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Timing of belief as a key to cross-linguistic variation in common ground management

https://doi.org/10.1515/lingvan-2020-0116
Received November 4, 2020; accepted November 5, 2020

Abstract: In this paper we introduce the notion of *Timing of Belief* (ToB) as a relevant factor of variation in common ground (CG) management in sentence-peripheral particles across different languages. CG management traces the epistemic development of mutual beliefs between speaker and addressee. Evidence for the relevance of ToB comes from a small-scale acceptability study which tested the relevance of ToB for particles in English, German, and Spanish. While these languages all possess grammaticalized structures to encode different types of knowledge asymmetries between speaker and addressee, they vary with respect to the sensitivity or encoding of ToB. The evident relevance of ToB for CG management suggests that models which focus on the dynamic character of CG development require further expansion. We hope that the fine-graded differences in CG management reported here serve to inspire an engagement with the notion of ToB and the variation we find across languages and dialects.

Keywords: common ground; reason to believe; sentence-peripheral particles; storyboards; timing of belief

1 Background: common ground management starts with a knowledge asymmetry

The notion of common ground (Stalnaker 1978, henceforth: CG) has undergone several revisions over the last few years to reflect the dynamic and interactional process it takes to expand the CG. The notion has become more interactional because the speaker can at best *propose* for a belief to be added to the CG. Grounding a belief, however, is a mutual act (Farkas and Bruce 2010; Groenendijk and Roelofsen 2009; Stalnaker 2014; Wiltschko and Heim 2016). It is also a dynamic act because it often involves more than one speech act for a belief to be grounded (Bavelas et al. 2012; Clark and Brennan 1991; Malamud and Stephenson 2014). Hence, grounding a belief is a complex process. The beginning of an act of grounding can be defined as a knowledge asymmetry between speaker and addressee (Heim 2019b; Osa Gomez del Campo 2020): For a belief to be proposed as an addition to the CG, the proposing speaker must qualify as a credible source (Gunlogson 2008). The role of the addressee is to decide on whether they agree to believe the new proposition to be added (Stalnaker 2002). The default case of an assertion is therefore that the speaker has evidence for the truth of a proposition which is hitherto unknown to the addressee. It is necessary to monitor both the speaker's and the addressee's ground independently to understand the variation in use conventions of different discourse phenomena. Consider the examples in (1) to (4). For an assertion (1) to be used, the speaker has to know more than the addressee. With a polarity question (2), this scenario is inversed: initially, only the addressee knows which propositional alternative is true, and the speaker has reasons to belief that the addressee qualifies as a source of knowledge. In a biased question (3), the knowledge asymmetry is weaker than in polarity questions because some (extralinguistic) support makes one of the polar alternatives seem more credible to the speaker.

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With an echo question (4), in particular when the speaker expresses indignation, the initial asymmetry is defined by opposing beliefs.

(1) *It is raining.* [speaker knows p; addressee is presumably ignorant]

(2) *Is it raining?* [speaker is ignorant; addressee presumably knows *p*]

(3) *It is raining?* [speaker is biased; addressee presumably knows *p*]

(4) *It is RAINING?!* [speaker assumes -p after addressee claims *p*]

Because the use conventions for the phenomena in (1) to (4) can be distinguished by the initial asymmetry between the speaker's and the addressee's knowledge, we assume that CG management needs to be modeled by individually monitoring both the current and the future ground of both interlocutors. We therefore follow the recent trend in CG modeling by assuming that it needs to include a dynamic aspect responsible for the possible back and forth between interlocutors and an interactional aspect. The latter requires CG to be conceived not only in terms of possible worlds in which *p* is believed to be true (Stalnaker 1978) but also by the individual stances of each interlocutor on what they regard as true. In Wiltschko and Heim (2016), we therefore propose the CG model in Figure 1 for an assertion like (1). This model includes a speaker ground, an addressee ground and a negotiation table (following Farkas and Bruce 2010). Crucially, before *p* can be added to the CG, the addressee needs to accept it (verbally or non-verbally). We hence include an anticipated second turn modeling this acceptance (following Clark and Brennan 1991).

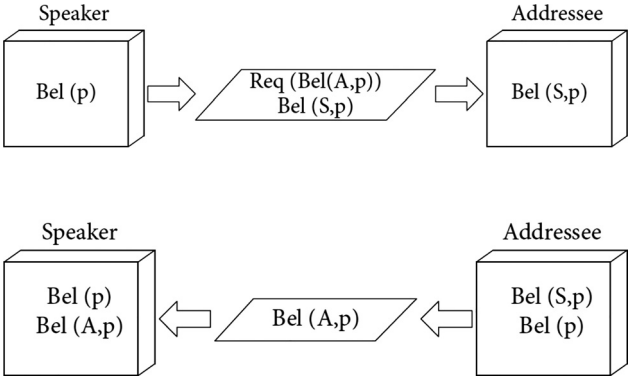


Figure 1: CG development in the context of an assertion (Wiltschko and Heim 2016).

The addition of *p* to the CG is modeled as a request to add the speaker's belief (Bel (S,p)) to the ground of the addressee and therefore to make Bel (S,p) a belief shared by the addressee (Bel (A,p)). It is the response in the acceptance phase that takes this proposal up and adds the asserted proposition to the CG.

The CG model in Figure 1 was developed to address the variation found in use conventions of tag questions in Canadian English (Wiltschko and Heim 2016, 2020). In a cross-linguistic comparison of our findings (Burton and Wiltschko 2015; Heim et al. 2016; Wiltschko 2021) we discovered an additional parameter of variation encoded through the particle *leicht* in Upper Austrian German. *Leicht* is in complementary distribution with the confirmational particle *geu*. The different use conventions are illustrated with the two storyboards in Figures 2 and 3. *Geu* is only compatible with the context in Figure 2; *leicht* is only compatible with the one illustrated in Figure 3. These and similar figures were used for eliciting speaker judgments in our cross-linguistic comparison of CG management (Heim et al. 2016). The crucial difference between the two contexts concerns the existence of a previous belief (however weak). In Figure 2, the speaker has a previous reason to suspect that the addressee has a new dog. In Figure 3, the speaker does not have any previous indication that the addressee would have a dog. The realization that there is a new dog occurs at the time of utterance visualized by the second panel in both storyboards. We refer to the introduction of evidence for the truth of a proposition before the utterance

time (Figure 2) as a *previous* reason to believe (RTB) and an introduction of such evidence at the utterance time (Figure 3) as a *current* RTB.

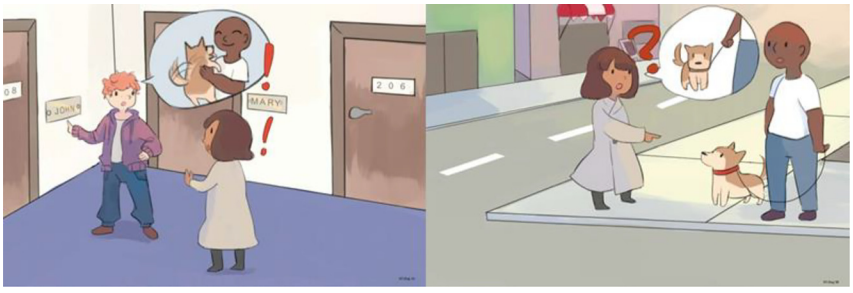


Figure 2: Context for a previous RTB: a mutual friend has already mentioned the dog present in the final panel.

(5) a. *Du host an neichn Hund,* ***geu****?*
You have a new dog PRT
'You have a new dog, right?'

b. **Du host* ***leicht*** *an neichn Hund?*
You have PRT a new dog
'You have a new dog?'

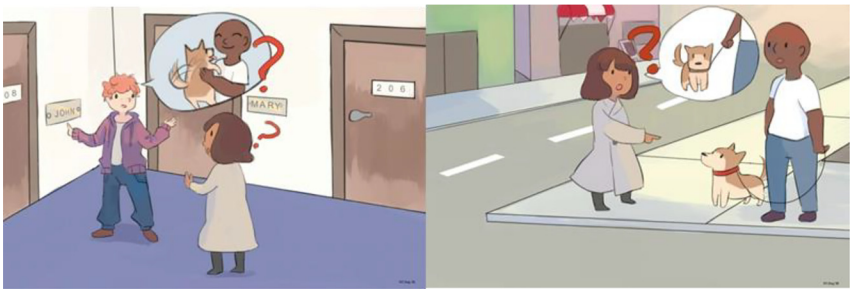


Figure 3: Context for a current RTB: only the current situation helps clarifying whether the interlocutor has a new dog.

(6) a. **Du host an neichn Hund,* ***geu****?*
You have a new dog PRT
'You have a new dog, right?'

b. *Du host* ***leicht*** *an neichn Hund?*
You have PRT a new dog
'You have a new dog?'

While both contexts in Figures 2 and 3 license a request for confirmation of the speaker's belief, the reason that led to the speaker's belief that something is true differs in *terms* of when it comes about. The incompatibility of the confirmational *geu* with the particle *leicht* which encodes the current realization that there is a new dog in (6)b suggests that a belief formed at utterance time does not qualify for a request to confirm its truth with *geu*. It appears that *leicht* encodes a weaker bias that *p* is true than is necessary to license a confirmational tag, such as *geu*. Since *leicht* does not exist in other dialects of German, we chose to elicit the sensitivity to ToB across different languages and dialects via an online survey. In the remainder of this paper, we discuss our findings and possible implications for CG modeling.

2 Experiment: results from a small-scale acceptability rating study

Based on the differences relative to the ToB lexicalized with the two particles *leicht* and *geu* in Upper Austrian German, we conducted a small-scale naturalness rating study that tested the sensitivity to ToB in the context of confirmational particles in Spanish, English, and German. Dialectal differences were not targeted in the study, but will be mentioned as potential avenues for future research in the context of German due to the encoding of the relevance of a current RTB with *leicht* in the Upper Austrian variant.

With this study, we wanted to investigate whether English and Spanish showed a similar sensitivity in their confirmationals to the ToB as Upper Austrian German does, and whether the sensitivity in Upper Austrian German would hold for other speakers of German (including different varieties) as well. For English, we tested the Canadian confirmational *eh* (which has similar contexts of use in Australian English, British English and New Zealand English; Avis 1972; Columbus 2010). For German, we tested the confirmational *gell*, which naturally occurs in the Southern federal states of Germany as well as in Austria and parts of Switzerland (with some phonological and orthographical variation; we henceforth use *gell* to refer to all such variants in German). For Spanish, we chose the confirmational *no*. All particles tested occur sentence-finally.[1]

We expected that in languages with timing-sensitive particles there would be a clear preference for either a previous or a current RTB. We had no language-specific predictions for what type of timing was preferred – except that speakers form Upper Austria would dislike conditions with a current RTB. For timing insensitive confirmationals, we expected positive ratings across all conditions with a RTB, even for our control items which had a clear out-of-the-blue reading of the referent of the sentences tested.

2.1 Methods

2.1.1 Participants

Twenty-seven native speakers of English, 25 native speakers of German, and 17 native speakers of Spanish were recruited via email and social media to participate in an online study hosted on fluidsurveys.com. Speakers of all three languages varied in dialectal background. Although this variation is not reflected in our statistical analysis of the ratings due to the uneven distribution, we include the details here for sake of completeness.[2] Among the 27 native-speakers of English, 18 self-identified as speakers of Canadian English (with 8 from the West Coast, 2 from Ontario, 1 from Ottawa, 1 from Toronto, 1 from Prince Edward Island, 1 from Alberta, 1 from the Maritime area, and 3 without further specification), 7 as speakers of American English (1 from New York City, 1 from Northern Virginia, 3 from the South of the US, and 2 from the West) and 1 speaker from New Zealand and Australia each. Among the German 25 speakers, 7 self-identified as speakers of Standard German, 2 as speakers of Alemannic, 2 as speakers of Swabian, 4 as speakers of Austrian German, 2 as speakers of Viennese, 1 as a speaker of Upper Austrian, 1 as a speaker of Vorarlberg-Austrian, 1 as a speaker of East-Austrian, 2 as speakers of Zurich German, 1 as a speaker of Swiss German, 1 as a speaker of East Swiss German, and 1 as a speaker of an unidentifiable dialect. Among the 17 native speakers of Spanish, 5 self-identified as speakers from Mexico, 1 as a speaker from Salvador, 10 as speakers of peninsular Spanish, and 1 as a 'naturalized' speaker of Spanish with a Catalan accent. Participants had a mean age of 34.3. They submitted a language background questionnaire that served to identify them as native speakers of one of the target languages. Only incomplete surveys were excluded.

1 The German confirmational *gell* is special in that it can occur both sentence-finally and initially. For a discussion of possible effects of its distribution, see Heim (2019a).

2 We are grateful to two anonymous reviewers who alerted us to the vulnerability of our conclusions drawn for individual languages given the considerable dialectal variation. We submit that dialects have notable effects of acceptability ratings, especially on ratings of data that includes particles with well-known dialectal variation, such as the use of *eh*. The overall dialectal variation, however, made it difficult to ascribe any effects to one specific dialect as can be seen for the Austrian versus non-Austrian comparison in Section 2.2 (see Table 2).

2.1.2 Materials

Stimuli consisted of eight two-panel storyboards designed according to a 2×2-factorial design with the following four conditions: one condition with a storyboard that establishes a previous and a current RTB (+ previous, + current), one with a storyboard that establishes a previous, but not a current RTB (+ previous, – current), one with a storyboard that establishes only a current, but not a previous RTB (– previous, + current) and one with a storyboard that includes neither a current nor a previous RTB (– previous, – current). The first panel of each storyboard, which served to establish whether or not there was a previous RTB, was accompanied by a brief description introducing the context and an initial dialogue presented in writing. The second panel, which served to establish whether or not there is a current RTB, was also accompanied by a brief dialogue presented in writing, which ended with the target sentence including a confirmational particle. The dialogue in the final panel did not reflect whether or not there was a current RTB in the panel. Only the details of the drawings did: those including a current RTB contained a referent of the confirmational request, those not including a current RTB did not. As a reference point for the effectiveness of the contextual manipulations, we included two additional storyboards as control items. These storyboards had an initial panel without any mention of the belief that was targeted by the particle in the second panel. That second panel corresponded to the panel with a current RTB in the critical stimuli. The control items introduced the referent of the confirmation request out-of-the-blue while all critical stimuli had a previous mentioning of said referent. Each configuration of +/– previous versus +/– current RTB was represented with two different contexts – one about a new dog, and one about working out at the gym. Figure 4 represents the four different possible configurations based on one type of context. A sample for the English data including the introductions and dialogues for each panel is provided in (7) to (9).[3] Note that the texts and dialogues are identical for the panels with and without a current RTB. Standard orthography was chosen for all three languages despite the fact that *gell* in German is non-standard. It nevertheless has equivalent particles in other dialects of German (Zimmerman 2011).

(7) **Text accompanying the panel with a previous RTB**
John tells Mary that their common friend Greg has a new dog:
John: "Greg got a super cute new puppy dog!"
Mary: "Oh, I didn't know. Nice!"

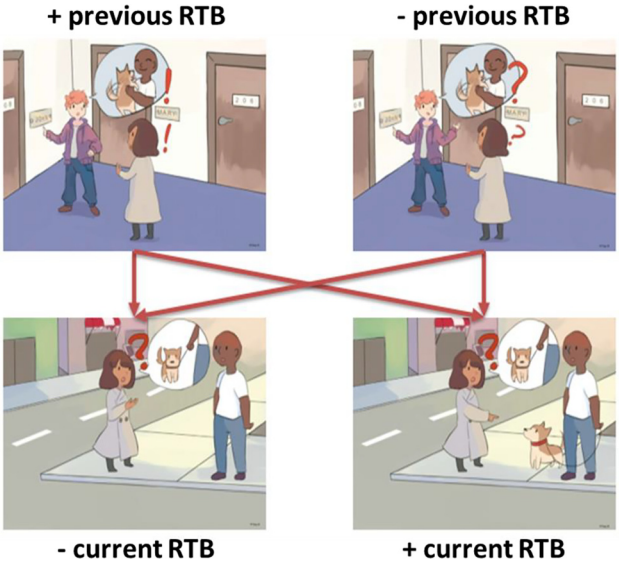


Figure 4: Stimuli configuration with "new dog" context.

3 See Appendix for the complete English, German and Spanish data tested.

Figure 5: Sample control storyboard without a current RTB and no previous mentioning of the dog.

(8) **Text accompanying the panel without a previous RTB**
John asks Mary whether their common friend Greg has a new dog:
John: "Hey, do you know: did Greg get a puppy?"
Mary: "Oh, I have no idea!"

(9) **Text accompanying the panels with and without a current RTB**
Shortly after, Mary runs into Greg on the street.
Mary: "Hey Greg, how are you? **You've got a dog now, eh**?"

Figure 5 gives a sample of the control storyboard. Introduction and thoughts for the first panel are given in (10). The text and dialogue for the second panel were identical to the +/– current RTB sample in (9).

(10) **Sample text accompanying the first panel of a control item**
Mary hasn't seen her friend Greg in a long time and is wondering about him:
"I wonder how Greg is doing these days, it's been ages since I've seen him last…."

The different storyboards were all presented with both panels side by side as in the control item in Figure 5.

2.1.3 Procedure

Each participant saw all 10 storyboards described above (2 per condition and 2 control items). Each storyboard and text combination was followed by a request to rate the naturalness of the exchange on a six-point scale in a drop-down menu ranging from *excellent* to *poor*. We chose this form of rating in favor of a classic six-point Likert scale to simulate the storyboard elicitations we had used for preceding investigations of CG management with particles across different languages (Heim et al. 2016). In addition to the rating scale, participants were encouraged to enter alternative ways of expressing the target request in a comment box. Items were randomized. At the beginning of the study, participants could choose their target language, which was also the language in which the language background questionnaire preceding the rating items was presented. The study did not include any distractors or filler items; it was modeled after a storyboard elicitation procedure developed for semantic fieldwork (Burton and Matthewson 2015). A further measure similar to the fieldwork context was the addition of the comment box in which participants could volunteer alternative particles. In offline storyboard elicitation tasks, such comments often provide valuable insights.

2.2 Results

For our statistical analysis, we relied on linear mixed effect regressions using the *lme4* package (Bates et al. 2014) in R (R Core Team 2020). Initial model fitting followed a 'keeping it maximal' strategy for the random effects structure with subsequent pruning guided by experiment design (Barr et al. 2013). Planned posthoc tests were conducted using the *emmeans* package (Lenth 2018) and consisted of pairwise comparisons of the

Table 1: Grand means of ratings for configurations of +/− current versus +/− previous RTB (with standard errors in brackets).

Language	RTBs				
	+ previous, − current	+ previous, + current	− previous, + current	− previous, − current	Control
English	4.52 (±0.25)	4.51 (±0.26)	4.12 (±0.23)	2.12 (±0.19)	3.88 (±0.31)
German	4.60 (±0.30)	3.68 (±0.34)	2.98 (±0.33)	2.54 (±0.28)	2.26 (±0.27)
Spanish	4.55 (±0.33)	2.92 (±0.24)	2.76 (±0.29)	2.84 (±0.39)	2.89 (±0.31)

four conditions. A planned comparison of each condition with the control items was performed with independent sample *t*-tests, relying on the Welch correction where HOV was not tenable.

Results for the four configurations of +/− previous RTB and +/− current RTB are presented in Table 1. The table also includes the ratings for the control items to allow for a comparison of the context manipulation and an out-of-the-blue reading of the referent targeted by the particle. We expected the ratings for the control items to be very low because of the out-of-the-blue reading.

In English, the combination of a previous RTB without a current RTB was rated highest (M = 4.52, SE = 0.25), with combinations of previous and current RTB and current RTB without a previous RTB following closely. The lack of both previous and current RTB was rated lowest (M = 2.12, SE = 0.19), even lower than the control items (M = 3.88, SE = 0.31). Only the condition with neither previous nor current RTB was rated lower than then the mid-point of the scale; all other items had positive naturalness ratings.

We fitted a linear mixed effects regression model to predict the relationship between naturalness ratings and the variables of current and previous belief. A full model with previous and current RTB as fixed effects and a random effect structure of intercepts by subject and by item and by-item and by-subject slopes for the type of storyboard did not converge. We therefore excluded by-item slopes and by subject-slopes for the storyboard type. The analysis revealed a significant interaction of the fixed effects (χ^2 (1) = 9.903, p = 0.001742). In other words, previous and current belief had inter-dependent effects on the rating of the stimuli. On average, the presence of a current belief increased ratings by 0.91; the presence of a previous belief by 1.31. A posthoc pairwise comparison (Tukey) revealed that the condition with neither current nor previous RTB differed significantly from the other three conditions: the combination of a current RTB without a previous RTB (t (11.87) = 5.427, p = 0.001), the combination without a current RTB with a previous RTP (t (11.87) = 4.516, p = 0.004) and the combination of previous and current RTB (t (11.87) = 5.093, p = 0.001). All other pairwise comparisons were not statistically significant. A planned comparison with the control items revealed that those with a previous RTB and no current RTB (t (109.84) = 2.13, p = 0.036, *95% CI for the difference* [3.86, 4.52]) and those with neither previous nor current RTB (t (108.58) = 5.55, p > 0.001, *95% CI for the difference* [2.16; 3.86]) differed significantly. In simple terms, any RTB in English sufficed for a rating above the mid-point of the scale. Ratings were only negative if there was no RTB.

In German, the combination of previous RTB without a current RTB received notably higher ratings than any other condition (M = 4.60, SE = 0.30). If a present RTB was combined with a current RTB, ratings were still above the mid-point of the scale (M = 3.68, SE = 0.34). The other two conditions were rated below the mid-point of the scale, as were the control items (M = 2.26, SE = 0.27).

We used the same linear mixed effects regression analysis to predict the relationship between naturalness ratings and the variables of current and previous belief as for the English data. This time, however, the model did not converge until random slopes and even the intercept for the type of storyboard were removed. Again, there was a significant interaction of the fixed effects (χ^2 (1) = 5.7266, p = 0.018). Hence, just as for the ratings of the English data, previous and current RTB had inter-dependent effects on the ratings. On average, the presence of a current RTB decreased ratings by 0.24 compared to the absence of a current RTB; the presence of a previous RTB increased ratings by 1.38. Compared with the English data, then, previous RTB had similar effects on the ratings across languages, current RTB had not. The pairwise comparison revealed that only two conditions were rated higher than the condition with neither previous nor current RTB: the difference was very

marginal for the combination of both previous and current RTB (t (13.1) = 2.583, p = 0.093) but notably higher for the combination of previous RTB without a current RTB (t (13.1) = 4.667, p = 0.002). Amongst each other, these conditions did not differ significantly, but the condition with a previous RTB without a current RTB was rated significantly higher than the condition with a current RTB but without a previous RTB (t (13.1) = 3.670, p = 0.013). A planned comparison of the rating of the control items revealed that they differed significantly from those of storyboards with a previous RTB and no current RTB (t (96.053) = 6.88, p < 0.001, *95% CI for the difference* [2.26, 4.60]), as well as those with both a previous and a current RTB (t (98) = 3.85, p < 0.001, *95% CI for the difference* [2.26, 3.68]) and those without a previous RTB and a current RTB (t (97.253) = 2.1827, p = 0.031, 95% *CI for the difference* [2.26, 2.98]). The ratings for German therefore show a strong preference of a previous RTB with little effect of a current RTB. If there was a current RTB and the referent was salient from the initial panel, ratings were still higher than when the confirmational particle appeared out-of-the blue (i.e. in the control items where there was a reference neither in the initial nor the second panel).

In Spanish, only the combination of a previous RTB without a current RTB received ratings above the mid-point of the scale; it received similar naturalness ratings (M = 4.55, SE = 0.33) as in German and English.

A mixed effects regression model identical to the one we used for the English data revealed a very marginally significant interaction of the fixed effects (χ^2 (1) = 2.7179, p = 0.099). As before, previous and current belief had inter-dependent effects on the rating of the stimuli. On average, the presence of a current belief increased ratings by 0.91; the presence of a previous belief by 1.31. On average, the presence of a current RTB decreased ratings by 0.70 compared to the absence of a current RTB; the presence of a previous RTB increased ratings by 0.94. Descriptively speaking, the negative effect of the current RTB was higher in Spanish than in German. The planned pairwise comparison revealed that the highest ratings for storyboards with a previous RTB and no current RTB differed only very marginally significantly from those for storyboards with neither previous nor current RTB (t (6) = 2.889, p = 0.098). Ratings for storyboards without a previous RTB but a previous RTB exhibited a very marginally significant difference from those with neither previous nor current RTB (t (6) = 3.022, p = 0.083). The former condition received the lowest ratings overall. The planed comparison with the control items only revealed a significant difference in ratings for the condition rated highest (t (74) = 4.2203, p < 0.001).

Descriptively, then, we can summarize the findings across languages as follows: English participants gave positive ratings for any RTB as long as the proposition was salient; German participants showed a preference for previous RTB without a current RTB, but also accepted a current RTB if salient; Spanish participants only liked the a previous RTB without a current RTB.

Since Upper Austrian German has a lexical encoding of the presence of a current RTB with *leicht* while other dialects of German do not, we also compared ratings from Austrian participants with speakers of other German varieties. Table 2 provides the mean naturalness ratings of nine subjects from Austria and 16 speakers of other German dialects. Unfortunately, participants speaking Austrian German could not be reliably divided into different local dialects because subjects chose their own dialect labels and there were not enough participants per self-identified dialect to merit statistical significance testing.

While the ratings of non-Austrian participants broadly map onto the ratings for German in Table 1, the ratings of Austrian participants are slightly higher for storyboard contexts that only included a current RTB. The latter receive negative ratings (i.e. below the mid-point of the scale) for non-Austrian participants in

Table 2: Mean ratings (incl. SEs) for configurations of +/− current versus +/− previous RTB for Austrian versus non-Austrian speakers.

Variant	RTBs				
	+ **previous,** − **current**	+ **previous,** + **current**	− **previous,** + **current**	− **previous,** − **current**	**Control stimuli**
Austrian	4.44 (±0.42)	3.67 (±0.42)	3.28 (±0.41)	3.11 (±0.44)	2.44 (±0.49)
Non-Austrian	4.68 (±0.33)	3.69 (±0.28)	2.81 (±0.30)	2.22 (±0.28)	2.16 (±0.37)

Table 2 and also for all German participants combined in Table 1. Due to the small number of participants from Austria, we refrain from a statistical analysis of the dialectal variation here and only include this comparison as a reference point for future research as to how exactly ToB-sensitive particles in the lexicon of a language or dialect influence the sensitivity to the notion of ToB at large.

2.3 Discussion

The findings reported confirm our hypothesis that in some languages confirmational particles show a preference for a particular ToB: the Spanish confirmational *no* clearly prefers a previous over a current RTB, with conditions including a current RTB rated similarly poorly as the out-of-the-blue control items. The German confirmational shows a similar preference for a previous RTB, albeit with smaller penalty for a co-occurring current RTB. This is confirmed by the strong dislike of the out-of-the-blue control stimuli, which received the lowest ratings. The English data, however, suggest that there are also languages that are insensitive to ToB: any RTB will do.

What we did not expect was the finding that Austrian German had ratings around the midpoint of the scale for the condition that only included a current RTB. In light of the *leicht* data from our storyboard elicitations, we expected that the Austrian German confirmational would show an even stronger dislike of the condition that only included a current RTB than those of other German dialects. A possible explanation for this finding may be that Austrian participants, who included some speakers of Upper-Austrian, were willing to accommodate for the lack of encoding the presence of a current RTB. A particle that was frequently offered in the comment box for the condition with only a current RTB was the sentence-initial particle *ah*. This particle indicates a change of state, similar to English *oh* (Golato 2010; Heritage 1984). This particle was not offered in any other condition among the Austrian participants and only once among the other German-speaking participants. In the latter case, the particle was offered for the combination of previous and current RTB. Although the expectation that speakers of Austrian German would avoid the configuration of a current RTB without a previous RTB did not materialize, then, the comments made about *ah* suggest there is a heightened sensitivity toward the presence or absence of a current RTB. We leave further verification of this observation for a future investigation with a focus on dialectal variation.

The crucial take-away from our findings, however, is that languages which employ similar means of requesting confirmation exhibit different degrees of sensitivity toward ToB in this context. In light of the absence of the variable of ToB in previous models of CG management, we suggest that the idea that speakers project the future development of CG requires a more nuanced conceptualization. The distinction of CG and projected set (e.g. Farkas and Bruce 2010; Malamud and Stephenson 2014) is only sufficient to the extent that it reflects the dynamic and interactional aspects of CG management. Both interlocutors contribute to CG management and it may involve several turns to add a proposition to CG. Yet interlocutors are also aware of where to anchor a particular RTB: at utterance time, which may allow some accommodation due to presence of extralinguistic support (Heim 2019b), or in the moment prior to that utterance. A sensitivity to ToB suggests that we may need to rethink the role of accommodation (Chafe 1976; Stalnaker 2002), salience (Bartels 1997; Grosz and Sidner 1986), and source of commitment (Gunlogson 2008; Wolf 2014) with respect to the timing of when and how a RTB comes about.

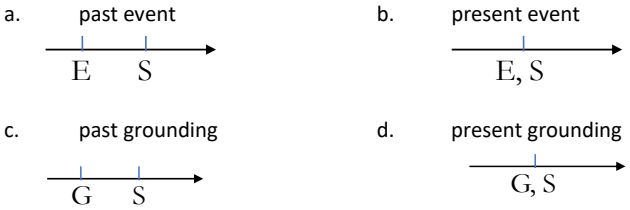
Finally, the finding that ToB appears to be a neglectable variable for the English confirmational *eh* underscores the importance of drawing on a wider range of unrelated languages for our modeling of CG management. We have shown elsewhere (Heim et al. 2016; Keupdjio and Wiltschko 2018; Wiltschko 2017; Yang and Wiltschko 2016) that the study of non-European CG phenomena can reveal several variables of CG management not attested in English CG phenomena, such as expertise, politeness, and strength of belief.

3 Theoretical implications: how can timing of belief be modeled?

We have now seen that there is significant sensitivity of confirmationals to ToB in some languages: whether the interlocutor has formed the belief they want confirmation for some time prior to the conversation or whether it is a new belief, formed at the time of conversation. But crucially, this significance differs across the languages we explored: as reported in Burton and Wiltschko (2015), this is a categorical distinction in Upper Austrian German, but this is not a general pattern. The question we address in this section concerns the theoretical implications of this finding (see Wiltschko 2021 for detailed discussion).

It is well-known that languages across the world differ relative to how they treat the temporal interpretation of an event: there are languages where the event has to be ordered relative to the utterance time, and there are languages where this temporal ordering is not required. This is the familiar difference between tensed and tenseless languages. So the question that one might ask is if the sensitivity to ToB and its absence parallels the distinction between tensed and tenseless languages. Note that ToB can be viewed in similar ways as tense. Past tense marks that the event time (E) is prior to the speech time (S), while present tense marks that the event time happens simultaneously to speech time as in (11)a&c. Similarly, we can introduce a timing of grounding (G) which is ordered relative to speech time: grounding time may be prior to speech time or simultaneously to speech time, as in (11)b&d.

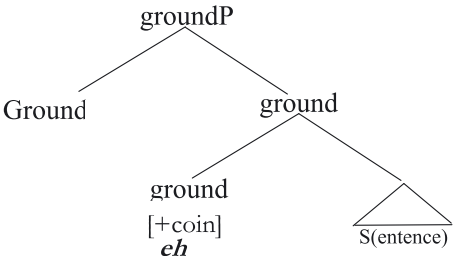
(11)



Leicht signals the grounding time as coincidental with speech time, while *geu* marks grounding time as occurring before speech time. In contrast, in English, *eh* is vague and can encode both a present and path interpretation. As a point of departure for modeling this variation, consider Wiltschko and Heim's (2016) analysis of *eh*. We argue that there is an articulated layer of structure above the propositional structure dedicated to grounding: a speaker-oriented GroundP introducing the speaker's ground and an addressee-oriented GroundP introducing the addressee's ground. Following Wiltschko (2014), we further assume that every functional category relates two arguments via an unvalued coincidence feature [*u*coin]. In the case of $\text{GroundP}_{\text{Spkr}}$, [*u*coin] relates the utterance to the speaker's ground asserting that what is said is or is not in the speaker's ground. Thus, in the example in (12), with the use of *eh* the speaker asserts that the proposition is in their ground. Formally, this is implemented by assuming that *eh* positively values [*u*coin] in $\text{Ground}_{\text{Spkr}}$. They further propose that the request for confirmation comes about via the sentence final rise associated with *eh*. It is treated like a unit of language that associates with another functional head, which regulates turn-taking.

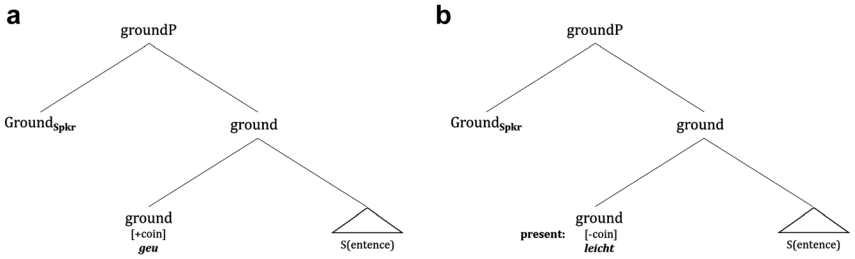
(12) You have a new dog, eh?

(13)



With this analysis in mind consider again the difference between *geu* and *leicht*. Wiltschko (2019) proposes that *geu* is used to positively value the coincidence feature in GroundP asserting that the propositional content is in the speaker's ground as in (14)a, while *leicht* is used to value it negatively, as in (14)b.

(14)



The difference between languages that are sensitive to ToB and those that are not has to do with the status of new beliefs. That is, for English *eh,* it does not matter when the belief entered the speaker's ground. Both old and new beliefs count. For German and Spanish, however, only beliefs that have been formed prior to the time of conversation are taken to be in the ground. New beliefs cannot yet be asserted to be in the ground. And this is what *leicht* marks overtly: a belief that is not (yet) in the ground. Assuming that *eh* is used to positively value [+coin] leaves us with the question as to whether there is a way to value [*u*coin] negatively in English. Wiltschko (2021) proposes that in English it is the incredulity contour which serves this purpose. It is used in circumstances where the speaker does not (yet) hold the belief that the proposition is true. In brief, while English overtly distinguishes beliefs from non-beliefs, Upper Austrian overtly distinguishes old from new beliefs. Non-beliefs in Upper Austrian fall into the same category as new beliefs because the line of distinction – corresponding to the valuation of the coincidence feature in *Grounding* – is fundamentally different for English and Upper Austrian. How this translates to the findings for Spanish and other German dialects has to be left for future research. As we have seen from the results of the naturalness rating study, it may well be that the line of distinction here directly corresponds with a distinction of what can be accommodated through a previous RTB and what cannot.

4 Conclusion

In this paper, we presented quantifiable evidence for the variation in sensitivity of ToB for the licensing of confirmation requests via the English particle *eh*, the German particle *gell*, and the Spanish particle *no*. Our survey demonstrated that Spanish and German exhibit a preference for a previous over a current RTB in these contexts and a dislike of confirmation requests to occur out-of-the-blue. This is unlike what we found for the English confirmation requests: as long as our stimuli included either a current or a previous RTB, even if that RTB occurred out-of-the blue, subjects rated the use of *eh* positively. Surprisingly, we did not find a direct correlation of sensitivity and lexicalization of ToB among our participants from (Upper) Austria. Even though absence of previous RTB and presence of current RTB was judged as incompatible with a request to confirm in one-on-one storyboard elicitations, participants from (Upper) Austria rated storyboards with only a current RTB as somewhat positive. A possible explanation, which gained support from the comments offered by the subjects, may be that Austrian participants were willing to accommodate the use of *gell* in these contexts even though they showed notable awareness that the RTB was current, not previous. We hope to explore dialectal differences for the use conventions of *gell* in a more focused study in the future.

One of the questions that our study raises concerns the nature of the observed variation in ToB. It could be a property of individual confirmationals. It could be a property of the whole class of confirmationals in a given language. Or it could be a more general property of language which extends beyond confirmationals. That is, discourse sensitive timing of knowledge states is not something that is restricted to confirmationals. This is an interesting empirical question raised by our investigation, which needs to be explored. It has the potential to shed more light on the interface between grammar and CG management.

Appendix: Experimental stimuli

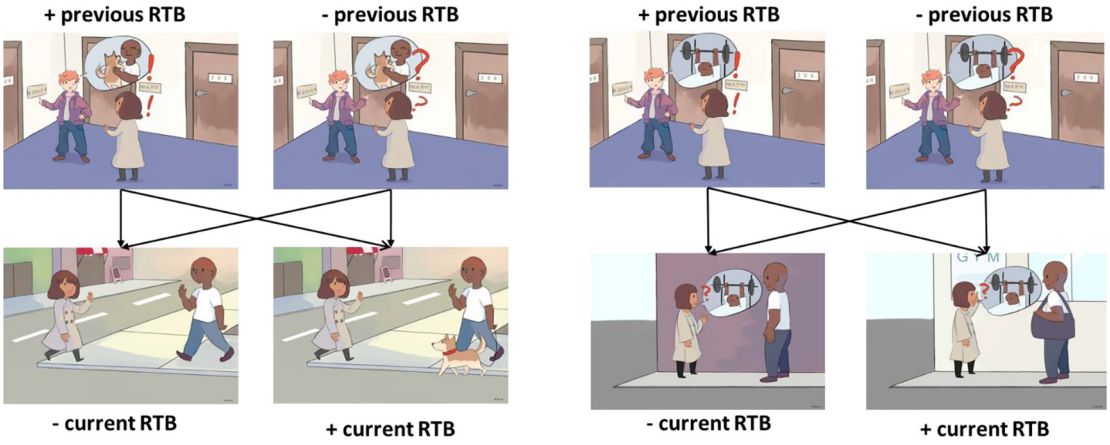


Figure 6: Stimuli configuration with (a) "new dog" context (b) "gym" context.

Experimental stimuli for the English survey

(1) Text accompanying the panel with a previous RTB

a. John tells Mary that their common friend Greg has a new dog:
John: "Greg got a super cute new puppy dog!"
Mary: "Oh, I didn't know. Nice!"

b. John tells Mary that their common friend Greg is now working out at Crossfit:
John: "Greg is getting super strong – he's working out now!"
Mary: "Oh, I didn't know – Nice!

(2) Text accompanying the panel without a previous RTB

a. John asks Mary whether their common friend Greg has a new dog:
John: "Hey, do you know: did Greg get a puppy?"
Mary: "Oh, I have no idea!"

b. John asks Mary whether their common friend Greg is working out these days:
John: "Hey, do you know if Greg is going to the Gym lately?"
Mary: "Oh, I have no idea!"

(3) Text accompanying the panels with and without a current RTB

a. Shortly after, Mary runs into Greg on the street.
Mary: "Hey Greg, how are you? You've got a dog now, eh?"

b. Shortly after Mary runs into Greg on the street.
Mary: "Hey Greg, how are you? You are working out now, eh?"

Experimental stimuli for the German survey

(1) **Text accompanying the panel with a previous RTB**

a. Hans erzählt Maria, dass ihr gemeinsamer Bekannter Gregor jetzt im Crossfit trainieren geht.
Hans: "Gregor wird richtig stark, der trainiert jetzt auch."
Maria: "Oh ja? Interessant!"

b. Hans erzählt Maria dass ihr gemeinsamer Freund Gregor einen neuen Hund hat.
Hans: "Gregor hat jetzt einen total süßen Hund!"
Maria "Oh ja? Interessant, er wollte ja immer schon mal einen Hund haben."

(2) **Text accompanying the panel without a previous RTB**

a. Hans fragt Maria ob ihr gemeinsamer Freund Gregor einen neuen Hund hat.
Hans: "Hat Gregor jetzt einen neuen Hund?"
Maria: "Hm, keine Ahnung, das weiß ich nicht."

b. Hans fragt Maria, ob ihr gemeinsamer Bekannter Gregor jetzt auch ins Fitnessstudio geht.
Hans: "He, weißt du, ob der Hans trainieren geht?
Maria: "Hm, keine Ahnung, das weiß ich nicht."

(3) **Text accompanying the panels with and without a current RTB**

a. Am nächsten Tag begegnet Maria Gregor auf der Straße.
Maria: "Hallo Gregor, wie geht's? Du hast jetzt einen Hund, gell?"

b. Am nächsten Tag begegnet Maria Gregor auf der Straße.
Maria: "Hallo Gregor, wie geht's? Du gehst jetzt auch trainieren, gell?"

Experimental stimuli for the Spanish survey

(1) **Text accompanying the panel with a previous RTB**

a. Juan le comenta a María que su amigo en común Greg tiene un perro nuevo:
Juan: "¡Greg tiene un perrito súpermono!"
María: "¡Qué me dices! ¡Qué bien!"

b. Juan le comenta a María que su amigo en común Greg está yendo al gimnasio:
Juan: "Greg está súper en forma, está yendo al gimnasio!"
María: "Oh, no lo sabía … ¡Guau!"

(2) **Text accompanying the panel without a previous RTB**

a. Juan le pregunta a María si su amigo en común Greg tiene un perro nuevo:
Juan: "Oye, ¿sabes si Greg tiene un perrito?"
María: "Hmmm ¡ni idea!"

b. Juan le pregunta a María si su amigo en común Greg está yendo al gimnasio:
Juan: "Oye, ¿sabes si Greg está yendo al gimnasio últimamente?"
María: "Uy, ¡ni idea!"

(3) **Text accompanying the panels with and without a current RTB**

a. Poco después María se encuentra a Greg por la calle:
María: "Hola, Gregor, ¿cómo te va? ¡Hace tantísimo que no nos vemos! Tienes un perrito, ¿no?"

b. Al día siguiente, María se encuentra a Greg en la calle. Greg lleva una bolsa de gimnasio:
María: "¡Hombre, Greg! ¿cómo estás? Estás yendo al gimnasio, ¿no?"

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