The calculability test for conversational implicatures

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Abstract. This paper presents a novel understanding of the notion of calculability. In Gricean frameworks, calculability is defined in terms of *how* speakers can infer an implicature. The relevant inferences must e.g. be based on maxims of conversation or cooperation principles. Meanwhile, I suggest to define calculability in terms of *when*, or under which conditions, speakers can infer an implicature. An implicature is calculable if hearers can infer its existence even supposing that the implicature is not semantically encoded. This approach avoids familiar challenges, including recently prominent challenges from pragmatic particularism.

1   Introduction

Philosophers invoke conversational implicatures in many areas of philosophy to explain (or to explain away) puzzling data.[1] To support respective assumptions, they frequently appeal to test criteria for conversational implicatures such as cancelability, non-detachability and calculability.[2] Calculability stands out here as "the final test for the presence of a conversational implicature" (Grice, 1981: 187), but many

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[1] In epistemology, see e.g. Rysiew, 2001; Brown, 2006 on salience and stakes effects on knowledge attributions; in aesthetics, see e.g. Hopkins, 2011: 145; Simion, 2016: 3051–3052 on the acquaintance inference; in ethics, see e.g. Finlay, 2005; Strandberg, 2012; Woods, 2014 on the relation between affective states and moral assertions; in philosophy of language, see e.g. Grice, 1989 on conditionals and e.g. Nunberg, 2018 on slurs.

[2] For seminal discussion of these test criteria, see Grice, 1989. For recent discussion of cancellability, see e.g. Weiner, 2006; Blome-Tillmann, 2008; Åkerman, 2015; Zakkou, 2018.

have argued that it is ill-suited for this role. In this paper, I develop a novel understanding of calculability that avoids the problems in question. In section 2, I present Grice's account of calculability and raise familiar concerns. In section 3, I suggest a novel account of calculability and explain how it avoids these concerns. In section 4, I address two possible objections to the proposed account of calculability.

Notice that calculability is a technical notion. This means that we cannot rely on ordinary intuitions to constrain definitions of this notion. Instead, we should check whether any given definition serves whatever theoretical goals the notion of calculability is supposed to serve. Here I assume that the notion of calculability serves primarily as a test criterion for conversational implicatures, and I will assess definitions of calculability along these lines. For now I further assume that calculability can serve this goal only if it satisfies at least the following desideratum (I discuss this and some further potential desiderata below). Calculability should be a necessary feature of conversational implicatures in cases of successful communication. That is, conversational implicatures must be calculable in cases where the hearers come to know what the speaker communicates.

2 Grice's account

Grice (1989) defines calculability roughly as follows.

> **Calculability$_1$** A proposition p is calculable in a context of utterance c iff the hearers of c can "work out" that the speaker of c implicates p by following the Working-out Schema.

The "Working-out Schema" is the reasoning schema Grice describes in the passage quoted below. The "maxims" are the familiar maxims of Quality, Quantity, Relation and Manner (26–27), and the "Cooperative Principle" asks speakers to make their contribution "such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged." (26)

> **Working-out Schema**: [The speaker] has said that *p*; there is no reason to suppose that he is not observing the maxims, or at least the Cooperative Principle; he could not be doing this unless he thought that *q*; he knows (and knows that I know that he knows) that I can see that the supposition that he thinks that *q* is required; he has done nothing to stop me thinking that *q*; he intends me to think, or is at least willing to allow me to think, that *q*; and so he has implicated that *q*. (31)

Notice that the Working-out Schema concludes that the speaker has implicated that q. Following Grice, I take what a speaker implicates to comprise everything the speaker "implied, suggested, meant" (24; see also p. 86), and I assume that this category coincides, at least roughly, with what is more standardly referred to as what the speaker communicates or conveys.

To illustrate the indicated definition, consider Grice's (1989: 32) petrol case ("⤳" indicates implicatures in the broad sense of the previous utterance).

(1) *A:* Where can I get petrol?

     B: There is a garage around the corner.

     ⤳ The garage is open and has petrol to sell.

The implicature is calculable as defined because A can work it out as follows. B said that there is a garage around the corner. She is apparently cooperative and thus intends to make a relevant contribution. The claim that there is a garage around the corner is relevant in the present context only if the garage is open and has petrol to sell. B must therefore believe this, and since this is mutually obvious, she implicates this.

Accounts like Calculability$_1$ have been criticized in several ways, putting pressure on the idea that they satisfy the necessity desideratum above. Consider the premise that the speaker said that p of the Working-out Schema. Swanson (2017) argues that conversational implicatures can arise through silence, when nothing is said. Consider the cooperativity assumption. Asher and Lascarides (2013) suggest that conversational implicatures arise even when speakers are not cooperative. Consider the premise that the speaker could not be observing the maxims or the Cooperative Principle unless they believed q. Hugly and Sayward (1979) argue that this premise cannot be justified in a non-circular way in cases of non-literality, e.g., when one utters "War is war". Meanwhile, Davis (1998: 62–113) argues that the premise is almost always false because there is hardly ever anything a speaker *must* believe to obey the maxims or the Cooperative Principle. Since these concerns are supposed to arise even in cases of successful communication, they suggest that calculability as defined isn't necessary for conversational implicatures

even when communication succeeds. Intentionalists about conversational implicatures have raised a further, more foundational concern. According to them, speaker intentions determine the conversational implicatures of an utterance. If this is case, it becomes immediately doubtful that conversational implicatures are always calculable as defined. After all, whether I have e.g. an intention to make you believe something doesn't depend on whether you can work this out (e.g. Hirschberg, 1985: 17–24, Horn, 1989: 232, Davis, 1998: 114–131 and, most recently, Buchanan and Schiller, 2022). More specifically, it doesn't depend on whether you can work this out in a particular way, e.g., by following the Working-out Schema. For obviously, the Working-out Schema is not the only way to access other people's intentions (see e.g. Buchanan and Schiller, 2022: 66). This objection too suggests that calculability as defined isn't necessary for conversational implicatures even when communication succeeds.[3]

More could be said here, but I think there is reason enough to at least consider alternatives to the Gricean definition of calculability.

3   A novel account

According to Gricean accounts of calculability like Calculability$_1$, an implicature is calculable when it can be inferred in a particular way. Let's assume these inferences generate knowledge of what the speaker implicated. These accounts then tie calculability to *how* we can come to know about a putative implicature. On the account I'd like to suggest, calculability is instead defined in terms of *when*—i.e. under which conditions—we can acquire such knowledge.

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[3] In principle, one can respond to the last concern by denying intentionalism, but in the present context, this is not an option. I assume that test criteria for conversational implicatures should work independently of any particular theory of the nature of conversational implicatures.

Calculability₂ A proposition p is calculable in a context of utterance c iff the hearers of c would be in a position to know that the speaker implicates that p even if p didn't belong to the conventional meaning of the utterance of c.[4]

The basic idea is this. To check whether an implicature is calculable, you suppose that it is not part of the conventional meaning of the target utterance. Then you check whether, under this supposition, hearers are still in a position to know the implicature is there. If the implicature is conversational, then they should be because the supposition is true anyway. Meanwhile, if the implicature is not conversational but e.g. conventional, they should no longer be able to know about its presence because they will likely have derived the implicature based on the premise that it is conventionally encoded and, under the given supposition, this premise is no longer available.

I'll illustrate this with examples in minute, but let me begin with some more general remarks. First, consider the counterfactual even-if conditional on the right-hand side of the definition. (i) The "even" can be dropped without loss. I use it only to acknowledge that, if p does belong to the conventional meaning of the target utterance, it is normally trivial that the hearers are in a position to know that p is implicated. (ii) The putative conversational counterfactuality implicature (that the antecedent is false)

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[4] On might worry that the notion of an implicature occurs on the right-hand side of this definition. But this is not in any way revisionary. It also occurs in the concluding sentence of the Working-Out Schema, and it therefore occurs on the right-hand side of traditional Gricean definitions of calculability as well (and I use the term "implicature" in just the way Grice defines it in various places of his work (see above)). Maybe the term shouldn't occur there. That would be a problem for both the Gricean account and mine, and any replacement notion that works for Grice should work for me as well. One may further worry that, on the proposed account, one has to know whether p is an implicature before one can determine whether p is calculable due to the factivity of knowledge. But, first, one doesn't have to know that. If, for instance, one finds that the hearer lacks sufficient evidence that p is an implicature, one can conclude that p is not calculable independently of whether p is an implicature. Second, even if one had to know that, it's not clear why this should be problematic. The calculability test is supposed to help us detect *conversational* implicatures, not implicatures (see, similarly, Grice's (1989: 30–31) "characterization" of conversational implicature as a subclass of implicatures). Finally, one can replace knowledge with justified belief or rational high credence in the proposed definition, and it will still work fine (see also below).

suggested by the counterfactual marking should be understood as contextually cancelled.[5] After all, we typically want to employ the notion of calculability when we haven't settled on whether p belongs to the conventional meaning. (iii) I assume a standard semantics for counterfactual conditionals along roughly the following lines. A counterfactual conditional "if p, then q" is true iff q holds in the nearest possible worlds in which p holds (e.g. Stalnaker, 1968; Lewis, 1973; Kratzer, 1979). (iv) In line with that, I assume that to assess whether a counterfactual conditional is true, we typically suppose (or imagine) that its antecedent is true, adjust related beliefs accordingly and check whether the consequent is then true (e.g. Stalnaker, 1968: 102). To assess whether a proposition p is calculable on the given definition, we should thus suppose that p doesn't belong to the conventional meaning of the target utterance and then check whether the hearers are (still) in a position to know that p is implicated.

Second, consider the antecedent of the indicated counterfactual conditional, which asks us to suppose that p does not belong to the conventional meaning of the relevant utterance. The conventional meaning of an utterance is supposed to comprise everything that is conventionally encoded with this utterance, including propositions semantically expressed, conventional implicatures, semantic presuppositions as well as the entailments of the aforementioned contents. Consider for illustration the contrast conventionally implicated by "but". If we suppose that this conventional implicature is not part of the conventional meaning of a given utterance featuring "but", we suppose that it is neither a semantic presupposition nor a conventional implicature nor the proposition expressed nor an entailment of any of those. We would thus suppose that the sentence in question is semantically equivalent to a sentence that results from replacing "but" by "and".

Notice, on the one hand, that we don't have to be able to tell whether a given proposition belongs to conventional meaning to suppose that it doesn't (this would make the calculability test as defined useless). Analogously, we don't have to know whether a given number is prime to suppose it is prime in e.g., an attempt at a reductio argument. On the other hand, it may sometimes be unclear exactly what

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[5] On the cancellability of the counterfactuality implicature, see e.g. Lewis, 1973: 3; Stalnaker, 1975: 277.

the conventional meaning of an utterance is if we suppose that a given content is not conventionally associated with the utterance in question. Typically, though, those who claim that some implicature is conversational have a theory about the remaining conventional meaning. We should thus suppose that the conventional meaning is as they assume. To make this more precise, we might say that an implicature is calculable *relative to such-and-such assumptions about the conventional meaning of the respective utterance* iff the hearers would be in a position to know the implicature is there if these assumptions were to hold. This definition is more precise, but I will stick with the previous definition for simplicity.

Third, consider the consequent of the discussed counterfactual conditional, which asks us to assess whether hearers are *in a position to* know something under the discussed supposition. Roughly, being in a position to know p is knowing p minus believing p. Thus, being in a position to know p doesn't entail that you believe p, but it does entail that p is true and that you have good evidence for p. A detective, for instance, who has collected sufficient evidence to solve the case, may be in a position to know who perpetrated the crime even if she hasn't put the pieces together.[6] In a sense, then, the above definition ties into the tradition that sees calculations of implicatures as "rational reconstructions" rather than descriptions of real psychological processes (e.g. Blome-Tillmann, 2013: 176–177). To assess whether an implicature is calculable, you must assess whether the hearer's evidence is good enough for knowledge about this implicature. You don't have to assess whether and how they use this evidence to derive the respective knowledge.

To illustrate the presented definition, consider the petrol case again and why the relevant implicature (that the garage is open and has petrol to sell) is calculable on the proposed account. To check whether this implicature is calculable, we suppose that it is not part of the conventional meaning of the utterance in question. Next, we ask whether, under this supposition, the hearers are in a position to know that the implicature is there. On the face of it, they are, because even under the given assumption, they can reason

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[6] Williamson (2000: 95) coined the notion of being in a position to know. For recent discussion, see e.g. Yli-Vakkuri and Hawthorne, 2022.

in the way familiar from Grice: The mentioned garage would be irrelevant if it wasn't open and didn't have petrol to sell. Since the speaker surely aims to make a relevant contribution, she must believe that it is open and has petrol to sell. Since she can see that I can work this out, she implicates this. This reasoning doesn't appeal to any conventional meanings besides what the speaker said and so it should be available to the hearer even under the given supposition.

To further illustrate the definition, consider also why some contents are *not* calculable, starting with the conventional implicature triggered by "but" in the following sentence.

(2)   Jones is a philosopher, but she is down-to-earth.

⤳ There is a contrast between being a philosopher and being down-to-earth.

Suppose this implicature was not a part of the conventional meaning of (2) and thus that we can replace "but" by "and" without semantic effect. Are hearers still in a position to know that the speaker implicated that there is a contrast between being a philosopher and being down-to-earth? It seems that they are not. Under the given supposition, the audience knows that the proposition expressed is that Jones is a philosopher *and* down-to-earth. They also know that "but" (rather than "and") was used to express this conjunction, in line with its supposed semantic content. But none of this suggests that the speaker believes, let alone implicates, that there is a contrast between the first and the second conjunct. Consider also the semantic presupposition of "stopped" in the following sentence.

(3)   Jane stopped smoking.

⤳ Jane smoked.

This presupposition isn't calculable either. Suppose it was not part of the conventional meaning of the utterance of (3). Under this supposition, sentence (3) presumably expresses the proposition that Jane doesn't smoke, while carrying no additional semantic presuppositions. Nothing seems to suggest that the speaker believes or implicates that Jane smoked before.

As for the objections to the Gricean account, Calculability$_1$, they all say that some premise in the Working-Out Schema doesn't necessarily have to be used to work out a conversational implicature. Some

implicature calculations don't rely on an assumption of cooperativity, some implicature calculations don't rely on a prior identification of what is said, etc. More generally, conversational implicatures can be calculated in a whole variety of ways, and there is just no reason to think that these calculations always fit precisely into the Working-Out Schema. None of these objections applies to the present account because this account doesn't require that implicature calculations follows any specific pattern. It only matters that they don't rely on the target proposition being semantically encoded.

Indeed, with calculability as defined, there is a general argument to the conclusion that calculability is a necessary condition for conversational implicatures in cases of successful communication. Assume a speaker conversationally implicates p. The speaker thus implicates p. Assuming conversational success, hearers know what speakers implicate. So, the hearers know that the speaker implicates p, and thus they are in a position to know this. Now conversational implicatures are not part of conventional meaning.[7] So, taken together, hearers are in a position to know that p is implicated, and p does not belong to the conventional meaning of the relevant utterance. This makes the counterfactual "hearers would be in a position to know that p is implicated if p didn't belong to the conventional meaning of the relevant utterance" automatically true. After all, the nearest possible world where the antecedent is true is just the actual world, and in this world, the consequent holds. This means that the implicature is calculable as defined. Since this goes for every conversational implicature as long as communication succeeds, calculability as defined is necessary for conversational implicatures in successful communication.

I assumed that hearers know what the speaker implicates in successful communication, and this may seem overdemanding for various reasons. One worry could be that hearers typically know only roughly what the speaker implicates even when communication succeeds (e.g. Buchanan, 2010). It's unproblematic though to restate Calculability$_2$ in terms of such rough knowledge and to likewise relax our

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[7] There may be semantically entailed conversational implicatures (e.g. Davis, 1998: 6; Bach, 2006). To be more neutral here, one can rephrase the above argument in terms of *mere* conversational implicatures, i.e., conversational implicatures which are not semantically entailed. The cancelability test is typically restricted in the same way (e.g. Blome-Tillmann, 2008: 157n2).

understanding of successful communication. Another worry could be that hearers rarely know what the speaker implicates because knowledge is such a demanding state. To be less committal here, one can unproblematically restate Calculability$_2$ along with our understanding of successful communication in terms of justified belief or rational high credence instead. A further worry could be that since hearers do not possess the technical concept of an implicature, they can never know that anything is implicated. But the notion of an implicature merely summarizes what a speaker implies, suggests or means, and we can replace it with a disjunction of these ordinary notions.

4   Objections and replies

Here is one potential concern with the proposed account of calculability. Calculability should be a necessary condition on conversational implicatures even in cases of unsuccessful communication, while, on the proposed account, it is not. Assuming intentionalism, for instance, the presence of a conversational implicature is determined by speaker intentions. It is possible to have the relevant intentions while not making them transparent in any way (thereby failing to communicate successfully). Thus, it is possible to conversationally implicate p while your audience is not in a position to know that you implicated p under any relevant supposition.

To respond, I doubt that calculability must be a necessary condition on conversational implicatures in cases of unsuccessful communication. Recall that my aim here is to develop a notion of calculability that is useful as a test criterion for conversational implicatures, and a test criterion can be useful even if it works only in a limited domain. Indeed, when conversational implicatures are posited to explain puzzling data and test criteria for conversational implicatures are required, the relevant cases usually feature successful communication and unsuccessful communication is irrelevant.[8] To be sure, an account that makes calculability necessary in both successful and unsuccessful communication would be preferable

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[8] See the references in footnote 1, and consider e.g. the notorious "bank cases" in epistemology.

to mine, other things equal. But such an account is not on the horizon. Calculability$_1$, for instance, fails in cases of both successful and unsuccessful communication.

One could now argue that, to be useful as a test criterion, a definition of calculability doesn't even *have to* satisfy the initially presented necessity desideratum for successful communication. For instance, a rough heuristic can be useful too, and Calculability$_1$ may satisfy this desideratum. That may be right, but like before, an account of calculability that yields more than a rough heuristic is preferable, and so Calculability$_2$ remains preferable to Calculability$_1$.

Here is a second concern. Calculability should be a sufficient condition for the presence of a conversational implicature, while, on the proposed account, it is not. When a proposition p is calculable on the proposed account, hearers are in a position to know that p is implicated even assuming that p is not semantically encoded. Given the factivity of knowledge, this is arguably so only if p is in fact implicated. But nothing guarantees that p is conversationally implicated. Based on this general observation, several specific counter-examples may come to mind including politeness-based implicatures (e.g. Grice, 1989: 28), recently conventionalized implicatures (e.g. Grice, 1989: 43; Sadock, 1978) and implicatures about basic requirements on cooperative communication such as that the speaker believes what she says (e.g. Grice, 1989: 41–42).[9]

One line of response would be that, at least in the specific examples given, the relevant contents are conversational implicatures after all (see e.g. Levinson, 2000: 105; Huang, 2007: 27 on basic cooperativity requirements and e.g. Zakkou, ms on the possibility of conventional conversational implicatures).

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[9] One may also worry about cases where a speaker implicates something due to their intentions and where the hearer can recover these intentions only because a computer screen reliably displays the speaker's intentions. The implicature is calculable on my view but one may balk at the conclusion that it must be conversational. Similar worries, though, arise for the Gricean account already. Suppose, in addition, that the premises of the relevant instance of the Working-Out Schema are true while the hearer has no way of figuring this out except through another computer screen that reliably displays relevant instances of the Working-Out Schema whenever the respective premises are true. Now the implicature is also calculable on the Gricean account, but it's still not clear that it must be conversational.

Another line of response would be to tweak the proposed account (e.g. by copying Grice's non-triviality requirement; see e.g. Grice, 1989: 41–42; Grandy, 1989: 522; Sander, 2021: 1535–1537). While at least some of these response strategies seem promising, I will not pursue them here and grant that calculability as defined is not sufficient for conversational implicatures. Once more, though, I doubt that it must be. We are looking for a useful diagnostic for conversational implicatures, and calculability can be useful in this way even if it is only necessary for the presence of conversational implicatures (in successful communication, I take this to be understood in the following). A necessary condition on conversational implicatures can allow us to detect that something is not a conversational implicature. This is useful even if we can't detect that something is a conversational implicature. As before, an account that makes calculability sufficient for conversational implicatures would be preferable to mine, other things equal. But also as before, no such account has been offered in the literature. For instance, Grice (1989: 43) himself concedes that calculability as he defines it is not sufficient for conversational implicatures, and many further authors have pressed him on this point (e.g. Sadock, 1978: 285–287; Davis, 1998: 27–32). In addition, other things are not equal here: unlike Calculability$_2$, Calculability$_1$ does not provide a necessary condition for conversational implicatures.

To be sure, a necessary condition of conversational implicatures allows us to detect that something is not a conversational implicatures (and is therefore useful) only if it is an interesting necessary condition, that is, a necessary condition that some things fail to satisfy. But calculability as defined is an interesting necessary condition in this sense. As we've seen, typical cases of conventional implicatures and semantic presuppositions are not calculable on the proposed account.

5   Conclusion

Unlike familiar Gricean accounts, the proposed account of calculability provides a useful test criterion for conversational implicatures. More cautiously, it provides a *more useful* test criterion than the original Gricean account because calculability comes out as more tightly linked to the presence of conversational implicatures.

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