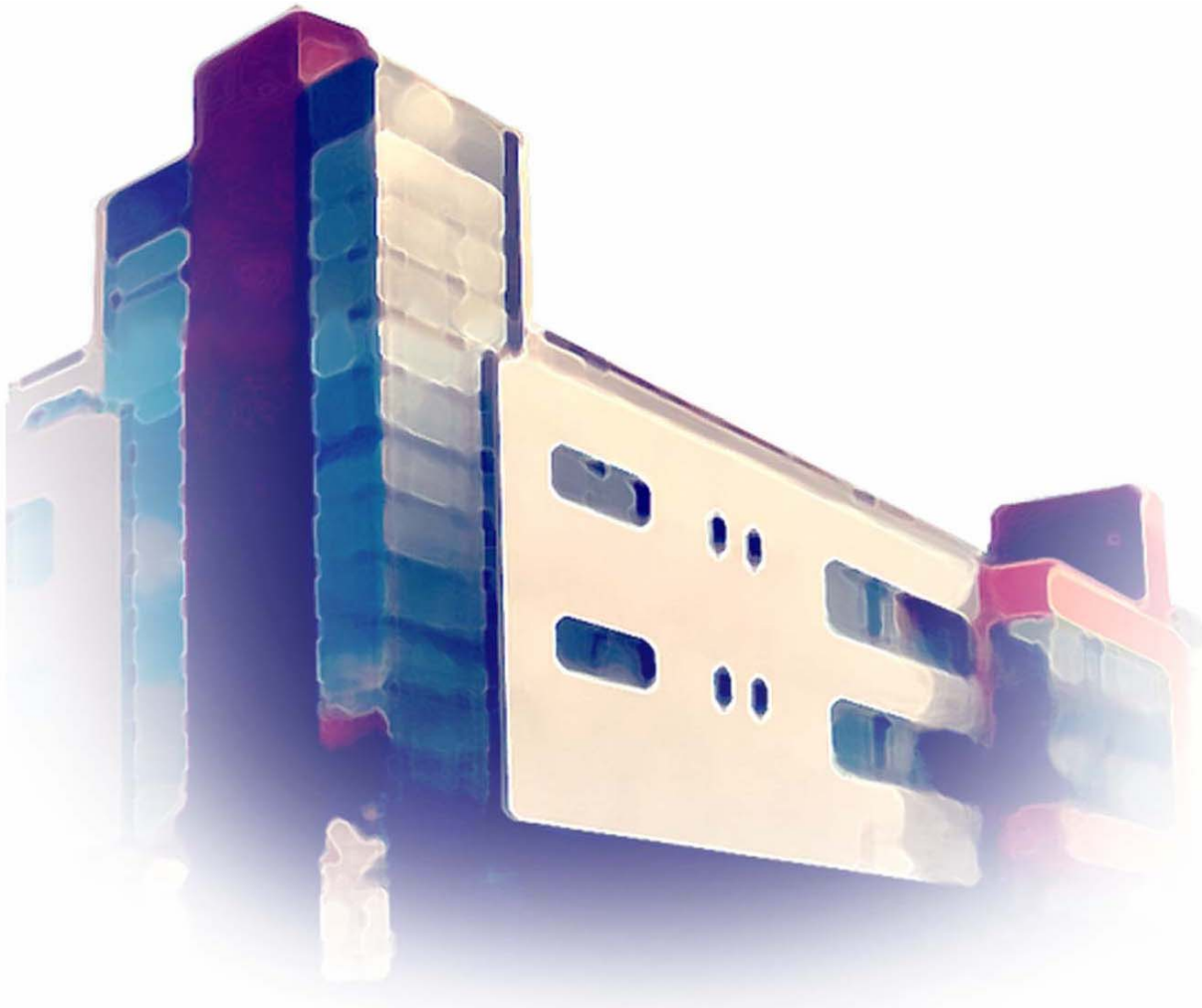Judith Degen

Processing Scalar Implicatures: What Role Does the Question of Default Play for the Debate Between (Neo-)Griceanism and Relevance Theory?

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Processing Scalar Implicatures: What Role Does the Question of Default Play for the Debate Between (Neo-)Griceanism and Relevance Theory?

Cognitive Science BSc Thesis

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Abstract

Current empirical research on scalar implicature processing is yielding substantial support for the Context-Driven over the Default account of scalar implicatures (Noveck and Posada (2003), Breheny et al. (2006)). The Context-Driven model is taken to be on par with Relevance Theory, the Default model with Neo-Gricean accounts (Noveck and Posada (2003)). It is thus concluded by experimental researchers such as Noveck that Relevance Theory is more likely to provide a correct account of scalar implicatures, while Neo-Griceanism cannot account for the data.

I show that the debate between Relevance Theory and (Neo-)Griceanism is unresolvable via predictions following from current empirical approaches. In particular the assumption - employed e.g. by Noveck - that being a Neo-Gricean implies defending a Default notion of scalar implicatures is not warranted. Further, I show that there is nothing to prevent Neo-Gricean theories in general from being compatible with the Context-Driven model.

Contents

1 Introduction

This paper is concerned with the processing of the following type of discourse:

(1)   Martin: Was the exam easy?
       Sarah: Some students failed.

Apart from conveying that there were students who failed, Sarah's answer in (1) is additionally taken to mean both that *not all students failed* and that *the exam was not easy* (Grice (1975)). Paul Grice explained this additional, non-literal meaning conveyed by a speaker in a given utterance, by introducing the notions of *sentence meaning* and *speaker meaning*, which distinguish between what is *said* and what is *meant* (Grice (1969)). Sentences can be considered as abstract objects with certain phonological, syntactic and semantic properties. The study of these grammatical properties falls into the domain of *syntax* and *semantics*, which are at the core of linguistics. Utterances on the other hand are realizations of sentences: they are concrete objects in time and space. They inherit all grammatical properties pertaining to the uttered sentence, and additionally have different properties in virtue of having been uttered in a specific situation by a specific speaker addressing a specific audience, i.e. in virtue of occurring in a certain *context*. These properties, constituting speaker meaning, are the main object of study in *pragmatics*. While sentence meaning is an abstract object, speaker meaning denotes a mental state. Specifically, for a speaker to mean that P is for her to have the intention that the hearer should realize that, in producing the utterance, she intended him to think that P. As Grice (1969) puts it:

"*U* meant something by uttering *x*" is true iff, for some audience *A, U* uttered *x* intending:

(1) *A* to produce a particular response *r*

(2) *A* to think (recognize) that *U* intends (1)

(3) *A* to fulfill (1) on the basis of the fulfillment of (2).

In the above example (1), Sarah for example intends Martin to think that the exam was not easy, without explicitly saying so. Additionally conveyed meaning is *implicated*, what carries this meaning is called an *implicature*.

How do hearers go about inferring implicatures from utterance decoding and contextual information? According to Grice, interlocutors are guided by rationality assumptions. Discourse is assumed to be a cooperative activity, therefore speaker and hearer expect each other to follow certain standards. These standards are collapsed in the Cooperative Principle: "Make your conversational 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." (Grice (1975): 45). Under this general principle fall nine more specific conversational maxims:

Maxims of Quantity

Quantity-1: Make your contribution as informative as is required (for the current purpose of the exchange).

Quantity-2: Do not make your contribution more informative than is required.

Maxims of Quality

Supermaxim: Try to make your contribution one that is true.

Truthfulness: Do not say what you believe to be false.

Evidencedness: Do not say that for which you lack evidence.

Maxim of Relation

Be relevant.

Maxims of Manner

Supermaxim: Be perspicuous.

Obscurity Avoidance: Avoid obscure expressions.

Ambiguity Avoidance: Avoid ambiguity.

Brevity: Be brief (avoid unnecessary prolixity).

Orderliness: Be orderly.

Implicatures are worked out on the basis of these maxims. Specifically, the implicature that not all students failed in the above example (1) is derived as follows (assuming the speaker is following the Cooperative Principle): Quantity-1 requires that the speaker make his contribution as informative as required. However, there is a more informative statement that the speaker could have made, that is *All students failed*. If he didn't make this statement, thus violating Quantity-1, it must be because he doesn't believe it to hold (assuming his compliance with the maxim of Truthfulness). Therefore it is reasonable to infer that the speaker

intended the hearer to believe that in fact some, but not all students failed.

This kind of implicatures, which are derived as the result of a clash between Quantity-1 and the Quality maxims (Truthfulness and Evidencedness) are called *scalar implicatures*. They are scalar because the implicature trigger - *some* in the above example - is the weaker expression in a partially ordered scale consisting of a stronger and a weaker element (Matsumoto (1995)). In the above example, the involved scale is ⟨all, some⟩, where *all* is the stronger element, as it logically entails *some*[1]. The ordering relations that may hold between scale elements are manifold: entailment, as in example (1); ranking of entities, states, and attributes; whole/part relationships; type/subtype, instance-of, and generalization/specialization relations (Carston (1998)). Generally, making the weaker statement is taken to mean either that the stronger statement does not hold - if the use of the weaker expression is attributed to the maxim of Truthfulness - or that the speaker does not know whether the stronger statement holds - if attributed to the maxim of Evidencedness, as in example (2)[2].

(2)   Peter: Did your guests stay until midnight?

      Mary: Some of them did.

Again, Quantity-1 requires that Mary make the stronger statement that *all* of her guests stayed until midnight. However, Mary knowing that she had been in no state of mind to notice whether any of her guests had left earlier, thus not having evidence for uttering the stronger statement, she employs the weaker one. Peter, having the same information as Mary, interprets her utterance as carrying the implicature that she does not know whether all of her guests stayed until midnight. Note that the maxims of Truthfulness and Evidencedness may not be violated to satisfy Quantity-1.

Current theories of scalar implicatures are based more or less on Grice's original formulation. They share the idea that what allows hearers to infer speaker meaning on the basis of an

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[1] In first-order predicate logic, $\exists x F(x)$ is implied by $\forall x F(x)$ (though only for non-empty domains, i.e. the fact that *all 13 year old university students are geniuses* does not entail that *there are 13 year old university students who are geniuses*).

[2] Sometimes scales are claimed to consist of more than two items, e.g. Levinson (2000) assumes scales such as ⟨all, many, some⟩. However, as in a specific context the salient contrast is always between two items, one of which is stronger than the other, I will follow Matsumoto (1995) and not consider scales containing more than two items.

utterance and its context is the existence of certain expectations about interlocutors' behavior in discourse. In Grice's theory these expectations are captured by the conversational maxims. Neo-Gricean approaches (e.g. Levinson (2000), Matsumoto (1995)) stay close to Grice's account, while Relevance Theory (Wilson and Sperber (1995), Carston (1998)) departs significantly from the idea of Gricean maxims. I will present these theories in section 3.

Current empirical research is concerned with the so-called *default nature* of scalar implicatures, i.e. the question of whether scalar implicatures arise effortlessly per default, or whether generating them is an effortful, context-driven process (Noveck and Posada (2003), Breheny et al. (2006)). The main goal of this paper is to question the assumptions made by empirical researchers such as Noveck concerning the embedding of the question of Default (what I call the *empirical debate*) into the overarching theories, namely (Neo-)Griceanism and Relevance Theory (what I call the *theoretical debate*).

The rest of this paper is structured as follows. In section 2 scalar implicatures are positioned in the wider context of Grice's (1975) theory of conversational implicature and their empirical properties are highlighted. In section 3 the competing empirical models (Default and Context-Driven) concerned with explaining the actual cognitive processing of scalar implicatures are sketched, along with the overarching theories that the models are taken to pertain to (Neo-Griceanism and Relevance Theory, respectively). Experimental evidence for the Context-Driven model (and consequently, Relevance Theory) over the Default model (and consequently, Neo-Griceanism) is presented in section 4. In section 5 I will then show that, though seemingly a sensible assumption, Griceanism does not imply endorsing the Default model. Rather, (Neo-)Gricean theories in general are fully compatible with the Context-Driven model (although Grice's theory itself was not intended as a psychologically adequate, but rather as a purely functional theory, of utterance interpretation). This leads to the conclusion, in section 6, that the question of Default is not suited to resolve the debate between Relevance Theory and (Neo-)Griceanism.

2   Scalar Implicature - the Phenomenon

Scalar implicatures are taken to display a number of distinctive properties, namely *calculability*, *nonconventionality*, *cancelability*, *nondetachability*, *reinforceability* and *universality* (Levinson (2000)). In the introduction I have demonstrated how scalar implicatures are calculable in that they are derivable from premises that include the assumption of rational conversational activity. In what follows, I will present the phenomenon of scalar implicature along the lines of the remaining properties.

2.1   Nonconventionality

Grice made a distinction between *conventional* and *conversational* implicatures. Conventional implicatures arise as a word's or expression's agreed-upon, conventional meaning. For example words such as *but* and *still* do more than simply contribute to sentence meaning. Even though for (3) to be true nothing else is required than that (6) be true, there is a difference between the two.

(3)   She is poor *but* honest.

(4)   She is poor *and* honest.

The difference lies in the presence of the word *but*, which indicates a contrast between being poor and being honest. This contrast is not part of what is said, nor is it entailed by what is said. It is not a conversational implicature either, because it does not have to be worked out on the basis of the conversational maxims introduced above. Rather, it depends solely on the conventional meaning of the word *but*, and is thus commonly viewed as a conventional implicature (Bach (1999)).

Conversational implicatures on the other hand arise from "certain general features of discourse" (Grice (1975): 45) alone. These general features are given by the conversational maxims, on the basis of which conversational implicatures are worked out.

Grice differentiated the class of conversational implicatures into *generalized* and *particularized* conversational implicatures. Generalized conversational implicatures seem to arise in the same systematic manner independently of context. In example (1), the scalar implicature that not all students failed is a generalized conversational implicature. It would have also been

implicated by Sarah's utterance if it had been the answer to question (5).

(5)   Martin: Is the teacher doing a good job?

Sarah: Some students failed.

→ Not all students failed.

→ The teacher is not doing a good job.

↛ The exam was not easy.

I use the → symbol throughout to indicate *conversationally implicates* and the ↛ symbol to indicate *does not conversationally implicate*.

Other examples of generalized conversational implicatures are the following:

(6)   John turned the key and the engine started.

→ First John turned the key and then the engine started.

(7)   John caused Bill to die.

→ John killed Bill indirectly, not in a prototypical manner.

(8)   Ralph or Tony went to the party.

→ Either Ralph or Tony went to the party, but not both.

In example (6), the implicature that John's turning the key occurred before the engine's starting can be attributed to the maxim of Orderliness, which requires that events be told in the sequence in which they occur. Although logically the order of the conjuncts in a statement *p and q* does not carry any temporal implications[3], when employed in natural language the first conjunct usually describes an event that precedes the event described by the second conjunct (Partee (1984)).

In example (7), use of the longer *caused ... to die* over the briefer alternative *killed* implicates a non-stereotypical process of death causation. Had John killed Bill directly, the maxim of Brevity would have obliged the speaker to use the shorter *killed*. Assuming the speaker's cooperativeness, she must have a good reason for violating the Brevity maxim, e.g. the wish to indicate the non-stereotypicality of John's method of murder, complying with the maxim of Relation. Thus, the hearer may infer that John did not kill Bill in a normal manner Levinson (2000).

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[3] The logical *and* operator $\wedge$ is commutative, i.e. $p \wedge q$ is semantically equivalent to $q \wedge p$.

Example (8) is an example of scalar implicature. The relevant scale is $\langle$and, or$\rangle$, where *and* is the stronger element, as *p and q* logically implies *p or q*[4]. Analogous to the example presented in section 1, Quantity-1 obliges the speaker to employ the stronger alternative. However, the maxim of Truthfulness takes precedence over Quanitity-1. Consequently the speaker, knowing that in fact only Ralph or Tony went to the party, but not both, uses the weaker alternative *or*, which is pragmatically enriched to carry the exclusive (*not both*) meaning that it does not have in logic. Scalar implicature, though only one example of generalized conversational implicature, is the prototypical one.

Grice noted that the key feature of generalized conversational implicatures is their seeming context-independence, as they arise in the same manner across quite differing contexts. For example, *P and Q* (where P and Q describe events) usually implicates that the event described by P occurred before the one described by Q; *some P are F* (where P denotes individuals and F denotes a property) usually implicates that not all P are F; *P or Q* usually implicates that either P is the case or Q is the case, but not both.

In contrast to the scalar implicature that not all students failed in example (1), the implicature that the exam was not easy belongs to the class of particularized conversational implicatures, which are clearly context-dependent. That the exam was not easy is certainly not implicated if Sarah's utterance that some students failed is the answer to the question whether the teacher is doing a good job as in example (5) - no exam was introduced in the discourse that one might implicate anything about. In this context though, Sarah's utterance gives rise to a different particularized conversational implicature, namely that the teacher is not doing a good job.

These two classes of conversational implicatures thus differ significantly in their degree of context-dependency. While generalized conversational implicatures are taken to arise automatically in an almost conventionalized manner, particularized conversational implicatures are subject to the occurrent context (Levinson (2000)).

However, the distinction between generalized and particularized conversational implicature is not accepted by all researchers. Especially proponents of Relevance Theory, which I will elaborate on in section 3, believe that all implicatures are equally context-dependent

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[4] The logical *or* operator $\vee$ has an inclusive meaning, i.e. $p \vee q$ is not only true if a) p is true and q is false and b) p is false and q is true, but also if c) both p and q are true.

and arise from the same pragmatic process. Thus, that generalized conversational implicatures arise automatically and context-independently is taken to be a faulty assumption and the distinction between generalized and particularized conversational implicature is rejected (Carston (1998), Wilson and Sperber (1995)).

2.2 Cancelability

What distinguishes an implicature from an entailment?

Entailments are not *cancelable*. The sentence *There is a red cube on the table* logically entails that there is a cube on the table. It is not possible to say *There is a red cube on the table, but there is no cube on the table*. The situation is different for implicatures, they are cancelable. Although the sentence *Some students failed* conversationally implicates that not all students failed, it is possible to explicitly cancel the implicature by adding an extra clause, as in *Some students failed, in fact all of them did*.

Besides being *explicitly* cancelable, scalar implicatures are also *implicitly* cancelable, namely when they are not licensed by the occurrent context. An example of such implicit cancellation is example (9) (taken from Levinson (2000): 51).

(9)   John: Is there any evidence against them?

       Peter: Some of their identity documents are forgeries.

       $\nrightarrow$ Not all of their identity documents are forgeries.

In this context, John's question is taken to have explicitly fixed the level of expected informativeness. It suffices for him to know that *at least some* of their documents are forgeries. Whether all of them are is deemed irrelevant. Thus, the *not all* implicature is implicitly canceled in compliance with Quantity-2, which demands that the speaker should not make his contribution more informative than required.

Contexts in which a scalar implicature is implicitly canceled have been called *lower-bound* contexts (Breheny et al. (2006)). Conversely, *upper-bound* contexts are those that license the implicature. The same sentence, in context, may or may not give rise to a scalar implicature, depending on whether it occurs in an upper-bound or lower-bound context. Further examples where the implicature does not arise are the following (the involved scales are indicated in angular brackets):

(10)   It is not the case that Ralph or Tony went to the party.

    ↛ It is not the case that Ralph or Tony went to the party, but not both.

    Scale: ⟨and, or⟩

(11)   It is not the case that some of the students failed.

    ↛ It is not the case that some, but not all, of the students failed.

    Scale: ⟨all, some⟩

(12)   Sarah doubts that Mario will try to climb the mountain.

    ↛ Sarah doubts that Mario will try to climb the mountain but not succeed.

    Scale: ⟨succeed, try⟩

(13)   Do you believe that he will drop by later?

    ↛ Do you believe, but not know, that he will drop by later?

    Scale: ⟨know, believe⟩

Whether or not a scalar implicature arises in a given context depends on both pragmatic and structural (grammatical) features. Structural contexts that have been identified as blocking scalar implicatures are - among others - negation, the antecedent of conditionals, embedding under negative propositional attitude verbs, yes-no questions, 'before'- and 'without'-clauses (Chierchia (2004)). A theory of scalar implicatures must be able to account not only for the presence of the implicature in upper-bound contexts, but also for the absence of the implicature when using the same expression in lower-bound contexts, by providing an account of the cancellation mechanisms at work.

2.3   Nondetachability, Reinforceability, Universality

I treat the properties of nondetachability, reinforcability and universality together, as they are not of great importance for the purpose of this paper (though worth mentioning for the sake of completeness).

Scalar implicatures are *nondetachable*, which is to say that any expression that carries the same coded content will carry the same scalar implicatures. Put differently: it is not possible to say the same thing in a different way without also giving rise to the same implicature. This is so because scalar implicatures arise in virtue of what is said, not because of the manner of

expression. Grice gives the example *try*, which carries some notion of failure, or the potential of failure, as in *Mario tried to climb the mountain* vs. *Mario climbed the mountain*; "this implicature would also be carried if one said *A* [Mario] *attempted to do x, A* [Mario] *endeavored to do x,* or *A* [Mario] *set himself to do x*" (Grice (1978): 185).

Further, scalar implicature are *reinforceable*. It is often possible to add explicitly what is implicated anyway, without the sense of redundancy that arises when repeating an expression's coded content Levinson (2000). Examples of reinforced scalar implicatures are:

(14) Some of the students failed, but not all of them did.

   Scale: ⟨all, some⟩

(15) Ralph or Tony went to the party, but they didn't both go.

   Scale: ⟨and, or⟩

(16) Mario tried to climb the mountain, but he didn't succeed.

   Scale: ⟨succeed, try⟩

(17) Sarah believes that he will drop by, but she doesn't know for sure.

   Scale: ⟨know, believe⟩

Finally, scalar implicatures are deemed *universal* because they are derived ultimately from fundamental presumptions of rationality expressed by the conversational maxims. Unlike coded meaning they are not arbitrary, but motivated. However, that these rationality assumptions and the conversational maxims may really be taken to hold cross-culturally is a matter of debate (Keenan (1976), as in Carston (1998)).

2.4 Intermediate Summary

In this section I presented empirical properties displayed by scalar implicatures. Any adequate theory of scalar implicatures must be able to account for these properties. Many such theories have been developed over the past decades (e.g. Carston (1998); Chierchia (2004); Gazdar (1979); Horn (2004); Levinson (2000); Matsumoto (1995); Wilson and Sperber (1995)). In the next section, concerned with competing psychological models of scalar implicature processing, I will introduce a Neo-Gricean theory (Levinson (2000)) and Relevance Theory

(Carston (1998); Wilson and Sperber (1995)), which provide fundamentally different accounts of scalar implicatures.

3 Defaultism vs. Contextualism

How do scalar implicatures actually arise? How are they processed? There are two opposing views on this question: the Default model, often associated with researchers who hold a Gricean view, and the Context-Driven model, often associated with Relevance Theory (Noveck and Posada (2003)). In this section I outline how these models explain the arising of scalar implicatures.

3.1 The Default Model

The Default view of scalar implicatures arises from a very specific interpretation of what Grice originally had to say about generalized conversational implicatures. In contrast to particularized conversational implicatures, he claimed, one can sometimes say that "the use of a certain form of words in an utterance would normally (in the absence of special circumstances) carry such-and-such an implicature" (Grice (1975)), i.e. the same expression usually carries the same implicature across contexts. Further, as mentioned in section 2, generalized conversational implicatures may be cancelled either explicitly, by adding a clause that negates the implicature; or implicitly, "if the form of utterance that usually carries it [the implicature] is used in a context that makes it clear that the speaker is opting out". Henceforth, when I speak of *cancellation*, I will (unless marked otherwise) mean *implicit cancellation*.

From these statements, Default view proponents conclude that generalized conversational implicatures occur automatically, by default, upon the occurrence of an implicature trigger, and thus intrude effortlessly into the interpretation of an utterance (Noveck (2004)). Under the Default model, scalar implicatures arise independently of context. In a subsequent step they are open to implicit cancellation under consideration of contextual factors (Noveck and Posada (2003)). Thus, implicature generation is considered a two-step process, giving rise to generalized conversational implicatures in the first step, while adding particularized conversational implicatures and potentially canceling previously generated implicatures in the second step. Two prominent Default accounts of scalar implicatures are defended by Chier-

chia (Chierchia (2004), Chierchia et al. (2004)) and Levinson (Levinson (2000)), which I will now present.

3.1.1 Chierchia's Structural Account

Under Chierchia (2004)'s view, scalar implicatures are derived from compositional syntax and semantics through *functional application*, and intrude locally into *truth value computation* (the computation of sentence meaning). According to truth-conditional semantics, to know the meaning of a sentence is to know what the world would have to look like for that sentence to be true (an idea dating back to Frege (1892)). Thus, computing a sentence's meaning boils down to computing the sentence's truth conditions. These are computed compositionally via functional application, which assumes that the expression at every node in a given parse tree has a denotation, i.e. refers to an object or a set of objects in the world. Every node's denotation is of a certain type that acts either as the argument for its sister node's denotation, or as a function that takes its sister node's denotation as an argument. Applying the function node to its sister yields the parent node's meaning.

For example, in the sentence *Ann smokes*, where *Ann* is the noun phrase (NP) and *smokes* the verb phrase (VP), the denotation of *Ann* is simply the individual Ann named *Ann*, and the denotation of *smokes* is a function from individuals to truth values - 1 iff true, 0 iff false (Heim and Kratzer (1998)).
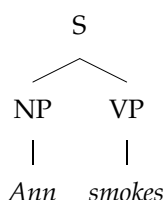
Formally:

$[\![Ann]\!]$ = Ann

$[\![smokes]\!] = \lambda x$. 1 iff x smokes

Applying $[\![smokes]\!]$ (the denotation of *smokes*) to its argument yields a truth value for the sentence *Ann smokes*:

$[\![Ann\ smokes]\!] = [\![smokes]\!]\ (\ [\![Ann]\!]) = [\lambda x$. 1 iff x smokes$]$ (Ann) = 1 iff Ann smokes

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        S
       ╱╲
     NP    VP
      |     |
    Ann   smokes
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Chierchia claims that scalar implicatures intrude into this mechanism of sentence meaning computation and provides evidence that scalar implicatures systematically arise only in *upward*, not in *downward entailing contexts*.

Upward entailing contexts are generated by upward entailing (or monotone increasing)

items such as *some, every, at least*, which allow for conclusions from the denotations of a verb phrase VP_1 to a verb phrase VP_2, where the denotation of VP_1 is a subset of the denotation of VP_2 (Barwise and Cooper (1981)). For example if VP_1 is the phrase *entered the race early* and VP_2 the phrase *entered the race*, then sentence (18) entails sentence (19).

(18)   Some Republican entered the race early.

(19)   Some Republican entered the race.

Downward entailing (DE) items such as *no, few, at most* create downward entailing contexts, where the entailment relation is just the opposite from upward entailing contexts - from superset to subset. Thus, sentence (20) entails sentence (21).

(20)   No Republican entered the race.

(21)   No Republican entered the race early.

Chierchia claims that scalar implicatures can be predicted from the structural context alone, due to the tight correlation between downward entailing contexts and the absence of scalar implicatures, as in examples (22) (taken from Chierchia (2004)) and (23).

(22)   No student with an incomplete or a failing grade is in good standing.
       ↛ While/in fact a student with both is.

(23)   Few people who smoke or drink are happy.
       ↛ While those who do both are happy.

Chierchia provides an elaborate system of implicature generation. He assumes that every expression has a plain, as well as a *strengthened* meaning, where the plain meaning is simply the expression's linguistic meaning, and the strengthened meaning is yielded by pragmatically enriching the plain meaning[5]. Pragmatic enrichment occurs by Gricean reasoning processes. As soon as an implicature trigger is encountered, its scalar alternatives are computed. The trigger's plain linguistic meaning is then per default enriched by the negation of the trigger's immediately stronger alternative (picked from the previously computed set of alternatives). The trigger's strengthened meaning is thus introduced locally and further

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[5] If for a certain expression pragmatic enrichment is not possible due to lack of alternatives, then the expression's strengthened meaning is equal to its plain meaning.

projected upwards according to the recursive semantic rules of composition. What happens if a downward entailing context like negation, the antecedent of conditionals, negative propositional attitudes, etc., is encountered? At each step of the derivation, the so-called *Strength Condition* is checked. The Strength Condition is a constraint on computation of meaning: "the strong value cannot become weaker than the plain value" (Chierchia (2004)). Because downward entailing items reverse the logical relations, the formerly stronger expression becomes the weaker one. In this case, one returns to the expression's plain meaning by simply removing the implicature. Chierchia (2004) provides the sentence *I doubt that John saw some students* to demonstrate the presented mechanism (the negative propositional attitude verb *doubt* is analyzed as ¬*believe*). (24a) is the plain interpretation of the VP, while (24b) is the strengthened one.

(24)   a. $[\![doubt]\!]$ ($[\![that\ [\ some\ student_i\ [\ John\ saw\ t_i]\ ]\!]\!]$) =

           ¬believe(some(student)(λx. saw(John,x)))

       b. $[\![doubt]\!]^S$ ($[\![that\ [\ some\ student_i\ [\ John\ saw\ t_i\ ]\ ]\!]\!]^S$) =

           ¬believe(some(student)(λx. saw(John,x)) $\wedge$ ¬every(students)(λx saw(John,x)))

Under the downward entailing item *doubt*, (24a) is now stronger than (24b), because it entails (24b). Taking (24b) as the strong value would violate the Strength Condition, thus the *not all* implicature is simply removed.

This process, described informally above, is formalized as follows[6]:

(25)   Strong Application:

       Suppose α = [β γ], where β is of type <a,b> and γ of type a. Then:

       $[\![\ \beta\ \gamma\ ]\!]^S = \begin{cases} [\![\beta]\!]^S([\![\gamma]\!]^S) & \text{if } [\![\beta]\!] \text{ is not DE} \\ [\![\beta]\!]^S([\![\gamma]\!]) & \text{otherwise} \end{cases}$

In Chierchia's words: "the theory predicts that sentences have certain default interpretations. Defaults (when incompatible with the context) can be overridden." An implicature trigger's meaning is automatically enriched, i.e. the scalar implicature automatically arises. If a DE item is then encountered, the implicature is cancelled.

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[6] This is actually not the final version of Strong Application as developed by Chierchia (2004). The final version also handles the generation of additional implicatures in DE contexts. However, the version I provide here is sufficient to demonstrate the basic process.

Thus, Chierchia's theory predicts that the implicature arises by default in upper-bound contexts, while in lower-bound contexts it is subsequently cancelled. It also arises by default in neutral contexts (contexts in which the implicature is not of interest, and which may be interpreted both with or without the implicature), because in such contexts no structural factors for canceling the default implicature are available. In section 4 we will see that this is a false prediction. A further problem with Chierchia's account is that it is not able to deal with the absence of scalar implicatures in solely pragmatically motivated lower-bound contexts such as example (9), repeated here as (26).

(26)   John: Is there any evidence against them?

       Peter: Some of their identity documents are forgeries.

       ↛ Not all of their identity documents are forgeries.

The sentence uttered by Peter does not contain an implicature blocking DE item, thus Chierchia's purely structural account wrongly predicts the arising of the implicature that not all of their documents are forgeries. In the next section I present a pragmatic theory of scalar implicatures which is able to account for such purely pragmatic phenomena Chierchia's theory fails to account for.

3.1.2   Levinson's Neo-Gricean Account

Default views are generally taken to be embedded in a (Neo-)Gricean account (Noveck and Posada (2003)). The starting point for Neo-Gricean accounts is Grice's original theory. However, the number or form of the maxims assumed to be involved in cooperative discourse is modified (Levinson (2000)), or an ordering is imposed on Grice's original set of maxims (Matsumoto (1995)). A typical Neo-Gricean account is Levinson's (2000).

Levinson's goal is to give an account of utterance-type meaning, an additional kind of meaning which he claims lies between sentence-type meaning and utterance-token meaning (Carston (2004)). It is more than encoded linguistic meaning but less than the full interpretation of an utterance. Scalar implicatures, and generalized conversational implicatures in general, belong to this level of utterance-type meaning. Although licensed by pragmatic principles, they aren't based on direct computations about the speaker's intentions, but rather on "general expectations about how language is usually used" (Levinson (2000): 22). These

general expectations give rise to preferred or default interpretations of certain utterances, and depend on the language's structure. So, for example, the term *some* carries a default rule licensing the *not all* implicature.

Levinson develops three informativeness principles that are based roughly on Grice's Quantity and Manner maxims. Every generalized conversational implicature falls into one of three classes, depending on the principle it is licensed by.

(27) The Q-Principle:

Speaker's maxim: Do not provide a statement that is informationally weaker than your knowledge of the world allows, unless providing an informationally stronger statement would contravene the I-principle.

Recipient's corollary: Take it that the speaker made the strongest statement consistent with what he knows.

(28) The I-Principle:

Speaker's maxim: Say as little as necessary; that is, produce the minimal linguistic information sufficient to achieve your communicational ends (bearing Q in mind).

Recipient's corollary: Amplify the informational content of the speaker's utterance, by finding the most *specific* interpretation, up to what you judge to be the speaker's m-intended point.

(29) The M-Principle:

Speaker's maxim: Indicate an abnormal, nonstereotypical situation by using marked expressions that contrast with those you would use to describe the corresponding normal, stereotypical situation.

Recipient's corollary: What is said in an abnormal way indicates an abnormal situation.

These principles are best conceptualized as heuristics that guide interlocutors' behavior in discourse. Recall examples (6), (7), and (8), repeated here as (30), (31), and (32), which are all instances of generalized conversational implicatures.

(30) John turned the key and the engine started.
      → First John turned the key and then the engine started.

(31)   John caused Bill to die.

   → John killed Bill indirectly, not in a prototypical manner.

(32)   Ralph or Tony went to the party.

   → Either Ralph or Tony went to the party, but not both.

The implicature that the engine started *after* John turned the key in example (30) can be attributed to the I-Principle. Due to the hearer's expectation that what is said in a simple or unmarked way represents a stereotypical situation, he automatically enriches the expression *P and Q* to *P and then Q*.

Conversely, the implicature in example (31) is attributed to the M-Principle. Using the marked expression *caused . . . to die* instead of the simpler *killed* is interpreted as indicating an abnormal, nonstereotypical situation. Thus, the implicature that John killed Bill in an indirect manner (e.g. by continually giving him a higher dose of his prescribed medication) arises.

It is the remaining, the Q-Principle, which licenses scalar implicatures. The applicability of this principle relies on computing a set of clearly established stronger (S) and weaker (W) salient contrasts that form a scale. When an expression is identified as being the weaker member of such a scale, the hearer, assuming that the speaker made the strongest statement consistent with his knowledge, automatically enriches W to ¬S. In example (32), the salient scale is ⟨and, or⟩: the statement that Tony *and* Ralph went to the party is informationally stronger than the statement that Tony *or* Ralph went to the party. Thus, *or* being the weaker scale member, it is automatically enriched by the hearer to *not both* upon being encountered in an utterance.

Levinson distinguishes generalized conversational implicatures, which he takes to belong to utterance-type meaning, from particularized conversational implicatures, which he positions on the level of utterance-token meaning. While generalized conversational implicatures arise effortlessly, by default, and across contexts, their particularized cousins are relative to the occurrent context. Whether a particularized conversational implicature arises depends on some unspecified maxim of relevance which is responsive to contextual circumstances.

In contrast to Chierchia's structural Default view, Levinson proposes a pragmatic Default view. In a first step, all encountered implicature triggers are automatically pragmatically enriched according to the Q-, M- and I-Principle (level of utterance-type). This shows that,

although a pragmatic phenomenon, scalar implicatures' default nature "causes them to be deeply entangled in grammar and semantics" (Levinson (2000): 169). In a second step, the contextual assumptions are taken into account, potentially canceling the previously generated implicatures if they are not licensed by the context (level of utterance-token). This subsequent cancellation is taken to be an effortful process.

(33)   Anna: Did all the parents pick up their kids from school?

      Ben: Some did.

      → Not all parents picked their kids up from school.

(34)   Anna: Did any parents pick up their kids from school?

      Ben: Some did.

      ↛ Not all parents picked their kids up from school.

For example, the implicature that not all parents picked up their kids in example (33) is deemed cognitively less effortful to derive than the absence of the same implicature in example (34), because the latter requires an additional cancellation step.

Although Chierchia's and Levinson's accounts of scalar implicatures differ in that Chierchia provides a mainly grammatical account of scalar implicatures, while Levinson's account is a pragmatic one, both share the core idea that scalar implicatures arise per default, independently of context; cancellation occurs in an additional, effortful step.

3.2   The Context-Driven Model

In contrast to the Default model, the Context-Driven model does not consider scalar implicature generation to be an automatic, effortless process. The arising of scalar implicatures is seen as just one of many workings of the interaction of semantics and pragmatics (Carston (1998)). The process of pragmatic enrichment under this account is connected to additional processing effort. Additional processing resources are needed for computing not only an implicature trigger's simple linguistic meaning, but also its additional, enriched meaning. Further, the Context-Driven model refutes the Default model's two-step process: if an utterance's context calls for an implicature-enriched meaning, the implicature will arise - if it does not, it will not.

Under the Context-Driven model, there is no implicit subsequent cancellation of implicatures, they simply do not arise if they are not licensed by the context.

3.2.1 Relevance Theory

The Contextualist position is associated with Relevance Theory (Noveck and Posada (2003)). Proponents of Relevance Theory share Grice's original intuition that utterances raise expectations of relevance. However, they question whether the Cooperative Principle and any set of maxims are necessary or even appropriate to provide a cognitively realistic account of utterance interpretation (Wilson and Sperber (1995), Carston (1998)). They further reject the distinction between generalized and particularized conversational implicatures - according to Relevance Theory, all pragmatic processes are equally context-dependent. Whether an implicature arises is ultimately determined by the Cognitive Principle of Relevance, which is a meta-principle of cognition meant to replace the whole Gricean apparatus.

(35)   Cognitive Principle of Relevance:

Human cognition tends to be geared to the maximization of relevance.

A given utterance is processed by integrating the salient context with the assumption that the utterance itself is maximally relevant to the discourse. This process yields a full-blown utterance interpretation. Therefore, the utterance will be interpreted as carrying an implicature if the implicature is conducive to relevance.

In Relevance Theory, relevance is defined in terms of cognitive effects and processing effort (Wilson and Sperber (1995)):

(36)   Other things being equal, the greater the positive cognitive effects achieved by processing an input, the greater the relevance of the input to the individual at that time.

(37)   Other things being equal, the greater the processing effort expended, the lower the relevance of the input to the individual at that time.

A positive cognitive effect is defined as a worthwhile difference to a person's representation of the world, a true conclusion that matters to that person for example by answering a question,

settling a doubt or correcting a mistaken impression. False conclusions are also cognitive effects, but not positive ones.

Processing effort is defined as the "effort of perception, memory and inference" (Wilson and Sperber (1995): 2)required in the derivation of cognitive effects from an incoming stimulus. The greater the processing effort, it is claimed, the less rewarding the input will be to process, and thus the less deserving of the hearer's attention.

In interpreting an utterance, the hearer assumes a) that the speaker's utterance is relevant enough to be worth processing and b) that the utterance is the most relevant one compatible with the speaker's abilities and preferences. On the basis of these assumptions, the hearer then follows "a path of least effort in computing cognitive effects" (Wilson and Sperber (1995): 8) by testing interpretive hypotheses (implicatures, disambiguations, reference resolutions, etc.) in order of accessibility. He stops this procedure when his expectations of relevance are satisfied. The process of utterance interpretation is thus the simultaneous maximization of cognitive effects and minimization of processing effort.

How does this work when applied to scalar implicatures? Consider the following exchange:

(38)   Mario: Are all of your friends Buddhist?

   Sarah: Some are.

   → Not all of Sarah's friends are Buddhist.

That Sarah has some friends that are Buddhist is relevant enough to be worth Mario's attention (as indicated by the question). However, it is not sufficient to satisfy Mario's expectations of relevance. Presumably, Sarah was able, and not reluctant, to tell Mario whether *all* of her friends are Buddhist[7], and that would have been of more relevance to Mario (as indicated by the use of *all* in his question). As Sarah did not say that all of them are Buddhist, Mario is entitled to interpret Sarah as meaning that only *some*, but *not all* of her friends are Buddhist.

An almost identical exchange, which however is taken to give rise to a different implicature, is the following (discussed in Carston (1998), though I took the liberty of changing the interlocutors' names - A and B in the original - for enhancing readability):

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[7] Assuming that Sarah is aware of all her friends' religious affiliations.

(39) Mario: Are some of your friends Buddhist?

Sarah: Some are.

↛ Not all of Sarah's friends are Buddhist.

Here, Carston says, there is no reason to suppose that Sarah is implicating that not all of her friends are Buddhist. Rather, Mario has lower expectations of relevance, indicated by explicitly requesting information about only *some* of Sarah's friends.

Under the Relevance Theoretic account, the arising of scalar implicatures is reduced to the application of the Principle of Relevance. If a given utterance containing a scalar implicature trigger is more relevant (in terms of positive cognitive effects and processing effort) *with* than *without* the scalar implicature, then the implicature will arise.

Relevance Theory's main problem is vagueness: it is not clear how to quantitatively grasp the notion of cognitive effects and processing effort. Further (and as a result of this), it remains unclear which kind and number of cognitive effects is worth which kind and amount of processing effort. This makes it very difficult to arrive at any useful predictions. However, as with Chierchia and Levinson's accounts, I will not delve into Relevance Theory's problems in any depth (but cf. Levinson (2000) for an elaborate criticism).

3.3   Intermediate Summary

In sum, empirical researchers concerned with the processing of scalar implicatures distinguish between Default and Context-Driven accounts. While Relevance Theory is taken to be Contextualist, (Neo-)Gricean accounts are portrayed as Defaultist (Noveck and Posada (2003)). Is there a way to determine which of the opposing models makes the right predictions? Empirical evidence concerned with this question is presented in the next section.

4   Empirical evidence

Experimental Pragmatics is a recently emerging field of enquiry (Noveck and Sperber (2004)). Researchers in this field are attempting to find empirically testable predictions and to develop new experimental paradigms for resolving issues in pragmatics, among which resides the processing of scalar implicatures. The small but growing body of work on the processing of scalar implicatures includes Noveck and Posada (2003), Bott and Noveck (2004), Breheny

et al. (2006), Storto and Tanenhaus (2004), Bezuidenhout and Morris (2004), Katsos et al. (2005), Reboul (2004).

Here I present two representative studies that investigate whether scalar implicatures arise per default (Breheny et al. (2006), Noveck and Posada (2003)).

4.1   Breheny's Support for the Context-Driven Model

Breheny et al. (2006) set out to test the Default predictions by conducting two reading time experiments.

The first experiment investigated reading times for upper- vs. lower-bound contexts. Twelve pairs of texts like the following comprised the critical materials.

(40)   a. *(Upper-bound)* John was taking a university course and working at the same time. For the exams he had to study from short and comprehensive sources. Depending on the course, he decided to read *the class notes or the summary.* ($\rightarrow$ but not both)

   b. *(Lower-bound)* John heard that the textbook for Geophysics was very advanced. Nobody understood it properly. He heard that if he wanted to pass the course he should read *the class notes or the summary.* ($\nrightarrow$ but not both)

Every pair contained one upper-bound text (interpretation with implicature) and one lower-bound text (interpretation without implicature), consisting of two sentences each. Participants read 12 texts, where half of the texts was taken from the upper-bound set, the other half from the lower-bound set. The text order was randomized. The time taken by participants to read the trigger phrases (located at the end of the second sentence, italics in the above example) was measured by recording the time taken to press a button.

The Default view predicts that, if cancellation is seen as requiring processing effort, reading times should be longer for lower-bound contexts than for upper-bound contexts. This is so because in lower-bound contexts the automatically generated implicature must subsequently be cancelled, while in upper-bound contexts cancellation is not necessary. If cancellation is seen simply as the decay of an activated implicature, then there should be no difference in processing effort, as measured by reading time. Thus, the Default view predicts that there is either no difference in reading time between lower- and upper-bound contexts, or reading times are longer for lower-bound contexts.

The Context-Driven view on the other hand predicts that reading times should be longer for upper-bound contexts, as no implicature is generated in lower-bound contexts in the first place, while implicature generation in upper-bound contexts is an effortful process.

Indeed, Breheny et al. (2006)'s results support the Context-Driven model. Reading times for upper-bound contexts were significantly longer than for lower-bound contexts, suggesting that implicatures are not generated effortlessly per default, but rather by an effortful process.

The second experiment tested whether scalar implicatures arise in neutral contexts. In contrast to upper- and lower-bound contexts, neutral contexts are such that it is not of interest whether the utterance is interpreted as carrying the implicature or not. For these cases the Default view predicts that the implicature will arise, as the implicature arises per default and will not be canceled if (the pragmatic and structural) context does not explicitly call for it. Thus, in comparison with upper-bound contexts, there should be no difference in reading time. The Context-Driven view predicts just the opposite; the implicature does not arise, since implicature-generation is an effortful process. Consequently, reading time should be longer for upper-bound than for neutral contexts.

Again, the results support the Context-Driven model. Significant differences in reading times between upper-bound and neutral contexts suggest that the implicature does not arise in neutral contexts, contrary to the Default model's prediction.

4.2 Noveck's Support for the Context-Driven Model

Noveck and Posada (2003) also set out to test the predictions from the Default and Context-Driven model. For this purpose, they conducted a single-sentence judgement task with subjects on underinformative sentences such as the following:

(41)   Some elephants have trunks.

Such underinformative sentences are interesting in terms of semantic-pragmatic evaluability because they are considered to have two truth values. They are true when taken at face value (lower-bound interpretation), but false if interpreted with the scalar implicature "not all" (upper-bound interpretation). Noveck and Posada (2003) call the lower-bound in-

terpretation of underinformative sentences *logical*[8], the upper-bound interpretation *pragmatic*. They assessed differences in reaction time to such sentences under a logical vs. pragmatic interpretation.

Subjects were asked to respond "true" or "false" to underinformative sentences. The measured variable was the reaction time that subjects took to answer by pressing a button. Additionally, subjects judged control items that were either patently true (example (42)) or patently false (example (43)).

(42)   Some houses have bricks.

(43)   Some crows have radios.

The predictions from the Default and the Context-Driven view are the following: according to the Default view, scalar implicatures are generated by default and are subsequently cancelled. Therefore, pragmatic responses ("false") should be faster than logical ones ("true"), because under the logical interpretation the immediately arising implicature has to be cancelled in a second effortful step, thus leading to longer reaction times. Under the Context-Driven view, the generation of scalar implicatures is an effortful process, so the pragmatic interpretation should involve more processing effort and thus longer reaction times than the logical interpretation.

Noveck's results support the Context-Driven model: reaction times of pragmatic responders were almost twice as high as those of logical responders. This further undermines the idea of scalar implicature generation as an effortless, default process.

4.3   Intermediate Summary

In sum, there is a growing body of support for the Context-Driven model, while the Default model seems to be simply false. According to Noveck and Posada (2003) this evidence proves Neo-Griceanism wrong, as it endorses the Default model. On the other hand Relevance Theory, which supports the Contextualist view, is taken to be the superior theory. In the following section I will examine whether these conclusions are warranted.

[8] The lower-bound interpretation of *some* corresponds to the semantics of the logical existential operator. Logically, that some elephants have trunks is implied by the fact that all elephants have trunks, and thus the underinformative sentence receives a positive truth value.

5   What the Evidence Does Not Show

In fact, Noveck's conclusion that Neo-Griceanism is wrong is faulty. His conclusion arises from the assumption that being (Neo-)Gricean implies defending a Default view of scalar implicatures: "The Neo-Gricean approach (e.g. Levinson, 2000) assumes that implicatures intrude automatically on the semantics of a term like *Some*" (Noveck and Posada (2003): 2). Further, he claims that "Grice suggests that [. . .] his so-called 'generalized conversational implicatures' linked in particular to words such as *some, and* or *or* [. . .] are derived by default" (Noveck (2004): 302). Although he explicitly names Levinson's account as the exemplary theory he is arguing against, his point is directed against Neo-Gricean approaches in general, as well as against Grice's original formulation. I will show that this assumption is not warranted: adopting a (Neo-)Gricean view does not imply accepting a Default view. Or simply: Griceanism does not imply Defaultism.

Right off it is important to acknowledge that Grice did not intend to make any claims about the actual processing of scalar implicatures. In the words of Kent Bach (2005):

> Grice did not intend his account of how implicatures are recognized as a psychological theory or even as a cognitive model. He intended it as a rational reconstruction. [...] He was not foolishly engaged in psychological speculation about the nature of or even the temporal sequence of the cognitive processes that implements that logic.

Ascribing any position to Grice on the question of Default is therefore quite a bold act, if not a category mistake. However, I will just as boldly as Noveck commit this mistake in order to show that even if one insists on pressing Grice's theory into the corset of an empirical model, it is actually better conceived of as a Contextualist rather than as a Defaultist account (though compatible with both).

But first note that, although we have seen a clearly Defaultist Neo-Gricean account in section 3 (Levinson 2000; Chierchia et al. 2004), there are also explicitly Contextualist Neo-Gricean accounts of scalar implicatures: I present Matsumoto's (1995) theory here as an example.

5.1 Matsumoto's Contextualist Neo-Gricean Account

Matsumoto does not develop a new system of maxims as Levinson does, but rather imposes an ordering on Grice's original maxims by introducing the Conversational Condition. The Conversational Condition is intended to predict when the use of a weaker expression (W) instead a stronger alternative (S) gives rise to a scalar implicature. S and W must constitute an ordered pair of expressions ⟨S, W⟩, which constitutes a *possible* scale. In context, a possible scale may give rise to an implicature, in which case it is a *functional* scale.

(44)   The Conversational Condition:

The choice of W instead of S must not be attributed to the observance of any information-selecting Maxim of Conversation other than the Quality Maxims and the Quantity-1 Maxim (i.e., the Maxims of Quantity-2, Relation, and Obscurity Avoidance, etc.).

This is another way of expressing that, if the use of W can be attributed to Quantity-2, Relation, Obscurity Avoidance and possibly other information-selecting maxims[9], then W will not serve as a trigger for the scalar implicature ¬S. Thus, in every utterance that contains the weaker member W of a possible scale, one must determine if the use of W is in fact attributable to any information-selecting maxim other than Quantity-1 and the Quality maxims. If it is not, the implicature will arise.

Consider the following exchange, first discussed in Grice (1975) and taken up by Matsumoto (1995). Deidre and Robyn are planning a trip to France, both know that Robyn wants

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[9] Information-selecting maxims are those maxims that determine the choice between expressions that differ in meaning, e.g. that influence whether W or S is used. They are distinguished from those maxims that govern linguistic form rather than semantic content, such as the maxim of Brevity. For instance, the utterances *It is possible that the plane will be late* and *It is not impossible that the plane will be late* have the same semantic content, namely that it is possible that the plane will be late, and only differ in their linguistic form. However, the maxim of Brevity requires uttering the former, as it is briefer than the latter. Under Levinson's account, uttering the longer expression is attributable to the M-Principle, which is the only principle governing linguistic form rather than semantic content. Compare this to the maxim of Quantity-1, clearly an information-selecting maxim, which requires making the most informative statement possible. It governs the choice of the stronger *All elephants have trunks* over the weaker *Some elephants have trunks*, which carry different semantic content (the former is a statement about the set of elephants, the latter possibly only of a subset).

to visit her friend Pierre.

(45)   Deidre: Where does Pierre live?

       Robyn: Somewhere in the south of France.

       → Robyn does not know which town Pierre lives in.

Using the weaker *somewhere in the South of France* as opposed to a more informative town name violates Quantity-1. However, because Robyn does not have evidence for the exact town Pierre lives in, using a town name would violate Quality-1. The Quality maxims, as mentioned in the introduction, may not be infringed to satisfy Quantity-1. Because the use of *somewhere in the South of France* can further not be attributed to any other information-selecting maxims, the implicature arises.

But what if the same exchange took place in a slightly different context? Say Robyn knows that Deidre is not very proficient in French geography. In this case Robyn's use of *somewhere in the South of France* instead of a town name can be attributed to the maxim of Obscurity Avoidance - had she used a town name, she would have violated the maxim of Obscurity Avoidance by employing a term unfamiliar to Deidre. Thus, the implicature does not arise.

Or consider the situation if Deidre and Robyn are planning a trip, not to France, but around the world (and still want to visit Pierre). Then, if Deidre's question is solely a request for the information about which country Pierre lives in, Robyn's use of the weaker scale member can be attributed to Quantity-2. In order to avoid being over-informative, she does not name the exact town. Here, again, Deidre's question creates a lower-bound context, and the implicature that Robyn doesn't know Pierre's exact whereabouts does not arise.

As a consequence of his deliberations, Matsumoto reduces the difference between generalized and particularized conversational scalar implicatures to "the question of whether or not the intrinsic semantic relationship between S and W is such that S usually satisfies the Conversational Condition when W is uttered" (Matsumoto (1995): 55). Thus, under this account generalized conversational implicatures can only be viewed as being relatively context-independent, due to the fact that satisfaction of the Conversational Condition is itself always context-dependent.

As we have seen, Matsumoto provides a quite different account of scalar implicatures from Levinson's, though both carry the label of Neo-Griceanism. It is important to note that

there is no place in Matsumoto's account for a Default notion of scalar implicatures. Rather, we are confronted here with a Neo-Gricean account that fits well with a Context-Driven view. For a scalar implicature to arise, the Conversational Condition must be satisfied. The Conversational Condition being context-dependent, the check for satisfaction of the Condition is therefore best conceptualized as an effortful process.

5.2 (Neo-)Griceanism: Defaultist or Contextualist?

I have presented a counter-example to Noveck's claim that all Neo-Gricean theories endorse the Default model of scalar implicature processing: Matsumoto's theory is clearly in line with the Context-Driven model. The question arises whether (Neo-)Gricean theories in general are better conceived of as Defaultist or Contextualist. For this purpose we shall have a closer look at Grice's original theory of implicature.

Is there anything in the calculation process of scalar implicatures itself that suggests a default process? According to Grice, what the hearer relies on in calculating a conversational implicature is, among other things, "(2) the Cooperative Principle and its maxims; (3) the context, linguistic or otherwise, of the utterance; (4) other items of background knowledge" (Grice (1975): 49). In the case of scalar implicatures in particular there is a lot of work to be done by the hearer: the flouting of Quantity-1 must be noticed, which in itself implies computing an expression's stronger alternatives against the background of expected informativeness. Further, the flouting will have to be attributed to a clash with one of the Quality maxims. Depending on contextual assumptions, the hearer will infer whether the speaker employed the weaker expression because he did not believe, or did not have sufficient evidence for, the stronger one. There is no evidence for defaultness in the way scalar implicatures are worked out. This process is better construed as effortful and context-dependent, in line with the Contextualist view.

We must search the reasons for conceiving of Grice as Defaultist elsewhere. His vague passages concerning the distinction between particularized conversational implicatures and generalized conversational implicatures seem most promising. Already mentioned in section 3, I repeat these passages here. About generalized conversational implicature one can say "that the use of a certain form of words in an utterance would normally (in the absence

of special circumstances) carry such-and-such an implicature or type of implicature" (Grice (1975): 57). Returning to our favorite example, *some*, this means that *some* usually, ceteris paribus, carries the implicature *but not all*. This notion of scalar implicatures as the preferred reading of certain triggers may have in part given rise to Noveck's view of Grice's theory as Defaultist. This is a false intuition, though: if special circumstances can prevent the implicature from arising, as implied by the quote above, then it is not a context-independent phenomenon. Whatever these ceteris paribus conditions may be, checking whether they actually are given implies expending processing effort. Again, this is not evidence for, but rather against, a Default view of scalar implicatures.

However, there is one passage which is quite critical and concerns the cancelability of generalized conversational implicatures. As we have seen before, a scalar implicature may be canceled in two ways: "It may be explicitly canceled, by the addition of a clause that states or implies that the speaker has opted out, or it may be contextually canceled, if the form of utterance that usually carries it [the implicature] is used in a context that makes it clear that the speaker is opting out" (Grice (1975): 57). An example of explicit cancellation is sentence (46).

(46)   Some of my friends are Buddhist. In fact, all of them are.

Explicit cancellation is not a problem, since Defaultists and Contextualists agree that the implicature must have arisen in such contexts, only to be canceled by the second clause.

The problem is rather implicit, or contextual, cancellation. Recall example (39), repeated here as (47). The context is lower-bound, so the implicature is absent.

(47)   Mario: Are some of your friends Buddhist?
        Sarah: Some are.
        ↛ Not all of Sarah's friends are Buddhist.

It is here that Defaultists and Contextualists disagree. Under the Default view, the implicature arises and must subsequently be implicitly canceled. Under the Context-Driven view, the implicature does not arise in the first place. Grice's notion of implicit cancellation is thus of great interest. One might argue - as Levinson (2000) does - that the fact that Grice even speaks of cancellation in this context implies that the implicature arises per default. Otherwise it need

not be cancelled. So, besides Grice's quote above concerning scalar implicatures as preferred reading, his acknowledgment of implicit cancellation is the second pillar that a Defaultist interpretation of his account rests on.

On the other hand, one may interpret Grice in a completely different way. In the above cited passage, implicit cancellation occurs in cases of opting out. Implicit cancellation according to Grice thus occurs in contexts where the speaker makes it clear that he is not following the Cooperative Principle. However, it is not at all the case that every instance of an absent scalar implicature is one in which the speaker is uncooperative. Example (47) for instance may be construed in different ways. It may be a case of opting out, in which Sarah knows that Mario would, in spite of only asking whether some of her friends are Buddhist, also be interested to know if all of her friends are Buddhist. Suppose that Sarah has reasons to hold back the more relevant information that all of her friends are in fact Buddhist. If she thus reluctantly, evasively answers *Some are*, she marks her utterance as a case of opting out.

The same example may also simply be construed as a case of complying with Quantity-2: Sarah does not exceed the relevant level of required informativeness set by Mario to *some*. This is not a case of opting out, still the implicature does not arise. Importantly, Grice does not make any explicit statement concerning such situations. However, the Contextualist idea that the implicature does not arise in these cases in the first place is compatible, if not the logical conclusion, from the above cited statement concerning the presence of scalar implicatures in absence of special circumstances. Thus, if one insists on Grice's having made an ontological claim about the implicit cancellation of implicatures, this default generation and subsequent cancellation is limited to cases of opting out and does not apply to lower-bound contexts in general[10]. However, as mentioned in the beginning of this section, Grice in fact did not make any ontological claims about the processing of scalar implicatures. His theory is not to be conceptualized as psychological. Thus, when he speaks of implicit cancellation, one should not interpret this as implying an *actual* cancellation process. The notion of implicit cancellation is purely functional.

Similarly, Grice's distinction between generalized and particularized conversational implicature is not intended to distinguish between two psychologically real categories of infer-

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[10] Whether the implicature actually arises and is canceled in cases of opting out could of course be tested by the methods described in section 4.

ences. Rather, its purpose is to grasp the systematicity with which for example scalar implicatures arise in the same way across quite different contexts. Acknowledging this systematicity by introducing a name for the classes of implicatures that do or do not fall under it does not imply making a statement about the cognitive processes that actually implement the computation of these implicatures.

6 Conclusion

The role played by the question of Default may be summed up as follows.

Contrary to Noveck's claim, it is not suited to resolve the debate between the Neo-Gricean and the Relevance Theoretic position. Such a resolution requires a clear matching of Relevance Theory to Contextualism and Neo-Griceanism to Defaultism, thus allowing a direct inference from an empirical model's falsification to a theoretical approach's inadequacy. In this case, Neo-Griceanism's claims would be undermined by proving Defaultism wrong. However, I have shown in the previous section that this one-to-one matching is not warranted. While the Default model may not be integrated with Relevance Theory, but rather only with certain (Neo-)Gricean approaches, the Context-Driven model, which has gained support from recent findings in Experimental Pragmatics, is compatible with both Relevance Theory and (Neo-)Gricean approaches[11]. The fact that the Context-Driven model may be integrated with both competing positions - Relevance Theory on the one hand, Grice's and Matsumoto's (and possibly other Gricean) theories on the other hand - thus implies that empirical evidence in support of the Context-Driven model cannot help to distinguish between one or the other theoretical position.

However, predictions from the Default and Context-Driven model may - if findings continue to reveal support for the Context-Driven and against the Default model - filter out those theories that endorse the Default model, such as Chierchia's and Levinson's. Such theories would have to be discarded or at least considerably revised. Ultimately, though, the question of whether Relevance Theory or Neo-Gricean theories are considered adequate accounts of scalar implicatures will not be resolved via the question of Default.

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[11] Except with those Neo-Gricean approaches that explicitly endorse the Default model, such as Levinson's, obviously.

Are there any other empirical approaches to the processing of scalar implicatures that might resolve the debate?

The second testable feature of scalar implicatures currently subject to empirical investigation, besides defaultism, is localism. The question is whether scalar implicatures intrude locally, as soon as possible[12], into the interpretation of an utterance, or globally, after the uttered sentence's truth-conditions have been fully processed. Recent empirical findings from eye-tracking yield support for the localist position (Storto and Tanenhaus (2004)).

Although for example Chierchia characterizes Grice's theory as globalist because, under the Gricean view, scalar implicatures "are calculated by the pragmatic module once the semantic module has completed its computation" (Chierchia et al. (2004): 285), Grice himself was unsure whether scalar implicature computation is achieved locally or globally: "It certainly does not seem reasonable to subscribe to an absolute ban on the possibility that an embedding locution may govern the standard nonconventional implicatum" (Grice (1989): 375). Neo-Gricean approaches (e.g. Levinson (2000)) and Relevance Theory (Wilson and Sperber (1995)) alike adopt localist positions. So localism, like defaultism, is not an empirically testable distinctive feature of Neo-Griceanism vs. Relevance Theory and is thus not suited for inferences from empirical results to conclusions concerning the general adequacy of the theoretical approaches.

There are no empirical approaches to date that have the potential to verify Relevance Theory while falsifying Neo-Griceanism or vice versa. This is due to the theories' different goals: while Relevance Theory aims at developing a cognitively adequate theory of utterance interpretation, Grice originally simply intended to provide a rational reconstruction of the way (scalar) implicatures are worked out, his theory is a purely functional one. Among the Neo-Gricean approaches, there are those that explicitly call for psycholinguistic validation (e.g. Levinson) and those that do not make a claim about the psychological validity of their account (e.g. Matsumoto). It is evident that, while Relevance Theory may claim psychological validity, what Noveck and Posada (2003) call "the Neo-Gricean position" is not one unified position, but rather encompasses a broad variety of functional and psychological, Defaultist and Contextualist positions. The only commonality between all (Neo-)Gricean accounts of

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[12] Note that *as soon as possible* does not mean *automatically* (which would be the Default view). It is rather to be understood as *as soon as licensed by the context.*

scalar implicature consists in the assumption that interlocutors employ conversational principles in utterance interpretation, in particular that some kind of informativeness principle is involved in the generation of scalar implicatures (e.g. Quantity-1 in Grice's account or the Q-Principle in Levinson's account). Collapsing all of these positions into (a Defaultist) one, and claiming from empirical evidence for the Context-Driven and against the Default model that one has shown the superiority of Relevance Theory over (Neo-)Griceanism is a distortion of facts, and one nurtured consequently throughout much of Noveck's work (e.g. Noveck and Posada (2003), Bott and Noveck (2004), Noveck (2004)).

Whether there exist empirically testable discrimination points between the different theoretical positions in general remains an open question. However, empirical research addressing the question of Default continues to provide exciting new insight useful for evaluating those accounts claiming cognitive adequacy.

References

Bach, K. (1999). The myth of conventional implicature. *Linguistics and Philosophy 22*, 327–366.

Bach, K. (2005). The top ten misconceptions about implicature. In B. Birner and G. Ward (Eds.), *Festschrift for Larry Horn*. Amsterdam: John Benjamins.

Barwise, J. and R. Cooper (1981). Generalized quantifiers and natural language. *Linguistics and Philosophy 4*, 159–219.

Bezuidenhout, A. L. and R. K. Morris (2004). Implicature, relevance and default pragmatic inference. In I. A. Noveck and D. Sperber (Eds.), *Pragmatics*, Chapter 12, pp. 257–282. Palgrave Macmillan Ltd.

Bott, L. and I. A. Noveck (2004). Some utterances are underinformative: The onset and time course of scalar inferences. *Journal of Memory and Language 51*, 437–457.

Breheny, R., N. Katsos, and J. Williams (2006). Are generalised scalar implicatures generated by default? An on-line investigation into the role of context in generating pragmatic inferences. *Cognition 100*, 434–463.

Carston, R. (1998). Informativeness, relevance and scalar implicature. In R. Carston and S. Uchida (Eds.), *Relevance Theory: Applications and Implications*, pp. 179–236. Amsterdam: John Benjamins.

Carston, R. (2004). Review of Stephen C. Levinson, Presumptive meanings: The theory of generalized conversational implicature. *Journal of Linguistics 40*, 181–186.

Chierchia, G. (2004). Scalar implicatures, porlarity phenomena, and the syntax/pragmatics interface. In A. Belletti (Ed.), *Structures and Beyond*. Oxford University Press.

Chierchia, G., M. T. Guasti, A. Gualmini, L. Meroni, S. Crain, and F. Foppolo (2004). Semantic and pragmatic competence in children's and adults' comprehension of or. In I. A. Noveck and D. Sperber (Eds.), *Experimental Pragmatics*, Chapter 13, pp. 283–300. Palgrave Macmillan Ltd.

Frege, G. (1892). Über Sinn und Bedeutung. *Zeitschrift für Philosophie und philosophische Kritik 100*, 25ß50.

Gazdar, G. (1979). *Pragmatics: Implicature, Presupposition, and Logical Form*. Academic Press.

Grice, P. (1969). Utterer's meaning and intentions. *Philosophical Review 78*(2), 147–177. Reprinted in Grice 1989, pp. 86-116.

Grice, P. (1975). Logic and conversation. *Syntax and Semantics 3*, 41–58. Reprinted in Grice 1989, pp. 22-40.

Grice, P. (1978). Further notes on logic and conversation. *Syntax and Semantics 9*, 183–197. Reprinted in Grice 1989, pp. 41-57.

Grice, P. (1989). *Studies in the Way of Words*. Harvard University Press.

Heim, I. and A. Kratzer (1998). *Semantics in Generative Grammar*. Blackwell.

Horn, L. (2004). Implicature. In L. Horn and G. Ward (Eds.), *Handbook of Pragmatics*. Blackwell.

Katsos, N., R. Breheny, and J. Williams (2005). The interaction of structural and contextual constraints during the on-line generation of scalar inferences. In B. Bara, L. Barsalou, and M. Bucciarelli (Eds.), *Proceedings of the 27th Annual Conference of the Cognitive Science Society*, pp. 1108–1113. Mahwah, NJ: Erlbaum.

Keenan, E. (1976). The universality of conversational postulates. *Language and Society 5*, 67–80.

Levinson, S. C. (2000). *Presumptive Meanings - The Theory of Generalized Conversational Implicature*. The MIT Press.

Matsumoto, Y. (1995). The conversational condition on Horn scales. *Linguistics and Philosophy 18*, 21–60.

Noveck, I. and A. Posada (2003). Characterizing the time course of an implicature: an evoked potentials study. *Brain and Language 85*, 203–210.

Noveck, I. A. (2004). Pragmatic inferences related to logical terms. In I. A. Noveck and D. Sperber (Eds.), *Experimental Pragmatics*, Chapter 14, pp. 301–321. Palgrave Macmillan Ltd.

Noveck, I. A. and D. Sperber (Eds.) (2004). *Experimental Pragmatics*. Palgrave Macmillan.

Partee, B. (1984). Nominal and temporal anaphora. *Linguistics and Philosophy 7*(3), 243–286.

Reboul, A. (2004). Conversational implicatures: nonce or generalized? In I. A. Noveck and D. Sperber (Eds.), *Experimental Pragmatics*, Chapter 15, pp. 322–333. Palgrave Macmillan Ltd.

Storto, G. and M. K. Tanenhaus (2004). Are scalar implicatures computed online? In *Proceedings of WECOL*.

Wilson, D. and D. Sperber (1995). Relevance theory. In G. Ward and L. Horn (Eds.), *Handbook of Pragmatics*, pp. 607–632. Oxford: Blackwell.