A Puzzle About Anti-Factives

ABSTRACT: *The starting point for this article is Holton's (2017) claim that there are no anti-factive attitude verbs (in Indo-European languages). In a first step, I argue that the German verb "wähnen" (as used by Frege and his contemporaries) is a counter-example. However, it seems as though anti-factives are rarer than factives, which raises the question of how to account for that observation. Since Holton's explanation, as well as a seemingly promising neo-Gricean explanation, turns out to be unsuccessful, I turn to the question of whether the rarity of anti-factives needs to be explained in the first place. I argue that, on closer inspection, anti-factives are not as special as they may appear, and I also argue that the comparative rarity of anti-factives can be explained via the principle of charity.*

1 Introduction

Verbs such as "notice" or "know" seem to differ from other attitude verbs, such as "believe" or "assume", in that sentences containing them entail the truth of the complement clause. By uttering "John knows that pigs do not have wings" (Chierchia & McConnell-Ginet 1990: 22), one is, arguably, committed to its being the case that pigs do not have wings. Since the early 1970s, such verbs have been called "factives".

Assuming that factive verbs are not a mere "myth" (cf. Hazlett 2010), the question arises whether there are also anti-factives, i.e. items that entail the falsity of the embedded clause. The answer to that question depends on what a genuine anti-factive is supposed to be. Consider verbs such as "mistake" or "pretend". The sentence "Dr P. mistook his wife for a hat" (modelled on Oliver Sacks's almost homonymous book) clearly implies that Dr P.'s wife is, or was, not a hat, and by uttering "Homer is pretending to be Mr. Burns's mother" you are committing yourself to the assumption that Homer is in fact not Mr. Burns's mother. But at least in English there seems to be no verb that takes a that-clause as complement and that is related to falsity in exactly the same way that "know" is related to truth. We shall see that the same is true for many other languages.

This lexical gap may seem philosophically unexciting. However, some scholars have argued that the paucity of anti-factives has notable repercussions for epistemology and related disciplines. First, Holton (2017) has claimed that the lexical gap teaches us something important about the entities that some of our mental states are directed at: while belief is a relation between an agent and a proposition, knowledge is a relation between an agent and a fact. And according to

Unger, the rarity of anti-factives indirectly supports the radical view that we do not know anything. Unger (1975: 167) claims that putative examples of anti-factives (such as "pretend", "misbelieve" or "fancy") "do *not entail* the negation of their completing clauses but only do so much as *suggest* that these negations hold", whereas cognitive or emotive factives such as "notice" or "regret" entail the truth of the complement as well as knowledge on the ascribee's part (Unger 1975: 158–162). This supposed contrast between factives and anti-factives is part of a convoluted argument in favor of a radical kind of skepticism to which I cannot do justice here. Suffice it to say that if Unger is wrong about the existence of anti-factives, we would have a reason to resist some of his skeptical conclusions.

Now both Unger and Holton seem to waver between two claims. For instance, Holton (2017: 245) says on the one hand that there are "no clear examples" of anti-factives in any Indo-European language, but on the other hand he argues that some putative anti-factives from non-Indo-European languages may not be "truly contrafactive" (2017: 263), thereby suggesting that there are no anti-factives whatsoever. And in line with this suggestion, Strohmaier and Wimmer (2023: 67) have argued that Holton "has drawn attention to a novel semantic universal".

But is it an actual universal? One of the aims of this article is to show that there is *at least* one counterexample to such a claim, namely the German verb "wähnen". However, I still think that Holton was onto something important. There are anti-factives, but they seem to be significantly rarer than factives, both intralingually and interlingually. This is puzzling since the paucity of anti-factives is in obvious tension with their usefulness. Consider an example due to Dennett (1978: 569):

> Very young children watching a Punch and Judy show squeal in anticipatory delight as Punch prepares to throw the box over the cliff. Why? Because *they know Punch thinks Judy is still in the box*. They know better; they saw Judy escape while Punch's back was turned. We take the children's excitement as overwhelmingly good evidence that they understand the situation – they understand that Punch is acting on a mistaken belief (although they are not sophisticated enough to put it that way).

Dennett's example is supposed to illustrate an idea that has played an important role in cognitive science: the best criterion for whether an animal (including humans) has a "theory of mind" is that its behavior is evidence that it ascribes *false* beliefs to other animals. So we not only routinely ascribe false beliefs to others in order to explain what they are doing. The very ability to do so seems central to fully understanding the mind of others, and if that is the case, then the rarity of anti-factives becomes even more puzzling. First of all, if there were an English anti-factive (in what follows, I shall use Holton's (2017: 250) fictitious verb "wrongthink"), we could express the reason for the children's delight in a more concise way. Instead of saying "They know Punch thinks Judy is still in the box and know that Judy is not in the box", we could simply say "They know that Punch wrongthinks that Judy is in the box."

Moreover, there is also empirical evidence that the anti-factive verbs that do exist in some Chinese topolects offer an actual cognitive advantage. Using anti-factives "in false-belief tasks improves the performance of Chinese children relative to using more neutral verbs." (Liu et al. 2008: 528). But anti-factives are not only useful for explaining why someone did what they did; they also have or would have a more straightforward polemical function. When someone is wrong (on the internet or elsewhere), an anti-factive may come in handy ("Hey everybody, this guy wrongthinks that a hot dog is a sandwich").

So the rarity of anti-factives needs to be accounted for, and in what follows I will discuss several possible ways of doing that. In Section 2, I take a closer look at Frege's example "wähnen". In Section 3, I turn to Holton's explanation for the alleged non-existence of anti-factive attitude verbs. I argue that his explanation, though ingenious, is ultimately inconclusive, and a seemingly promising neo-Gricean explanation will turn out to be deficient as well. In the final section, I discuss two potentially problematic assumptions Holton makes, thereby showing that anti-factives are not as special as Holton thinks. And I will also argue that the scarcity of anti-factives is best explainable by the assumption that our attitude to our fellow human beings is generally a spirit of trust, not of distrust.

2 German "wähnen" as a Counterexample

In this section, I will argue that German "wähnen" is indeed a counterexample to Holton's claim that there are no anti-factives, at least not in any Indo-European language. But before coming to that, it is important to note that the term "factive" is used in two ways. Many scholars, particularly linguists, restrict the notion of factivity to presupposition triggers. According to this usage, a word cannot be factive unless it carries a projective content: for instance, "know" is factive since not only "A knows that p", but also "A doesn't know that p" and "Does A know that p?" imply that p is the case. (This test is known as the "family of sentences" diagnostic; cf. Chierchia & McConnell-Ginet 1990: 281.) Some other scholars, especially philosophers, employ the notion of factivity in a more generous way. For instance, when Williamson characterizes knowledge as the "most general factive mental state", he is not in the slightest concerned with the projection behavior of "know". That a mental state operator Φ is factive simply means "that the form of inference from 'S Φs that A' to 'A' is deductively valid" (Williamson 2000: 34). (Quite a few scholars prefer the term "veridical" here; see, e.g., Anand & Hacquard 2014).

Since I am concerned here with *anti*-factives I should point out that I will use this term according to the latter usage. Crucially, this is not just a terminological issue. Anti-factivity is an underexplored area of research, both empirically and theoretically, and so we don't know very much about the projection behavior of some anti-factives that do exist. More importantly, most of the well-documented anti-factives are *not* clear-cut examples of presupposition triggers. For instance, the anti-factives that exist in Taiwanese Southern Min and Mandarin Chinese are not negatable (Hsiao 2017: 11–12, Glass 2023: 12), which means that the standard test for presupposition cannot be applied to them.

Another problem arises with the Spanish reflexive verb "creerse". An utterance of

(2.1) Juan se cree que está lloviendo. (Juan REFL believes that it is raining.)

"naturally implies … that it is in fact not raining" (Anvari et al. 2019: 57). Now if "creerse" were a presupposition trigger, then the negation of (2.1) would also have to imply that it is not raining, but it's the other way round: the negation of (2.1) conveys that it is raining.

German "wähnen", which is the topic of this section, presents yet another problem. In the corpora (https://www.dwds.de/d/k-referenz), there are almost no negated occurrences of that verb. And the few examples that can be found are almost exclusively imperatival (along the lines of "Do not wrongthink that …!"). Moreover, the informants I have consulted found negated occurrences odd and hard to interpret, though not ungrammatical.

Finally, consider the verb "pretend", which is often taken to be one of the most plausible examples of an English anti-factive (see, e.g., Rosenberg 1975: 110). According to Lakoff (1970: 177), the sentence

(2.2) Irv is not pretending that he is sick.

is subject to an interesting kind of dialectal variation: for speakers of "Dialect B", (2.2) presupposes that Irv is not sick; for speakers of "Dialect A", (2.2) does not.

So the interaction between negation and anti-factives is a vexing issue, and it is also far from clear how many anti-factives are presupposition triggers. This is the first reason why I will largely focus on unembedded occurrences in what follows. The second reason has to do with Holton's notion of an anti-factive (or, in his words, "contrafactive") verb, which is directly modelled on Williamson's non-presuppositional notion of a factive mental state operator. Though Holton (2017: 256–260) argues that the relation between a factive sentence and the truth of its complement ought to be construed in terms of presupposition, his official notion of anti-factivity is non-committal in this respect: "contrafactives" are verbs that "semantically entail or presuppose" (2017: 246) the falsity of the complement.

Let us now take a closer look at Frege's classical example of an anti-factive verb. Towards the end of his "Über Sinn und Bedeutung", Frege claims that some clauses, when being "connected" with others, express more than they would do in isolation. His key example of this phenomenon features the word "wähnt", which is the third-person singular of the infinitive "wähnen":

Let us now consider cases where this regularly happens. In the sentence
'Bebel fancies [wähnt] that the return of Alsace-Lorraine would appease France's desire for revenge'
two thoughts are expressed, which are not however shown by means of antecedent and consequent clauses, viz.

(1) Bebel believes that the return of Alsace-Lorraine would appease France's desire for revenge;

(2) the return of Alsace-Lorraine would not appease France's desire for revenge. (Frege 1892: 47–8, 1997: 168)

In Black's translation, German "wähnt" is rendered as "fancies". Was that a good choice? On Holton's (2017: 246) view, the answer is no:

> Clearly 'fancy' doesn't really require the falsity of the complement: one can fancy something to be the case that turns out to be true. At most there is some kind of conversational implicature that what is fancied to be true is in fact false, an implicature that can easily be cancelled.

This remark is an example of Holton's overall strategy of explaining away putative counterexamples by showing that they are not anti-factives proper. More specifically he argues, here and elsewhere (cf. Holton 2017: 247, 263), that conversational implicatures may create the illusion that an ordinary attitude verb is an anti-factive. But it is not at all clear whether implicatures may come to the rescue here. It may or may not be true that doxastic verbs such as "believe" generally implicate the falsity of the complement (more on which in the next section), but the counterexamples discussed by Holton seem to be more robustly anti-factive than ordinary doxastic verbs. Accordingly, Holton would have to show why, say, the Spanish reflexive verb "creerse" is more likely to be misunderstood as an anti-factive than the ordinary verb "creer" (*believe*). It doesn't seem likely that this fact might be explained in terms of conversational implicatures.[1]

It is also far from clear that Holton's lexical claim about "fancy" is correct. Consider a particular occurrence of that verb. Towards the end of Oscar Wilde's *The Picture of Dorian Gray* (Chapter 10), Basil Hallward visits Dorian in order to inquire about the "most dreadful things" that he heard being said about Dorian. Being uncertain whether the rumors are true, Basil deplores not being able to see Dorian's soul, which only God could do. Dorian replies as follows: "I shall show you my soul. You shall see the thing that you fancy only God can see." The point of Dorian's utterance seems clear: Basil is wrong in assuming that only God can see his soul. Now one might claim of course that "fancy" simply means something like "believe" here, but it is far from evident that this is the most fitting interpretation. According to the OED (online version), "to fancy" may mean (among other things) "to believe without being able to prove". On such a reading, "fancy" is clearly not an anti-factive verb, but it differs crucially from ordinary doxastic verbs such as "think". More importantly, the current online edition of the Merriam-Webster glosses "to fancy" as "to believe mistakenly or without evidence", the left disjunct of which is almost indistinguishable from Frege's analysis of "wähnen". Perhaps, "fancy", as used by Dorian Gray (or Oscar Wilde), does have (roughly) the same meaning as "wähnen".

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[1] Could this be an example of manner implicature? I do not think so. The only submaxim that might be relevant here is "Be brief (avoid unnecessary prolixity)" (Grice 1989: 27), but German "wähnen" isn't more prolix than the more neutral verb "glauben" (believe). And the same goes for the opposition between Mandarin *yǐwéi* and *rènwéi* (see below).

But Holton's main point is not that Black made a mistake; his point is, rather, that Frege himself may have been wrong about the actual content of "wähnen". On Holton's (2017: 249) view, the non-existence of anti-factives in contemporary English, Spanish, French, and German "gives further reason for being sceptical of Frege's account of 'wähnen', even for nineteenth-century German". To some extent, I would agree with Holton, for a reason Frege himself has noted. In his "Über Sinn und Bedeutung", Frege discusses the overall content of the sentence

>   (2.3) Napoleon, who recognized the danger to his right flank, himself led
>   his guards against the enemy position.

On Frege's view, it is clear that (2.3) somehow conveys the thought that Napoleon's recognition of the danger was his reason for leading his guards against the enemy position. What is for him far from clear is whether that additional thought is actually expressed or only "slightly suggested" (1892: 47, 1997: 168). And the reason for his doubt has to do with the mechanism by means of which such "side-thoughts" (*Nebengedanken*) are conveyed (cf. Sander 2021: § 3). Frege maintains that side-thoughts are automatically associated with the thoughts we express, "in accordance with psychological laws" (1892: 46, 1997: 168). As a consequence of that automatism, a mere side-thought may appear to be "the main-thought itself". Such confusions are especially prone to happen when language changes: "A thought which to begin with was only suggested by an expression may come to be explicitly asserted by it. And in the period in between different interpretations will be possible" (Frege 1897: 152–153, 1997a: 241).

Now if all of that is essentially correct, then Frege himself may have been the victim of a semantic illusion. In the case of "wähnen", he may have mistaken a mere suggestion for a semantic content. And it is easy to see why such a confusion may arise here: doxastic verbs such as "believe" will often be understood along the lines of "believes, but doesn't know", which raises the general question of how to distinguish between suggested and encoded contents.

In current linguistic theory, there is a familiar test that goes back to Grice (1961: 128–129): mere suggestions (such as conversational implicatures) are cancellable, whereas inferences of a more robust nature (be they entailments or conventional implicatures) are uncancellable:

>   (2.4) # Bart is a bachelor and has been married for five years now.
>   (Entailment)
>   (2.5) # Paula is poor but honest, and there is not the slightest contrast
>   between poverty and honesty. (Conventional implicature, carried
>   by the adversative "but")
>   (2.6) Sid ate some of the cookies, indeed he ate all of them. (Generalized
>   conversational implicature, cancelled by the continuation)

While sincerely uttering either (2.4) or (2.5) would betray a severe lack of linguistic competence, sentence (2.6) is perfectly felicitous. So, in order to find out whether "wähnen" merely suggests the falsity of the complement, it seems as though we

simply have to ask native speakers of German whether sentences of the following sort are semantically anomalous:

(2.7) A wähnt, dass *p*, aber *p*. (A wrongthinks that *p*, but *p*)[2]

When asking German native speakers about sentences such as (2.7), one obtains results that are, unfortunately, fairly inconclusive: some people find them acceptable, and some others do not. (We shall later see, in Section 4, that this is exactly what is to be expected.) But even if the results were more clear, they would not really address the issue raised by Holton. Holton maintains, after all, that Frege's account may be wrong "even for nineteenth-century German" (2017: 249). Since the usage of "wähnen" may have changed over the last century, the key question is not "What does 'wähnen' mean today?", but rather "What did 'wähnen' mean around 1890?" Fortunately, there is a wealth of clear evidence on this issue.

First of all, there are some contemporary dictionaries that clearly support Frege's analysis. The (monolingual) *Deutsches Wörterbuch* features an entry on "wähnen" that was originally published in Frege's lifetime (1905). The entry distinguishes several usages, one of which is glossed as "wrongly assume" (*falsch annehmen*). A bilingual dictionary from around the same time, the *Muret-Sanders* (*Hand- und Schulausgabe*, 14th ed., 1910) attests essentially the same usage: one of the meanings of "wähnen" is rendered there as "to think (*or* believe) erroneously *or* mistakenly *or* wrongly". (Interestingly, this usage disappeared from later editions of the same work. According to the 1983 edition of *Der Große Muret-Sanders*, "wähnen" simply means "imagine", "believe" or "think").

Carnap's *Meaning and Necessity* is the next piece of evidence. In his discussion of Frege's account of indirect speech, he mentions Frege's now familiar example:

> Frege takes as an example a sentence 'Bebel wähnt, dass …', that is (writing 'A' as an abbreviation for a long subsentence), 'Bebel has the illusion that A', or 'Bebel believes erroneously that A'. Frege interprets this sentence, no doubt correctly, as 'Bebel believes that A; and not A'. (Carnap 1947: 132)

Carnap is not convinced by Frege's idea that, in such cases, "one occurrence of a sentence has simultaneously two different nominata" (Carnap 1947: 132), but he takes Frege's interpretation of the sentence not only to be correct, but to be *undoubtedly* correct.

My final piece of evidence is a 1957 book by the German philologist Heinrich Götz. The book is concerned with several key notions of medieval German poetry, one of which is Old High German "uuân", the predecessor to the nominal

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[2] Note that this test is, for the reason just mentioned, insensitive to the difference between entailment and conventional implicature. Now the very notion of conventional implicature is highly contested (see, e.g., Grice 1989: 25-26, Bach 1999, Potts 2005, Horn 2013, Sander 2022), and I cannot clear up that theoretical muddle here. So in what follows, I am relying only on the more or less uncontested distinction between cancellable and non-cancellable contents.

counterpart of "wähnen". According to Götz, "uuân" has two (non-factive) core meanings, corresponding to Latin "spes" and "opinio" (*hope* and *belief*), but it may also correspond to Latin "falsa opinio" (*false belief*). For present purposes, the crucial point is that Götz explicitly warns against assuming that Old High German "uuân" *generally* means "false belief" – a view he takes to be influenced by the usage of "wähnen" current in his lifetime (Götz 1957: 133). So even in the middle of the last century, the usage analyzed by Frege still seems to have been common.

Summing up, Holton (2017: 249) *may* be right that there are "no contrafactive mental state operators in English" and that "the same appears to hold true of contemporary Spanish, French and German", but as far as "nineteenth-century German" is concerned, he seems to be wrong. Since there are, apart from Frege himself, four other sources that clearly attest such a usage, I would tentatively conclude that there is, or was, at least one anti-factive attitude verb.

This is an important result since both Holton (2017: 250–251, 262–264) and Strohmaier & Wimmer (2023) have argued that the examples of anti-factives that occur in the literature are not anti-factives proper (at least not in Holton's demanding sense, more on which in Section 4). An instructive example is the Mandarin verb *yǐwéi* (cf. Holton 2017: 263; Strohmaier & Wimmer 2023: 70), which on all accounts "implies that the proposition following the verb is not true" (Li 2024: 3). However, as Glass (2023: 7) has recently stressed, this "implication" "behaves like a conversational implicature" in that it can be both reinforced and cancelled. So even though *yǐwéi* "strongly suggests" (Glass 2023: 21) the falsity of the complement, it is arguably not a genuine anti-factive. Accordingly, German "wähnen", as used by Frege and his contemporaries, may be one of the very few uncontroversial examples of an anti-factive attitude verb. (This is precisely the reason why Holton suggests that Frege fell prey to a semantic illusion.)

3 Explaining the Rarity of Anti-factives

If Frege, Carnap and some other authors are right, then "wähnen" was used as an anti-factive attitude verb. Since the 19th and early 20th century German is (a time-slice of) an Indo-European language, Holton's claim that there are no anti-factive propositional attitude verbs in any Indo-European language is, arguably, incorrect. However, as Strohmaier & Wimmer (2023: 68) have rightly underscored, Holton may have a point even if there are a few counterexamples; there would still be "an asymmetry between factives and contrafactives" in that "factives would be abundant, contrafactives scarce".

Is there an explanation for this observation? On Holton's view, we can account for it by making two assumptions. The first assumption is that there is a crucial asymmetry between epistemic (factive) and doxastic (non-factive) verbs: while knowledge is a relation between an agent and a fact, belief is a relation between an agent and a proposition. The second assumption is this: "if there were any contrafactives, the referents of their complement clauses would be of the same type as the referents of the complement clauses of factives" (2017: 251), which means that there couldn't be anti-factives unless there were anti-facts. More precisely, a language

containing anti-factives would be committed to the existence of anti-facts, even if there are, in fact, no such things (cf. Holton 2017: 262–263).

Does the reluctance to assume the existence of these rather odd entities—anti-facts—explain the rarity or even non-existence of anti-factives? I don't think so. Holton's argument essentially involves "an assumption of similarity of domain for factives and contrafactives" (2017: 251). But Frege's analysis of "wähnen" shows this assumption to be questionable (see also Hyman 2017: 271–272). If Frege is right, then "wähnen" essentially contains a *belief* predicate: by using it, one ascribes a belief to someone (which is just a relation between a person and a proposition) and at the same time declares the content of the belief to be false. The ontological commitments associated with anti-factives, then, do not appear to be odder than those incurred by ordinary belief reports, and so we need a better explanation for the rarity of anti-factives.

A possible explanation might proceed along Gricean lines. Neo-Griceans such as Horn and Levinson have long argued that the Gricean mechanism of conversational implicature not only explains how things such as innuendos work; it may also explain certain lexical phenomena. For example, quite a few languages have a word (or a pair of words) for the NOR function, i.e. "not (p or q)". English "neither … nor …" is an example. But curiously, no language seems to have a word for the dual NAND function (aka "Sheffer stroke"), i.e. "not (p and q)". The neo-Gricean explanation for this gap makes use of so-called Horn scales, which are a means of representing the relative informational strength of certain sentences. For instance, the fact that "p and q" is informationally stronger than "p or q" can be represented by the scale <and, or>.

One of the key ideas of Gricean pragmatics is the assumption that speakers are expected to make their contribution "as informative as is required" (Grice 1989: 26) and that implicatures may arise when that requirement does not seem to be met. Now disjunctions are generally not particularly informative, and for that reason, an utterance of "p or q" typically generates the scalar implicature that, for all the speaker knows, "p and q" is not the case. In other words, choosing the weaker item on the scale <and, or> pragmatically conveys that the stronger item does not apply. But if that is true, then there is no need for a dedicated NAND operator. If you want to convey a content involving the NAND function, you can simply utter a disjunction (cf. Horn 2001: 258–259). More generally, the non-existence of a particular lexical item can be explained as follows: "If the use of a lexical item w carries a generalized conversational implicature I, then *ceteris paribus* there will be no lexical item x that directly encodes I" (Levinson 1983: 163).

Specifically as to anti-factives, one might argue that anti-factives are superfluous because by employing an ordinary doxastic term one somehow already implicates the falsity of the belief. Such an explanation is suggested (though not fully embraced) by Anvari et al. (2019). Their article is concerned with the reflexive believe construction in Spanish, which generally implies that the complement clause is false. They note that this observation may appear "underwhelming" since "the same inference is often triggered by run-of-the-mill belief reports" (2019: 58). Now if the sentence

>   (3.1) Juan believes that it is raining. (Anvari et al. 2019: 58)

generally carried the implication that it is not raining, then we would indeed have an elegant explanation for why dedicated anti-factives are superfluous or, in any event, not particularly useful: if you want to convey that A wrongly believes that *p*, then you simply ought to utter "A believes that *p*".

But do belief reports really carry such an implication? There are two mechanisms which might be relevant here. First, one could argue that the implication essentially involves a scalar implicature. If, as is often assumed, <know, believe> is a Horn scale (Grice 1989: 52; Levinson 2000: 110), then uttering (3.1) would generally implicate

>   (3.2) Juan doesn't know that it is raining.

And in a second step, one could argue that belief plus lack of knowledge is most likely to be understood as lack of truth.

The second mechanism one could invoke here (cf. Anvari et al. 2019: 58) is known as "Maximize presupposition!": "Presuppose as much as possible in your contribution!" (Heim 1991: 515). This maxim is, as Heim notes, reminiscent of scalar implicatures. When using the non-presuppositional verb "believe" instead of the presupposition trigger "know", one would thereby imply that the content which the ascribee believes is not part of the common ground (cf. Sauerland 2008: 586; Schlenker 2012: 393).

Can we explain the rarity of anti-factives by one of these two mechanisms? It seems not, for two reasons. The first reason is straightforward: it is simply not true that doxastic verbs robustly implicate the falsity of the complement. We routinely ascribe beliefs to other persons without thereby suggesting that they are mistaken. An example by Levinson (2000: 110) illustrates this point:

>   (3.3) The doctor believes that the patient will not recover.

An utterance of (3.3) clearly does not convey (at least not in typical cases) that the patient will recover. If one knew the doctor to be wrong, uttering (3.3) would not make much sense. The most plausible interpretation of (3.3) seems to be that the doctor's opinion is a kind of educated guess, which despite falling short of knowledge is worth hearing.

Worse still, belief reports sometimes suggest, not the falsity but the truth of the complement, especially if the interlocutors take the ascribee to be an authority on a certain issue (cf. Simons 2007; Chemla 2008: 158–160; Glass 2023: 2–3). If Sam is known as an expert on Central American Pottery, then uttering

>   (3.4) Sam believes that this is an Aztec potsherd.

may convey that the demonstrated object is indeed an Aztec potsherd. Accordingly, belief reports do not generally implicate the falsity of the complement. But that would have to be the case in order for the neo-Gricean explanation to work at all.

The second reason is that it is not even clear whether a neo-Gricean explanation can account for those cases where belief reports do carry an anti-factive implication. Consider an example due to Chemla (2008: 141):

> (3.5) John believes that I have a sister.

(3.5) carries a strong suggestion that the speaker does not have a sister. However, Chemla has argued in detail that such an interpretation of (3.5) cannot be accounted for solely in terms of either scalar implicatures or the maxim "Maximize presupposition!". We rather have to make some additional assumptions specific to this case: most notably, that people generally know whether they have a sister or not (Chemla 2008: 157).

To sum up: the neo-Gricean idea is that dedicated anti-factives are superfluous in that their job is already done by ordinary doxastic verbs. We have seen, however, that the implicatures carried by belief ascriptions are far more context-dependent than those carried by standard examples of generalized implicatures. A disjunction "p or q" robustly implicates "not both p and q", but sentences of the form "A believes that p" do not robustly implicate that p is false. Accordingly, anti-factives are a useful enrichment of the expressive resources of a language.

Moreover, there is something more fundamentally wrong with the claim that anti-factives are non-existent (or rare) because they are superfluous. For this claim immediately raises the question: "Superfluous for what?". Neo-Gricean explanations for lexical phenomena are ultimately based on expressive economy. For instance, neo-Griceans have argued (see above) that natural languages do not have a NAND operator because it is superfluous for the purposes of mundane communication. However, a NAND operator is rather useful for logical purposes.

But even when disregarding technical terms such as logical operators, we shouldn't construe "economy" too simplistically. Language is, as Leech (1983: 68) reminds us, not "limited to efficient, but pedestrian transactions"; sometimes we are rather "concerned with effectiveness in a broad sense which includes expressive and aesthetic aspects of communication".

Frege's "politically tinted" (Sundholm 2001: 63) Bebel example is instructive in this respect since it is in a sense expressive. Especially as used by Frege, "wähnen" seems to have a polemical function: by simultaneously ascribing a belief to a person A and declaring its content p to be false, one diminishes A's epistemic authority, at least as far as the issue p is concerned. The notions of truth and falsity have, as noted by Ogden and Richards (1946: 151), "evocative" uses too: just as indicating that somebody holds a true belief may "excite attitudes of acceptance or admiration", so indicating the falsity of a belief may "excite attitudes of distrust or disapprobation". So even if a dedicated anti-factive were, in a certain sense, as superfluous as a NAND operator, it might serve an expressive function that would justify adding it to the vocabulary of a language.

4 Two Problematic Assumptions

So far, I have discussed two explanatory strategies. Holton's explanation for the non-existence of (Indo-European) anti-factives is based on the idea that by employing

such terms one incurs a commitment to ontologically odd entities. And the neo-Gricean explanation for the comparative rarity of anti-factives has it that anti-factives are superfluous because ordinary belief reports implicate the falsity of the complement. Both explanations turned out to be unsuccessful, so perhaps we ought to take a step back and ask ourselves whether we tried to explain something which does not need to be explained in the first place.

To some extent, I think that this is indeed what has gone wrong. Anti-factives are comparatively rare, but they are not as rare as some scholars have assumed. More specifically, there are at least two problematic assumptions that may have led us astray. The first problem is an unduly restrictive notion of anti-factivity. Here is how Holton characterizes anti-factives:

> [i] A suitable contrafactive would need to express a mental attitude […]; [ii] the attitude would need to be to something expressed by a sentential complement, i.e. by a that-*clause* […]; [iii] the attitude would need to be a mental *state* […]; [iv] and the verb would need to be unanalysable, not built up out of simpler parts […]. (Holton 2017: 246, numerals added)

An analogy may help to see the problem. Some people see themselves as rational consumers, and when thinking about buying a new product, they start with collecting as much information as possible, often to the point of being overinformed, and then prepare an extensive list of all the features the new product ought to have. Frequently, this seemingly rational behavior leads into a quagmire: in spite of there being a plethora of available products, one may end up realizing that there is not a single product that meets all one's criteria at once. In such a predicament, even a slight relaxation of one of the criteria can be helpful.

Similar things could be said about Holton's account. He uses Williamson's (2000: 34) specific notion of "factive mental state operators" (FMSOs) as a shopper's guide and concludes that there are no anti-FMSOs (cf. Holton 2017: 250). Now there may be indeed very few (if any) words that meet all four conditions at once, but once we employ a slightly broader notion of anti-factivity, there will be numerous anti-factives in English. (Holton (2017: 249) concedes that some of his conditions may seem arbitrary.)

First of all, there are plausible examples of anti-factives that do not meet any of Holton's conditions, counterfactual conditionals being an obvious example: "If iron were less dense than water, it would float on water" (Frege 1892: 48, 1997: 170) clearly implies that iron is *not* less dense than water. And even though none of Holton's conditions are met, counterfactuals are (as suggested by the very term) anti-factives (cf. Lakoff 1970: 177). More radically, one might even claim that "all nonindicative moods such as the optative and imperative" (Giannakidou & Mari 2021: 48) are examples of anti-factivity.

Let us now consider some examples that are mental attitude verbs. First, verbs such as "misjudge" or "misestimate" are anti-factive but do not meet condition [ii]. Next, consider the sentence

(4.1) Macbeth is hallucinating that there is a dagger.

Since "hallucinate" can occur in the progressive, thereby differing from "know", it does not meet Holton's requirement [iii], but apart from this it seems to be a quintessential example of an anti-factive. Finally, when disregarding condition [iv], phrases such as "foolishly believe" (Lehrer 1975: 240) and "be under the illusion" would count as anti-factives too. Note that the latter item even seems to qualify as a presupposition trigger. (Thanks to a reviewer for drawing my attention to this.) Both the negated and the unnegated version of

> (4.2) He is {not} under the illusion that Jane Austen's oeuvre constitutes the Country Diary of a Regency Lady. (https://www.lrb.co.uk/the-paper/v07/n02/brigid-brophy/woman-in-love.)

imply that Jane Austen's oeuvre does not constitute the Country Diary of a Regency Lady.

It is also worth pointing out that Holton's condition [iv] may be unduly restrictive especially with respect to some non-European languages. One could argue that the Mandarin verb *yǐwéi* isn't an anti-factive proper since it is made up of two syllables, each of which has an independent meaning. But then one would have to say that *zhīdào*, a disyllabic Mandarin verb which means "to know", is not a factive either. Why should it matter how many morphemes or lexemes one needs in order to express a certain notion?

The second problem is Holton's assumption that factives differ from (alleged examples of) anti-factives in terms of "robustness". On Holton's view, words such as "fancy" at best carry a cancellable implicature that the complement is false. Factives, in contrast, "do require the truth of their complement clauses in some robust, non-cancellable way" (Holton 2017: 246). Holton, moreover, assumes that this truth requirement applies not only to freestanding sentences ("A knows that p"), but also to cases where factives occur in the scope of an entailment-cancelling operator ("A doesn't know that p"). In other words, factives both entail and presuppose the truth of the complement; alleged examples of anti-factives, in contrast, neither entail nor presuppose the falsity of the complement. But is the factivity of factives as robust as Holton assumes?

The main focus of this article is, for the reasons outlined at the beginning of Section 2, the question of whether anti-factives entail the falsity of the complement clause. However, since Holton assumes that there is a contrast between factives and anti-factives in terms of both entailment and presupposition, it is worth taking a brief a look at embedded occurrences of factives here.

It is generally assumed that presuppositions are cancellable in certain contexts. For instance, by uttering "John doesn't know that Bill came" (Levinson 1983: 186) one presupposes that Bill came; by uttering "I don't know that Bill came" one does not. This observation raises the question of whether some presuppositions are more easily cancellable than others. Holton (2017: 258–259) assumes that in this respect there is no difference whatsoever between factives and other presupposition triggers, and it is worth pointing out that this assumption does not seem in line with the linguistic data. Consider this example:

(4.3) If detectives discover that those who investigated the shooting ignored evidence [...], it would move the scandal beyond the Rampart Division and squarely into Parker Center. (Beaver 2010: 81)

An utterance of (4.3) is non-committal as to whether the investigators of the shooting indeed ignored evidence. So, in this context, the presupposition standardly carried by the factive verb "discover" is cancelled. Compare, in contrast, the existential presuppositions triggered by the (incomplete) descriptions "the shooting" and "the scandal": an utterance of (4.3) still conveys that there was a shooting and a scandal.

Observations such as these have led to the common view that presupposition triggers come in two flavors: hard and soft (see, e.g., Abbott 2006; Abusch 2010). And while definite descriptions are typically listed among the hard triggers, cognitive factives are prime examples of soft ones. Now if, as the common view has it, cognitive factives "shed their factivity fairly easily" (Abbott 2006: 1), then the factivity of verbs such as "know" is in an important respect less robust than Holton assumes.

It would be interesting to compare how factives and anti-factives differ in this regard, but (as pointed out before) this is an underexplored area of research. So let us turn to unembedded occurrences. According to Holton, there is an important contrast between factives and (alleged examples of) anti-factives in this case too. Holton's central claim can be summarized as follows:

(CC) [i] An unembedded occurrence of a sentence of the form *A [factive verb]-s that p* non-cancellably commits the respective speaker to the truth of *p*. [ii] An unembedded occurrence of a sentence of the form *A [alleged anti-factive verb]-s that p* does not non-cancellably commit the respective speaker to the falsity of *p* (though, in some contexts, the falsity may be somehow implied).

To see whether there is in fact such as contrast, it is useful to take a closer look at [i]. In epistemology, there is a near consensus that knowledge requires truth, and the justification for that claim often consists in an appeal to linguistic intuitions. On such a view, it is simply a conceptual truth that something false cannot be known. On the other hand, epistemologists have long been aware that our actual use of the verb "know" is in tension with this view. Here is an example:

(4.4) Everyone knew that stress caused ulcers, before two Australian doctors in the early 80s proved that ulcers are actually caused by bacterial infection. (Hazlett 2010: 501)

In (4.4), "know" is clearly used in a non-factive way. In order to reconcile this observation with the supposed existence of a truth condition on knowledge, scholars have generally attempted to explain away such counterexamples in a piecemeal way. It has been claimed, for instance, that cases such as the above are just examples of an "inverted commas use": in (4.4), "know" means something along the lines of "feel

great confidence" (Audi 2003: 220). Alternatively, one may appeal to a mechanism Holton (1997) has called "protagonist projection": by uttering (4.4), one does not in fact ascribe knowledge to "everyone"; one rather describes the doxastic state of the ascribees in the way they themselves would have expressed it.

So with the notable exception of Hazlett (2010), philosophers have generally not taken such examples to be seriously problematic. Recent empirical research, however, indicates that this might have been a mistake. Degen and Tonhauser (2022) have conducted a number of experiments involving 20 attitudinal predicates, including not only cognitive and emotive factives such as "know" and "be annoyed", but also non-factives such as "think" and "say".[3] In one of their experiments, roughly 350 participants were shown (written) utterances such as the following

> **Christopher**: "Melissa knows that Danny ate the last cupcake, but he didn't."

and were then asked to answer the question "Is Christopher's utterance contradictory?" with either "yes" or "no" (Degen & Tonhauser 2022: 574).

The result was, surprisingly, that the proportion of positive answers was close to 1 only in the case of "be right". In the case of prototypical factives such as "know" or "prove", the proportion was around 0.8, and most surprisingly there were various verbs such as "reveal", "inform" and "admit" where the proportion lay between 0.4 and 0.8. It is also worth noting that even in the case of "think", the proportion of "yes" ratings was significantly above zero.

A very similar experiment has been performed by Colonna Dahlman and van de Weijer (2022), who have compared cognitive factives from nine European languages. In their experiment, participants were given brief dialogues such as

(4.5) [a] A: Where is Mary?
       [b] B: Bill knows that she went to the movies, but Susan realized that she is at home. (Colonna Dahlman and van de Weijer 2022: 10)

and were then asked to rate the acceptability of B's reply. Since (4.5b) does not feature any entailment-cancelling operators, one might have expected the answers to be more or less unanimous. (4.5b), after all, sounds almost like a contradiction. However, it turned out that many participants found non-factive uses of verbs such as "know" quite acceptable. There was significant cross-linguistic variation, but on average the answers were almost evenly distributed between the three options "completely acceptable" (38%), "weird but not unthinkable" (31%) and "completely unacceptable" (31%).

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[3] The experiments tested both the entailment property and the projection property, but for the reasons given in Section 2, I will focus on entailment here, more specifically on entailment as tested by the "contradictoriness diagnostic" (Degen & Tonhauser 2022: 568).

What are we to make of these experiments? The results are by no means easy to interpret. According to Degen and Tonhauser, whose conclusion is largely negative, "the results of our investigations do not identify a class of factive predicates" (Degen & Tonhauser 2022: 581), which is reminiscent of Hazlett's (2010) claim that factives are a "myth". However, if that were the whole truth, then it would be very difficult to account for the fact that most (though not all) participants in Degen's and Tonhauser's study rated sentences of the form "A knows that p, but not p" as contradictory.

However, in another passage Degen and Tonhauser have interpreted their findings in slightly different terms. They write that "a binary distinction between factive and nonfactive predicates is too coarse" (2022: 585), which may be taken to suggest that a non-binary, that is a gradient notion of factivity is better suited to account for the data. On such a view, we should indeed dismiss the idea that there is a clear-cut class of factive predicates. But we could still respect the intuition that, in terms of commitment to truth, ascriptions of knowledge differ crucially from mere belief ascriptions.

According to the standard view, sentences containing attitude verbs either entail or do not entail the complement (factives vs non-factives). On the alternative view, verbs of saying and thinking differ (among other things) in encoding varying degrees of commitment to the truth of the complement. This alternative view is not new. Indeed, it seems to be a kind of corollary of the widely accepted idea that attitude verbs have broadly evidential uses. Consider an example due to Simons (2007: 1048, 1036, (4.6a) modified):

(4.6) A: Who was Louise with last night?
       B: [a] I know from Henry that she was with Bill.
          [b] Henry believes/I believe that she was with Bill.
          [c] Henry supposes/I suppose that she was with Bill.

Simons (2007: 1036) argues that in such cases the embedded clause has "main point status" and that the "main clause predicate" functions as an evidential. More importantly here, it seems as though the three verbs occurring in the answers can be arranged on a scale of commitment or reliability (cf. Urmson 1952: 485). It is, as we have seen, open to doubt whether "know" is a truth-entailing verb, but it seems clear that (4.6a) carries a strong commitment to the truth of the complement. (4.6b) is less committal in this respect, but still seems more committal than (4.6c). A gradient notion of factivity can account for this observation, and it also offers a simple explanation for why the factivity of verbs such as "confirm", "inform" and "point out" has been disputed (cf. Anand & Hacquard 2014: § 2.2): such verbs appear to indicate a middle to high degree of commitment.

Now if factivity is a gradient notion, then the same should be true for anti-factivity. Consider again the example of German "wähnen". When asking native speakers whether sentences of the form

(4.7) A wähnt, dass p, aber p (A wrongthinks that p, but p).

involve a contradiction (which is exactly the diagnostic employed by Degen and Tonhauser), the answers one receives are far from unanimous: some people say yes, and some people say no, which may be taken to mean that "wähnen" (as used today!) is a medium strength anti-factive, just as "inform" is, arguably, a medium-strength factive.

More generally, one might attempt to sort predicates that *may* receive an anti-factive interpretation very roughly into three classes, without thereby suggesting that there are clear borderlines between them. (In what follows "CC" abbreviates "complement clause".)

(i) Non-factives such as "believe" suggest the falsity of the CC only in a suitable context (for instance, if the proposition believed is generally held to be false).

(ii) Weak anti-factives such as English "fancy" more robustly indicate that the CC is false.

(iii) Strong anti-factives such as "wähnen" (as used by Frege and his contemporaries) entail the negation of the CC (or come close to doing so).

How many anti-factive attitude verbs are there and how many of them are strong ones? In the literature, examples from at least ten languages have been discussed, sometimes sketchily, sometimes in more detail: Toba Batak *agam*, *rimpu*, *sangkap*, *pikir*, *kira* (Rosenberg 1975a: § 3.5), Turkish *san-* and *zannet-* (Shatz et al. 2003), Cantonese *ji5-wai4* (Cheung et al. 2009), Daakie *notselaane* (Krifka 2011), Tagalog *akala* (Kierstead 2015: § 2.4), Taiwanese Southern Min *liah8-tsun2* (Hsiao 2017), Spanish *creerse* and French *s'imaginer* (Anvari et al. 2019), Mandarin *yǐwéi* (Glass 2023), and Kipsigis *par* (Bossi 2023: § 4). Additionally (and based on anecdotal evidence), there are some more anti-factive reflexives in certain Germanic languages: German *sich einbilden* and its Swedish cognate *inbilla sig*.

In terms of robustness and projection behavior, there are many crucial differences between these items, but the whole set of examples seems to indirectly support the view outlined above. Just as there are, in English, various degrees of being committed to the truth of a CC, so there are, interlingually, various degrees of being committed to the falsity of a CC. The two verbs from Spanish and Mandarin provide a nice example. The strong suggestion of falsity carried by *yǐweí* can be cancelled, but cancellation is subject to subtle restrictions (see Glass 2023: 7–8). The anti-factive implication of "creerse", in contrast, is uncancellable (Anvari et a. 2019: 61, but cf. Holton 2017: 250), and according to the informants I have consulted, the same is true for German "sich einbilden" and Swedish "inbilla sig".

Now if this picture is true to the facts, then we ought to be skeptical about Holton's rendering of the subject. Recall that on Holton's view, there are many verbs that "require the truth of their complement clauses in some robust, non-cancellable way" (Holton 2017: 246) while alleged anti-factives, at best, suggest the falsity of the CC. On the alternative view, there are varying degrees of factivity as well as varying degrees of anti-factivity. Accordingly, there isn't the sharp contrast between factives and anti-factives Holton fancies to exist.

One may still wonder, however, why there seem to be more factives than anti-factives and why "wähnen" (as used in Frege's time) has no clear counterpart in many other languages, including contemporary German. Let me end with a conjecture on that issue. Numerous scholars have argued that in order to make sense of the linguistic or non-linguistic behavior of others, we have to assume that what they take to be true is largely the same as what we take to be true. Here is a rather crude version of such a claim:

> *Ceteris paribus*, we ought to attribute beliefs we regard as true. (Gauker 1986: 1)

Needless to say, such a "principle of charity" is not supposed to work as a universal rule; there are often reasons to assume that somebody's beliefs are false (or, in any event, different from our beliefs). But one may still hold that taking another person to be a "believer of truths" (Davidson 2001: 222) is, in some sense, the default stance towards them.[4] And if (some version of) that idea is on the right track, then there may be a simple explanation for why factives are more common (and, perhaps, generally more robust) than anti-factives: lexical items that reflect our spirit of epistemic trust towards others may be generally more useful than words like Frege's "wähnen".

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References

Abbott, Barbara (2006) 'Where have some of the presuppositions gone?'. In Betty J. Birner and Gregory Ward (eds.), *Drawing the boundaries of meaning: Neo-Gricean studies in pragmatics and semantics in honor of Laurence R Horn.* (Amsterdam/Philadelphia: John Benjamins), pp. 1–20.

Abusch, Dorit (2010) 'Presupposition triggering from alternatives'. *Journal of Semantics*, 27, 37–80.

Anand, Pranav and Hacquard, Valentine (2014) 'Factivity, belief and discourse'. In Luka Crnič and Uli Sauerland (eds.), *The art and craft of semantics: A festschrift for Irene Heim* (Cambridge, MA: MIT Working Papers in Linguistics), pp. 69–90.

Anvari, Amir, Maldonado, Mora, and Ruiz, Andrés Soria (2019) 'The puzzle of reflexive belief construction in Spanish'. *Proceedings of Sinn und Bedeutung*, 23, 57–74.

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[4] The assumption that our fellow human beings are generally competent may also explain why there are not many verbs that mean "to be ignorant of". Latin "ignoro" and some of its Romance cognates (such as Italian "ignorare" and French "ignorer") are among the few examples.

Audi, Robert (2003) *Epistemology: A Contemporary Introduction to the Theory of Knowledge* (2nd edn.) New York: Routledge.

Bach, Kent (1999) 'The Myth of Conventional Implicature'. *Linguistics and Philosophy*, 22, 327–66.

Beaver, David (2010) 'Have you noticed that your belly button lint colour is related to the colour of your clothing'. In Rainer Bäuerle, Uwe Reyle, and Thomas Ede Zimmermann (eds.), *Presuppositions and Discourse: Essays offered to Hans Kamp* (Bingley: Emerald), pp. 65–100.

Bossi, Madeline (2023) '*Epistemic modality across syntactic categories in Kipsigis*'. Ph.D. thesis, University of California, Berkeley. <https://escholarship.org/uc/item/5gt4077b >

Carnap, Rudolf (1947) *Meaning and Necessity: A Study in Semantics and Modal Logic*. Chicago: University of Chicago Press.

Chemla, Emmanuel (2008) 'An epistemic step for anti-presuppositions', *Journal of Semantics*, 25, 141–73.

Cheung, Him, Chen, Hsuan-Chih, and Yeung, William (2009) 'Relations between mental verb and false belief understanding in Cantonese-speaking children'. *Journal of Experimental Child Psychology*, 104, 141–55.

Chierchia, Gennaro and McConnell-Ginet, Sally (1990) *Meaning and Grammar: An Introduction to Semantics*. Cambridge, MA: The MIT Press.

Colonna Dahlman, R., & van de Weijer, J. (2022) 'Cognitive factive verbs across languages'. *Language Sciences*, 90, 1–17.

Davidson, Donald (2001) 'Mental Events'. In his *Essays on Actions and Events* (Second edn.; Oxford: Clarendon Press), pp. 207–27.

Degen, Judith and Tonhauser, Judith (2022). 'Are there factive predicates? An empirical investigation'. *Language*, 93, 552–91.

Dennett, Daniel C. (1978) 'Beliefs about beliefs'. *The Behavioral and Brain Sciences*, 1, 568–70.

Frege, Gottlob (1892) 'Über Sinn und Bedeutung'. *Zeitschrift für Philosophie und philosophische Kritik*, 100, 25–50.

Frege, Gottlob (1897) 'Logik'. In Hans Hermes, Friedrich Kambartel, and Friedrich Kaulbach (eds.), *Gottlob Frege: Nachgelassene Schriften* (Hamburg: Felix Meiner), pp. 137–63.

Frege, Gottlob (1997) 'On *Sinn* and *Bedeutung*'. In Michael Beaney (ed.), *The Frege Reader* (Oxford: Blackwell), pp. 151–71.

Frege, Gottlob (1997a) 'Logic'. In Michael Beaney (ed.), *The Frege Reader* (Oxford: Blackwell), pp. 227–50.

Gauker, Christopher (1986) 'The Principle of Charity'. *Synthese*, 69, 1–25.

Giannakidou, Anastasia and Mari, Alda (2021). *Truth and veridicality in grammar and thought: Mood, modality, and propositional attitudes*. Chicago: University of Chicago Press.

Glass, Lelia (2023) 'The negatively biased Mandarin belief verb *yiwei*'. *Studia Linguistica*, 77, 1–46.

Götz, Heinrich (1957) *Leitwörter des Minnesangs*. (Abhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig, Philologisch-Historische Klasse) Berlin: Akademie-Verlag.

Grice, Herbert Paul (1961) 'The Causal Theory of Perception'. *Proceedings of the Aristotelian Society, Supplementary Volumes*, 35, 121–53.

Grice, Herbert Paul (1989) *Studies in the Way of Words*. Cambridge, MA: Harvard University Press.

Hazlett, Allan (2010). 'The Myth of Factive Verbs'. *Philosophy and Phenomenological Research*, 80, 497–522.

Heim, Irene (1991) 'Artikel und Definitheit'. In Armin von Stechow and Dieter Wunderlich (eds.), *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung* (Berlin: de Gruyter), pp. 487–535.

Holton, Richard (1997), 'Some telling examples: A reply to Tsohatzidis', *Journal of Pragmatics*, 28, 625–28.

Holton, Richard (2017) 'Facts, Factives, and Contrafactives'. *Aristotelian Society Supplementary Volume*, 91, 245–66.

Horn, Laurence R. (2013) 'I love me some datives: Expressive meaning, free datives, and F-implicature'. In Daniel Gutzmann and Hans-Martin Gärtner (eds.), *Beyond Expressives: Explorations in Use-Conditional Meaning* (Leiden: Brill), pp. 151–99.

Horn, Laurence R. (2001) *A Natural History of Negation*. (2nd edn.) Stanford, CA: CSLI.

Hsiao, Pei-Yi Katherine (2017) 'On counterfactual attitudes: a case study of Taiwanese Southern Min'. *Lingua Sinica*, 3, 1–27.

Hyman, John (2017) 'Knowledge and Belief'. *Aristotelian Society Supplementary Volume*, 91, 267–88.

Kierstead, Gregory (2015) '*Projectivity and the Tagalog Reportative Evidential*'. Master's Thesis (The Ohio State University). <https://etd.ohiolink.edu/!etd.send_file?accession=osu1440154594&disposition=inline>

Krifka, M. (2011) *Notes on Daakie (Port Vato): sounds and modality*. Paper presented at the Eighteenth Meeting of the Austronesian Formal Linguistics Association, Harvard University. <https://ir.lib.uwo.ca/afla/aflaxviii/meeting/9/>

Lakoff, George (1970) 'Linguistics and natural logic'. *Synthese*, 22, 151–271.

Leech, Geoffrey (1983) *Principles of pragmatics*. London: Longman.

Lehrer, Adrienne (1975) 'Interpreting certain adverbs: Semantics or pragmatics?'. *Journal of Linguistics*, 11, 239–48.

Levinson, Stephen C. (1983) *Pragmatics*. Cambridge: Cambridge University Press.

Levinson, Stephen C. (2000) *Presumptive meanings: The theory of generalized conversational implicature*. Cambridge, MA: MIT Press.

Li, Ruya (2024) *The Acquisition of Anaphora in Child Mandarin: Reflexive Binding and Argument Dropping*. London: Taylor & Francis.

Liu, David, et al. (2008) 'Theory of mind development in Chinese children: a meta-analysis of false-belief understanding across cultures and languages'. *Developmental psychology*, 44, 523.

Ogden, C.K. and Richards, I.A. (1946) *The Meaning of Meaning: A Study of the Influence of Language Upon Thought and of the Science of Symbolism*. (Eighth edn.) New York: Harcourt, Brace & World.

Potts, Christopher (2005) *The Logic of Conventional Implicatures*. Oxford: Oxford University Press.

Rosenberg, Marc S. (1975) 'Why negation would wreak havoc with counterfactive verbs, if there were any'. *Paper in Linguistics*, 8, 101–24.

Rosenberg, Marc S. (1975a) '*Counterfactives: a pragmatic analysis of presupposition*'. Ph.D. thesis, University of Illinois at Urbana-Champaign. <https://www.proquest.com/openview/ef007d4f3ccad0fbad5e9f349251ac76/>

Sander, Thorsten (2021) 'Fregean Side-Thoughts'. *Australasian Journal of Philosophy*, 99, 455–71.

Sander, Thorsten (2022) 'Taxonomizing Non-at-Issue Contents'. *Grazer Philosophische Studien*, 99, 50–77.

Sauerland, Uli (2008) 'Implicated presuppositions'. In Anita Steube (ed.), *The discourse potential of underspecified structures* (Berlin: Walter de Gruyter), pp. 581–600.

Schlenker, Philippe (2012) 'Maximize presupposition and Gricean reasoning'. *Natural language semantics*, 20, 391–429.

Shatz, Marilyn, et al. (2003) 'The influence of language and socioeconomic status on children's understanding of false belief'. *Developmental Psychology*, 39, 717–29.

Simons, Mandy (2007) 'Observations on embedding verbs, evidentiality, and presupposition'. *Lingua*, 117, 1034–56.

Strohmaier, David and Wimmer, Simon (2023) 'Contrafactives and Learnability: An Experiment with Propositional Constants'. In Daisuke Bekki, Koji Mineshima, and Elin McCready (eds.), *Logic and Engineering of Natural Language Semantics* (Cham: Springer), pp. 67–82.

Sundholm, Göran (2001) 'Frege, August Bebel and the Return of Alsace-Lorraine: The dating of the distinction between *Sinn* and *Bedeutung*'. *History and Philosophy of Logic*, 22, 57–73.

Unger, Peter (1975) *Ignorance: A case for scepticism*. Oxford: Clarendon Press.

Urmson, James O. (1952) 'Parenthetical verbs'. *Mind*, 61, 480–96.

Williamson, Timothy (2000) *Knowledge and its Limits*. Oxford: Oxford University Press.