

Default Agreement with Subjective Assertions*

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Abstract This paper puts forward a formal proposal for a judge-dependent notion of assertion that derives asymmetries in the discourse profile of subjective and objective assertions while preserving a unary illocutionary profile for utterances of declarative sentences. We propose that when a speaker asserts a sentence, they commit to that sentence being true as judged by themselves, but project acceptance of the truth of that sentence as judged by all interlocutors. This account makes different predictions, then, for assertions of declarative sentences with judge-invariant denotations, and assertions of declarative sentences with judge-variant denotations.

Keywords: assertion, subjectivity, predicates of personal taste, table model, agreement

1 The challenge: the discourse profile of subjective assertions

Consider the following declarative sentences: (1a) describes a factual matter, whose truth value is intuitively the same across speakers; (1b), by contrast, reports on a subjective assessment, whose truth-value seems to crucially depend on the particular perspective of the speaker.

- | | | |
|-----|-------------------------------|------------|
| (1) | a. The movie was set in 1995. | Objective |
| | b. The movie was awesome. | Subjective |

Recent work has shown that these two types of moves differentially affect the development of discourse (Beltrama 2018a,b); this asymmetry poses a challenge to theories aiming at capturing the illocutionary profile of declarative sentences in a unified way. In this paper, we solve this puzzle by proposing a judge-dependent version of assertion, which derives the asymmetry while still assigning a single illocutionary profile to declarative sentences.

The paper is divided as follows. In §3, we present the relevant observations. In §4, we outline our proposal. In §5, we demonstrate the application of our proposal to the problematic data. Finally, in §6, we discuss the potential of an explanation of these asymmetries that eschews judge-dependence, or indeed any semantic distinction between subjective and objective predicates.

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2 Background: The theory of assertion

Much of semantic theory is concerned with the truth-conditional analysis of sentences of natural language. A common assumption is that declarative sentences denote propositions. Declarative sentences are often used in conversation to communicate information—namely that the proposition they denote is true. But the theory of the meanings of sentences is not (necessarily) the theory of how those meanings are actually used, exchanged or negotiated in communication. To achieve this goal, we need a theory of assertion—one that provides a mapping from the semantics of declarative sentences to their communicative potential.¹

We make the following assumptions about assertion. When a speaker *s* asserts a sentence denoting *p*, they make a public discourse commitment to *p* (Hamblin 1971; Gunlogson 2001), propose that *p* become common ground (Stalnaker 1978), and make the question of whether *p* is true the current local Question Under Discussion (QUD—Roberts 1996; Ginzburg 1996). We assume that this information is kept track of on a ‘conversational scoreboard’ (Lewis 1979) in each participant’s head; idealizing to a case in which there are no miscommunications or misunderstandings, we will refer to a shared representation of the context as *the* scoreboard. For the sake of concreteness, we will assume the scoreboard formalization of Farkas & Bruce (2010), in which utterances place pairs of the syntactic structure and denotation of the uttered sentence (or ISSUES) onto the QUD stack (or TABLE), thereby PROJECTING a future state of the scoreboard in which that sentence has become common ground.²

Crucially, the view sketched in the above paragraph predicts a homogenous discourse profile for assertions: for any assertion by a speaker *s* of a sentence with syntactic structure *S* denoting *p*, the state of the scoreboard following the assertion differs from the prior state of the scoreboard only in the following ways: *s* is committed to *p*, $\langle S, p \rangle$ is on top of the Table, and a common ground incorporating *p* is projected. An important corollary of this view, and in particular of models like Farkas & Bruce (2010), is that any two moves that affect the scoreboard in the same way should also exhibit a parallel behavior with respect to other discourse-related phenomena—including the licensing of common ground update, provocation of conversational crisis, and licensing of response particles. However, this prediction is called into question by the examination of the behavior of subjective vs. objective

1 Approaches under the umbrella of dynamic semantics eschew static truth conditions and instead treat context updates as the basic meanings of sentences of natural language (e.g. Kamp 1981; Heim 1982; Groenendijk & Stokhof 1991; Veltman 1996). These approaches could be seen as packaging a theory of assertion into the theory of natural language semantics. We set aside such theories here, opting to keep the theory of assertion separate for clarity’s sake.

2 This final clause is a simplification, true only of declarative sentences. For interrogative sentences, what is projected is a set of future states of the scoreboard in which some answer to the question has become common ground. We focus exclusively on declarative sentences here.

assertions.

3 The problem with subjective assertions

Beltrama (2018a,b) presents experimental studies highlighting three ways in which subjective assertions differ from non-subjective assertions with respect to phenomena that are supposed to be characteristic of all assertions. We briefly summarize the observations here; the reader is referred to the original papers for details of the methods and results of the experiments.

3.1 Automatic common ground update

Assertions are used to build common ground (Stalnaker 1978). An assertion proposes a common ground update (Farkas & Bruce 2010), which is accepted by default (Walker 1996).³ An account of assertion as licensing DEFAULT AGREEMENT predicts that any sentence should be taken to represent a mutual belief following an uncontested assertion of it; if an interlocutor wishes to prevent this, they are obligated to say so explicitly. Beltrama (2018a) tested this prediction by investigating subjects' intuitions about whether subjective sentences like (2a) and objective sentences like (2b) represent mutual knowledge among the conversational participants if the addressee does not respond overtly to their being asserted.

- (2) a. The movie was awesome.
b. The movie was set in 1995.

Beltrama (2018a) found that subjective sentences were significantly less likely to be judged to represent mutual knowledge than objective sentences following an uncontested assertion (Beltrama 2018a: fig. 1). There is an asymmetry in how strongly subjective and objective sentences trigger common ground update by default.

3.2 Provocation of conversational crisis

Assertions raise the issue of whether the asserted proposition is true (Roberts 1996; Ginzburg 1996), while also committing the speaker to the truth of the asserted

³ "Assertions project confirmation, and therefore the move of confirming an assertion is the least marked next discourse move. ... Note that assertion confirmation may be left unsignalled altogether. This is, we claim, unsurprising given the default nature of the move, under the natural assumption that the more canonical a move is the less overt marking it needs. ... Denials are highly marked and therefore they must be explicit and must be signalled ... as early as possible." (Farkas & Bruce 2010: 93-100)

proposition (Hamblin 1971; Gunlogson 2001). Crucially, if the addressee responds with a denial, they have committed to the negation of that proposition; in this particular situation, given the interlocutors' contradictory commitments, it becomes impossible to resolve the issue at hand. This state is called CONVERSATIONAL CRISIS (Farkas & Bruce 2010). Conversational crises can be ended by one of the interlocutors retracting their commitment, or by the interlocutors "agreeing to disagree," and moving on to another issue, leaving the original one unresolved.

Beltrama (2018a) investigated the aftermath of disagreements over subjective and objective sentences, and found an asymmetry in the preferred follow-up strategy. Participants read dialogues containing either a subjective or an objective sentence, in which the original speaker responds to disagreement by either welcoming the alternative viewpoint (3a) or insisting on his own (3b).

- (3) **Greg:** The movie was {awesome, set in 1995}.
Mary: No, it was not!
a. Aha, interesting to hear!
b. No way! That can't be true!

Subjects rated welcoming responses to be significantly more acceptable following subjective assertions than objective assertions, and vice versa for insisting responses (Beltrama 2018a: fig. 2). This contrast indicates an asymmetry in how strongly subjective and objective sentences provoke conversational crisis, suggesting that denials targeting subjective assertions do not cause a crisis, or at the very least cause a much milder one than the one induced by denials targeting objective assertions.

3.3 Licensing of response particles

A basic design consideration of Farkas & Bruce's (2010) Table model is that it predicts the availability of response particles on the basis of the current state of the scoreboard. Because any assertion alters the scoreboard in the same way, it should license the same response particles (modulo the polarity of the asserted proposition, and the polarity of the response, q.v. Roelofsen & Farkas 2015). Beltrama (2018b) shows that this is not the case for all response particles; specifically, he observes that the use of *totally* as a stand alone confirmation fragment sounds considerably better in response to subjective assertions than it does in response to objective ones.

- (4) a. A: The movie was awesome.
B: Totally!
b. A: The movie was set in 1995.
B: #Totally!

In addition, [Beltrama \(2018b\)](#) provides experimental evidence that, when used as an epistemic, speaker-oriented level modifier, *totally* is rated as significantly more acceptable when modifying subjective assertions than when modifying objective ones (see also [Irwin 2014](#) on this use of the modifier). The contrast is shown in the examples below. To appreciate this empirical observation, it is essential to assume that the two sentences are uttered without previous discussion around the issue.

- (5) a. John’s new house is totally beautiful. >
 b. John’s new house is totally large.

Taken together, these observations point to an asymmetry in how available *totally* is as a response to subjective and objective sentences, as well as as a modifier of assertions containing subjective vs. objective sentences.

3.4 Ramifications

To account for their divergent behavior, [Beltrama \(2018a,b\)](#) suggests that subjective assertions affect the scoreboard in a different way from ordinary assertions: whereas ordinary assertions commit a speaker *s* to a proposition *p* and project a common ground incorporating that proposition, subjective assertions commit *s* to the truth of *p as judged by herself*, and raise the issue of whether the addressee judges *p* to be true as well, projecting both a common ground in which they do and a common ground in which they don’t.⁴

This approach, though, comes with a disadvantage: by assigning separate discourse profiles to subjective vs. objective assertions, it marks a step back from recent advances in our understanding of the mapping from clause type to discourse update ([Gunlogson 2001](#); [Farkas & Roelofsen 2017](#); [Rudin 2018](#))—and in particular from analyses aiming at deriving the discourse effects of declarative sentences from their semantic type (modulo intonational factors—q.v. the above authors plus [Pierrehumbert & Hirschberg 1990](#); [Bartels 1999](#); [Truckenbrodt 2006](#); [Westera 2017](#)). We might thus wonder whether giving up the clause-discourse mapping is really necessitated by the observations encountered in this section. In the remainder of the paper, we argue that it is not; it is indeed possible to explain these data while holding on to the idea that the discourse effect of utterances of declarative sentences can be modeled in a unified way. Specifically, we follow [Beltrama \(2018b\)](#) in making use of judge dependence in our account of subjective assertions; however, by percolating judge dependence throughout the Table model, we are able to derive the observed asymmetries between subjective and objective sentences from a uniform mechanism of assertion.

⁴ For another approach assigning a separate illocutionary profile to subjective assertions, see [Déchaine, Cook, Muehlbauer & Waldie \(2017\)](#), where these moves are treated as PRESENTATIONAL.

4 Proposal

This section outlines our proposal. We first put forward some assumptions about the semantics of subjective predicates that we inherit from prior literature (§4.1). We then present our proposed mechanism of assertion (§4.2).

4.1 The semantics of subjective predicates

Subjective predicates, such as predicates of personal taste (the flagship examples are *tasty* and *fun*) license FAULTLESS DISAGREEMENT (Kölbel 2004): in (6), despite the fact that **A** and **B** have (apparently) asserted p and $\neg p$ respectively, it's not intuitively obvious that either of them is mistaken, or has said something false.⁵

- (6) **A:** This coffee is tasty!
B: No it isn't!

The possibility of faultless disagreement is problematic: if $\neg p = W - p$, as is commonly assumed, then one of these sentences must be true, and one must be false. One influential solution to this problem has been to parameterize the interpretation function to a contextually relevant judge j whose taste is at issue (Lasersohn 2005; Stephenson 2007; Bylinina 2017; and many others).⁶ On this view, plausibly for **A**'s utterance, $j = \mathbf{A}$, and for **B**'s utterance, $j = \mathbf{B}$, so the proposition that **B** is negating is not the proposition that **A** asserted, making it no longer a logical consequence that one of them has said something false. This proposal allows us to define a distinction between subjective and objective sentences:⁷

- (7) (NON)SUBJECTIVITY
- a. A sentence S is subjective iff $\exists j, j', \llbracket S \rrbracket^j \neq \llbracket S \rrbracket^{j'}$
 - b. A sentence S is objective iff it is not subjective, i.e. $\forall j, j', \llbracket S \rrbracket^j = \llbracket S \rrbracket^{j'}$

If any element of a sentence varies with the judge parameter (changing the parameter changes the denotation of the sentence), we call it subjective; if the denotation of the sentence is judge-invariant, we call it objective.

⁵ For an argument that disagreements like this are not actually faultless, see Stojanović (2007).

⁶ For a generalization of this strategy to other constructions, see MacFarlane (2014) on parameterization to contexts of assessment. Not all proposals about subjective predicates involve sensitivity to an interpretation parameter.

⁷ For convenience, we assume a judge-dependent semantics in this paper. However, our account could be formalized for any semantics of subjective expressions that allows for a sharp semantic delineation between subjective and non-subjective sentences, e.g. Umbach's (2016) EVALUATIVE vs. NON-EVALUATIVE propositions, Kennedy & Willer's (2016) COUNTERSTANCE CONTINGENT vs. NON-CONTINGENT propositions, or Coppock's (2017) DISCRETIONARY vs. OBJECTIVE propositions. It's less clear whether our reasoning could be extended to accounts that allow no such delineation, like accounts relying on generic quantification (Anand 2009; Moltmann 2010; Pearson 2013).

This semantics gets around the most urgent logical problem posed by faultless disagreement: how it can be possible for interlocutors to disagree over the truth of a sentence without either one saying something false. In order for the application of this semantics to Beltrama’s asymmetries to be made concrete, this semantic solution must be complemented by a corresponding modification of the theory of assertion. We turn to this task, which comprises the core of our proposal, in the next section.

4.2 Introducing judge dependence to assertion

We begin by articulating the interrelated components of the Table model before moving on to the introduction of judge dependence to an assertion operation couched within the model. The Table model has five named components, though two (*cs* and *ps*) are derived components defined in terms of the primitive components (*DC*, *cg*, and *T*). Any context *K* is represented in terms of these five components.

(8) COMPONENTS OF THE TABLE MODEL

- a. INDIVIDUAL DISCOURSE COMMITMENTS (*DC*): For each interlocutor *i*, *i*’s commitment state DC_i is the set of all propositions that *i* is publicly committed to; *DC* is the set $\{DC_i : i \text{ is a current interlocutor}\}$
- b. COMMON GROUND (*cg*): The Common Ground *cg* is the set of all propositions the interlocutors take to be mutual commitments
- c. CONTEXT SET (*cs*): The Context Set *cs* is the set of all worlds compatible with the interlocutors’ mutual commitments ($= \cap cg$)
- d. TABLE (*T*): The Table *T* is a push-down stack of pairs of a syntactic structure and its denotation $\langle S, \llbracket S \rrbracket \rangle$, the maximal element of which ($\text{MAX}(T)$) being what is currently at issue
- e. PROJECTED SET (*ps*): The Projected Set *ps* illustrates the future Common Ground that could result from the denotation of $\text{MAX}(T)$ ($\text{DEN}(\text{MAX}(T))$) becoming a mutual commitment ($= \{cg + \text{DEN}(\text{MAX}(T))\}$)⁸

Note that, because *cg* represents mutual commitments, it is constrained in a principled way by *DC*:

- (9) INDIVIDUAL COMMITMENTS CONSTRAIN COMMON GROUND:
 $cg \supseteq \cap DC$

⁸ This formulation is simplified to capture only the behavior of declarative sentences. For a version that works with both declarative and interrogative sentences, see Farkas & Bruce (2010).

The practical ramification of this constraint is that if the interlocutors' individual commitments are updated such that they all contain some proposition p , p is automatically added to cg , in order to maintain the relationship indicated in (9), i.e. to keep the common ground reflective of mutual commitments.

We turn now to articulating a judge-dependent mechanism for assertion. Farkas & Bruce's (2010) assertion operator is given below, with some notational changes:

- (10) ASSERTION (Farkas & Bruce 2010 version): (q.v. F&B ex. 9)
 $\text{ASSERT}(S, sp, K_i) = K_o$ such that
- a. $DC_{sp,o} = DC_{sp,i} + \llbracket S \rrbracket$
 - b. $T_o = T_i + \langle S, \llbracket S \rrbracket \rangle$
 - c. $ps_o = \{cg_o + \llbracket S \rrbracket\}$
 - d. in all other respects, $K_o = K_i$

In words: When a speaker sp makes an assertion using a sentence S in an input context K_i , they commit to its denotation, place its denotation and its syntactic structure on the Table, and project a common ground incorporating its denotation.⁹

We propose two modifications to this assertion operation, incorporating the judge parameter. The assertion operation given in (10) doesn't make reference to judge parameterization. We will show that the asymmetries observed in §3 can be made to fall out from a single assertion operation that distributes judge dependence asymmetrically among the different parts of the operation. The first modification that we propose is that when a speaker makes an assertion using a sentence S , they commit to the denotation of S as parameterized to themselves as judge (cf. Stephenson's 2007 judge-dependent norm of assertion).¹⁰

$$(11) \quad DC_{sp,o} = DC_{sp,i} + \llbracket S \rrbracket^{sp}$$

The second modification that we propose is that when a speaker makes an assertion using a sentence S , what they make at issue is whether S is true as parameterized to all n of the interlocutors i , and they project it becoming common ground that it is.¹¹

$$(12) \quad \begin{array}{l} \text{a. } T_o = T_i + \langle S, \llbracket S \rrbracket^{i_1 + \dots + i_n} \rangle \\ \text{b. } ps_o = \{cg_o + \llbracket S \rrbracket^{i_1 + \dots + i_n}\} \end{array}$$

⁹ Note that we overload the plus sign here, using it to represent both adding an element to a set, and pushing an element onto a stack. We trust that no confusion will result.

¹⁰ Note that here and throughout, we suppress all parameters of interpretation other than the judge.

¹¹ Cf. Stephenson's (2007) concept of a context set as a set of world-time-judge triples with all interlocutors as judge and Coppock's (2017) proposal that utterances of subjective sentences are used to coordinate on shared outlooks.

Putting these pieces together, the judge-dependent notion of assertion that we propose here works as follows:

- (13) ASSERTION (final judge-dependent version):
 ASSERT(S, sp, K_i) = K_o such that
- a. $DC_{sp,o} = DC_{sp,i} + \llbracket S \rrbracket^{sp}$
 - b. $T_o = T_i + \langle S, \llbracket S \rrbracket^{i_1+\dots+i_n} \rangle$
 - c. $ps_o = \{cg_o + \llbracket S \rrbracket^{i_1+\dots+i_n}\}$
 - d. in all other respects, $K_o = K_i$

The final assumption we make is a crucial one about the nature of default agreement. We propose that default agreement comprises an agreement to share the assertor's commitment *with no parameter shifts*.

- (14) DEFAULT AGREEMENT (final judge-dependent version):
 When a speaker sp makes an assertion using a sentence S , thereby committing themselves to $\llbracket S \rrbracket^{sp}$, all interlocutors are by default taken to share their commitment to $\llbracket S \rrbracket^{sp}$.

That is to say, when a speaker makes an assertion using S , the addressee ad by default agrees to share their commitment to $\llbracket S \rrbracket^{sp}$ —if ad wants to avoid sharing this commitment, they must make some overt indication of that. However, there is no default assumption that the addressee agrees to commit to $\llbracket S \rrbracket^{ad}$.

In the following section, we show how the judge-dependent implementation of assertion in (13), in combination with the judge-dependent implementation of default agreement in (14), derives the asymmetries observed in §3.

5 Accounting for the facts

In this section, we show how the proposal from the previous section derives the asymmetries observed in §3. We begin by showing how our modified, judge-dependent implementations of assertion (13) and default agreement (14) derive identical results to the more familiar implementation from Farkas & Bruce (2010) when applied to objective sentences.

5.1 Objective assertions

Recall that a sentence is OBJECTIVE iff its denotation is judge-invariant (7b). Call the proposition denoted by a given objective sentence, irrespective of the judge parameter, p . In this case, the proposition that the speaker commits to by virtue

of their assertion, and the proposition that they place on the Table and project the common grounding of, are one and the same: p .

An important corollary of this discourse effect is that, in the case of an objective assertion, default agreement will lead automatically to the projected common ground becoming actual. To see this, consider that default agreement will commit the addressee(s) to p as well (14). After this has happened, all interlocutors will share a commitment to p . This means p will be automatically added to cg to reflect that it is a mutual commitment, by (9). The speaker's assertion projected a cg with p added to it, and this is what has come about. In other words, in the case of objective assertions, default agreement entails the default realization of the projected common ground.

What happens if an addressee responds with disagreement? In the case that the addressee responds to an assertion using S by making an assertion using its negated counterpart $\neg S$, the addressee is now committed to $\neg p$, leading the conversation to a state of crisis.¹² We will define a conversational crisis as follows:

(15) CONVERSATIONAL CRISIS:

A conversation is in crisis iff $\text{DEN}(\text{MAX}(T)) \cap \bigcap \text{UDC} = \emptyset$ ¹³

In the Table model, an Issue is RESOLVED iff its denotation is entailed by the context set. A conversation is in crisis if the current Issue is UNRESOLVABLE WITHOUT RETRACTION: the participants have made commitments that block the restriction of the context set to a subset of the denotation of the current Issue. If i_1 is committed to p , and i_2 is committed to $\neg p$, and the denotation of the current Issue is p (or $\neg p$), then the issue is unresolvable without retraction: any context set that is a subset of p is ruled out by i_2 's commitment, and any context set that is a subset of $\neg p$ is ruled out by i_1 's commitment. Note, however, that this case of conversational crisis has another property, which was not discussed in earlier accounts of this phenomenon. We'll call this property SEVERITY:

(16) SEVERE CONVERSATIONAL CRISIS:

A conversational crisis is SEVERE iff $\bigcap \text{UDC} = \emptyset$.

In a severe conversational crisis, the interlocutors' commitments are UNSHAREABLE: they don't just make resolution of the current Issue impossible, but they directly

¹² This distinction between $\neg S$ and $\neg p$ is not as trivial as it seems! Because S is assumed here to be judge-invariant, its negation will express the contradictory proposition to its positive-polarity form, regardless of the assertor. But if S were subjective, nothing would guarantee that S as judged by i_1 and $\neg S$ as judged by i_2 would denote contradictory propositions.

¹³ A note on this formula: first we aggregate all propositions that any interlocutor is committed to (UDC), and then intersect all of those propositions to derive a set-of-worlds representation of the total information carried by all of the interlocutors' commitments ($\bigcap \text{UDC}$).

contradict each other. In other words, not only is the current Issue unresolvable, but it is not possible for the interlocutors to coherently agree to share each other's commitments. As we now turn to show, the distinction between severe and non-severe conversational crises can shed light on the different behavior of objective vs. subjective assertions. More precisely, disagreements in which one party asserts S and the other asserts $\neg S$ create severe conversational crises only if S is objective. Because objective sentences are judge-invariant, our modifications to assertion and default agreement have no effect on objective assertions: default agreement actualizes the projected common ground, and severe conversational crises result from disagreements. We now turn to showing that these properties do not hold of subjective assertions. In particular, we'll show that for such assertions such disagreements still create conversational crises, but do not create severe ones.

5.2 No automatic common ground update for subjective assertions

In the case of a subjective assertion, the proposition that the speaker commits to and the proposition that the speaker places on the Table and projects are different. Because default agreement is with the proposition the speaker has committed to, this means that default agreement won't lead to actualization of the projected common ground, thus explaining the different behaviors of this type of assertion with respect to default updates.

Call the proposition that a speaker i_1 commits to p ($= \llbracket S \rrbracket^{i_1}$), and the proposition that the speaker projects the common grounding of q ($= \llbracket S \rrbracket^{i_1+\dots+i_n}$). By the definition of subjectivity (7a), p is not necessarily equivalent to q . By default agreement, the addressee(s) share the speaker's commitment to p . By (9), this means p will be automatically added to cg to reflect that it is a mutual commitment. But what is added to the common ground here is the proposition denoted by the subjective sentence as judged by the speaker, not as judged by the addressee(s), or as mutually judged by all interlocutors. The resulting context set does not necessarily resolve the Issue that the speaker raised—without the addressee(s) weighing in on whether the sentence is true in their own judgment, the Issue that the speaker raised remains unresolved, despite the fact that the context now reflects a shared commitment to its truth in the speaker's judgment.

There are two points that it is important to make here. The first is that this account captures the intuition that assertions of subjective sentences raise the issue of whether they are true in the judgment of the addressee. This intuition is directly hardwired in Beltrama's (2018b) special subjective assertion mechanism; here, by contrast, it is derived from a general mechanism for assertion. In the case of subjective assertions, default agreement does not resolve the Issue that has been raised, and what is necessary to resolve it is information about the addressee's

judgment, but neither fact is hard-coded into a mechanism of assertion specific to subjective sentences.

The second point is that common ground has increased, despite the fact that the Issue the speaker has raised has not been resolved: the interlocutors now all share a commitment to the denotation of the subjective sentence as judged by the speaker, which is reflected in the common ground.¹⁴ Whereas the Issue raised by an objective assertion is resolved by default agreement, the Issue raised by a subjective sentence can only be resolved by an overt agreement response.

- (17) **A:** This coffee is disgusting.
B: Yes, it is.

We assume that **B**'s response above amounts to an assertion of the same sentence S as **A**'s initial assertion: we assume that *yes* simply encodes features that relate the polarity of the prejacent to the polarity of its discourse antecedent (Roelofsens & Farkas 2015), that *it* is anaphoric to *this coffee*, and that **A**'s utterance provides the antecedent for the verb phrase ellipsis in **B**'s. **B** responding to **A**'s assertion of a subjective sentence S by asserting S themselves raises the same Issue as **A**'s assertion, and projects the same common ground, but introduces a new commitment. In addition to the proposition $\llbracket S \rrbracket^A$ that they committed to via default agreement in response to **A**'s assertion, **B** is now also committed to $\llbracket S \rrbracket^B$ by virtue of her own assertion. Via default agreement, **A** will share **B**'s new commitment, and they will both be committed to both propositions. This means that both propositions are in the common ground, and therefore that the information they carry is reflected in the context set. Assuming that $\llbracket S \rrbracket^A \wedge \llbracket S \rrbracket^B \leftrightarrow \llbracket S \rrbracket^{A+B}$, the context set now entails $\text{DEN}(\text{MAX}(T))$, and the Issue raised by an assertion of S has been resolved. What happens automatically for objective assertions must be achieved via overt agreement with subjective assertions.

Precisely because, on our account, default agreement with subjective assertions leads to a common ground update, we should now be explicit about what we take the observations in §3.1 to indicate. Beltrama (2018a) observed that participants are reluctant to assume that a subjective sentence represents mutual knowledge following its assertion, if the addressee does not follow up with overt agreement. Note that participants were asked about whether the *sentence* represented mutual knowledge. We should distinguish, then, between a *proposition* being common ground, and a *sentence* being common ground, seeing as subjective sentences determine different propositions for different judges. We will say that a sentence S is common ground

¹⁴ Our ability to deliver this result is a reason to prefer our system over the one sketched by Stephenson (2007), in which the context set is a set of world-time-judge triples that share all interlocutors as judge. This framework cannot capture the way that subjective sentences can be used to coordinate on worlds in which the interlocutors' judgments differ!

in a context c including n interlocutors i iff $\llbracket S \rrbracket^{i_1+\dots+i_n}$ is entailed by the context set in c . So when **A** asserts *this coffee is disgusting* to **B** in (17), the proposition $\llbracket \text{This coffee is disgusting} \rrbracket^A$ becomes common ground by default, but the sentence itself does not become common ground by default: it is only after **B**'s assertion that the proposition $\llbracket \text{This coffee is disgusting} \rrbracket^B$ becomes a mutual commitment, rendering the sentence common ground. Put another way, a sentence does not become common ground until the Issue it has raised has been resolved. The upshot is that objective sentences, but not subjective sentences, resolve the Issues they raise by default, therefore explaining the asymmetry observed in §3.1.

5.3 No provocation of conversational crisis for subjective assertions

Above we saw how our account deals with agreement responses to subjective assertions. In this section we turn to disagreement responses. First, note that default agreement with $\llbracket S \rrbracket^{sp}$ is not called off by an addressee who responds with $\neg S$:

- (18) **A:** This coffee is delicious.
B: No it isn't!

B here does not dispute that **A** finds the coffee delicious; rather, they forcefully express that they do not share that judgment. Our proposal predicts this fact, because here **B** commits to $\llbracket \neg S \rrbracket^B$, which is not incompatible with a commitment to $\llbracket S \rrbracket^A$, and so does not block the acquisition of that commitment via default agreement. If **B** wishes to avoid taking on a commitment to $\llbracket S \rrbracket^A$ via default agreement, they must push back directly against that commitment:

- (19) **A:** This coffee is delicious:
B: You don't actually think that! That has to be a joke!

Responding to an assertion using the sentence S with a counter-assertion using the sentence $\neg S$ doesn't block default agreement *because the commitments don't clash*. However, it *does* provoke conversational crisis, because it renders the Issue at hand unresolvable. We argue that it's exactly this asymmetry that explains Beltrama's observations.

Recall the definition of conversational crisis in (15). By this definition, a conversation is in crisis if there are no worlds compatible with all interlocutors' commitments that are also compatible with the denotation on the Table. In the case of the disagreement in (18), **A** is committed to $\llbracket S \rrbracket^A$, the proposition that **A** finds the coffee delicious, and **B** is committed to $\llbracket \neg S \rrbracket^B$, the proposition that **B** doesn't find the coffee delicious. $\text{DEN}(\text{MAX}(T))$ is $\llbracket \neg S \rrbracket^{A+B}$, the proposition that both **A** and **B** don't find the coffee delicious. It should be obvious that there is no world compatible

with both **A** and **B**'s commitments that is also compatible with what is on the Table. Therefore, the conversation is in crisis.

However, recall also the definition of a severe conversational crisis in (16): a conversational crisis is severe iff the participants cannot coherently share each others' commitments. The disagreement in (18) does not provoke a severe conversational crisis. Despite the fact that **A** and **B** will not be able to coordinate on a world in which they have the same judgment of the coffee's deliciousness, they are perfectly able to agree to share each other's commitments. **A** can remain committed to the coffee being delicious in her judgment and also agree to share a commitment to the coffee not being delicious in **B**'s judgment without contradicting herself—there is a world at which both $\llbracket S \rrbracket^A$ and $\llbracket \neg S \rrbracket^B$ are true; *mutatis mutandis*, the same goes for **B**. We take the unseverity of conversational crises prompted by disagreements over subjective sentences to explain Beltrama's (2018a) observations that such disagreements facilitate moves that welcome the other party's opinion to a higher degree than disagreements over objective sentences.

5.4 Asymmetric licensing of *totally*

Beltrama (2018b) analyzes *totally* as an epistemic operator conveying the speaker's belief that the proposition should be true in the judgment of all interlocutors. We extend this analysis to the response particle use of *totally* as follows. First, we assume the particle is always accompanied by a prejacent clause, which is usually fully elided. Just as with the polarity particles *yes* and *no* (see discussion above), we assume that what is asserted is the prejacent clause. On this view, *totally* serves to add an additional speaker commitment on top of the commitment to the denotation of the prejacent that follows from the operation of assertion.

- (20) An assertion of a sentence of the form *totally*(*S*) asserts *S*, and additionally commits the speaker to the proposition $\forall i, i' (\llbracket p \rrbracket^i = \llbracket p \rrbracket^{i'})$

In other words, a response with *totally* commits the responder to the prejacent sentence having a judge-invariant denotation relative to a judge pool comprising the set of current interlocutors.

In the case of objective sentences, of course, the sentence has a judge-invariant denotation by definition. Therefore, the proposition that it is judge-invariant with respect to the current set of interlocutors is intrinsically redundant. However, if the sentence is subjective, then the proposition that it is judge-invariant with respect to the current set of interlocutors is not intrinsically redundant. We suggest that the intrinsic redundancy of this additional commitment, which is the sole contribution of *totally*, explains why *totally* is degraded in response to objective sentences.

6 Beyond judge dependence: An internalist sketch

In the above, we've used a judge-dependent framework for the sake of simplicity and formal clarity. We take the above to serve as a proof of concept that the observed asymmetries can be derived from a unified account of the context update operation carried out by assertions. However, it's not necessary to adopt a judge-dependent semantics in order to deliver this result. In this section, we sketch an approach to explaining these asymmetries that doesn't rely on any formal distinction at all between the content of subjective and objective sentences.

The motivation for a semantic distinction between subjective and objective predicates starts from externalist assumptions. Given an externalist view of denotata (Putnam 1973), the denotation of a predicate is a set of entities that exist in the world, and there is an objective fact of the matter about whether any entity is a member of that denotation or not. Thus, if faultless disagreement is possible, the denotation of a subjective predicate must be something other than the ordinary, judge-invariant set of entities. It's not clear that this problem motivates a semantic distinction between subjective and objective predicates if one makes internalist assumptions about denotata (Chomsky 2003). If whether or not an entity is a member of a predicate is simply a fact about some agent's mental representation of the world, we could take an entirely different approach to the ramifications of these classic observations. In this section, we outline an internalist approach to subjective predicates, and describe how it might account for some aspects of their discourse behavior. For the purposes of this paper, this will remain only a sketch.

6.1 Internalism and subjective predicates

We now outline our basic assumptions about an internalist interpretation of model-theoretic semantics. We assume a standard version of model-theoretic predicate logic, in which one-place predicates simply denote sets of entities. A model represents some agent's mental representation of the world they inhabit. When we judge sentences to be true or false, we make those judgments by evaluating them against our own models. When we refer to the EXTENSION of a predicate in some model, we refer to the set of mental representations of entities denoted by that predicate in that model, rather than to any set of actual physical objects that exist in reality.

By hypothesis, when one knows the meaning of a predicate-denoting expression, one knows on what basis one can conclude that an entity belongs in the extension of that predicate in one's own model. An agent is justified in concluding that an entity belongs in the extension of a predicate iff they have access to a piece of PREDICATE-RELEVANT EVIDENCE (e). Evidence is predicate-relevant if the observation of it settles whether or not an entity is a member of that predicate. An e is generated by

applying a VALID MEASURING APPARATUS (*vma*) to an entity. A speaker knows the meaning of a predicate if they know what its *vmas* are, and what its *es* are.

To make this concrete, let's consider two predicates, the objective *less-than-four-feet-wide*, and the subjective *tasty*. Throughout, we'll use these two predicates as proxies for the class of objective predicates and the class of subjective predicates, at the risk of over-generalizing. For *less-than-four-feet-wide*, a *vma* is a tape measure. The *e* generated by applying a *vma* to an entity is a length. Iff *e* is less than four feet, that entity is a member of the predicate in the mental model of an agent who has access to *e*. For *tasty*, a *vma* is a set of tastebuds. The *e* generated by applying a *vma* to an entity is an experience falling somewhere along the spectrum of pleasure, indifference, and displeasure. Iff *e* is a pleasurable experience, that entity is a member of the predicate in the mental model of an agent who has access to *e*.

On this view, there is no *formal* difference between objective and subjective predicates—they both denote sets of entities in mental models. If an agent eats a hot dog and has a sensory response of the correct kind, they have applied a *vma* to the hot dog and generated an *e* that places the hot dog in the extension of *tasty* in their mental model, just as if they measure a door with a tape measure and find that its length is three feet, they have applied a *vma* to the door and generated an *e* that places the door in the extension of *less-than-four-feet-wide*. The difference between the two classes of predicates is in terms of what kind of evidence an agent will make use of in deciding how to populate the properties in their mental model with entities.

By virtue of the kind of evidence used to justify the inclusion of an entity in an objective predicate like *less-than-four-feet-wide*, any competent observer who has applied a *vma* to a door will generate the same *e*, settling the question of its membership in the predicate.¹⁵ If two agents disagree, it must be either that at least one of them is not competent (e.g. has misread their *vma*), or has not used a *vma* (e.g. their tape measure is inaccurate). That is to say, there is very high INTER-ANNOTATOR AGREEMENT (IA) about predicates like *less-than-four-feet-wide*.

However, it is simply not the case that any competent observer who has applied a *vma* to a hot dog will generate the same *e* regarding its tastiness. Two competent observers can apply a *vma* (i.e. their taste buds) to the same hot dog and observe two distinct *es*: a pleasant experience and an unpleasant one. That is to say there is very low IA about predicates like *tasty*. This isn't a fact about formal semantics—it's part of our world-knowledge. Perhaps it's all and only those predicates that display low IA that display the kinds of "subjective" behavior at issue in this paper. Call the hypothesis that low IA in itself is responsible for the interesting behavior of subjective predicates the INTER-ANNOTATOR AGREEMENT THEORY OF SUBJECTIVE PREDICATES (IAT).

¹⁵ Here and throughout, we're ignoring the problem of degrees of precision, and setting aside considerations of vagueness.

6.2 Faultless disagreement

If the denotations of subjective predicates are no different than the denotations of predicates of any other kind, then asserting a subjective sentence should be no different than asserting an objective one, and likewise for disagreement. If there is no formal difference between assertion of subjective and objective sentences, then whence the intuition that one kind of disagreement is faultless and the other isn't?

Call a disagreement faulty if some party is not a competent observer, or has not used a *vma*. If two people disagree about the extension of an objective predicate within their respective mental models, somebody must be at fault, by virtue of the high IA of objective predicates: any two competent observers who have applied a *vma* to an entity will generate the same *e*. But if two people disagree about the extension of a subjective predicate within their respective mental models, it's possible that both are competent observers who have applied a *vma*, and simply observed different *es*, by virtue of the low IA of subjective predicates. Hence the possibility of a faultless interpretation of the disagreement.

IAT makes predictions about when disagreement over subjective predicates should *not* be interpreted as faultless. Sometimes there is very high IA about the (non)membership of certain kinds of entities in the extensions of subjective predicates. Hazel Pearson (2013) observes the following sentence:

(21) Soapy dishwasher is tasty. (ex. 83a)

Pearson expresses the intuition that this is “just plain false.” I.e. disagreement over it is not faultless. Given IAT, this is because there is extremely high IA about the tastiness of soapy dishwasher, and so we're not willing to believe that a competent observer could apply their taste buds to it and have a pleasurable experience. IAT predicts (accurately, it seems) that faultless disagreement is a property of predicate-argument pairs, not predicates *simpliciter*, and that the distribution of plausible judgments influences intuitions about the faultyness of a disagreement. Note also that IAT views faultlessness as arising from the assumption that both parties are competent observers who've used *vm*s. In contexts that don't license this assumption, faultlessness is less available. Imagine an argument between a master sommelier and a layperson about whether a particular Cabernet is delicious. A wine snob might be unwilling to say this is faultless—the layperson's untrained palette simply doesn't, in their judgment, qualify as a *vma* in comparison to the master sommelier's.

6.3 Default agreement and the acquaintance inference

An utterance of (22a) is associated with an inference that the speaker has tasted a Big Mac. An utterance of (22b) is not associated with an inference that the speaker has measured a Big Mac.

- (22) a. Big Macs are tasty.
b. Big Macs are four inches wide.

(22a), but not (22b), displays the ACQUAINTANCE INFERENCE (Ninan 2014; Kaiser & Herron Lee 2017; Anand & Korotkova 2018; Muñoz 2019). The IAT predicts both this inference and asymmetries in default agreement in the same stroke. If you believe that a competent observer has used a *vma* to generate an *e* that places an entity in the extension of an objective predicate in their own model, you're justified in believing that entity to be a member of that extension yourself, though you don't actually have access to *e*. This is because you can be confident that you'd generate the same *e* if you used a *vma*, by virtue of the high IA of the predicate. But even if you believe that a competent observer has used a *vma* to generate an *e* that places an entity in a subjective predicate in their own model, you're not justified in believing that entity to be a member of that predicate yourself. You can't be confident that you'd generate the same *e* if you used a *vma*, by virtue of the low IA of the predicate.

In other words, for objective predicates, the observation that an agent has legitimately generated an *e* that places an entity in a predicate in their mental model itself counts as an *e* that justifies placement of that entity in that predicate in other agents' mental models. For predicates that display low IA, the same observation does not count as such a piece of evidence. This is the default agreement asymmetry: if we assume our interlocutor to be sincere and competent, our willingness to adopt their judgments about objective (but not subjective) predicates follows. And if an agent is justified in asserting that an entity is a member of a subjective predicate—i.e., if they have access to an *e* that places it in the predicate—it must be that they are “acquainted” with it in the relevant way, because *e* is a mind-internal sensory response, and cannot be reliably inferred on the basis of other observers' conclusions.

7 Conclusion

We find this final sketch attractive because it connects the behavior of subjective predicates to the kind of evidence on the basis of which one can conclude that an entity is a member of that predicate (Rudolph 2018). Is it a kind of evidence about which there is strong inter-annotator agreement, like a measurement of length? Or is it a kind of evidence for which there is low inter-annotator agreement, like a sense of enjoyment that accompanies the consumption of food? Connecting the behavior of subjective predicates to the kind of evidence relevant to them allows us to make predictions about *which* predicates will be the subjective ones. This advantage is not shared by judge dependent accounts, which must simply stipulate which predicates are sensitive to the judge parameter, and thereby make no predictions about which classes of predicates will display the relevant behaviors.

References

- Anand, Pranav. 2009. Kinds of taste. Manuscript, UC Santa Cruz.
- Anand, Pranav & Natasha Korotkova. 2018. Acquaintance content and obviation. In Uli Sauerland & Stephanie Solt (eds.), *Proceedings of Sinn und Bedeutung 22*, .
- Bartels, Christine. 1999. *The Intonation of English Statements and Questions: A Compositional Interpretation*. Routledge.
- Beltrama, Andrea. 2018a. Subjective assertions are weak: Exploring the illocutionary profile of perspective-dependent predicates. In *Proceedings of Sinn und Bedeutung 22*, .
- Beltrama, Andrea. 2018b. *Totally* between subjectivity and discourse: Exploring the pragmatic side of intensification. *Journal of Semantics* .
- Bylinina, Lisa. 2017. Judge-dependence in degree constructions. *Journal of Semantics* 34. 291–331.
- Chomsky, Noam. 2003. Internalist explorations. In Martin Hahn & Bjorn Ramberg (eds.), *Reflections and Replies: Essays on the Philosophy of Tyler Burge*, 259–288. Bradford.
- Coppock, Elizabeth. 2017. Outlook-based semantics. *Journal of Semantics* .
- Déchaine, Rose-Marie, Clare Cook, Jeffrey Muehlbauer & Ryan Waldie. 2017. (de-)constructing evidentiality. *Lingua* 186-187. 21–54.
- Farkas, Donka & Kim Bruce. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27. 81–118.
- Farkas, Donka & Floris Roelofsen. 2017. Division of labor in the interpretation of declaratives and interrogatives. *Journal of Semantics* .
- Ginzburg, Jonathan. 1996. Dynamics and the semantics of dialogue. In J. Seligman & Dag Westerståhl (eds.), *Language, Logic, and Computation*, vol. 1, 1–16. CSLI.
- Groenendijk, Jeroen & Martin Stokhof. 1991. Dynamic predicate logic. *Linguistics and Philosophy* 14. 39–101.
- Gunlogson, Christine. 2001. *True to Form: Rising and Falling Declaratives as Questions in English*: University of California, Santa Cruz PhD dissertation.
- Hamblin, C.L. 1971. Mathematical models of dialogue. *Theoria* 37. 130–155.
- Heim, Irene. 1982. *The Semantics of Definite and Indefinite Noun Phrases*: University of Massachusetts, Amherst PhD dissertation.
- Irwin, Patricia. 2014. So [totally] speaker-oriented: An analysis of "Drama SO". In Raffaella Zanuttini & Laurence R. Horn (eds.), *Microsyntactic Variation in North American English*, 29–70. Oxford: Oxford University Press.
- Kaiser, Elsi & Jamie Herron Lee. 2017. Experience matters: A psycholinguistic investigation of predicates of personal taste. In *Proceedings of SALT 27*, 323–339.

- Kamp, Hans. 1981. A theory of truth and semantic representation. In Jeroen Groenendijk, Theo Janssen & Martin Stokhof (eds.), *Formal Methods in the Study of Language*, .
- Kennedy, Christopher & Malte Willer. 2016. Subjective attitudes and counterstance contingency. In *Proceedings of SALT 26*, .
- Kölbel, Max. 2004. Faultless disagreement. *Proceedings of the Aristotelian Society* 104. 53–73.
- Lasersohn, Peter. 2005. Context dependence, disagreement, and predicates of personal taste. *Linguistics and Philosophy* 28. 643–686.
- Lewis, David. 1979. Scorekeeping in a language game. *Journal of Philosophical Logic* 8. 339–359.
- MacFarlane, John. 2014. *Assessment Sensitivity*. Oxford University Press.
- Moltmann, Friderike. 2010. Generalizing detached self-reference and the semantics of generic one. *Mind and Language* 25. 440–473.
- Muñoz, Patrick. 2019. *On Tongues: The Grammar of Experiential Evaluation*: University of Chicago PhD dissertation.
- Ninan, Dilip. 2014. Taste predicates and the acquaintance inference. In *Proceedings of SALT 24*, .
- Pearson, Hazel. 2013. A judge-free semantics for predicates of personal taste. *Journal of Semantics* 30. 103–154.
- Pierrehumbert, Janet & Julia Hirschberg. 1990. The meaning of intonational contours in the interpretation of discourse. In P. Cohen, J. Morgan & M. Pollack (eds.), *Intentions in Communication*, 271–311. MIT Press.
- Putnam, Hilary. 1973. Meaning and reference. *The Journal of Philosophy* 70(19). 699–711.
- Roberts, Craige. 1996. Information structure in discourse. In J.H. Yoon & A. Kathol (eds.), *OSU Working Papers in Linguistics 49: Papers in Semantics*, 1–53. Ohio State University.
- Roelofsen, Floris & Donka Farkas. 2015. Polarity particle responses as a window onto the interpretation of questions and assertions. *Language* 91(2). 359–414.
- Rudin, Deniz. 2018. *Rising Above Commitment*: University of California, Santa Cruz PhD dissertation.
- Rudolph, Rachel. 2018. Talking about appearances: the roles of evaluation and experience in disagreement. *Philosophical Studies* .
- Stalnaker, Robert. 1978. Assertion. In Peter Cole (ed.), *Syntax and Semantics 9*, 315–32. Academic Press.
- Stephenson, Tamina. 2007. Judge dependence, epistemic modals, and predicates of personal taste. *Linguistics and Philosophy* 30. 487–525.
- Stojanović, Isidora. 2007. Talking about taste: disagreement, implicit arguments, and relative truth. *Linguistics and Philosophy* 30. 691–706.

- Truckenbrodt, Hubert. 2006. On the semantic motivation of syntactic verb movement to C in German. *Theoretical Linguistics* 32(3). 257–306.
- Umbach, Carla. 2016. Evaluative propositions and subjective judgments. In Cécile Meier & Janneke van Wijnbergen-Huitink (eds.), *Subjective Meaning: Alternatives to Relativism*, 127–168. de Gruyter.
- Veltman, Frank. 1996. Defaults in update semantics. *Journal of Philosophical Logic* 25(3). 221–261.
- Walker, Marilyn. 1996. Inferring acceptance and rejection in dialog by default rules of inference. *Language and Speech* 39(2-3). 265–304.
- Westera, Matthijs. 2017. *Exhaustivity and Intonation: A Unified Theory*: Institute for Logic, Language and Computation, Universiteit van Amsterdam PhD dissertation.

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