrate the potential of experimental work to cast light on aspects of linguistic presupposition behaviour that have long been contested in the literature. Our research represents a small step in this direction, and enables us to identify some of the many challenges that this complex phenomenon poses. However, it also moves us towards a clearer view of how diverse strands of research in this area might fruitfully be brought together. By enhancing our understanding of how presuppositions are exploited and processed by speaker and hearer, we may be able to inform and constrain theories of the logical or computational processes that underlie this behaviour.

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Appendix

Test questions

- Did John stop smoking?
Did Mary stop attending the course?
Did Elaine stop going out with Bill?
Did Ed stop playing golf?
Does Vicky continue to read novels?
Does Toby continue to watch films?
Does Margaret continue to give blood?
Does Pete continue to chair the committee?
Did Ben regret arguing with his boss?
Did Fiona regret buying the house?
Did Tracy regret giving up her job?
Did Colin regret moving to France?
Is Liz a better teacher than Bob?
Is Mike a better pianist than Barbara?
Is Tanya a better driver than Mark?
Is Harry a better historian than Georgina?
Did Lee make only one phone call?
Did Amy sing only one song?
Did Richard write only one letter?
Did Esther take only one exam?
Did Brian lose his wallet again?
Did Sandra miss her bus again?
Did Robin forget his keys again?
Did Helen arrive late again?
Did Ian win a prize too?
Did Isabel pass the test too?
Did Jake score a goal too?
Did Joanna get upset too?
Does Laura still live in London?
Does Susan still work as a model?
Does Julian still go to church?
Does David still write plays?

Filler questions

- Are any of John's friends at home?
- Did Ben pass any of his exams?
- Did Tom eat any of this pizza?
- Has Julia seen any Almodovar films?
- Did Susan visit all her relatives in Manchester?
- Will Ian teach all of John's lectures in his absence?
- Has Craig opened all his Christmas presents yet?
- Did Mike invite all his classmates to the party?
- Who has interviewed the suspects?
- Who is advising our client?
- Who is narrating the school play?
- Who is preparing the report on climate change?
- Who is available to represent the company at the exhibition?
- Who has surplus provisions to distribute?
- Who is available to interview prospective students?
- Who has pictures of the suspects to show the press?
- Is Mary's favourite candidate doing well in the polls?
- Is Mary doing OK with her PhD?
- Did Peter do well in the exams he had to take?
- Was the Prime Minister's talk received well?
- Did the company manage to drastically reduce costs?
- Has the new agricultural policy been effective?
- Does Hilary have a chance for a medal?
- Can the government show that they really care about refugees?