Non-doxastic Attitude Reports, Information Structure, and Semantic-Pragmatic Interface

Wojciech Rostworowski[1] · Katarzyna Kuś[1] · Bartosz Maćkiewicz[1]

Abstract

Truth conditions of sentences ascribing non-doxastic propositional attitudes seem to depend on the information structure of the embedded clause. In this paper, we argue that this kind of sensitivity is a semantic phenomenon rather than a pragmatic one. We report four questionnaire studies which explore the impact of the information structure on the truth conditions of non-doxastic attitude ascriptions from different perspectives. The results of the first two studies show that the acceptability of those ascriptions can be affected by some structural modifications of the embedded clause, in particular, when we replace a simple form by an equivalent complex *conjunctional* form ('*p* and *q*'). However, it is possible that different evaluations of such ascriptions have a pragmatic source, namely, the ascriptions with embedded conjunction *imply* that the agent's attitude transfers to both conjuncts. In the second pair of studies, we further investigate the nature of this implication which can be classified as 'Conjunction Elimination' (CE) in the scope of an attitude verb. The results show that CE-inferences in the context of non-factive non-doxastic attitude ascriptions are not easily cancellable and hence of a semantic rather than pragmatic nature. The results are not conclusive when it comes to the factive non-doxastic attitudes. We conclude our findings by some considerations about a potential source of the observed difference between non-factive and factive attitude verbs and the significance of our general findings to the semantic theory of non-doxastic attitude ascriptions.

1 Introduction

Even early on, philosophical reflections on natural language have recognized that sentences ascribing propositional attitudes – like believing, hoping, fearing that something is the case, etc. – are problematic for semantic analysis (Frege 1892; Russell 1905). Roughly, the problem is that the truth conditions of such an ascription

---

✉ Bartosz Maćkiewicz
   b.mackiewicz@uw.edu.pl

1   Faculty of Philosophy, University of Warsaw, Warsaw, Poland

can change as a result of modifications of the complement clause, which do not affect the truth conditions of the complement clause itself. For instance, an ascription of an attitude may change its truth value if we replace a singular term with a co-referring one in the complement clause:

(1) a. John believes that the Morning Star is a star.
    b. John believes that Venus is a star.

While the replacement of 'the Morning Star' with 'Venus' does not change the truth condition of the subclause 'the Morning Star is a star', it has consequences for the truth value of the whole belief ascription. It may be *true* that John believes that whatever the Morning Star is, it is a star, but at the same time, it may be *false* that John believes that Venus is a star (when he does not know that Venus and the Morning Star are actually one and the same). Another problem is that an agent may fail to recognize that a sentence p is logically equivalent to a sentence q, and may believe that p, but not that q – even though p and q are true in exactly the same circumstances. So, a substitution of p with q in the scope of, e.g., knowledge ascription may change the value of the whole ascription. It is sometimes called a problem of 'logical omniscience' (e.g., Égré 2020).

The aim of this paper is to explore a novel problem of attitude reports: an ascription can change its truth value once we modify the *information structure* of the embedded clause, without changing the clause's truth conditions. The issue concerns the ascriptions of *non-doxastic* attitudes, and it is partially recognized in the literature (e.g., Heim 1992; von Fintel 1999; Levinson 2003; Rostworowski 2018; Rostworowski et al. 2023). The results of the previous studies have suggested that evaluations of non-doxastic attitude ascriptions are sensitive to the information structure of the embedded clause. The empirical investigations presented in this paper extend the earlier findings and further indicate that the aforementioned sensitivity is a semantic phenomenon rather than a pragmatic one. In Section 2, we discuss the problem of information structure in non-doxastic attitude ascriptions and summarise main observations about it from the literature, including both theoretical and empirical insights. In Sections 3 and 4, we present our experimental Studies 1 and 2. Section 5 discusses the overall relevance of the obtained empirical results and its implications for semantic theories of non-doxastic attitude ascriptions.

2 Non-doxastic Attitude Ascriptions and Information Structure

Let us start with a demarcation of the field of our interest. By 'non-doxastic' attitudes, we mean a loosely defined type of mental states held by human agents with desire, approval, fear, or regret being their prototypical examples. Typically, attitude verbs used to report on this kind of mental states have a semantic component of an agent being *in favour of* something (e.g., pro-attitudes such as 'want' or 'be glad') or *against* something (e.g., con-attitude such as 'fear' or 'feel sorry'). Non-doxastic attitudes verbs take as an object of the attitudes a nominal argument (e.g., 'Mark desires a career as a computer programmer') or a clausal component when

it is used to ascribe a propositional attitude. Some non-doxastic attitude ascriptions lack a cognitive element (i.e., people's belief or knowledge of the attitude content), they also do not imply that the content of an ascription refers to a fact:

> (2) Mark fears that the philosophy classes next year will be online.
> ⇏ i. Mark knows/believes that the philosophy classes next year are online.
> ⇏ ii. The philosophy classes next year will be online.

However, the cognitive component is not necessarily absent in non-doxastic attitudes. For example, in sentence (3) the verb 'is glad' is not only factive, but it also implies the agent's knowledge about that fact:

> (3) Mark is glad that the philosophy classes this year are online.
> ⇒ i. The philosophy classes this year are online.
> ⇒ ii. Mark knows/believes that the philosophy classes this year are online.

We are going to focus on the attitudes like the ones above, that is the ones which (i) are expressed by ascriptions with that-clause (i.e., '*S AV*es that *p*'), and (ii) include a widely construed evaluative (pro or con) component. There are also propositional attitudes that do not include such a component, but involve more than just a belief or denial that a proposition is true; these are, for instance, rogative attitudes such as *wondering* or *wishing to know*, etc. Our study does not include them, but they arguably pose similar problems. Finally, there is a class of epistemic verbs that express different degrees of (dis)believing in a proposition, like 'deny', 'doubt', etc. These are *not* regarded as non-doxastic on our characterization and will not be the target of our consideration.[1]

2.1 The Problem

Consider the following pair of statements:

> (4) a. Anne's father is in cancer remission.
> b. Anne's father got cancer and has (now) entered into remission.

These sentences intuitively convey the *same information* in somewhat *different ways*. In particular, (4b) sounds like a more explicit version of (4a). Despite the difference in their formulations, they are true in exactly the same circumstances (i.e., if (4a) is true, so must be (4b), and vice versa), setting aside some potential hidden indexicality. Moreover, a competent user of language would easily infer (4b) from (4a) and vice versa. Hence, it is natural to expect that *knowing* or *believing* in one of these propositions entails knowing or believing in the other. In other words, the ascriptions like the following ones seem to be equivalent:

---

[1] For an extended typology of attitude verbs (proposed in the context of analysing anaphoric relations) see Asher 1987.

(5) a. John knows that Anne's father is in cancer remission.
　　b. John knows that Anne's father got cancer and has (then) entered into remission.

Generalising a bit, the evaluation of a doxastic-attitude attribution is not particularly sensitive to the way in which the information from the embedded clause is structured; what matters is rather the mere informational content. However, this does not seem to be true for non-doxastic attitude ascriptions. Consider some ascriptions with non-doxastic attitude verbs:

(6) a. Anne is glad that her father is in cancer remission.
　　b. Anne is glad that her father got cancer and (then) entered into remission.
(7) a. John wishes that Anne's father was in cancer remission.
　　b. John wishes that Anne's father got cancer and (then) entered into remission.

There are circumstances in which (6a) and (7a) are true, while (6b) and (7b) (respectively) sound unacceptable, if not simply *false*. For instance, assuming that Anne's father had cancer, Anne is surely glad that her father is now in remission and the cancer has been gone for a while. But, in normal circumstances, Anne would not be glad that her father *has experienced the whole thing* – i.e., got cancer (was treated etc.) and then entered into remission. Similarly, John may wish for Anne's father to be in remission. Obviously, however, John does not wish for Anne's father to be suffering from cancer, even if he is supposed to be close to remission. Let us give one more example:

(8) a. Mark fears that philosophy classes next year will be online.
　　b. Mark fears that there will be philosophy classes next year and they will be online.

If Mark likes philosophy classes and definitely prefers face-to-face over online meetings at the same time, (8a) is arguably true. But, in that case, (8b) sounds unacceptable. Still, the embedded clauses in these ascriptions seem to express the same information.[2]

Provided that there are contexts in which a-ascriptions are true while b-ascriptions are *not*, this means that statements with the same truth conditions (like, e.g., (4a) and (4b)) can generate *different truth conditions when embedded in non-doxastic attitude ascriptions*. Moreover, if we agree that these statements express the same contents per se, we must agree that they express *different contents* in attitude embeddings. This fact is problematic for semantic theory which standardly adopts compositionality, i.e., assumes that the semantic content of a complex clause is determined by the semantic contents of its constituents and the mode of their combination. It is worth noting that the indicated problem is more pressing from the

---

[2] For further examples see, e.g., Rostworowski 2018: 1322. In this paper, we investigate the structure problem based on examples of attitude ascriptions with embedded *conjunctions*. Arguably, the problem has other faces, among others, the *focus* can affect the interpretation of a non-doxastic attitude ascription (see, e.g., von Fintel 1999: 131-133).

viewpoint of semantic theories than the earlier observations that attitude contexts prevent substitutions of coreferring terms in their scope or logically equivalent sentences. The clauses embedded in (1) are not cognitively equivalent and the fact whether one of such ascriptions is true and the other false essentially depends on the epistemic history of the agent. On the other hand, the changes in the meaning of non-doxastic attitude ascriptions yielded by manipulations of information structure do not seem to be related to the agent's epistemic condition, but directly to the semantics of attitude verbs.

2.2 Previous Experimental Research

The intuition that information structure contributes to the truth condition of a non-doxastic attitude ascription has been confirmed by some empirical research. Rostworowski et al. 2023 have demonstrated that manipulation of the information structure affects the truth-value and acceptability judgements of an attitude ascription. They presented the respondents with short stories that suggested what pro- and con-attitudes the protagonist had and compared folk evaluations of two kinds of non-doxastic attitude ascriptions: one with a simple embedded clause (henceforth 'straight ascription') like, for instance, (6a); the other with an embedded conjunction in which the first conjunct was entailed/presupposed by the second one (henceforth 'conjunctive ascription') like, for instance, (6b). In the contexts of the presented stories, the straight ascriptions were accepted to a much greater degree than the conjunctive ones. The second study by Rostworowski et al. (2023) established that the difference in evaluations between straight and conjunctive ascriptions persists both in the case in which the first embedded conjunction expresses a presupposition of the second one, and in the case in which it expresses a non-presuppositional entailment of the second conjunct.

However, an important finding was that the conjunctive ascriptions were not unambiguously regarded as unacceptable or false. In fact, people tend to *weakly accept* them, depending on the background story. This may suggest that in those situations in which a straight ascription is true while the corresponding conjunctive ascription seems false, the latter is not literally false but only unassertable for pragmatic reasons. If this hypothesis is correct, it would mean that the information-structure problem of non-doxastic attitude ascriptions (or at least, the version of the problem considered in this paper) is not a problem for *semantic* theory.

Our goal in this paper is to settle the above raised issue of whether the difference between straight and conjunctive ascriptions is a genuine semantic difference, involving their meanings and truth conditions, or a merely pragmatic difference relying on different conditions of their assertability. The remainder of this section will focus on the question of what intuitively differentiates the meanings of straight and conjunctive ascriptions (Section 2.3). Our explanation will be roughly that straight ascriptions lack implications which, in turn, are triggered by the conjunctive ascriptions – namely, that the attitude of an agent transfers to the contents of *both* conjuncts of the conjunction embedded in a conjunctive ascription. We will next consider how this explanation can be formulated in pragmatic terms (Section 2.4).

2.3 (Non) Supportance for (Not All) Entailments

Attitude-verb operators are not generally closed under logical entailments. Yet, it seems that knowledge or belief attributions support some elementary entailments, in particular, the ones that rely on simple analytical relations between the subclauses. For instance, (9) apparently entails (9.i) below:

> (9) Sue knows that the old king has been assassinated.
>   ⇒ i. Sue knows that the old king is dead.

It would be hard to make sense of (9), provided that we regarded (9.i) as false. The meaning of the phrase 'has been assassinated' involves the fact that the person in question is dead, and granted that knowledge that the proposition p is true requires *understanding* of p, we can conclude that (9) cannot be true without (9.i)'s being true. Generalising a bit, in many cases in which p analytically entails q and this entailment is trivial enough, then believing/knowing that p entails believing/knowing that q.[3] However, non-doxastic attitudes are sharply different in this respect. A given non-doxastic attitude does not in principle transfer to analytic consequences of the content of a given attitude. This fact has been recognized in the literature. For instance, in defending Russell's theory of descriptions, Kaplan (2005: 985) says that the fact that Diogenes *wished to know* whether there existed honest men does not imply that he simply wished to know whether men exist at all.[4] A similar thing can be said about presuppositions. Linguists have observed that presuppositions tend to escape the scope of attitude verbs and are usually integrated as a part of the agent's beliefs (e.g., Karttunen 1974; Heim 1992; Geurts 1999; Elbourne 2010).[5] This is related to a more general phenomenon which is 'presupposition projection'. Setting details aside, a presupposition of the embedded clause can escape the scope of an attitude verb in a *non-doxastic* attitude ascription. This entails that someone may have an attitude towards p but not towards something presupposed by p. We can illustrate this by using a previous example. Provided that 'being in cancer remission'

---

[3] Of course, it is a vague matter which kinds of entailments are 'trivial', but the requirement of triviality seems to be essential in order to avoid the earlier-mentioned problem of logical omniscience. If q is deduced from p with a help of some relatively more demanding logical transformations, then an agent may believe in p but not in q. We can use an example of Bigelow (see Heim and Kratzer 1998: 310) in order to illustrate this point:

  (i) John believes that Robin will win.
  (ii) John believes that everyone who does not compete, or loses, will have done something that Robin will not have done.

 We are grateful for an anonymous reviewer for bringing such examples into our attention. Setting aside the problem of how 'close' two propositions must be (i.e., how to properly characterize the relation between them so that believing in one would entail believing in the other), we can still observe that non-doxastic attitude verbs filter entailments in an essentially more limited way than doxastic-attitude verbs.

[4] For similar considerations see, e.g., Stalnaker (1984: 89) and Neale (2005: 846-847).

[5] It is a matter of debate whether such a conclusion – i.e., that the holder of attitude p believes that the presuppositions of p are true – is also of a presuppositional nature. This is assumed by Heim (1992) and Elbourne (2010), for instance. See Geurts (1999) for the alternative.

presupposes that a person got cancer, this presupposition – triggered by the clause embedded in (10) below – is predicted to escape the scope of the attitude verb; consequently, the whole ascription does *not* entail (10.i):

(10) Anne is glad that her father is in cancer remission.
⇏ i. Anne is glad that her father got cancer.

In sum, non-doxastic attitude verbs do not generally support entailments, whether of presuppositional or non-presuppositional character.

However, conjunctive ascriptions such as (6b), (7b), and (8b) (i.e., the ones with embedded conjunctions) nonetheless seem to invite the conclusion that the agent has the attitude towards two particular pieces of entailment – namely, the ones expressed by the conjuncts themselves. In other words, a sentence of the form, e.g., '*S* is glad that *p* and *q*' implies that *S* is glad that *p* and likewise that *S* is glad that *q*. So, it seems that although non-doxastic attitude verbs do not support *all types* of entailments, they support Conjunction Elimination (CE). Before we address potential reservations about this claim, let us note that it yields a neat explanation of how the conjunctive ascriptions differ from the straight ones. Consider example (6), again. The view that CE is supported in the context of attitude ascriptions predicts that (6b) entails that Anne is glad that her father got cancer. But this implication is unacceptable in light of ordinary assumptions, so we intuitively reject (6b) as a statement having an unacceptable implication. On the other hand, (6a) does not imply anything like that, as we have just observed (ex. (10)). To sum up, when *S* has a non-doxastic attitude *A* towards *q* but does not hold *A* towards *p* – which is a certain presupposition/analytic entailment of *q* – we are not ready to accept the statement '*S* holds *A* towards *p* and *q*', because the latter implies that *S* has attitude *A* towards *p*.[6]

Some objections may be raised against our appeal to CE in the explanation of the problem at issue. Firstly, perhaps we do not need CE in order to demonstrate that straight ascriptions have different meanings from conjunctive ascriptions ones. Observe that they are not equivalent in every context; e.g.:

(11) Anne is sad that her father has been suffering from cancer…
a. She wishes he would go into remission.
b. ?She wishes he would have cancer and (then) go into remission.

The conjunctive ascription (11b) sounds infelicitous as a continuation of (11), in contrast to the straight ascription (11a). So, we do not need to postulate that straight and conjunctive ascriptions have actually different sets of entailments, in particular, that the latter but not the former licences CE. Second, it is disputable whether CE is indeed applicable in attitude contexts. While this rule seems unquestionable with regard to doxastic attitude ascriptions like '*S* believes that *p* and *q*' or '*S* knows

---

[6] This explanation builds on the one suggested by Rostworowski (2018: 1323) in his discussion of desire reports.

that *p* and *q*', it arguably fails in case of *negative* doxastic attitudes, like 'doubt' or 'deny'; consider:

(12) Anne doubts that John will come to the party and Jenny will be happy.
    ⇏ i. Anne doubts that John will come to the party.

When it comes to non-doxastic attitude verbs, there is some controversy about CE. For instance, Asher (1987) claims that although verbs like 'want' or 'hope' seem to support CE in many cases (strictly speaking, the more general inference patterns which he calls 'simplification'), there exist counterexamples; for instance:

(13) Nicholas wants to fly on the Concorde and not pay for it.
    ?⇏ i. Nicolas wants to fly on the Concorde.

(Asher 1987: 171)

Given that Nicholas does not want to pay for the expensive ticket of flying on the Concorde, he will not decide to take this trip. In that case, the attribution (13.i) seems false. However, the trip on the Concorde seems very attractive to him and he *would* decide to take this trip *if he did not have to pay for it*. So, the attribution (13) is arguably true.

In order to defend our explanation that appeals to CE, firstly, we would like to note that the alternative explanation based on the contrast in (11) seems to be implicitly relying on that principle anyway. The source of the problem with (11b) is precisely the first part of the attitude ascription, i.e., Anne wishing that her father would get cancer. Secondly, the presented counterexample to CE in attitude contexts is not fully appealing. Von Fintel (1999: 119–122) argues that examples of this sort rest on an equivocation related to context shifting. Rostworowski (2018: 1324–1325) points out that it sounds incoherent to state (13) but to deny (13.i) in the same discourse. Importantly, our experimental study which will be presented in Section 4 directly addresses this issue and delivers evidence suggesting that the CE-inference in attitude-ascription contexts reflects genuine entailment.

2.4 Pragmatic Account

It is possible to formulate the presented explanation of the problem of information structure in attitude contexts in purely pragmatic terms. The central idea of such an explanation would be that straight ascriptions have the same truth conditions as the (corresponding) conjunctive ascriptions and they are both true in the relevant contexts, but the latter – in contrast to the former – are unassertable in those contexts. For instance, (6a) is true in a situation in which Anne is happy that her father entered remission, but she is not happy that her father got cancer. Yet, (6b) is also literally true in such a case, as Anne is happy because *the conjunction becomes true*: 'my father got cancer and went into remission'. The problem, however, is that expressing this fact by the conjunction is very unfortunate as the first conjunct does not express something that Anne is happy about, but only what she takes for granted. So, we get

a very misleading interpretation saying that Anne is happy because her father got cancer. For this reason, reporting the attitude of Anne by using the conjunctional form is inappropriate.

Let us call the presented analysis a 'Pragmatic Account'. The key assumption of the Pragmatic Account is that CE in attitude context would be a sort of pragmatic inference. So, (6b) does not literally entail that Anne is glad that her father got cancer, but only 'implies' it in a pragmatic sense. This assumption coincides with the above-considered reservations about CE in the non-doxastic attitude embeddings. The fact that the rule works in *some* cases while is questionable in others – in particular, it may be suspended given appropriate contextual assumptions – suggests that the associated inference pattern is pragmatic. Of course, the details of the Pragmatic Account need to be worked out. We are not going to elaborate on this, but let us indicate a possible path. It is quite likely that the application of CE in attitude contexts proceeds in a way akin to a derivation of *generalised conversational implicatures* (see Grice 1975; Levinson 2000). In particular, we may appeal to the Maxims of Manner. A conjunctional form conventionally marks *all* pieces of information expressed by separate conjuncts, so if the speaker chooses this form, she signalises to the listener that each piece is important in a given respect – in particular, each one is supposed to be new information and not a part of the discourse background or something taken anyway for granted. Now, assuming that this conversational interpretation of conjunction can be performed at a local level – e.g., in the context of a (conjunctive) attitude ascription – the listener can infer that the speaker wants to convey that the contents of both conjuncts are relevant *from the viewpoint of the agent's attitude*.[7] For instance, the listener can infer from (6b) that Anne is glad that her father got cancer, among other things. If that were not the case, the speaker should have used the simpler form (6a), instead. So, an utterance of (6b) conversationally implicates that Anne is glad that her father got cancer.[8]

In sum, conjunctive ascriptions – which contain a conjunction '*p* and *q*' as the complement clause – invite the conclusion that the agent has the attitude towards *p* itself. This conclusion may be false in an appropriate context, even though the agent has the attitude towards *q*. For this reason, the conjunctive ascription does not sound *fully* acceptable in the context. In turn, straight ascriptions do not invite such a conclusion, which has to do with the fact that non-doxastic attitude verbs tend to block presuppositions or analytic entailments. Yet, it is disputable whether the CE inference in the context of conjunctive ascriptions reflects a semantic entailment or works for pragmatic reasons. The question whether the application of CE in the contexts of non-doxastic attitude ascriptions has a semantic or pragmatic basis will be the target of our main study (Section 4). The results of the study will decisively testify against the pragmatic solution.

---

[7] There is evidence to the effect that generalised implicatures arise in embedded contexts (see Levinson 2000, Chemla and Spector 2011).

[8] For a similar account, see Blumberg (2017) who distinguishes straight and conjunctive non-doxastic attitude ascriptions in pragmatic terms of 'contextual redundancy' (related to the latter ascriptions).

3 Study 1

Our first experiment should be considered as a follow-up to the previous empirical research of Rostworowski et al. (2023), aimed to verify the claim that there is indeed an asymmetry in the evaluation of straight and conjunctive ascriptions. Those studies have established that the conjunctive ascriptions were rated significantly lower compared to straight ascriptions in relevant contexts. The puzzling observation was that although conjunctive ascriptions were rated significantly lower, they were still on average rated as *somewhat* true.

In addition to two types of ascriptions tested in Rostworowski et al. (2023), we included another experimental condition in which the participants assessed the truth of attitude ascriptions whose embedded clauses contained *only the first* conjunct of the corresponding conjunctive ascription. (Call these the 'first-conjunct' ascriptions; so, for a given conjunctive ascription '*S AV*es that p and q', the first-conjunct ascription had the form '*S AV*es that p'.) The introduction of this condition into the tested types of ascriptions aimed to verify the theoretical significance of the result that conjunctive ascriptions are weakly acceptable. If we observed similar ratings of conjunctive ascriptions and the corresponding first-conjunct ascriptions – where the latter were presented as clearly false by the context stories – it would mean that the result under discussion is not really significant. Presumably people just refuse to treat apparently false ascriptions – whether the conjunctive or the first-conjunct ones – as definitely false for irrelevant reasons. On the other hand, if ratings of the conjunctive ascriptions turn out to be higher than ratings of the first-conjunct ascriptions, this would mean that the conjunctive ascriptions have a specific property that makes them not-really-false, according to the study participants. This would suggest that the Pragmatic Account sketched in the previous section requires further serious investigations.

3.1 Study 1a

3.1.1 Materials

In Study 1a, we utilized worded stimuli closely modelled after the materials used by Rostworowski et al. 2023. The experimental materials consisted of four sets of vignettes. Each set comprised two context stories (one for each tested non-doxastic verb: 'be glad' and 'want') that share a common set-up (e.g., planning university classes or a business presentation). Vignettes depicted situations in which a non-doxastic attitude of the protagonist can be truly described by an appropriate straight ascription ('*S AV*es that q'). However, certain elements of the context story (beliefs and other attitudes of the protagonist) indicate that for some p which is semantically entailed/presupposed by q, the ascription '*S AV*es that p' is false.

Each vignette was accompanied by one of three prompts corresponding to three types of ascriptions – conjunctive ('*S AV*es that p and q'), straight ('*S AV*es that q'), or the first-conjunct ('*S AV*es that p'). Here we present an example vignette for

'glad' together with all prompts. The rest of the stimuli can be found in Appendix, Table 1.[9]

> **Glad**: Today Linda has an important proposal presentation for a prospective client. Linda is very stressed about public speaking. She doesn't feel like presenting today and is concerned that she won't do well. However, she is very committed to making sure the client chooses her company. Fortunately, the presentation convinced the client to work with the company.

> *In the light of the story, how would you evaluate the statement:*

> **Straight ascription prompt**: *"Linda is glad that her presentation today convinced the client"?*
> **Conjunctive ascription prompt**: *"Linda is glad that she had a presentation today and convinced the client"?*
> **First-conjunct ascription prompt**: *"Linda is glad that she had a presentation today"?*

3.1.2 Methods

The study was conducted as a two (attitude verbs; manipulated within-subject) x three (ascription type; manipulated between-subjects) online questionnaire. We did not expect differences between verbs, but we included two ('be glad' and 'want') as a robustness check. The participants were asked to read eight short fictional stories. For each within-subject condition, the participants were presented with two vignettes for a total of four target vignettes. In addition, we included four filler vignettes designed to serve as a linguistic background for the target stimuli. The participants were asked to respond to three questions about each vignette. First, they answered a forced-choice comprehension question designed to check whether they have a basic grasp of the situation depicted in the story. On the next screen of the questionnaire, they were asked to evaluate the truth value of the sentence expressing an ascription of a non-doxastic attitude. Finally, on the third screen, the participants were prompted to express their confidence in their answers about the truth or falsity (depending on their previous answer) value of the attitude ascription using a visual analogue scale ranging from -50 (strongly disagree) to $+50$ (strongly agree).

Each participant was randomly assigned to a between-subject condition (type of ascription) and received four target vignettes with different setups, two for each attitude verb. Four setups (*Linda, Anne, Mark, John*) were counterbalanced across presentation lists in such a way that no participant received two vignettes with the same setup and each setup was equally likely to occur with any non-doxastic attitude verb. The order of the presentation was randomised but to make it more difficult for the participants to guess the goal of the study, no two target vignettes could be presented one after the other.

---

[9] The data, materials, and analytic code for all reported studies are available online: https://osf.io/59mjn/.
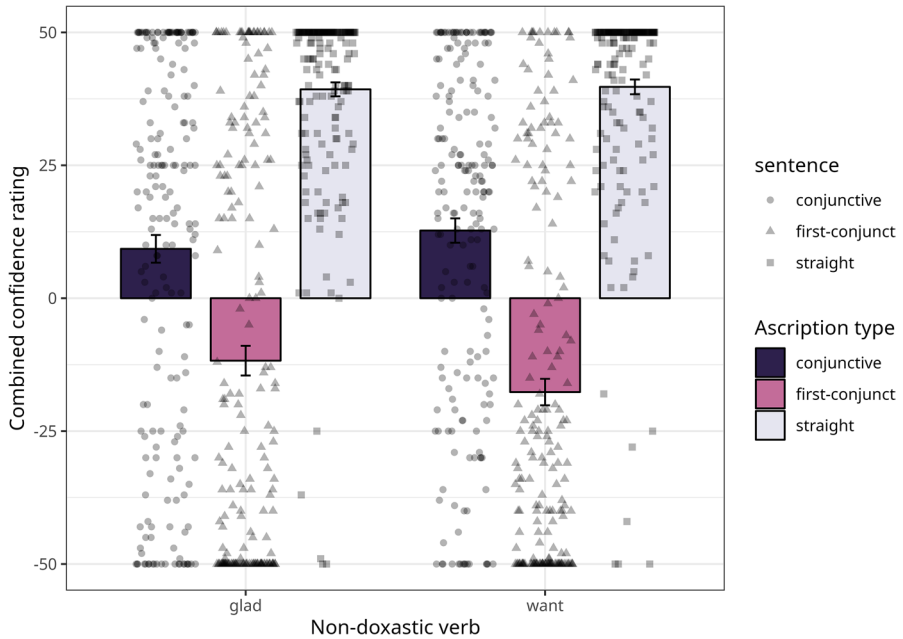
Fig. 1 The combined confidence scores in Study Ia. The variable ranged from -50 (strongest confidence in "false" response) to +50 (strongest confidence in "true" response). Error bars represent the standard error of the mean. Jittered points represent individual observations

The subjects were recruited on Clickworker crowdsourcing platform and were compensated for their participation. In total, 322 native English speakers[10] took part in the study (207 females, 107 males, six persons refused to answer, and two persons chose 'Other', mean age: 35.01 years old). 28 participants were excluded because they failed one or more of the comprehension questions.

3.1.3 Results

In order to analyse the results for each vignette rated by a participant, we computed the combined confidence score by multiplying the confidence rating by -1 if the participant indicated that the ascription is false and by +1 otherwise. We treated this index as a dependent variable for the purpose of further statistical analyses.

As can be seen in Fig. 1, straight ascriptions received the highest scores (*glad*: M = 39.29, SD = 18.4; *want*: M = 39.75, SD = 19.4), followed by the conjunctive ones (*glad*: M = 9.29, SD = 36.5; *want*: M = 12.73, SD = 32.1). The first-conjunct ascriptions received the lowest scores (*glad*: M = -11.74, SD = 39.1; *want*: M = -17.65, SD = 34.9) with the mean below the midpoint of the scale. Analysis of variance

indicated differences in compound confidence scores between different ascription types to be statistically significant (F(2, 91)=172.68, $p<0.001$, $\eta^2=0.45$), with no significant effect of the verb (F(1,291)=0.18, $p=0.67$, $\eta^2<0.001$) and small but marginally statistically significant interaction effect (F(2, 291)=3.12, $p=0.046$, $\eta^2=0.006$). Because we did not observe the effect of verb and the interaction effect was insubstantial, for the remaining analyses, we collapsed two experimental conditions differing in a non-doxastic attitude verb. Post-hoc Tukey HSD comparisons revealed statistically significant ($p<0.001$) differences between all three pairs of conditions. In addition, the mean score for conjunctive ascriptions was significantly above the midpoint (t(97)=5.76, $p<0.001$, d=0.58) and thus can be considered to be weakly accepted as 'true'. For the first-conjunct ascriptions, the situation was reversed – they were weakly rejected with the mean score significantly below the midpoint (t(97))=5.35, $p<0.001$, d=0.54). We also found substantial differences between context stories (see Appendix Tables 2 and 3).[11]

3.2 Study 1b

One objection that can be raised about Study 1a is that in the stories that we used, the mental states of the subject of non-doxastic attitudes are not explicitly stated but have to be inferred from other attitudes of the agent and their overall situation. Consider this example of experimental materials for the glad experimental condition:

> **Glad:** Today Linda has an important proposal presentation for a prospective client. Linda is very stressed about public speaking. She doesn't feel like presenting today and is concerned that she won't do well. However, she is very committed to making sure the client chooses her company. Fortunately, the presentation convinced the client to work with the company.

In this case, one can argue that we were told about the mental states of Linda before she had the presentation for the client (*She doesn't feel like presenting today and is concerned that she won't do well*) and not what she feels or thinks after the presentation. The reader is expected to make an inference that she is not glad that she had a presentation today. Although we think that this inference is plausible in the light of human psychology, this can be undermined. For example, maybe it is the case that before the presentation she did not feel good about it, but thereafter, she is glad that she had it because she, in fact, did really well?[12] To settle this issue, we decided to re-run the first study using experimental materials that *explicitly* state relevant facts about mental states of the subject of non-doxastic attitude in question.

---

[11] For straight ascriptions the standard deviations were about twice as small as for conjunctive ascriptions and first-conjunct ascriptions. This surprising result can be explained by the fact that the average ratings for straight ascriptions are close to the maximum of the scale (+50) which results in lower variance caused by the ceiling effect.

[12] We are thankful to the anonymous reviewer for raising this important objection.

3.2.1 Methods and Materials

The materials and the procedure were exactly the same as in the first experiment, except for stories that underwent several changes. All the vignettes were modified in such a way that removes potential issues with relying on tacit inferences by the reader. In each scenario, it was explicitly stated that the protagonist takes a given attitude toward one of the conjuncts and that he does not take a given attitude toward the other one. Below, we present a modified version of Linda's story for the *glad* condition in which the vignette explicitly states that the subject has not the first-conjunct non-doxastic attitude, as well as attributes straight non-doxastic attitude. The rest of the experimental stimuli is included in Appendix, Table 4.

> **Glad**: Today Linda had an important proposal presentation for a prospective client. Linda is very stressed about public speaking. She is not glad that she had a presentation today, she feels that she spoke vaguely and mixed things up. Fortunately, the client was very understanding and Linda is glad that she convinced him to work with the company.

The participants were recruited on Prolific crowdsourcing platform and were compensated for their participation.[13] In total, 319 native English speakers took part in the study. After excluding the participants who failed the attention check, 314 subjects remained (179 females, 137 males, 8 persons refused to answer, mean age: 40.95 years old).

3.2.2 Results

Figure 2 presents the results of the study. The overall pattern of responses from the first study has been replicated. Straight ascriptions received the highest scores (*glad*: M = 42.10, SD = 13.7; *want*: M = 40.94, SD = 18.4) and first-conjunct ascriptions the lowest ones (*glad*: M = -25.73, SD = 34.6; *want*: M = -23.31, SD = 32.3). Similarly to the first study, conjunctive ascriptions placed in the middle, very close to the mid-point of the scale (*glad*: M = -3.90, SD = 34.3; *want*: M = 8.59, SD = 32.9). ANOVA indicated statistically significant effects of type of ascription ($F(2.311) = 333.74$, $p < 0.001$, $\eta^2 = 0.59$) and verb ($F(1, 311) = 9.97$, $p = 0.002$, $\eta^2 = 0.011$), as well as the interaction ($F(2, 311) = 7.71$, $p < 0.001$, $\eta^2 = 0.016$). Paired t-tests showed that the effect of verb and the interaction is generated by the difference in the complex conjunction condition ($t(105) = 5.78$, $p < 0.001$, $d = 0.56$). For two remaining conditions the difference between two verbs was not observed (*straight*: $t(101) = 0.726$, $p = 0.47$, $d = 0.07$; *first-conjunct*: $t(108) = 0.904$, $p = 0.368$, $d = 0.08$). Post-hoc Tukey HSD comparisons resulted in statistically significant ($p < 0.001$) differences between all three pairs of types of ascriptions. Similarly to the previous study, for the straight ascriptions, the scores were firmly above the mid-point ($t(100) = 43.4$, $p < 0.001$, $d = 4.32$) whereas for the first-conjunct ascriptions they were below it ($t(107) = 10.7$,

---

[13] The reason for the change of the platform was that around the time we started to conduct Study 2, the quality of responses collected from Clickworker participants worsened, in particular, the number of people who did not pass attention checks reached an unacceptable level (over 50%).
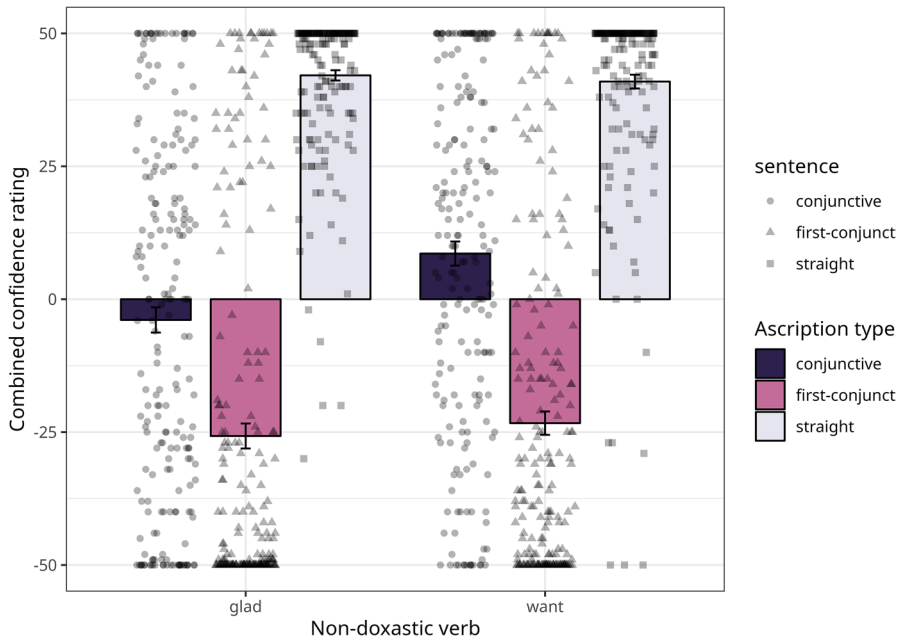
Fig. 2 The combined confidence scores in Study Ib. The variable ranged from -50 (strongest confidence in "false" response) to +50 (strongest confidence in "true" response). Error bars represent the standard error of the mean. Jittered points represent individual observations

$p < 0.001$, $d = 1.03$). The scores for conjunctive ascriptions in *glad* condition were not significantly below the mid-point ($t(104) = 1.48$, $p = 0.142$, $d = 0.11$) whereas in *want* condition they were weakly accepted, similarly to the previous study ($t(104) = 4.03$, $p < 0.001$, $d = 0.39$). Detailed results by setup story are included in Appendix, Tables 5 and 6.

3.3 Discussion

The results of the first studies are consistent with those of the previous empirical research on non-doxastic attitude ascriptions. Ordinary language users were sensitive to differences in the information structure of seemingly truth-conditionally equivalent attitude ascriptions, which was reflected in the stark difference in acceptability ratings between conjunctive and straight ascriptions. Similarly to the results of Rostworowski et al. 2023, we also have observed that the conjunctive ascriptions were weakly acceptable. Moreover, the evaluations people provided for these ascriptions were more positive than those of the first-conjunct ascriptions which, in turn, were rejected by the study participants. This finding suggests that people see an 'element of truth' in the conjunctive ascriptions, which is missing, in their opinion, in the first-conjunct ascriptions (or present to a lesser degree). One way of explaining this is to appeal directly

to the Pragmatic Account. The conjunctive ascriptions are literally true, but pragmatically misleading. For this reason, people give relatively ambivalent judgments and evaluate conjunctive ascriptions more positively than the *literally false* first-conjunct ones.

However, one may question the above explanation by saying that the results are also consistent with the assumption that the things are – so to speak – the other way around. Namely, conjunctive ascriptions may be literally false, but there is a factor that prompts people to provide more positive evaluations for them, exactly related to pragmatics. Looking at the contexts against which people evaluated all ascriptions, it is not hard to realise what this element may be. Namely, every conjunctive ascription (i.e., '*S AV*es that *p* and *q*') and first-conjunct ascription (i.e., '*S AV*es that *p*') were evaluated relative to a context which suggested/stated that *S* had a given attitude towards *q* (while he or she did not have the attitude towards *p*). Thus, people may have treated conjunctive ascriptions as 'half-truths', that is, the statements that described an attitude of a protagonist in a *partially correct* way.

In order to investigate this hypothesis, we have conducted an additional follow-up ($n = 99$), based on a very similar design, in which people evaluated conjunctive ascriptions – including doxastic and non-doxastic attitude verbs – as well as simple conjunctions. The idea was to compare the acceptability ratings of conjunctive ascriptions (in this case, any ascription of the form '*S AV*es that *p* and *q*', where *p* was *not* entailed by *q*) – in a context in which *S* had the attitude towards *q* but not towards *p* – to the acceptability ratings of the corresponding conjunctions '*p* and *q*' presented in similar contexts in which *q* was true and *p* false. In this study, we also asked the participants to evaluate the truth value of the first-conjunct ascriptions or the first conjuncts – before the main experimental task – in order to eliminate the possibility that they did not understand the setup correctly. We found that over a quarter of the participants (glad: 25.64%; want: 28.57%) still assessed conjunctive ascriptions with *non-doxastic* attitude verbs as 'true', even when previously they marked the corresponding first-conjunct ascription as 'false'. In contrast, a significantly lower proportion (6.02%) did that for the conjunctive ascriptions with *doxastic* attitude verbs, and almost no one (3.75%) who marked the first conjunct as 'false' evaluated the whole conjunction as 'true'. The differences, tested by using a chi-squared test of independence, were statistically significant ($p < 0.05$). This result suggests that the reason why people do not regard conjunctive non-doxastic attitude ascriptions as 'false' is not (only) for general pragmatic reasons, related to the fact that there is an 'element of truth' in the utterance. Hence, it is still likely that non-doxastic attitude conjunctive ascriptions are literally true, but pragmatically misleading – that is, the results hint at the Pragmatic Account.

4 Study 2

The main assumption of the Pragmatic Account is that a conjunctive ascription *implies* that the subject has the attitude towards the content of the first conjunct (whereas the straight ascription has no such implication). Crucially, this type of

'implication' is of a pragmatic nature; in particular, it may be akin to generalised conversational implicatures. One prominent feature of implicatures – or, more generally, any pragmatic derivations – is that they are 'cancelable'. That is, if *p* pragmatically implies *q*, it is possible to make a statement equivalent to '*p*; in fact, not *q*' without a feeling of *contradiction*. Hence, if the Pragmatic Account is correct, it should be possible to cancel the conclusion of CE-inferences in non-doxastic attitude contexts – that is, to say something like, e.g., '*S* is glad that *p* and *q*. In fact, *S* is not glad that *p*' without sounding incoherent. As the characteristic of cancelability appeals to linguistic intuition – on what sounds 'coherent' or 'incoherent' to a competent user of language – it may be subject to empirical tests (e.g., Skovgaard-Olsen et al. 2019; for a discussion see Mayol and Castroviejo 2013). In sum, the objective of the second study is to test the assumption of the Pragmatic Model by using the cancelability test applied to CE-derivations in the context of non-doxastic attitude ascriptions.

It is important to emphasise that cancelability provides an indirect and one-way diagnostic test on whether people accept CE in the considered types of embedding in the first place. If people find it incoherent to state a conjunctive ascription – and to deny the corresponding first-conjunct ascription at the same time – it would mean that the former ascription entails the latter according to their intuition, so we can likely infer the latter ascription from the former. If, on the other hand, people find the cancellation quite successful, this *can* mean that the CE is applicable in the context of non-doxastic attitude ascriptions, yet only pragmatically, but it can also mean that it is not at all applicable in those contexts.

Since there is no clear answer in the literature to the question of how exactly the cancellation should be indicated in the text, we used two different phrases in our study: 'In fact' (Study 2a; see, e.g., Pearson et al. 2010) and one proposed by an anonymous reviewer: 'But I don't intend to suggest' (Study 2b; a similar phrase is used by Skovgaard-Olsen et al. 2019).

4.1 Study 2a

4.1.1 Materials

We developed eight sets of two-sentence short discourses. Discourses in each set shared a common set-up (e.g., mushroom picking) but differed in the type of implication that is cancelled in the second sentence. We tested three sources of potential implication: conversational implicature, semantic entailment, and CE-inferences in attitude-ascription embeddings. Semantic entailments and implicatures played a role of a baseline enabling differentiation between the semantic and pragmatic mechanisms responsible for the implication (cf. Skovgaard-Olsen et al. 2019). First, implicatures were chosen as a paradigm case of an implication that can be cancelled without any serious threat to the coherence of the whole discourse. Second, if a proposition *q* is *semantically* entailed by *p*, an attempt to cancel *q* after saying *p* fails and results in an incoherent piece of

discourse. These two paradigm types of implications were contrasted with the CE-inferences in attitude embeddings (e.g., '*S* is glad that *p* and *q*' = > '*S* is glad that *p*' / '*S* is glad that *q*').

We employed two types of conversational implicatures (scalar and temporal order), four non-doxastic attitude verbs ('want', 'fear', 'feel sorry' and 'be glad'), and one *doxastic* attitude verb ('know'). Together with semantic entailments (which were not further divided), this made eight experimental conditions. Here we present an example set in all eight conditions. The rest of the stimuli can be found in Table 7 in the Appendix.

I. *scalar implicature*: Anne did not find many mushrooms during her walk in the forest. In fact, she has found none.

II. *temporal order implicature*: Anne went for a walk in the forest and found some mushrooms. In fact, she found the mushrooms before entering the forest.

III. *doxastic attitude*: Anne knows that her husband went to the forest and found some mushrooms. In fact, she doesn't know that he was in the forest.

IV. *wants*: Anne wants to go to the forest and find some mushrooms. In fact, she doesn't want to be in the forest.

V. *fears*: Anne fears that she will go to the forest and get lost. In fact, she doesn't fear going to the forest.

VI. *feels sorry*: Anne feels sorry that she went to the forest and found no mushrooms. In fact, she doesn't feel sorry about being in the forest.

VII. *glad*: Anne is glad that she went to the forest and found a lot of mushrooms. In fact, she isn't glad that she was in the forest.

VIII. *semantic entailment*: Anne found a lot of mushrooms while she was walking in the forest. In fact, she wasn't in the forest.

While constructing our discourses with attitude ascriptions, we usually tried to formulate the second occurrence of a conjunct from the conjunctive ascription – the one under negation in the second sentence – in a somewhat different way (e.g., 'went to the forest' was replaced by 'was in the forest'). This was to avoid the effect that people may find it incoherent to cancel the CE-conclusion in attitude-ascription contexts simply because the second sentence 'just looks like the negation of the first' (as one conjunct of a conjunctive ascription needed to be repeated in the second sentence, though in the scope of negation). Thus, people had to engage in understanding the given ascriptions in order to formulate their judgement on coherence.

Also, we tried to design the materials in such a way that the content of the 'eliminated' conjunct in conjunctive ascriptions with pro-attitude verbs (i.e., 'want' or 'be glad') sounded attractive in light of common perception (e.g., 'find some mushrooms'). For the con-attitude verbs (i.e., 'fear' or 'feel sorry'), we usually chose contexts presenting an inverse situation: the eliminated conjunct sounded unattractive (e.g., 'get lost'). The other conjunct which reoccurred in the second ascription was matched so to express a relatively neutral content (e.g., 'go to the forest'). Hence, we used this sort of contexts in which conjunctive ascriptions may sound more acceptable than the one-conjunct ascriptions, which means

that if there is a possible consistent way of reading a given piece of discourse, it will be salient enough for people and they would likely follow it. This means that if people nonetheless provide *negative* evaluations of coherence, the failure of the cancelability will be a very significant clue that CE-derivations in attitude-ascription contexts are semantic rather than pragmatic.

4.1.2 Methods

The study had the form of an online questionnaire. The participants were presented with sixteen two-sentence discourses (eight targets + eight fillers) and were prompted (*How would you evaluate the coherence of the above utterance?)* to evaluate their coherence using a seven-point Likert scale ranging from -3 (labelled as 'incoherent') to + 3 (labelled as 'coherent'). Eight setups (*Anne*, *Mark*, *John*, *Karen*, *Linda*, *George*, *Jack*, and *Mary*) were counterbalanced across the presentation lists in such a way that no participant received two discourses with the same setup and each setup was equally likely to occur with any type of implications.

The subjects were recruited on the Prolific crowdsourcing platform and were compensated for their participation. In total, 235 native English speakers took part in the study. After excluding those who failed an attention check at the beginning of the survey, 234 participants remained (124 females, 110 males, mean age: 42.92 years old).

4.1.3 Results

The coherence ratings of discourses in each experimental condition are presented in Fig. 3. It is fairly clear that two groups of conditions can be singled out. The first group contains implicatures, which were predicted to be generally cancellable. These discourses were, in fact, judged as coherent by the participants, though weakly (temporal order implicatures: M = 0.30, SD = 2.15; scalar implicatures: M = 0.53, SD = 1.97). In contrast to implicatures, discourses with the cancellation of semantic entailments were judged as completely incoherent, with the mean close to the bottom end of the scale (M = -2.39, SD = 1.23). The main finding is that the cancellation of CE-derivations in attitude-ascription contexts also belongs to the second group. Discourses with non-doxastic attitude ascriptions were judged to be as incoherent as those with 'cancelled' semantic entailments (*glad*: M = -2.05, SD = 1.36; *feel sorry*: M = -1.54, SD = 1.78; *want*: M = -2.37, SD = 1.12; *fear*: M = -2.27, SD = 1.17), as well as those with doxastic-attitude ascriptions (*know*: M = —2.47, SD = 0.99).

Pair-wise (with Holm correction for multiple comparisons) t-tests between conditions with non-doxastic attitude ascriptions revealed a small-size but statistically significant difference in coherence ratings between 'feel sorry' and the other three non-doxastic attitude verbs. In spite of this small difference, we have decided to collapse all non-doxastic attitude verbs into one condition in our statistical analysis, in order to see the general picture emerging from the data. (We did the same for the conditions with two types of implicatures.) Using pairwise t-tests with Holm correction, we found no statistically significant difference between the conditions with non-doxastic attitude ascriptions taken together (M = -2.06, SD = 1.41) and the condition with semantic entailments ($p = 0.661$). As for the cancellation of the CE-inference in
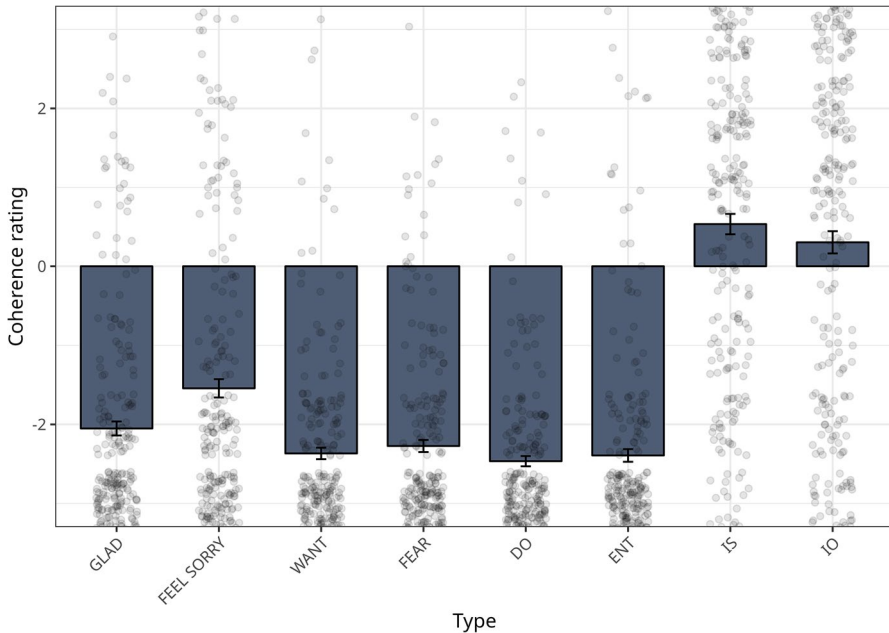
Fig. 3 Coherence ratings for discourses tested in Study 2a. Error bars represent the standard error of the mean. GLAD, FEEL SORRY, WANT and FEAR refer to the non-doxastic attitude conditions, DO to the doxastic attitude condition, IS stands for "scalar implicature" and IO for "temporal order implicature". Jittered points represent individual observations

the context of *doxastic*-attitude ascriptions ('know'), we observed lower scores compared to the case with non-doxastic attitude ascriptions ($p < 0.001$).

4.2 Study 2b

4.2.1 Methods and Materials

All the details of the experiment follow Study 2a except for experimental materials (two-sentence discourses) which were rewritten to incorporate another way of cancellation. Instead of using the formula 'In fact, not-p', we opted for 'But I don't intend to suggest that p', which more closely follows a way of expressing cancellation used in experimental literature (cf. Skovgaard-Olsen et al. 2019). Below, we present the *Anne* set for comparison. The rest of the experimental stimuli is included in Appendix, Table 8.

IX. *scalar implicature*: Anne did not find many mushrooms during her walk in the forest. But I don't intend to suggest that she has found any.

X. *temporal order implicature*: Anne went on a walk in the forest and found some mushrooms. But I don't intend to suggest that she found the mushrooms after entering the forest.

XI. *doxastic attitude*: Anne knows that her husband went to the forest and found some mushrooms. But I don't intend to suggest that she knows that he was in the forest.

XII. *wants*: Anne wants to go to the forest and find some mushrooms. But I don't intend to suggest that she wants to be in the forest.

XIII. *fears*: Anne fears that she will go to the forest and get lost. But I don't intend to suggest that she fears going to the forest.

XIV. *feels sorry*: Anne feels sorry that she went to the forest and found no mushrooms. But I don't intend to suggest that she feels sorry about being in the forest.

XV. *glad*: Anne is glad that she went to the forest and found a lot of mushrooms. But I don't intend to suggest that she is glad that she was in the forest.

XVI. *semantic entailment*: Anne found a lot of mushrooms while she was walking in the forest. But I don't intend to suggest that she was in the forest.

In total, 241 native English speakers recruited via Prolific took part in the study. After excluding those who failed an attention check at the beginning of the survey, 239 participants remained (116 females, 119 males, six persons refused to answer; mean age: 41.58 years old).

4.2.2 Results

The coherence ratings are presented in Fig. 4. The lowest ratings occurred with semantic entailment (M = -1.68, SD = 1.76), doxastic attitude (M = -1.48, SD = 1.72) and non-doxastic attitude in the *want* condition (M = -1.30, SD = 1.84). Moreover, for two additional non-doxastic attitudes (*fear*, *glad*) the participants also indicated that the discourses with cancelation were incoherent (*fear:* M = -0.80, SD = 1.89; *glad*: M = -0.22, SD = 2.01). For the last non-doxastic attitude verb phrase – *feel sorry* – the participants on average gave coherence ratings close to the midpoint of the scale (M = 0.05, SD = 1.97). Interestingly, discourses with scalar implicatures and implicatures of order were not, in general, rated as coherent (*order*: M = 0.21, SD = 2.00; *scalar*: M = -0.07, SD = 1.97). The ratings are lower compared to Study 2a with scalar implicatures placed slightly below the midpoint. Following Study 2a, comparison between experimental conditions was performed using pairwise t-tests with Holm correction. We did not observe any statistically significant difference between semantic entailment and doxastic attitude ($p > 0.999$) and *want* ($p = 0.256$). Discourses in the semantic entailment condition were ranked significantly lower compared to the *fear* ($p < 0.001$), *feel sorry* ($p < 0.001$) and *glad* condition ($p < 0.001$). The ratings for discourses in both *feel sorry* and *glad* conditions were not statistically different from scalar implicatures (*feel sorry*: $p > 0.999$; *glad*: $p > 0.999$) and implicatures of order (*feel sorry*: $p > 0.999$; *glad*: $p = 0.118$[14]). The comparisons with both types of implicatures for all the remaining conditions reached the level of statistical significance ($p < 0.05$).

---

[14] In the *glad* condition, the difference for implicatures of order reached statistical significance when correction for multiple comparisons was not applied ($p = 0.013$).
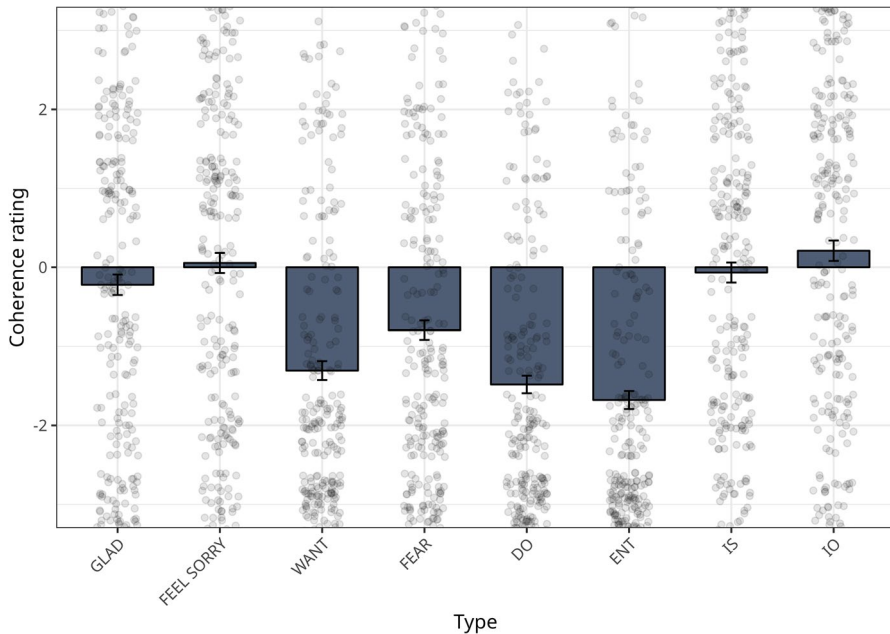
Fig. 4 Coherence ratings for discourses tested in Study 2b. Error bars represent the standard error of the mean. GLAD, FEEL SORRY, WANT and FEAR refer to the non-doxastic attitude conditions, DO to the doxastic attitude condition, IS stands for "scalar implicature" and IO for "temporal order implicature". Jittered points represent individual observations

4.3 Discussion

Although the obtained results are not fully clear-cut – especially the ones of Study 2b – they do not generally confirm the prediction of the Pragmatic Account. The assumption underlying this account says that CE-inferences in non-doxastic attitude embeddings are pragmatic and thus should be cancellable. In empirical terms, this means that a discourse that attempts to cancel this sort of inference – by using a phrase that can typically soften a possible incoherence effect – should be perceived as similarly coherent compared to discourses which cancel other typical pragmatic conclusions (like conversational implicatures). Our experiments have failed to demonstrate this. A cancellation in the *want* and *fear* conditions is judged as essentially less coherent in comparison to the implicature conditions, regardless of the wording ('in fact' vs. 'I don't intend to suggest'); also, the participants generally find the cancellation in those attitude contexts incoherent. The coherence ratings in the *glad* and *feel sorry* conditions are similar to the ones we obtain in the implicature conditions, but only when the cancellation starts with 'I don't intend to suggest that'; for 'in fact', the coherence ratings in the attitude conditions are still essentially lower than in the case of implicatures.

The conclusion that arises from the results of both studies 2a and 2b says that the cancelability tests provide evidence against the Pragmatic Account *rather* than in favour of it. As far as the cancelability is a diagnostic feature distinguishing the semantic from pragmatic derivations, the Pragmatic Account cannot be correct at least in the case of non-factive verbs. In other words, it seems that the attitude contexts like '*S* wants *p* and *q*' support CE, and this inference has a semantic and not a pragmatic nature. The results are ambiguous about whether this holds for the contexts with factive non-doxastic attitude verbs. A second immediate conclusion is that there is an interesting variation between different kinds of non-doxastic attitude verbs. It is possible that factive and non-factive verbs have different inferential properties and, in particular, the factives are more restricted when it comes to entailment filterings, in line with some insights from theoretical literature (e.g., von Fintel 1999).

An additional remark: in both the experiments, discourses with cancelled implicatures were rated as only weakly coherent, which can be surprising from the theoretical point of view. After all, one characteristic of implicatures is that they can be retracted by the speaker. We think that the relatively low ratings in the implicature conditions could be attributed to a very general formulation of the experimental prompt, which could suggest to the study participants that different forms of 'coherence' come into play. Even if cancellation is semantically consistent, it *does not come for free* as it may give an impression of conversational awkwardness or the speaker's uncooperativeness, etc. Furthermore, the formulation 'But I don't intend to suggest' introduces explicit negation which, combined with a possibly another negation in the complement clause, can be hard to process by language users. It is possible that such factors slightly decreased the coherence ratings of our discourses.

5 General Discussion: Factive vs. Non-Factive Attitude Verbs, and CE

The results of Study 1 have indicated a possibility that the difference between straight and conjunctive (complex) ascriptions may lie in pragmatics. The results of Study 2, which further investigated this possibility, have shown that this is not the case as far as non-factive verbs are concerned ('want', 'fear'), but are not decisive when it comes to the factive verbs ('glad', 'feel sorry'). This still leaves open the question whether the latter group of verbs provide contexts in which CE-inferences are in fact supported.

Suppose first that CE fails in factive non-doxastic attitude contexts. The question then arises why these contexts block CE-inferences, even though inferences of this sort are intuitive, as we have earlier observed. We think that this has to do with the nature of evaluation of sentences ascribing non-doxastic attitudes. When considering whether a person is glad, feels sorry etc. that *p*, we take into consideration what consequences *p* has for that person and assess how important they are from his or her point of view. Let us use an example:

(14) Anne is glad that she has found many mushrooms during today's walk.

Suppose Anne is a big fan of mushrooms and she planned to pick them today. However, Anne does not like cleaning and cooking mushrooms etc., which she has to do to prepare them for dinner. In this case, we will *agree* with (14) provided we assume that Anne's satisfaction with finding mushrooms compensates her for the effort of making them ready for dinner. We could *disagree* if we assumed otherwise – namely, that Anne's satisfaction is too low to make up for the effort. This strategy seems to be especially relevant in the cases of factive attitude ascriptions, since these attitudes are directed towards settled matters which cannot be 'undone' but only evaluated from different perspectives, and thus different factors naturally come into play.

Our observation might explain why CE sometimes fails in attitude contexts. When evaluating an ascription of the form, e.g., '*S* is glad that *p* and *q*', we need to assess the significance of the (relevant) consequences which the embedded conjunction *as a whole* has for *S*. If *p*, *q* are selected in such a way that, according to our knowledge, the agent has a positive attitude towards *only one* of them (let us say *q*), we need to make an assessment of whether the overall benefits of *q* are more important than the possible disadvantages related to *p* from *S*'s viewpoint. If the result of this calculation is 'yes', then we likely evaluate the conjunctive ascription as 'true', even though we would refuse to accept '*S* is glad that *p*'.

This analysis might also explain the fact why the participants of Study 1 provided essentially more positive evaluations for conjunctive ascriptions in some scenarios than in the others. In particular, the conjunctive ascription in the scenario with mushroom picking was more frequently evaluated as 'true' (*glad*: 74.0% in Study 1a and 47.2% in Study 1b) than the ascription in the scenario with a dog suffering from cancer (*glad*: 16.0% in Study 1a and 0% in Study 1b, see Appendix, Tables 2 and 3 for the detailed results of Study 1 by setup story). Many people could naturally assume that finding mushrooms compensates for getting wet, while even the best treatment does not compensate for having cancer. We also have an explanation for why the evaluations were quite diverse within-subjects. It is simply because people's assessments could naturally differ.

Let us now investigate the second possibility, namely, that different kinds of non-doxastic attitude verbs generally support CE, including the factive ones. The question then arises why this feature has not been fully observed in Study 2b, nor in Studies 1a and 1b. When it comes to 2b, we may suppose that it has to do with wording. Perhaps the phrase 'I don't intend to suggest' is not the best tool of cancellation, in particular, it may refer too much to pragmatics in terms of what the speaker could wish to convey by an utterance, and thus producing more options for a coherent interpretation of his whole speech act (leaving the issue whether the utterance is semantically consistent in the background). However, the results of both Studies 1a and 1b show that, in the context of one and the same story, people tend to accept a conjunctive ascription to a *greater* degree than the first-conjunct ascription, while the result of Study 2a suggests that the former should *entail* the latter. (Setting aside

factive attitudes, this issue requires an explanation anyway, since this sort of tension between the results clearly concerns the verb 'want'.)

To begin with, both sets of results may differ simply because they were obtained by different methods. In Study 1, we presented the participants with short stories which provided a wider context for evaluation; in Study 2, the participants were presented with short discourses and were asked to judge them in terms of coherence. Furthermore, this difference may be relevant in light of the earlier observation saying that evaluations of non-doxastic attitude ascriptions involve assessments or all-things-considered judgements. Presumably, this component is also present in the evaluation of non-factive attitude ascriptions, but to a significantly lesser degree. In particular, if people are presented with full contexts in the form of background stories — which give more information about the protagonist's attitudes and how certain things are important for him/her — they are arguably more inclined to make different assessments in their evaluation than when they lack such information. Thereby, they may sometimes accept a conjunctional ascription, due to an overall positive result of their assessments, in spite of the fact they reject the first-conjunct ascription.

Finally, it is possible that constructions with attitude verbs and embedded conjunctions (including the ones with factive verbs, such as '*S* is glad that *p* and *q*', '*S* feels sorry that *p* and *q*') are ambiguous and on some readings they allow for CE in their scope, but on the other readings they block such inferences (for the ease of reference, let us refer to the first kind of reading 'distributive'). While the ambiguity hypothesis is generally compatible with the mixed pattern of results we have obtained from our studies, it is far from clear what kind of ambiguity this would be and what mechanisms underlie the choice of a given interpretation. Apparently, what would drive the distributive (or the non-distributive) interpretation is the content of the embedded conjuncts, or presumably the relation between them, given that the coherence evaluations provided by participants of Study 2 were quite different across the discourse setups. Also, the tendency for the non-distributive interpretation may be influenced by the type of the verb (factive vs. non-factive).

6 Conclusions

Whether CE applies in the context of factive non-doxastic attitude verbs or not, our main finding remains: CE apparently works in the context of non-factive attitude verbs and has a *semantic* character, according to our tests of cancelability. Of course, we used only one kind of test and in order to state the conclusion in a more decisive way, we certainly need more data delivered by different sorts of tests. Still, cancelability is generally regarded as a diagnostic criterion and, furthermore, the results are clear-cut in this one respect: the ratings regarding the cancellation of CE in the 'want' or 'fear' embeddings are much lower than those of cancelled implicatures, regardless of the used cancelling word ('in fact' vs. 'I don't intend to suggest'). For this reason, we believe that our result provides quite strong evidence against the

Pragmatic Account. The fact that CE works in the contexts of non-doxastic attitude ascriptions – having perhaps a more restricted applicability than it can be initially assumed – means that the information-structure changes affect the semantic content of non-doxastic attitude ascriptions (or at least they can affect it in some cases). Thus the problem stated at the beginning of this paper remains. Moreover, we think that the problem is strictly related to the fact whether (or: to what extent) the conjunctive ascriptions of non-doxastic attitudes licence CE-inferences – in line with our earlier proposal – and this finds some support in our experimental investigations from Study 2. We have observed that whenever the discourse content indeed suggested that a person's attitude does not relate to each of the conjuncts, and the participants did judge the discourse as relatively coherent, the conjunctive ascription would not differ much in meaning from the corresponding straight ascription. We will illustrate this with one of the discourses used in Study 2b ((15a) below):

(15) a. Jack feels sorry that he went to France and took very few photographs. (But I don't intend to suggest that he feels sorry about being in France.)

b. Jack feels sorry that he took very few photographs while being in France.

Intuitively, (15a) (conjunctional) and (15b) (straight) serve to express the same information; at least, there is no such contrast between them as between, e.g., (6a) and (6b). This observation suggests a generalization saying that whenever CE *does* apply to a given (conjunctive) attitude ascription, the conjunctive ascription and the corresponding straight ascription would be non-equivalent.

The claim that straight and conjunctive ascriptions are not generally equivalent implies that even 'innocent' modifications of the structure – the ones which do not affect the cognitive content of the proposition – can alter the truth value of an attitude ascription. This gives preference to theories of propositions (i.e., the objects of our attitudes) which take them to be structured entities. Such theories include the accounts proposed by, for example, Cresswell (1985), Moltmann (2006), and King (2019). These accounts have natural resources to differentiate the meanings of sentences like (4a) and (4b) (repeated below) in terms of different syntactic structures:

(4) a. Anne's father is in cancer remission.

b. Anne's father got cancer and has (now) entered into remission.

Another possibility would be to adopt a possible-world semantics, but try to differentiate propositions in a more fine-grained way than just identifying them with sets of possible worlds; such an approach could be the one which relates differences in information structure to different potentials of *updating* discourse by sentences like (4a) and (4b), and uses the framework of possible worlds to represent the concept of discourse updates (e.g., see Heim 1992).

Appendix

Table 1 Experimental materials used in Study 1a

	Linda	John	Anne	Mark
Want Story	Today Linda has an important proposal presentation for a prospective client. She is very stressed about public speaking. She doesn't feel like presenting today and is concerned that she won't do well. In the end, she decides to bite the bullet and deliver the presentation to the best of her abilities	John has a beloved dog that has been sick for a long time. The poor animal has been suffering from cancer. There are two more operations ahead of him, but they are very complicated and risky. John is afraid about his dog's surgeries and would rather not have his pet operated on. However, he decides to have the treatment for the sake of the animal	Anne lives in a house next to the woods. She enjoys walking in the woods and, in autumn, she loves picking mushrooms. One October day, Anne plans to go to the woods to find mushrooms but the weather looks bad and it starts to rain. Anne fears she'll get wet. In spite of this, she decides to go because she really hopes to find some mushrooms	Mark is a third-year student of history. He strongly prefers online meetings over the regular stationary ones. This year he has attended a philosophy course which he hasn't enjoyed very much. Mark is simply not interested in philosophy. He would like very much if the continuation of the philosophy course next year is online
Comprehension check	Please answer the question: To whom Linda had to give the presentation? • a client • an employee	What was John's dog suffering from? • diabetes • cancer	Where does Anne live? • by the seaside • next to the woods	How far along is Mark in his university studies? • third year • second year
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement: (STRAIGHT) "Linda wants to do well today during her presentation for the client" (CONJUNCTIVE) "Linda wants to give a presentation for the client today and to do it well" (FIRST) "Linda wants to give a presentation for the client today"	(STRAIGHT) "John wants the dog to survive the complicated surgeries" (CONJUNCTIVE) "John wants his dog to have complicated surgeries and to survive them" (FIRST) "John wants his dog to have complicated surgeries"	(STRAIGHT) "Anne wants to find some mushrooms during her walk in the rain" (CONJUNCTIVE) "Anne wants to have a walk in the rain and find some mushrooms" (FIRST) "Anne wants to have a walk in the rain"	(STRAIGHT) "Mark wants the philosophy course next year to be online" (CONJUNCTIVE) "Mark wants a philosophy course next year and for it to be online" (FIRST) "Mark wants a philosophy course next year"

Table 1 (continued)

	Linda	John	Anne	Mark
Confidence rating (ranging from -50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question. To what extent do you agree that the statement (STRAIGHT/CONJUNCTIVE/FIRST) is TRUE/FALSE?			
Glad				
Story	Today Linda has an important proposal presentation for a prospective client. Linda is very stressed about public speaking. She doesn't feel like presenting today and is concerned that she won't do well. However, she is very committed to making sure the client chooses her company. Fortunately, the presentation convinced the client to work with the company	John has a beloved dog that has been sick for a long time. The poor animal has been suffering from cancer. Though the treatment has been painful for the dog, John is glad he has taken his pooch to the new vet. The change of the vet seems to have been crucial because his pet feels much better now	Anne lives in a house next to the woods. She likes walking in the woods and, in autumn, she loves picking mushrooms. One October day, Anne goes to the woods on a walk but the weather suddenly changes and a heavy rain begins. Anne gets terribly wet, which she doesn't like. However, at the same time she is happy because she has found a lot of mushrooms	Mark is a third-year student of history. He attends a philosophy course which he doesn't enjoy very much. He prefers online studying over the regular stationary meetings, especially when it comes to the philosophy course. This year the university runs all courses online due to the pandemic, which makes Mark happy
Comprehension check	Please answer the question:			
	To whom Linda had to give the presentation? • a client • an employee	What was John's dog suffering from? • diabetes • cancer	Where does Anne live? • by the seaside • next to the woods	How far along is Mark in his university studies? • third year • second year
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement:			
	(STRAIGHT) "Linda is glad that her presentation today convinced the client" (CONJUNCTIVE) "Linda is glad that she had a presentation today and convinced the client" (FIRST) "Linda is glad that she had a presentation today"	(STRAIGHT) "John is glad that his pet has been treated for cancer at the new vet" (CONJUNCTIVE) "John is glad that his pet has been suffering from cancer and treated at the new vet" (FIRST) "John is glad that his pet has been suffering from cancer"	(STRAIGHT) "Anne is glad that she has found a lot of mushrooms during her walk in the rain" (CONJUNCTIVE) "Anne is glad that she has had a walk in the rain and found a lot of mushrooms" (FIRST) "Anne is glad that she has had a walk in the rain"	(STRAIGHT) "Mark is glad that the philosophy classes this year are online" (CONJUNCTIVE) "Mark is glad to have philosophy classes this year and that they are online" (FIRST) "Mark is glad to have philosophy classes this year"

Table 1 (continued)

	Z	X	Y	Q
Confidence rating (ranging from -50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question. To what extent do you agree that the statement (STRAIGHT/CONJUNCTIVE/FIRST) is TRUE/FALSE?			
Fillers				
Story	Jack and Emily are on a wedding cake tasting. At the moment, they are trying two flavours: a sour cherry cake and a sweet raspberry cake. Jack tastes both cakes. However, he confuses the flavours: he takes the cherry cake to be a raspberry one and vice versa. Having the cherry cake in mind, he says to Emily: "This raspberry cake is a bit sour."	Alice shows to Ralph an old set of wooden chess pieces. At this moment, Alice is holding both the chess king and the chess queen. The king is made of oak, while the queen is made of sycamore. Having noticed the difference, Ralph wants to point to the king, but Alice moves the figures so fast that he accidentally points with his finger to the queen while saying: "This chess figure is made of sycamore"	Jessica and Jim are discussing who they are going to invite to their party next Saturday. Jim does not like Mr. and Mrs. Smith who are Jessica's colleagues so he does not want to invite them. However, Jessica is trying to persuade Jim that they should invite the Smiths and during the conversation she says: "If we don't invite the Smiths, they will feel insulted".	Martha and Bob are school friends. One day, they are chatting together and sharing some gossip about their school. Bob tells Martha that her best friend Angelica is having an affair with one of the teachers. Martha has already known it and asks Bob not to reveal this news to anyone. She says to Bob: "If people learn about this affair, Angelica will get into trouble."
Comprehension check	Please answer the question:			
	Which cake is sour? • Cherry cake • Raspberry cake	Which chess figure is made of oak? • King • Queen	Who doesn't like Mr. and Mrs. Smith? • Jessica • Jim	Who has an affair with a teacher? • Martha • Angelica
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement:			
	"This raspberry cake is a bit sour"	"This chess figure is made of sycamore"	"Jim and Jessica want to offend the Smiths by not inviting them"	"Martha does not want the affair to come to light and Angelica to get into trouble"
Confidence rating (ranging from -50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question. To what extent do you agree that the statement (STRAIGHT/CONJUNCTIVE/FIRST) is TRUE/FALSE?			

Table 2 Results of Study 1a divided by setup story. Binary responses (% of TRUE answers)

ascription	verb	Anne	John	Linda	Mark
conjunctive	**glad**	74.0	16.0	58.3	66.7
	want	58.3	54.2	62.0	66.0
first	**glad**	62.2	13.2	17.8	35.8
	want	20.8	15.6	24.5	20.0
straight	**glad**	98.0	93.6	97.9	100.0
	want	91.5	98.0	94.1	100.0

Table 3 Results of Study 1a divided by setup story. Combined confidence score

ascription	verb	Anne		John		Linda		Mark	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
conjunctive	**glad**	13.80	29.1	-14.50	39.4	18.7	32.4	20.0	33.80
	want	9.06	30.8	6.17	34.4	15.7	31.1	19.6	31.13
first	**glad**	8.36	34.6	-24.45	40.6	-12.4	34.3	-15.5	39.26
	want	-14.98	37.4	-19.22	32.2	-16.7	37.9	-20.4	31.37
straight	**glad**	40.65	14.8	33.79	25.4	37.8	18.8	44.4	11.26
	want	35.21	23.8	41.57	17.8	37.2	22.3	45.1	9.27

Table 4 Experimental materials used in Study 1b

Want	Linda	John	Anne	Mark
Story	Today Linda has an important proposal presentation for a prospective client. She is very stressed about public speaking. She doesn't want to give a presentation for the client today and is concerned that she won't do well. In the end, she decides to bite the bullet and meet the client. She wants to deliver the presentation well and convince the client	John has a beloved dog that has been sick for a long time. The poor animal has been suffering from cancer. There are two more operations ahead of him, but they are very complicated and risky. John is afraid about his dog's surgeries and doesn't want his pet to be operated on. However, he decides to have the treatment for the sake of the animal. He wants the dog to survive the surgeries and hopes he will live a long healthy life afterwards	Anne lives in a house next to the woods. She enjoys walking in the woods and, in autumn, she loves picking mushrooms. One October day, Anne plans to go to the woods because she wants to find some mushrooms. But the weather looks bad and it starts to rain. Anne does not want to get wet. In spite of this, she decides to go because she really hopes to find some mushrooms	Mark is a third-year student of history. He strongly prefers online meetings over the regular in-person ones. This year he has attended a philosophy course which he hasn't enjoyed very much. Mark is simply not interested in philosophy. He does not want to attend a philosophy course next year. But if there is an obligatory continuation of this course next year he wants for it to be online
Comprehension check	Please answer the question:			
	To whom Linda had to give the presentation? • a client • an employee	What was John's dog suffering from? • diabetes • cancer	Where does Anne live? • by the seaside • next to the woods	How far along is Mark in his university studies? • third year • second year

Table 4 (continued)

	Linda	John	Anne	Mark
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement:			
	(STRAIGHT) "Linda wants to do well today during her presentation for the client" (CONJUNCTIVE) "Linda wants to give a presentation for the client today and to do it well" (FIRST) "Linda wants to give a presentation for the client today"	(STRAIGHT) "John wants the dog to survive the complicated surgeries" (CONJUNCTIVE) "John wants his dog to have complicated surgeries and to survive them" (FIRST) "John wants his dog to have complicated surgeries"	(STRAIGHT) "Anne wants to find some mushrooms during her walk in the rain" (CONJUNCTIVE) "Anne wants to have a walk in the rain and find some mushrooms" (FIRST) "Anne wants to have a walk in the rain"	(STRAIGHT) "Mark wants the philosophy course next year to be online" (CONJUNCTIVE) "Mark wants a philosophy course next year and for it to be online" (FIRST) "Mark wants a philosophy course next year"
Confidence rating (ranging from -50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question. To what extent do you agree that the statement (STRAIGHT/CONJUNCTIVE/FIRST) is TRUE/FALSE?			
Glad	Linda	John	Anne	Mark
Story	Today Linda had an important proposal presentation for a prospective client. Linda is very stressed about public speaking. She is not glad that she had a presentation today, she feels that she spoke vaguely and mixed things up. Fortunately, the client was very understanding and Linda is glad that she convinced him to work with the company	John has a beloved dog that has been sick for a long time. John is not glad that the poor animal has been suffering from cancer. Though the treatment has been painful for the dog, John is glad that the dog has been treated at the new vet. The change of the vet seems to have been crucial because his pet feels much better now	Anne lives in a house next to the woods. She likes walking in the woods and, in autumn, she loves picking mushrooms. One October day, Anne goes to the woods on a walk but the weather suddenly changes and a heavy rain begins. Anne is not glad that she got terribly wet. The mushroom hunting however was a great success and she is glad that she has found a lot of mushrooms	Mark is a third-year student of history. He attends some courses which he doesn't enjoy very much. In particular, he is not glad to have philosophy classes this year. He prefers online studying over the regular in-person meetings, especially when it comes to the philosophy course. This year the university runs all courses online due to the pandemic, which makes Mark glad

Table 4 (continued)

Comprehension check	Please answer the question:			
	To whom Linda had to give the presentation? • a client • an employee	What was John's dog suffering from? • diabetes • cancer	Where does Anne live? • by the seaside • next to the woods	How far along is Mark in his university studies? • third year • second year
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement:			
	(STRAIGHT) "Linda is glad that her presentation today convinced the client" (CONJUNCTIVE) "Linda is glad that she had a presentation today and convinced the client" (FIRST) "Linda is glad that she had a presentation today"	(STRAIGHT) "John is glad that his pet has been treated for cancer at the new vet" (CONJUNCTIVE) "John is glad that his pet has been suffering from cancer and treated at the new vet" (FIRST) "John is glad that his pet has been suffering from cancer"	(STRAIGHT) "Anne is glad that she has found a lot of mushrooms during her walk in the rain" (CONJUNCTIVE) "Anne is glad that she has had a walk in the rain and found a lot of mushrooms" (FIRST) "Anne is glad that she has had a walk in the rain"	(STRAIGHT) "Mark is glad that the philosophy classes this year are online" (CONJUNCTIVE) "Mark is glad to have philosophy classes this year and that they are online" (FIRST) "Mark is glad to have philosophy classes this year"
Confidence rating (ranging from −50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question To what extent do you agree that the statement (STRAIGHT/CONJUNCTIVE/FIRST) is TRUE/FALSE?			
Fillers	Z	X	Y	Q

Table 4 (continued)

Story	Jack and Emily are on a wedding cake tasting. At the moment, they are trying two flavours: a sour cherry cake and a sweet raspberry cake. Jack tastes both cakes. However, he confuses the flavours: he takes the cherry cake to be a raspberry one and vice versa. Having the cherry cake in mind, he says to Emily:''This raspberry cake is a bit sour.''	Alice shows to Ralph an old set of wooden chess pieces. At this moment, Alice is holding both the chess king and the chess queen. The king is made of oak, while the queen is made of sycamore. Having noticed the difference, Ralph wants to point to the king, but Alice moves the figures so fast that he accidentally points with his finger to the queen while saying: ''This chess figure is made of sycamore''	Jessica and Jim are discussing who they are going to invite to their party next Saturday. Jim does not like Mr. and Mrs. Smith who are Jessica's colleagues so he does not want to invite them. However, Jessica is trying to persuade Jim that they should invite the Smiths and during the conversation she says:''If we don't invite the Smiths, they will feel insulted''.	Martha and Bob are school friends. One day, they are chatting together and sharing some gossip about their school. Bob tells Martha that her best friend Angelica is having an affair with one of the teachers. Martha has already known it and asks Bob not to reveal this news to anyone. She says to Bob:''If people learn about this affair, Angelica will get into trouble.''
Comprehension check	Please answer the question: Which cake is sour? • Cherry cake • Raspberry cake	Which chess figure is made of oak? • King • Queen	Who doesn't like Mr. and Mrs. Smith? • Jessica • Jim	Who has an affair with a teacher? • Martha • Angelica
Truth Value Judgment (binary response)	In the light of the story, how would you evaluate the statement: ''This raspberry cake is a bit sour''	''This chess figure is made of sycamore''	''Jim and Jessica want to offend the Smiths by not inviting them''	''Martha does not want the affair to come to light and Angelica to get into trouble''
Confidence rating (ranging from −50 to +50)	You evaluated the statement as TRUE/FALSE. Now we would like to know your opinion better and ask you one additional question. To what extent do you agree that the statement (STRAIGHT/FIRST) is TRUE/FALSE?			

Table 5 Results of Study 1b divided by setup story. Binary responses (% of TRUE answers)

ascription	verb	Anne	John	Linda	Mark
complex	**glad**	47.2	0	44.2	30.8
	want	38.5	84.6	69.8	24.5
first	**glad**	26.8	1.9	10.7	9.6
	want	7.7	33.9	13.5	5.4
straight	**glad**	95.9	98.1	94.2	98.0
	want	96.2	98.0	100	86.5

Table 6 Results of Study 1b divided by setup story. Combined confidence score

ascription	verb	Anne		John		Linda		Mark	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
conjunctive	**glad**	4.38	29.0	-9.68	39.04	-2.87	35.86	-7.48	31.83
	want	3.37	30.2	21.19	26.6	21.04	28.47	-11.09	34.68
first	**glad**	-15.57	32.2	-33.92	35.3	-27.14	33.94	-26.94	35.19
	want	-23.77	34.0	-8.62	32.0	-21.50	33.59	-39.25	21.46
straight	**glad**	43.61	12.1	39.88	15.1	40.15	17.05	45.02	8.42
	want	41.71	16.3	46.51	9.95	46.27	8.15	29.88	27.03

Table 7 Experimental materials used in Study 2a. GLAD, FEEL SORRY, WANT and FEAR refer to the non-doxastic attitude conditions, DO to the doxastic attitude condition, IS stands for "scalar implicature" and IO for "temporal order implicature"

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
IS	Anne did not find many mushrooms during her walk in the forest. In fact, she has found none	Some of Mark's university courses will be held online this year. In fact, all his university courses will be online	There are two more operations ahead of John's dog. In fact, he will have as many as three surgeries	Karen won't necessarily get a promotion at her current company. In fact, her promotion is impossible	Some of Linda's clients are dissatisfied with her proposal presentation. In fact, all of her clients are dissatisfied with her presentation	During George's birthday party, the music played too loud at times. In fact, it was too loud all the time	Jack will go on a trip to Portugal or France. In fact, he will visit both of these countries	Some of the novels written by Mary are popular. In fact, all of them are bestsellers
IO	Anne went on a walk in the forest and found some mushrooms. In fact, she found the mushrooms before entering the forest	Mark finished a course in history and started a course in philosophy. In fact, he started the philosophy course before finishing the history one	John's dog was operated on and went blind. In fact, he lost his sight before the surgery	Karen completed the annual report and got the promotion her boss promised her. In fact, she finished the report after being promoted	Linda made a proposal presentation for her clients today and went to a business lunch with them. In fact, she went to lunch with them before the presentation	The guests at George's birthday party ate a lavish dinner and took part in a karaoke contest. In fact, they took part in the contest first and then had dinner	Jack will go on a trip to Portugal and France. In fact, he will visit France first, and Portugal second	Mary finished writing a romance novel and a detective one. In fact, she completed the detective novel before the romance one

Table 7 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
DOX	Anne knows that her husband went to the forest and found some mushrooms. In fact, she doesn't know that he was in the forest	Mark knows that he will have a philosophy course this year and that the classes will be held online. In fact, he doesn't know that there will be a philosophy course	John knows that his dog's upcoming surgery is necessary and it carries a high risk. In fact, he doesn't know that the surgery is risky	Karen knows her boss is very demanding and it is hard to get a promotion at the company she works in. In fact, Karen doesn't know her boss has high demands	Linda knows she has an appointment with the clients at 10:00 a.m. and one with her supervisors at 12:00 p.m. In fact, she doesn't know she has a meeting with the clients at 10:00 a.m	George knows that his friends are preparing a birthday party for him and organizing a karaoke contest. In fact, George doesn't know that someone is preparing a party for him	Jack knows that he will go on a trip to France and take a lot of photographs. In fact, he doesn't know yet if he will go to France	Mary knows that her writing is excellent and people enjoy reading her works. In fact, she doesn't know if her writing is good
WANT	Anne wants to go to the forest and find some mushrooms. In fact, she doesn't want to be in the forest	Mark wants to have a philosophy course this year and for it to be online. In fact, he doesn't want to have a course in philosophy this year	John wants his dog to get general anesthesia ahead of its surgery and stay asleep throughout the operation. In fact, he doesn't want anesthesia for the dog	Karen wants to get a salary increase and spend it on vacation in Greece. In fact, she doesn't want to spend money on traveling to Greece	Linda wants to give a presentation for the client and to do it well. In fact, she doesn't want to make a presentation for the client	George's friends want to throw him a birthday party and for it to be a surprise for him. In fact, they don't want to organize any party for George	Jack wants to go on a trip to France and take a lot of photographs. In fact, he doesn't want to go to France	Mary wants to finish her novel before the fall and start a new one in the spring. In fact, she doesn't want to finish the novel before the end of the fall

Table 7 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
FEAR	Anne fears that she will go to the forest and get lost. In fact, she doesn't fear going to the forest	Mark fears that there will be a logic course this year and that the meetings will be online. In fact, he doesn't fear having a course in logic this year	John fears that his dog will suffer a lot during an eye surgery and will go blind afterwards. In fact, he doesn't fear that the dog will suffer	Karen fears that she won't meet her boss's expectations and he won't promote her. In fact, she doesn't fear letting her boss down	Linda fears that she will give a presentation but won't convince the client to sign the contract. In fact, she doesn't fear that the client won't be convinced to sign the contract	George's friends fear that his neighbors will complain to the building manager about the loud music during the birthday party and George will get into trouble. In fact, they do not fear that the neighbors will complain about the noise	Jack fears that the weather will be awful during his trip to France and he will have a bad time. In fact, he doesn't fear that the weather will be bad	Mary fears that her next novel won't be good enough and her fans will be angry with her. In fact, she doesn't fear that the next novel will not be good enough

Table 7 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
FEEL SORRY	Anne feels sorry that she went to the forest and found no mushrooms. In fact, she doesn't feel sorry about being in the forest	Mark feels sorry that he has chosen to attend a logic course and that the course has been online. In fact, he doesn't feel sorry that he has had a course in logic	John feels sorry that his dog has undergone an eye surgery and lost its sight afterwards. In fact, he doesn't feel sorry that his pooch has had a surgery	Karen feels sorry that she didn't manage to complete the annual report on time and that she wasn't promoted because of it. In fact, she doesn't feel sorry she didn't complete the report on time	Linda feels sorry that she had a presentation for the clients but didn't convince them to sign the contract. In fact, she doesn't feel sorry that the clients were not convinced to sign the contract	George's friends feel sorry that his neighbors complained about the loud music at the birthday party they organized for George and he got into trouble. In fact, they don't feel sorry that George got into trouble	Jack feels sorry that he went on a trip to France and took very few photographs. In fact, he doesn't feel sorry that he was in France	Mary feels sorry that she spent too much time writing and not making any new friends. In fact, she doesn't feel sorry that her writing took up so much time
GLAD	Anne is glad that she went to the forest and found a lot of mushrooms. In fact, she isn't glad that she was in the forest	Mark is glad that he has attended a philosophy course this year and that the course has been online. In fact, he isn't glad that he has taken the philosophy course	John is glad that his dog has undergone a surgery and it saved the dog's life. In fact, John isn't glad that his pooch had an operation	Karen is glad that she worked on the annual report and got the promotion she dreamed of. In fact, she isn't glad that she worked on the report	Linda is glad that she has had a presentation today and convinced the client to sign the contract. In fact, she isn't glad that she has had the presentation for the client today	George's friends are glad that they were able to organize a birthday party for George and that it was a surprise for him. In fact, they aren't glad that the party was a surprise for George	Jack is glad that he went on a trip to France and took a lot of photographs. In fact, he isn't glad that he went to France	Mary is glad that she has finished writing her latest novel and now has some free time for herself. In fact, she isn't glad that her last novel has been finished

Table 7 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
ENT	Anne found a lot of mushrooms while she was walking in the forest. In fact, she wasn't in the forest	Mark has attended an additional course this year and it was a philosophy course. In fact, he didn't attend any course this year	Last week John's dog had an eye surgery that saved its life. In fact, John's pet didn't undergo a surgery last week	Karen was promoted because she had managed to complete the annual report. In fact, Karen didn't complete the report	Thanks to a well-done presentation, Linda convinced the client today to sign the contract. In fact, Linda did not give a presentation today	George's friends organized a birthday party for him. In fact, they didn't celebrate his birthday at all	Jack took a lot of photographs while he was in France. In fact, he didn't go to France	Mary has got a lot of good reviews of her newly published novel. In fact, the book hasn't been published yet
Fillers								
	Jim has three aunts. In fact, he doesn't have a fourth auntie	Kate read four books in November. In fact, she tried to read faster, she didn't finish the fifth book until December 2	Most of Judy's friends came to her farewell party. In fact, only two workmates didn't make it because they already had other plans	Ben has been abroad for the past two weeks. In fact, during this time he wasn't in his home	William has written only three novels. In fact, he'll finish the fourth one next month	Amanda ate most of her dinner. In fact, there were only three small potatoes left on her plate when she got up from the table	Jenny thinks it's possible that there is life on Mars. In fact, she told her father it's also possible that there's no life on this planet	Adam scored at least 14 points on the last test. In fact, he finished with a 16/20 score

Table 8 Experimental materials used in Study 2b. GLAD, FEEL SORRY, WANT and FEAR refer to the non-doxastic attitude conditions, DO to the doxastic attitude condition, IS stands for "scalar implicature" and IO for "temporal order implicature"

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
IS	Anne did not find many mushrooms during her walk in the forest. But I don't intend to suggest that she has found any	Some of Mark's university courses will be held online this year. But I don't intend to suggest that not all his university courses will be online	There are two more operations ahead of John's dog. But I don't intend to suggest that he will not have a third surgery	Karen won't necessarily get a promotion at her current company. But I don't intend to suggest that her promotion is possible	Some of Linda's clients are dissatisfied with her proposal presentation. But I don't intend to suggest that not all of her clients are dissatisfied with her presentation	During George's birthday party, the music played too loud at times. But I don't intend to suggest that there were times when the music was not too loud	Jack will go on a trip to Portugal or France. But I don't intend to suggest that he will not visit both of these countries	Some of the novels written by Mary are popular. But I don't intend to suggest that not all of them are bestsellers
IO	Anne went on a walk in the forest and found some mushrooms. But I don't intend to suggest that she found the mushrooms after entering the forest	Mark finished a course in history and started a course in philosophy. But I don't intend to suggest that he started the philosophy course after finishing the history one	John's dog was operated on and went blind. But I don't intend to suggest that he lost his sight after the surgery	Karen completed the annual report and got the promotion her boss promised her. But I don't intend to suggest that she finished the report before being promoted	Linda made a proposal presentation for her clients today and went to a business lunch with them. But I don't intend to suggest that she went to lunch with them after the presentation	The guests at George's birthday party ate a lavish dinner and took part in a karaoke contest. But I don't intend to suggest that they took part in the contest second, after they had dinner	Jack will go on a trip to Portugal and France. But I don't intend to suggest that he will visit Portugal first, and France second	Mary finished writing a romance novel and a detective one. But I don't intend to suggest that she completed the detective novel after the romance one

Table 8 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
DOX	Anne knows that her husband went to the forest and found some mushrooms. But I don't intend to suggest that she knows that he was in the forest	Mark knows that he will have a philosophy course this year and that the classes will be held online. But I don't intend to suggest that he knows that there will be a philosophy course	John knows that his dog's upcoming surgery is necessary and it carries a high risk. But I don't intend to suggest that he knows that the surgery is risky	Karen knows her boss is very demanding and it is hard to get a promotion at the company she works in. But I don't intend to suggest that Karen knows her boss has high demands	Linda knows she has an appointment with the clients at 10:00 a.m. and one with her supervisors at 12:00 p.m. But I don't intend to suggest that she knows she has a meeting with the clients at 10:00 a.m	George knows that his friends are preparing a birthday party for him and organizing a karaoke contest. But I don't intend to suggest that George knows that someone is preparing a party for him	Jack knows that he will go on a trip to France and take a lot of photographs. But I don't intend to suggest that he already knows if he will go to France	Mary knows that her writing is excellent and people enjoy reading her works. But I don't intend to suggest that she knows if her writing is good
WANT	Anne wants to go to the forest and find some mushrooms. But I don't intend to suggest that she wants to be in the forest	Mark wants to have a philosophy course this year and for it to be online. But I don't intend to suggest that he wants to have a course in philosophy this year	John wants his dog to get general anaesthesia ahead of its surgery and stay asleep throughout the operation. But I don't intend to suggest that he wants anaesthesia for the dog	Karen wants to get a salary increase and spend it on vacation in Greece. But I don't intend to suggest that she wants to spend money on travelling to Greece	Linda wants to give a presentation for the client and to do it well. But I don't intend to suggest that she wants to make a presentation for the client	George's friends want to throw him a birthday party and for it to be a surprise for him. But I don't intend to suggest that they want to organize any party for George	Jack wants to go on a trip to France and take a lot of photographs. But I don't intend to suggest that he wants to go to France	Mary wants to finish her novel before the fall ends and start a new one in the spring. But I don't intend to suggest that she wants to finish the novel before the end of the fall

Table 8 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
FEAR	Anne fears that she will go to the forest and get lost. But I don't intend to suggest that she fears going to the forest	Mark fears that there will be a logic course this year and that the meetings will be online. But I don't intend to suggest that he fears having a course in logic this year	John fears that his dog will have an eye surgery and will go blind afterwards. But I don't intend to suggest that he fears that the dog will undergo an eye surgery.	Karen fears that she won't meet her boss's expectations and he won't promote her. But I don't intend to suggest that she fears letting her boss down	Linda fears that she will give a presentation but won't convince the client to sign the contract. But I don't intend to suggest that she fears that the client won't be convinced to sign the contract	George's friends fear that his neighbors will complain to the building manager about the loud music during the birthday party and George will get into trouble. But I don't intend to suggest that they fear that the neighbors will complain about the noise	Jack fears that the weather will be awful during his trip to France and he will have a bad time. But I don't intend to suggest that he fears that the weather will be bad	Mary fears that her next novel won't be good enough and her fans will be angry with her. But I don't intend to suggest that she fears that the next novel will not be good enough

Table 8 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
FEEL SORRY	Anne feels sorry that she went to the forest and found no mushrooms. But I don't intend to suggest that she feels sorry about being in the forest	Mark feels sorry that he has chosen to attend a logic course and that the course has been online. But I don't intend to suggest that he feels sorry that he has had a course in logic	John feels sorry that his dog has undergone an eye surgery and lost its sight afterwards. But I don't intend to suggest that he feels sorry that his pooch has had an eye surgery	Karen feels sorry that she didn't manage to complete the annual report on time and she wasn't promoted. But I don't intend to suggest that she feels sorry she didn't complete the report on time	Linda feels sorry that she had a presentation for the clients but didn't convince them to sign the contract. But I don't intend to suggest that she feels sorry that she had a presentation for the clients	George's friends feel sorry that his neighbors complained about the loud music at the birthday party they organized for George and he got into trouble. But I don't intend to suggest that they feel sorry that George got into trouble	Jack feels sorry that he went on a trip to France and took very few photographs. But I don't intend to suggest that he feels sorry that he was in France	Mary feels sorry that she spent too much time writing and not making any new friends. But I don't intend to suggest that she feels sorry that her writing took up so much time

Table 8 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
GLAD	Anne is glad that she went to the forest and found a lot of mushrooms. But I don't intend to suggest that she is glad that she was in the forest	Mark is glad that he has attended a philosophy course this year and that the course has been online. But I don't intend to suggest that he is glad that he has taken a philosophy course	John is glad that his dog has undergone a surgery and it saved the dog's life. But I don't intend to suggest that John is glad that his pooch had an operation	Karen is glad that she worked on the annual report and got the promotion she dreamed of. But I don't intend to suggest that she is glad that she worked on the report	Linda is glad that she has had a presentation today and convinced the client to sign the contract. But I don't intend to suggest that she is glad that she has had the presentation for the client today	George's friends are glad that they were able to organize a birthday party for George and that it was a surprise for him. But I don't intend to suggest that they are glad that the party was a surprise for George	Jack is glad that he went on a trip to France and took a lot of photographs. But I don't intend to suggest that he is glad that he went to France	Mary is glad that she has finished writing her latest novel and now has some free time for herself. But I don't intend to suggest that she is glad that her last novel has been finished
ENT	Anne found a lot of mushrooms while she was walking in the forest. But I don't intend to suggest that she was in the forest	Mark has attended an additional course this year and it was a philosophy course. But I don't intend to suggest that he attended any course this year	Last week John's dog had an eye surgery that saved its life. But I don't intend to suggest that John's pet underwent a surgery last week	Karen was promoted because she had managed to complete the annual report. But I don't intend to suggest that Karen completed the report	Thanks to a well-done presentation, Linda convinced the client today to sign the contract. But I don't intend to suggest that Linda gave a presentation	George's friends organized a birthday party for him. But I don't intend to suggest that they celebrated his birthday at all	Jack took a lot of photographs while he was in France. But I don't intend to suggest that he went to France	Mary has got a lot of good reviews of her newly published novel. But I don't intend to suggest that the book has already been published
Fillers								

Table 8 (continued)

Type	Anne	Mark	John	Karen	Linda	George	Jack	Mary
	Jim has three aunts. But I don't intend to suggest that he doesn't have an uncle	Kate read four books in November. But I don't intend to suggest that she is a fast reader	Most of Judy's friends came to her farewell party. But I don't intend to suggest that for all of them it was easy	Ben has been abroad for the past two weeks. But I don't intend to suggest that he was not reachable by e-mail	William has written only three novels. But I don't intend to suggest that he will not finish the fourth one next month	Amanda ate most of her dinner. But I don't intend to suggest that she is a picky eater	Jenny thinks it's possible that there is life on Mars. But I don't intend to suggest that she thinks that intelligent life exists	Adam scored at least 14 points on the last test. But I don't intend to suggest that he could not do better

Declarations

References

Asher, Nicholas. 1987. A typology for attitude verbs and their anaphoric properties. *Linguistics and Philosophy* 10 (2): 125–197. https://doi.org/10.1007/BF00584317.

Blumberg, Kyle. 2017. Ignorance Implicatures and Non-doxastic Attitude Verbs. In *Proceedings of the 21st Amsterdam Colloquium,* eds. Alexandre Cremers, Thom van Gessel, and Floris Roelofsen: 135–144. https://semanticsarchive.net/Archive/jZiM2FhZ/AC2017-Proceedings.pdf. Accessed 22 May 2023

Chemla, Emmanuel, and Benjamin Spector. 2011. Experimental evidence for embedded scalar implicatures. *Journal of Semantics* 28 (3): 359–400. https://doi.org/10.1093/jos/ffq023.

Cresswell, Max, J. 1985. *Structured Meanings: The Semantics of Propositional Attitudes*. Cambridge: MIT Press.

Égré, Paul. 2020. Logical Omniscience. In *The Wiley Blackwell Companion to Semantics.* John Wiley & Sons. https://doi.org/10.1002/9781118788516.sem034.

Elbourne, Paul. 2010. The existence entailments of definite descriptions. *Linguistics and Philosophy* 33 (1): 1–10. https://doi.org/10.1007/s10988-010-9072-3.

Frege, Gottlob. 1892 [1948]. Sense and Reference. *The Philosophical Review* 57(3) (1948): 209–230; originally published in 1892. https://doi.org/10.2307/2181485.

Geurts, Bart. 1999. *Presuppositions and Pronouns*. Amsterdam: Elsavier.

Grice, Paul H. 1975. Logic and Conversation. In *Syntax and Semantics 3: Speech Acts*, eds. Peter Cole and Jerry L. Morgan, 41–58. New York: Academic Press.

Heim, Irene. 1992. Presupposition Projection and the Semantics of Attitude Verbs. *Journal of Semantics* 9 (3): 183–221. https://doi.org/10.1093/jos/9.3.183.

Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Malden, MA: Blackwell.

Kaplan, David. 2005. Reading "On Denoting" on its Centenary. *Mind* 114 (456): 933–1003. https://doi.org/10.1093/mind/fzi933.

Karttunen, Lauri. 1974. Presuppositions and Linguistic Context. *Theoretical Linguistics* 1 (1–3): 181–194. https://doi.org/10.1515/thli.1974.1.1-3.181.

King, Jeffrey C. 2019. On propositions and fineness of grain (again!). *Synthese* 196 (4): 1343–1367. https://doi.org/10.1007/s11229-016-1291-x.

Levinson, Dmitry. 2003. Probabilistic Model-theoretic Semantics for "want." *Semantics and Linguistic Theory* 13: 222–239.

Levinson, Stephen C. 2000. *Presumptive Meanings: The Theory of Generalized Conversational Implicature*. Cambridge, MA: MIT Press.

Mayol, Laia, and Elena Castroviejo. 2013. How to cancel an implicature. *Journal of Pragmatics* 50 (1): 84–104. https://doi.org/10.1016/j.pragma.2013.02.002.

Moltmann, Friederike. 2006. Unbound Anaphoric Pronouns: E-Type, Dynamic, and Structured Propositions Approaches. *Synthese* 153: 199–260. https://doi.org/10.1007/s11229-005-5469-x.

Neale, Stephen. 2005. A Century Later. *Mind* 114 (456): 809–871. https://doi.org/10.1093/mind/fzi809.

Pearson, Hazel Anne, Manizeh Khan, and Jesse Snedeker. 2010. Even more evidence for the emptiness of plurality: An experimental investigation of plural interpretation as a species of implicature. *Semantics and Linguistic Theory* 20: 489–508.

Rostworowski, Wojciech. 2018. Descriptions and non-doxastic attitude ascriptions. *Philosophical Studies* 175: 1311–1331. https://doi.org/10.1007/s11098-017-0912-7.

Rostworowski, Wojciech, Katarzyna Kuś, and Bartosz Maćkiewicz. 2023. Semantics of Non-Doxastic Attitude Ascriptions from Experimental Perspective. *Experiments in Linguistic Meaning* 2: 241–251. https://doi.org/10.3765/elm.2.5364.

Russell, Bertrand. 1905. On Denoting. *Mind* 14 (4): 479–493. https://doi.org/10.1093/mind/XIV.4.479.

Skovgaard-Olsen, Niels, Peter Collins, Karolina Krzyżanowska, Ulrike Hahn, and Karl Christoph Klauer. 2019. Cancellation, negation, and rejection. *Cognitive Psychology* 108: 42–71. https://doi.org/10.1016/j.cogpsych.2018.11.002.

Stalnaker, Robert C. 1984. *Inquiry*. Cambridge University Press.

von Fintel, Kai. 1999. NPI licensing, Strawson Entailment, and Context Dependency. *Journal of Semantics* 16 (2): 97–148. https://doi.org/10.1093/jos/16.2.97.