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From thought experiments to real experiments in pragmatics

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Abstract

The puzzle of thought experiments is a hot topic in the philosophy of science. The paper raises the puzzle with respect to pragmatics as follows: How is it possible that thought experiments in pragmatics yield new experiential information about communication, although they are carried out entirely in one's head? The paper shows, first, that the structure of thought experiments in pragmatics consists of a series of plausible inferences. Second, the function of thought experiments is to serve as the initial step in the process of plausible argumentation as well as to test the plausibility of rival hypotheses. Third, while on the one hand, thought experiments and real experiments may be continuous, on the other hand, the former may be also indispensable components of the latter. Fourth, these properties provide a solution to the puzzle of thought experiments in pragmatics. The key idea of the solution is that thought experiments in pragmatics cannot generate new experiential information; rather, during the process of plausible argumentation they contribute to the retrospective re-evaluation of experiential information already given.

1. Introduction

The investigation of the relationship between thought experiments and real experiments in pragmatics is motivated by the state of the art in two different fields of inquiry.

The first is, of course, *pragmatics*. Currently, there is a growing interest in the application of experimental methods.¹ The use of real experiments in pragmatics is especially interesting, if one relates it to the *philosophical* origins of the discipline. In particular, Grice's ideas put forward in his seminal papers, Searle's widely discussed arguments for his account of illocutionary acts, and many other classical contributions to pragmatics have been based on invented 'stories' supporting the hypotheses which fertilized the development of this field. The way some authors characterise these stories highlights features which are typical of thought experiments. For example, Meibauer (2012: 769) maintains that "pragmatic *evidence* is more often than not construed as a *story*, the story reflecting *pragmatic intuitions* of a speaker or hearer" (emphasis added). Noveck and Sperber (2004: 8) maintain that "the only source of *evidence*" which those philosophers and linguists who developed pragmatics "have ever used has been their own intuition about how an *invented* utterance *would be* interpreted in a *hypothetical situation*" (emphasis added). The features mentioned in these quotations – narrative structure, intuition manifested in stories, hypothetical situation, invented case, the stories' being used as 'evidence' – strongly resemble those features which the philosophical literature attributes to thought experiments. Therefore, we assume that the hypothetical, imaginary situations which classical contributions to pragmatics make use of are interpretable

¹ For state-of-the-art overviews of current approaches to experimental pragmatics see e.g. Breheny (2011), Katsos and Cummins (2010), Noveck and Reboul (2008), Noveck and Sperber (eds.) (2004), Noveck and Sperber (2007), Németh T. (2006), Sauerland and Yatsushiro (eds.) (2009), Meibauer and Steinbach (eds.) (2011), Németh T. and Bibok (eds.) (2010).

as thought experiments. Then, the historical process that led from Grice's, Searle's, Austin's, Anscombe's and others' philosophical accounts of language use to the current state of the art in pragmatics, is associated with the transition from the exclusive use of thought experiments to a richer methodology which, besides retaining thought experimentation, includes the increasing application of real experiments as well (cf., for example, Noveck and Sperber 2004, Clark and Bangarter 2004, Noveck and Reboul 2008 etc.).

The second field is *the philosophy of science* which during the past two decades has seen a lively discussion on the structure and function of scientific and/or philosophical thought experiments. It has been realised that thought experiments had already been applied by the Pre-Socratics and later triggered many important insights such as Galileo's, Einstein's, Maxwell's, Schrödinger's discoveries etc., thus significantly contributing to the development of modern science.² The problem of the experiential content of thought experiments and their relationship to real experiments is one of the central topics of current discussions in the philosophy of science. The reason why thought experiments are subject to heated debates and why they are currently at the centre of interest is that they raise a seemingly mysterious puzzle. As Horowitz and Massey (1991: 1) put it, "[...] thought experiments often have *novel empirical import* even though they are conducted entirely inside one's *head* [...]" (emphasis added). They speak of "Kuhn's paradox", because Kuhn (1977: 241) raised it in a pointed way.³ Norton (2004a: 44) labels the same issue "the epistemological problem of thought experiments"; Kühne (2005: 25) calls it "the paradox of thought experiments". For the sake of later references, we formulate the puzzle as follows:⁴

The puzzle of thought experiments: How is it possible that thought experiments yield new experiential information about the world even though they are carried out in one's head?

Against this background, the aim of the present paper is to contribute to the clarification of the nature of thought experiments in pragmatics. However, due to the extreme methodological pluralism of pragmatics, our line of reasoning will have clear limits. First, we are compelled to discuss the problems we will raise on a high level of abstraction. Second, for lack of space, we cannot capture the whole diversity of thought experiments in pragmatics; therefore, we will illustrate our main tenets by a classical example taken from the philosophical origin of pragmatics. We will not be able to discuss the similarities and differences between the example chosen other kinds of thought experiments. Third, we will thereby focus on the issue of 'what is said' and 'what is implicated', because current trends in experimental pragmatics predominantly, though not exclusively, are directly or indirectly rooted in Gricean ideas. Fourth, the issue of 'what is said' and 'what is implicated' will motivate the choice of the examples by means of which we will illustrate the relationship between thought experiments and real experiments.

In order to achieve the aim we have outlined, we need a metatheoretical framework. Therefore, our first problem to be solved will be:

² For discussion see Brown and Fehige (2010), Rescher (2005), Sorensen (1992), Kühne (2005), Buzzoni (2008), Cohnitz (2006), Brown (1991), Gendler, (2000), Cohnitz (2006).

³ "How, [...] relying upon familiar data, can thought experiment lead us to new knowledge or to new understanding of nature?" (Kuhn 1977: 241).

⁴ The terminology in the literature on thought experiments is vague. For example, the terms 'empirical' and 'experiential' are not defined, and very often they are used interchangeably. Since the definition of 'empirical' is highly controversial and we cannot discuss it here, we will use the notion 'experiential' in a pre-explicative sense. We will apply this term to pieces of information which are rooted in a person's 'experiences' whatever the latter may be. For example, the results of real experiments or communicative situations in which one has already taken part, count as experiences and statements about such experiences are called 'experiential'.

(P1) What metascientific framework is suitable for the analysis of thought experiments in pragmatics?

We will start our line of reasoning in Section 2 by giving a brief overview of current trends in the philosophy of science which facilitate the investigation of the nature of thought experiments. From this overview, we will derive our framework, which we will apply to thought experiments in pragmatics in order to obtain the solutions to the problems (P2)-(P5) as raised below.

In Section 3 we will begin the application of the framework with the following problem:

(P2) What is the structure of thought experiments in pragmatics?

As an example, we will analyse one of Grice's classical thought experiments. Applying our metascientific framework, we will arrive at a solution to (P2).

Presupposing our solution to (P2), in Section 4 we will deal with the function of thought experiments:

(P3) What is the function of thought experiments in pragmatics?

Based on the solution to (P2) and (P3), in section 5 we will relate thought experiments to real ones:

(P4) What relationship is there between thought experiments and real experiments in pragmatics?

Having solved (P4) as well, we will be in a position to consider the puzzle of thought experiments with respect to pragmatics:

(P5) How do the solutions to (P2)-(P4) make it possible that thought experiments yield new experiential information about communication even though they are carried out in one's head?

Our solution to (P5) will partly integrate some of the insights discussed in the general philosophical literature and partly go beyond this literature.

Section 7 will pave the way for future research.

2. On (P1): Thought experiments and the philosophy of science

2.1. Introductory remarks

In this section we will set out to find a suitable metascientific framework capable of providing solutions to the problems (P2)-(P5). Before doing so, it should be made clear that there seems to be agreement that striving for a generally acceptable definition of the notion of thought experiment would be a hopeless endeavour (Kühne 2005). Accordingly, we will not attempt to give a general definition of thought experiments, either. Rather, we will propose a metascientific framework, the application of which will be expected to reveal at least some constitutive properties of particular thought experiments in pragmatics.

In Subsection 2.2 we will briefly summarise those trends in the philosophy of science which led to the current interest in the puzzle of thought experiments. In Subsection 2.3 we

will have a look at an account of thought experiments in linguistics. In Subsection 2.4 we will introduce the notions of plausible inference and plausible argumentation. Based on these notions, we will summarise our solution to (P1) in Subsection 2.5.

2.2. *The state of the art in the philosophy of science*

As regards the history of the philosophical reflection on the nature of thought experiments, there were early attempts made at the clarification of their structure and function in the late 18th and early 19th century. Kühne starts his overview of the state of the art with Immanuel Kant's *Kritik der reinen Vernunft* (Kühne 2005: 95 ff.) and Hans Christian Ørsted's *Experimenta circa effectum conflictus electrici in acum* (Kühne 2005: 105 ff.). Ernst Mach is considered the first 20th century thinker to call attention to the significance of thought experiments from the point of view of the philosophy of science (Mach 1960, 1976). However, the then prevailing perspective of logical positivism – which, following Reichenbach's distinction, focused on the 'context of justification' and was not interested in the 'context of discovery' – did not permit the realisation of the relevance of thought experiments for theory formation (cf. Moue et al. 2006: 64 ff, Kühne 2005: 19 f., Buzzoni 2008: 12 ff.). Thereby, it was the decline of logical positivism – decisively influenced by Kuhn's (1970) work – that, among others, facilitated the emergence of a series of tendencies within the philosophy of science and epistemology which paved the way for the systematic reflection on thought experiments:

(i) Due to Kuhn's (1970) impact, the relevance of the history of science for the philosophy of science was realised and, accordingly, issues were focused on which were very different from the rational reconstruction of scientific theories within the context of justification as advocated by logical positivism.

(ii) Related to the Kuhnian turn, the investigation of the context of discovery which logical positivism had excluded from the domain of the philosophy of science was, from the 1970s on, also identified as a substantial subject matter of the philosophy of science (Nickles 1980).

(iii) Finally, besides the shift of focus in the philosophy of science, new developments in psychology, cognitive science, logic and artificial intelligence research also contributed to the fact that the process of scientific problem solving emerged as a new topic of metascientific reflection.

Consequently, one may "trace the 'career' of thought experiments from almost total disregard to the point where thought experiments have been seen as a prominent methodological tool for 'actual thinking'" (Moue et al. 2006: 62).

In the past decades, numerous solutions to the puzzle of thought experiments have been suggested in the philosophical literature,⁵ but in the course of current debates none of them has turned out to be significantly more convincing than the others. The main argument often invoked against most of them (e.g. against Brown 1991, Norton 2004a, 2004b, Gooding 1990, Kuhn 1977, Sorensen 1992) in the debates is that they focus on very specific kinds of thought experiment taken from the natural sciences, but at the same time they commit the fallacy of hasty generalisation. In contrast, the workability of a few other approaches (Nercessian 1992, Mišćević 1992, Cooper 2005) can be questioned, because they are too general and 'empty' insofar as they do not define the means with the help of which particular thought experiments can be analysed. Due to these problems, none of the philosophical

⁵ See Brown (1991), Kuhn (1977), Rescher (1991), (2005), Gendler (2000), Norton (2004a), (2004b), Irvine (1991), Häggquist (1996), Cohnitz (2006), Nercessian (1992), Mišćević (1992), Cooper (2005), Gooding (1990), McAllister (1996).

solutions to the puzzle of thought experiments can be adapted to pragmatics as the *sole* framework for the solution of our problems (P2)-(P5).

2.3. *Thought experiments in linguistics*

Thomason (1991) discusses thought experiments in different fields of linguistics, but she does not mention examples from pragmatics. She distinguishes between two kinds: stage setting thought experiments and introspection. She characterises stage setting thought experiments as follows.⁶

- (1) (a) “In fact, the result of this sort of linguistic thought experiment is likely to be theory-dependent. The thought experiment will therefore not be a test of a hypothesis, but rather a stage-setting device that suggests tests that the linguist can carry out. In other words, the major role of the thought experiment is to clarify the theoretical issue, or to make it vivid, *as a first step in an argument*.
- (b) Often the thought experiment serves to get the audience’s agreement in advance about what would count as *supporting evidence* for the theory, even if that exact kind of evidence is not going to be forthcoming.
- (c) The second step – and it is a necessary one if the argument is to be successful – is a demonstration that some real-world situation is sufficiently *similar* to the result of the thought experiment that other linguists will accept that situation as supporting evidence.” (Thomason 1991: 247-248; emphasis added)

(1)(a) defines the *function* of stage setting thought experiments. It is important to emphasise that Thomason conceives of stage setting thought experiments in linguistics as components of an *argumentation process*.

(1)(b) suggests that stage setting thought experiments *do* have evidential significance, although – in connection with their being the first, preparatory step in an argumentation process – only to a restricted extent.

Thomason does not discuss the puzzle of thought experiments explicitly, but (1)(c) seems to open the possibility of a solution. In our interpretation (1)(c) says that an *analogical inference* can be constructed, one premise of which assumes the similarity between a real-world situation and the imaginary one described in the thought experiment. Via this premise the real-world situation supports the conclusion which corresponds to a particular hypothesis.

Introspective thought experiments are different:

- (2) (a) “Let us turn now to the other kind of linguistic thought experiment – *the kind that involves introspection*, by the linguist or by an informant (a native speaker of some language the linguist is investigating), about the appropriateness of a particular linguistic form or construction.
- (b) Thought experiments of this type are *actual tests of hypotheses* about language structure.” (Thomason 1991: 252-253; emphasis added)

(2)(a) characterises the *structure* of this kind of thought experiment, while (2)(b) contrasts the *function* of introspective thought experiments with that of stage setting ones.

⁶ We will divide the quotations into smaller units which makes it easier to refer to parts of the quotation to be analysed. The units do not necessarily correspond to paragraphs in the original text.

2.4. *Plausible inferences and plausible argumentation*

We think that a possible framework applicable to the solution of (P2)-(P5) should comprise the following components:

(i) *Stage-setting vs. introspective thought experiments*. We basically accept Thomason's (1991) distinction between stage setting and introspective thought experiments in linguistics. In the course of our reasoning we will have to check whether these two kinds are really distinct, or whether there are cases in which they are combined.

(ii) *The 'What if?' question*. Most authors agree that thought experiments are basically *conditional*. In accordance with Cooper (2005), Gendler (1998), (2000), Rescher (2005) and others, we will assume that a thought experiment supports a hypothesis about what the world would be like *if* the imaginary situation described were real. However, we have to specify *by what particular means* the answer to the 'What if?' question is obtained.

(iii) *Plausible inferences*. We assume that the link between the 'What if?' question and the answer to this question is provided by *plausible inferences*. This assumption can be motivated by the fact that in the philosophical literature there is a group of approaches which consider thought experiments to be reconstructed as inferences (Rescher 1991, 2005, Norton 2004a, 2004b, Irvine 1991, Häggquist 1996, Cohnitz 2006). However, most of the inferences that thought experiments consist of, lead to conclusions which, instead of being true with certainty, are only plausible to a certain extent. As Rescher (2005: 34) points out, "[...] thought experimentation [...] is not an instrumentality of *demonstration* but rather merely one of *plausibilification*: it is a tool not of *proof* but of *plausible reasoning*" (emphasis as in the original). The pioneering works on plausible inferences were put forward by George Polya, Douglas Walton and Nicholas Rescher (cf. e.g. Polya 1948, 1954; Rescher 1976, 1987). In the present paper we will adopt Kertész and Rákosi's (2012) approach to plausible inferences and plausible argumentation. Below we sketch the notions we need in a highly simplified, informal manner.⁷

The essence of plausible inferences can be best understood by contrasting them with deductive and demonstrative inferences. The conclusion of a deductive inference is true *provided that* the premises are true. Demonstrative inferences have an additional feature: besides being deductively valid, they rest on premises which one *knows to be true with certainty*. Therefore, their conclusion is *certain*, too (Polya 1948, 1954). As opposed to this, the main characteristic of plausible inferences is that they infer *plausible* conclusions from the premises. They are uncertain and fallible although they have heuristic power.

With respect to the structural relation between the premises and the conclusion, there are three basic types of plausible inference. In the first type at least one of the premises is not true but only plausible. Therefore, the conclusion cannot be certain, but is only plausible, too. However, it may be the case that the premises are true, but there is no logical consequence relation between them and the conclusion. Accordingly, in the second type *latent background assumptions* are needed which work as *hidden premises* and make it possible to transform the given inference-candidate into an inference in which there is a logical consequence relation between the premises and the conclusion. Such inferences are called *enthymematic*. This transformation consists in the extension of the set of the premises *explicitly given* by such latent background assumptions.⁸ Finally, the characteristics of these two types may be present *simultaneously*: there is no logical consequence relation between the explicit premises and the

⁷ For their precise definitions and numerous applications to different linguistic theories see the work mentioned. A first attempt to apply this approach to thought experiments is Kertész (2010).

⁸ A well-known example is inductive inferences, in which the set of the explicit premises has to be supplemented by the background assumption that the cases not examined also possess the characteristics that could be found in the investigated ones. The conclusion states the presence of these characteristics as a generalisation.

conclusion, and in addition, at least one of the explicit premises or latent background assumptions is not true with certainty but only plausible.

(iv) *Plausible argumentation*. The application of the notion of plausible argumentation can be motivated, among others, by Thomason's (1991) claim that stage-setting thought experiments in linguistics are parts of *argumentative processes*. However, we introduce the notion of plausible argumentation in a specific sense related to that of plausible inference, in accordance with Kertész and Rákosi (2012). Our point of departure is the fact that thought experiments are undoubtedly tools of *problem solving*. An informational state may be problematic in three ways. First, it may be informationally overdetermined. Informational *overdetermination* means that a certain statement is made plausible by a given source or an inference while its negation is also made plausible by some other source or inference; accordingly, inconsistency emerges. Second, the informational state at issue may be *underdetermined*, if there are statements which are neither plausible nor implausible. Third, it may be both over- and underdetermined with respect to different statements.

We call the heuristic device whose application aims at the elimination of the under- and/or overdetermination, *plausible argumentation*. It consists of a sequence of plausible inferences. During the process of plausible argumentation, by means of the sequence of plausible inferences, a problematic informational state is continuously re-evaluated by the elaboration of possible solutions to the given problems, the evaluation of the alternative solutions and the comparison of the latter. Since heuristics do not necessarily lead to the solution of a problem and may fail, plausible argumentation is fallible, too.

The process of plausible argumentation is not linear. It is *cyclic* in that during the argumentation process one returns to previous informational states and *retrospectively re-evaluates* former findings. In the course of such cycles the retrospective re-evaluation of the findings is – to use Rescher's (1987) term – *prismatic* in the sense that it is carried out from continuously changing perspectives during which new information is considered, and/or earlier findings are modified, deleted or supplemented by additional assumptions etc. It is important to emphasise that cyclic argumentation in this sense must be distinguished from circular argumentation. Circular argumentation (*circulus vitiosus*) returns to the starting informational state, therefore it is uninformative. As opposed to this, cyclic argumentation is effective, because it feeds back to a re-evaluated information content.⁹

2.5. *The solution to (P1)*

We summarise the solution to (P1) which we propose as (SP1):

- (SP1) The metatheoretical framework for thought experiments which is meant to provide a possible solution to (P2)-(P5) includes
- (a) a 'What if?' question;
 - (b) the distinction between stage setting and introspective thought experiments;
 - (c) plausible inferences as the tools of providing a possible answer to the 'What if?' question; and
 - (d) the cyclic, prismatic and retrospective re-evaluation of information by means of plausible inferences which constitute the process of plausible argumentation.

⁹ "The sort of 'self-criticism' at issue does not reflect any vicious or vitiating circularity, but in effect amounts simply to a *feedback* process that uses later, more refined stages of the analysis to effect revisionary sophistications in the materials from which earlier stages proceeded. One indeed returns to 'the same point' but does so *at a different cognitive level*" (Rescher 1976: 119; emphasis as in the original).

3. On (P2): The structure of thought experiments in pragmatics

3.1. An example: Grice on 'what is said' and 'what is implicated'

In order to show how our framework contributes to a possible solution of (P2), we choose as an example the first thought experiment in Grice (1989a) that raised the problem of the relationship between 'what is said' and 'what is implicated'. Since this is even today one of the most widely discussed central quandaries of pragmatics and its consequences reach as far as present-day experimental pragmatics, it is well suited to illustrate both the impact of thought experiments and the process of plausible argumentation that leads from thought experiments to real experiments in pragmatics.

Grice's famous thought experiment is as follows:

- (3) (a) "Suppose that A and B are talking about a mutual friend, C, who is now working in a bank. A asks B how C is getting on his job, and B replies, *Oh quite well, I think; he likes his colleagues, and he hasn't been to prison yet.* At this point, A might well inquire what B was implying, what he was suggesting, or even what he meant by saying that C had not yet been to prison. The answer might be any one of such things as that C is the sort of person likely to yield to the temptation provided by his occupation; that C's colleagues are really very unpleasant and treacherous people, and so forth. It might, of course, be quite unnecessary for A to make such an inquiry of B, the answer to it being, in the context, clear in advance. It is clear that whatever B implied, suggested, meant in this example, is distinct from what B said, which was simply that C had not been to prison yet.
- (b) It is clear that whatever B implied, suggested, meant in this example, is distinct from what B said, which was simply that C had not been to prison yet.
- (c) I wish to introduce, as terms of art, the verb *implicate* and the related nouns *implicature* (cf. *implying*) and *implicatum* (cf. *what is implied*). [...]" (Grice 1989a: 24.)

At first sight (3) seems to be a stage setting thought experiment in the sense of Subsection 2.3.¹⁰ Namely, (3) is the first step in the argumentation process starting with the section entitled *Implicature* in Grice's paper in that it raises the theoretical problem of the distinction between 'what is said' and 'what is implicated'. In this respect, the informational state at which (3) appears is underdetermined and thus problematic in the sense of (iv) in Subsection 2.4. In addition, the thought experiment in (3) aims at convincing the reader that this distinction and the introduction of the notion of implicature are well-motivated. Finally, the thought experiment is expected to be supplemented by further steps in later stages of the argumentation process which partly continue the argumentation initiated by the thought experiment, and partly re-evaluate its outcome retrospectively.

Our framework also suggests that Grice's thought experiment seeks an answer to the following 'What if?' question:

- (4) What would be the case if the imaginary state of affairs described in (3)(a) were actual?

¹⁰ However, we will see later that this impression needs to be refined.

(3)(a) describes a hypothetical, imaginary situation which is analogous to the well-known and much analysed paradigmatic examples of classical thought experiments discussed in the philosophy of science. It gives the following answer to (4):

- (5) If the imaginary state of affairs described in (3)(a) were actual, then the hypothesis would be plausible that the distinction in (3)(b) and the notion of implicature in (3)(c) are adequate.

We assume that in accordance with (SP1)(c) thought experiments in pragmatics can be decomposed into a series of plausible inferences. For the sake of illustration, we present a very simplified and merely partial reconstruction of the plausible inferences underlying the quotation in (3), emphasising that Grice's argumentation in the first and second paragraph of the section entitled *Implicature* (Grice 1989a: 24-25) is considerably more complicated. The relationship between (3)(a) and (3)(b) rests on the following inference:¹¹

- (6) Premises:
- (a) It is certain that by uttering *Oh quite well, I think; he likes his colleagues, and he hasn't been to prison yet* B said that C was not in prison yet.
 - (b) It is plausible that by uttering *Oh quite well, I think; he likes his colleagues, and he hasn't been to prison yet* B implied, suggested, meant that "C is the sort of person likely to yield to the temptation provided by his occupation, that C's colleagues are really very unpleasant and treacherous people, and so forth" (Grice 1989a: 24).
 - (c) <It is plausible that "what someone has said" is "closely related to the conventional meaning of the words (the sentence) he has uttered".> (Grice 1989a: 25)
 - (d) <It is plausible that what someone implies or suggests or means by uttering something, is distinct from the conventional meaning of the words he utters.>
 - (e) <It is plausible that if the conjunction of (a), (b), (c) and (d) is given, then "whatever B implied, suggested, meant in this example, is distinct from what B said, which was simply that C had not been to prison yet" (Grice 1989a: 24)>.

Conclusion:

It is plausible that "whatever B implied, suggested, meant in this example, is distinct from what B said, which was simply that C had not been to prison yet" (ibid.).

It is the plausible inference in (7) that underlies the relationship between (3)(b) and (3)(c):

- (7) Premises
- (a) <It is plausible that if two things have to be distinguished, and at least one of them has no name, then a new name for the latter has to be introduced.>
 - (b) It is plausible that what B implied, suggested, meant in this example, is distinct from what B said [...].
 - (c) <It is certain that what B implied, suggested, meant in this example, has no name.>

¹¹ Latent background assumptions are set within '<' and '>'. Moreover, we accept 'the weakest link principle' which says that the conclusion of a plausible inference takes its plausibility value from that of the 'weakest' explicit premise or latent background assumption (see e.g. Rescher 1976: XI f., 15, Kertész and Rákosi 2012). We also remark that the expressions 'it is plausible that' and 'it is certain that' merely indicate a very simplified representation of plausible statements. Kertész and Rákosi (2012) uses numerical scales of plausibility values whose introduction in the present paper would be beside the point.

Conclusion:

It is plausible that a new name for what B implied, suggested, meant in this example, has to be introduced.¹²

To show how these inferences shape the structure of the thought experiment itself as well as that of the process of plausible argumentation, which they are part of, we add a few comments. Let us first reflect on the relevant properties of the plausible inferences in (6) and (7):

(i) It is important to realise that except for (6)(a) the explicit premises and the latent background assumption of the inference in (6) are merely plausible. For example, the fact that (6)(c) and (d) are not true with certainty, but only plausible, is witnessed by the discussions that have taken place on the relationship between ‘what is said’ and ‘what is implicated’ during the past two decades (see also Section 5).

(ii) Both inferences are enthymematic. Beside the explicit premises, they also include latent background assumptions which have not been introduced explicitly, but without which the conclusion could not have been obtained. Consequently, (6) and (7) belong to the third type of plausible inference in that they are enthymematic and at least one of their explicit premises or latent background assumptions is not true with certainty. It is worth remarking that “[o]ne problem with enthymemes is that reasonable people can have differences of opinion on what the implicit assumptions are supposed to be. Filling in the missing parts of an enthymeme may depend on interpreting the natural language text in which the argument was put forward [...]” (Walton et al. 2008: 189).¹³ This problem with enthymemes may be one of the reasons why Grice’s distinction between ‘what is said’ and ‘what is implicated’ raised so much controversy and triggered so many interpretations. (In Section 5 such interpretations will be rendered as cyclic processes of the retrospective re-evaluation of (3)).

(iii) Moreover, (7) exemplifies how latent methodological rules shape the process of plausible argumentation and contribute to drawing plausible conclusions.

In accordance with (iv) in Subsection 2.4, we also have to assume that the plausible inferences in (6) and (7) are components of a process of plausible argumentation. In this respect, (6) and (7) have the following characteristics:

(i) At that stage of the argumentation process at which the thought experiment is carried out in Grice’s article, it is not clear in which sense Grice uses the word ‘say’. Therefore, the plausibility of (6)(c) is low. ‘Say’ is elucidated only in the next paragraph: “In the sense in which I am using the word *say*, I intend what someone has said to be closely related to the conventional meaning of the words (the sentence) he has uttered” (Grice 1989a: 25). That is, in a new ‘miniature’ cycle within the argumentation process the latent background assumptions (6)(c) and (6)(d) are retrospectively re-evaluated through the prism of the new information and, as a consequence, their plausibility increases. Nevertheless, the plausibility of (6)(d) is still lower than that of (6)(c), because there is no similar, relatively explicit feedback clarifying what is meant by ‘imply or suggest or mean’. These notions are retrospectively re-evaluated indirectly through the prism of further thought experiments in Grice (1989a), the introduction of the Cooperative Principle and the maxims as well as the argumentation in Grice (1989b) and (1989c).

(ii) In Grice (1989a) the above quotation is immediately followed by a series of further miniature thought experiments with the structure we have indicated. A new sub-cycle of the plausible argumentation process starts with a ‘What if?’ question; the plausibility of a possible answer to this question is assumed; and plausible inferences are used to obtain this answer,

¹² The pattern of both inferences corresponds to that of plausible *modus ponens*: {it is plausible that if *A* then *B*; *A* is plausible} \Rightarrow *B* is plausible.

¹³ Of course, this applies to our reconstruction of Grice’s argumentation in (6), (7), (9) and (10), too.

while these inferences are related to each other in the course of the cyclic, prismatic and retrospective re-evaluation of previously introduced information. Thus, the main issues which Grice's paper discusses – i.e. the distinction between 'what is said' and 'what is implicated', the Cooperative Principle, the conversational maxims, different examples of conversational implicature etc. – are not considered by a single thought experiment, but rather, by a complicated system of thought experiments.¹⁴

(iii) In discussing features of thought experiments in general, Sorensen (1992: 89) remarks that “[m]any thought experiments function as *reminders*” (emphasis added; see also Cohnitz 2006: 81). In Subsection 2.3 we quoted Thomason, who, in (1)(c), requires the *similarity* between the imaginary situation in the thought experiment and a real one. Independently of Sorensen's and Thomason's stance, Meibauer attributes the same feature to the stories pragmatists make use of:

- (8) “Part of the appeal of pragmatics to a wider audience certainly has to do with our willingness to reflect about stories. In the process of reflecting about stories, we *compare* the story told with *our own experiences*, i.e. a set of contexts we remember, *sharing* some properties with the story told.” (Meibauer 2012: 771-772; emphasis added)

Accordingly, if we identify such stories with thought experiments, then we may assume that the reader, for example of the thought experiment in (3), *compares* the imaginary communicative situation described there with her previous experiences made in real communicative situations. The structure of the comparison may be reconstructed as an analogical inference (which is a sub-type of plausible inference):

- (9) Premises:
(a) <It is plausible that the imaginary communicative situation as described in (3)(a) is similar to real communicative situations one has already experienced.>
(b) <It is plausible that in the imaginary communicative situation as described in (3)(a) whatever the speaker implied, suggested, meant is distinct from what she said.>

Conclusion:

It is plausible that in the real communicative situations one has experienced, whatever the speaker implied, suggested, meant is distinct from what she said.

Clearly, the conclusion of (9) retrospectively re-evaluates previous experience through the prism of the imaginary situation presented in the thought experiment.

(iv) After having introduced the Cooperative Principle and the conversational maxims, Grice (1989a: 29) explains them, maintaining that “it is just a well-recognized *empirical fact* that people do behave in these ways” (emphasis added). This is crucial for two reasons. First, it is not mentioned again in the later argumentation. Second, in the reconstruction of every further thought experiment in later sub-cycles, with the help of which Grice illustrates different aspects of conversational implicature, the empirical hypothesis that people behave in accordance with the Cooperative Principle and the maxims must be considered *as a latent background assumption* of an enthymematic plausible inference thus integrating *experiential content* into the thought experiment. As a simple example we refer to Grice's (1989a: 31) analysis of the story in (3)(a), the aim of which is to illustrate how conversational implicature is worked out with the help of the Cooperative Principle and the maxims, among other factors.

¹⁴ A detailed analysis of this structure, using the terminology of the framework we proposed above, would transgress the limits of the present paper.

A simplified reconstruction of one of the plausible inferences involved in the argumentation on p. 31 may be as follows:

(10) Premises:

- (a) <It is plausible that if (3)(a) is given and it is a well-recognised empirical fact that people behave according to the Cooperative Principle and the maxims, then B implicates that C is potentially dishonest.>
- (b) It is certain that (3)(a) is given.
- (c) <It is plausible that it is a well-recognised empirical fact that people behave according to the Cooperative Principle and the maxims.>

Conclusion:

It is plausible that B implicates that C is potentially dishonest.

3.2. *The solution to (P2)*

The above (simplified and partial) reconstruction of the structure of (3) illustrates a possible solution which our metascientific framework as summarised in (SP1) gives to (P2):

(SP2) A thought experiment in pragmatics of the kind illustrated in (3) has the following relevant structural properties:

- (a) It is a process of plausible argumentation beginning with a ‘What if?’ question and terminating with the answer to this question.
- (b) The answer is elaborated by a series of plausible inferences during the process of prismatic cycles of plausible argumentation retrospectively re-evaluating previously accepted explicit premises and latent background assumptions.
- (c) The plausible inferences applied may be enthymematic.
- (d) The process of plausible argumentation may also involve the comparison of the imaginary communicative situation with one’s own experiences of similar real communicative situations.
- (e) Hypotheses based on experience and considered empirical may be introduced in one of the sub-cycles of the argumentation process, and may be used as latent background assumptions of an enthymematic plausible inference in a later subcycle.

Although we have obtained (SP2) solely on the basis of (3), for the time being we assume that it is sufficiently abstract to serve as a starting point for capturing other kinds of thought experiments as well (see also Subsections 5.4.1 and 5.4.2). We assume that (SP2) is the ‘genus proximum’ which may be supplemented by ‘differentia specifica’ characteristic of particular subtypes of pragmatic thought experiment. Nevertheless, here we leave open the question, whether, and if so, how (SP2) may be modified in the light of further analyses of thought experiments used in current pragmatic research.

4. **On (P3): The function of thought experiments in pragmatics**

The structural properties as summarised in (SP2) pave the way for the fulfilment of the following functions of thought experiments:

(i) The philosophical literature distinguishes, among others, between *constructive* and *destructive* thought experiments (see e.g. Peijnenburg and Atkinson (2003), Brown and

Fehige 2010 etc.), and this distinction appears to be compatible with our metascientific framework. A thought experiment in pragmatics is constructive if in a process of plausible argumentation it increases the plausibility of a particular hypothesis about the subject matter of the argumentation at issue; it is destructive if it is intended to reduce the plausibility of the rival hypothesis. Grice's (1989a) *stage setting* thought experiments in his seminal paper are both constructive and destructive. On the one hand, among other things, Grice argued *against* "a common mistake" which "arises from the inadequate attention to the nature and importance of the conditions governing conversation" (Grice 1989a: 24). On the other hand, he argued *for* the plausibility of the hypothesis that there are "general conditions that, in one way or another, apply to conversation as such, irrespective of its subject matter" (ibid; on Grice's aims see also e.g. Neale 1992, Saul 2002 etc.).

(ii) Nevertheless, (3) is not a clear case of a stage setting thought experiment. It includes the description of English sentences while it is presupposed that the reader of the paper understands their conventional meaning in the same way as Grice does. Therefore, *semantic intuition* is indispensable for the workability of the thought experiment.

(iii) In addition, *pragmatic intuition* with respect to the context in which the utterance is uttered is needed for the workability of the thought experiment, too (see also Section 5 on semantic and pragmatic intuition). Meibauer (2012) emphasises that the stories – which we have interpreted here as thought experiments – are rooted in the author's pragmatic intuition in this sense.

(iv) This means that (3), besides being a stage setting thought experiment, can also be seen as *testing* alternative hypotheses by the use of *semantic and pragmatic intuition* involved in the thought experiment at issue. Thus, a thought experiment may be both stage setting and introspective, and the function of stage setting and testing may be *simultaneously* present. Therefore, Thomason's distinction is not mechanically applicable to thought experiments in pragmatics.¹⁵

(v) Accordingly, the thought experiment we analysed functions as *evidence* for the hypothesis in (5) proposed as an answer to the 'What if' question in (4) both in the sense of (1)(b) and (2)(b).¹⁶

Thus, we have obtained the following solution to (P3):

- (SP3) The function of a thought experiment in pragmatics of the kind exemplified in (3) may be
- (a) to work as a stage setting device in order to provide the initial step of a plausible argumentation process by
 - increasing the plausibility of a hypothesis about the subject matter of the argumentation at issue, and/or
 - reducing the plausibility of rival hypotheses;
 - (b) to test the plausibility of alternative hypotheses about communication on the basis of semantic and pragmatic intuition;
 - (c) to serve as evidence for or against the alternatives both in the sense of (1)(b) and (2)(b).

Just as in the case of (SP2), the question remains open, to what extent (SP3) as the 'genus proximum' should be supplemented by 'differentia specifica' in order to capture different kinds of pragmatic thought experiments.

¹⁵ For examples supporting this insight in the practice of current pragmatic research see Németh T. (2008), (2010).

¹⁶ Here we use the notion of 'evidence' pre-explicatively. For its explication within the present metascientific framework, see Kertész and Rákosi (2012).

5. On (P4): The relationship between thought experiments and real experiments in pragmatics

5.1. *Introductory remarks*

The philosophical literature on thought experiments devotes considerable space to the question of in what cases thought experiments fail (see for example Peijnenburg and Atkinson 2003, Cooper 2005, Thomason 1991, Cohnitz 2006). If we relate the suggestions discussed there to the framework we introduced in Subsection 2.4, we will obtain a straightforward answer to this question with respect to pragmatics. In particular, a thought experiment fails if the process of plausible argumentation, which it is part of, does not fulfil its function as specified in (SP3). Nevertheless, since the process of plausible argumentation is dynamic in that it involves the continuous re-evaluation of the information during the cycles, the failure of a thought experiment may be only temporary and may be remedied in later cycles.

In Subsection 5.2 we will discuss an example of the potential failure of Grice's thought experiment quoted in (3). Subsection 5.3 will show how in the pragmatic literature attempts have been made to correct the potential failure by the use of further thought experiments. Then, in Subsection 5.4 we will illustrate in what way real experiments are connected to thought experiments in the process of plausible argumentation. Finally, in Subsection 5.5 we will derive our solution to (P4) from our comments on these examples.

For lack of space, we will not present a precise reconstruction of the plausible inferences which constitute the argumentation process, but we will restrict the discussion to illustrating the ways in which Grice's thought experiment may fail and how its potential failure, mediated by many further thought experiments, eventually motivates the use of real experiments.

5.2. *From Grice's thought experiment to Grice's circle*

Early criticisms had already pointed out many alleged shortcomings of the answer that Grice gave in (5) to the 'What if' question in (4). These criticisms also affect indirect consequences of (5) inferred during the plausible argumentation process in Grice (1989a), such as his approach to speaker's meaning, the Cooperative Principle, the maxims, the way implicatures work etc.

Basically, the philosophical literature on thought experiments discusses three ways in which a thought experiment may fail. These can be exemplified with respect to (3) as follows:

(i) The first reason why a thought experiment may fail is that the answer given to the 'What if?' question is *unworkable* (see also Cooper 2005). As regards pragmatics, for example, the early criticisms of Grice (1989a) in Kempson (1975), Sadock (1978) and Kiefer (1979) can be interpreted in such a way:

- (11) (a) "[...] the theory is [...] *vacuous* and therefore of *no* explanatory power" (Kiefer 1979: 57)
(b) "[the Gricean maxims] do not even account for *the type of communication* they have been devised for." (Kiefer 1979: 60)
(c) "[...] "almost *any meaning* can be worked out on the basis of almost *any meaning*" (Kiefer 1979: 70)¹⁷

¹⁷ See also Searle (1969: 43-45).

(ii) A second kind of failure is when a thought experiment leads to *contradictory* conclusions (Cooper 2005, Thomason 1991, Peijnenburg and Atkinson 2003). Grice's work has often been charged with making this mistake. For example, Green (1996: 91) claims that the maxim of manner is contradictory in a self-refuting way:

- (12) "Insofar as *perspicuous* and *prolixity* are unnecessarily obscure expressions (compared to *clear* and *verbosity* or *too many words*), the statement of the maxim and its third submaxim violate the first submaxim; submaxim (3) violates itself as well with the obscure and repetitious paraphrase; and submaxim (4) is not ordered well with the others, bringing to mind infuriating recipes like that in (i)."

This is a good example of how in the course of the argumentation process thought experiments can – indirectly, through many plausible inferences, as remote consequences – *lead to* contradictions. Through a sequence of further thought experiments and plausible inferences, Grice's seminal thought experiment quoted in (3) led, among others, to the hypothesis that the Cooperative Principle and the conversational maxims are adequate. In contrast, one of the latter, in turn, led to the self-refuting contradictions unveiled in (12).

(iii) The philosophical literature mentions *circular argumentation* as a third possibility (Peijnenburg and Atkinson 2003, Thomason 1991, Cohnitz 2006). For lack of space, in what follows, we will illustrate only this type in somewhat greater detail.

'Grice's circle' emerges as an immediate consequence of the thought experiment with the help of which Grice made the first step toward introducing his account of implicature. Levinson defines the circle as follows:

- (13) (a) "Grice's account makes implicature dependent on a prior determination of 'the said'. The said in turn depends on disambiguation, indexical resolution, reference fixing, not to mention ellipsis unpacking and generally narrowing. But each of these processes, which are prerequisites to determining the propositions expressed, may themselves depend crucially on processes that look indistinguishable from implicatures.
- (b) Thus, what is said seems both to determine and to be determined by implicature. Let us call this *Grice's circle*.
- (c) It should be clear that this is not a minor point in Gricean exegesis. It is a circle that equally afflicts any theory that seeks to make a semantics/pragmatics distinction play a crucial role in the general theory of meaning. The 'said' can be taken to be truth-conditional content – the proposition expressed, the output of the process of semantic interpretation; the proper domain of a theory of linguistic meaning. The 'implicated' can be taken more generally than I am taking it here, to include all the processes of pragmatic inference; it is the proper domain of a theory of communication." (Levinson 2000: 186; emphasis as in the original)

(13)(b) states that 'what is said' – i.e. truth-conditional meaning – is the input to 'what is implicated', and 'what is implicated' is the input to 'what is said'. Nevertheless, Levinson goes further in (13)(c) where he raises the general problem of the relationship between truth-conditional semantics and pragmatics. Since the propositional content of utterances is the subject matter of truth-conditional semantics, while implicature belongs to the realm of pragmatics, the circular relation between semantics and pragmatics is at stake, too.

The fundamental relevance of the circle cannot be overlooked. It undermines the answer which Grice gave in (5) to the ‘What if?’ question in (4) via the thought experiment we quoted in (3) and which included the distinction between ‘what is said’ and ‘what is implicated’. The reason why the circle undermines (5) is that “the pragmatic enterprise that concedes that pragmatics intrudes into semantics (read: truth-conditional content or propositional forms) is circular, hence a *definitionally impossible enterprise*” (Capone 2006: 650). Thus, if the circle cannot be resolved, then the thought experiment in Grice (1989a) fails exactly in the sense the literature deems the emergence of circularity as the failure of thought experimentation in general.

5.3. Possible resolutions of Grice’s circle via new thought experiments

Without striving for a comprehensive overview, we illustrate possible resolutions of the circle proposed by a few examples (for a survey of the different standpoints see Ariel 2008: 261-308 and Buchanan 2010).

Bach (1994) introduced the notion of *impliciture* and elaborated on it in a series of later papers (see e.g. Bach 1999, 2001, 2007). This notion is intended to capture the middle ground between ‘what is said’ and ‘what is implicated’ and in this way the circle does not emerge. ‘Impliciture’ applies to cases in which the speaker has not been fully explicit. There are two kinds of impliciture. The first is when an utterance does not express a complete proposition, and therefore needs completion so that a complete proposition can be produced. In the second case, the utterance expresses a proposition, but the speaker communicates another proposition. In both cases, the speaker intends the hearer to understand something which has not been expressed explicitly in the utterance.

One of the most influential resolutions of the circle is Recanati’s, which the author put forward in widely cited publications (e.g. Recanati 1989, 2001, 2004 etc.). In his view “there is no such thing as ‘what the sentence says’ (in the standard sense in which that phrase is generally used)” (Recanati 2001: 87). Namely, ‘what is said’ incorporates optional contextual elements. It includes saturation (i.e. the fixing of reference, the specification of indexicals and the disambiguation of expressions) as well as optional processes such as *free enrichment* (Recanati 2001: 79). Thus, the notion of ‘what is said’ is a pragmatic notion at the outset, for almost everything one says includes pragmatic enrichment.

Levinson’s own approach distinguishes between three levels of meaning: sentence meaning, utterance-type meaning and utterance-token meaning. Sentence meaning is basically assumed to be conventional and semantically underdetermined. Utterance-token meanings are calculated on the basis of particularised conversational implicatures which are highly context-dependent and may include encyclopedic information as well. Utterance-type meanings result from inferences based on generalised conversational implicatures. However, in Levinson’s approach, generalised conversational implicatures are assumed to be default inferences that are relatively independent of the context, although in specific contexts they may be cancelled. They may contribute to the truth-conditional content of utterances. These distinctions boil down to the insight that “[t]here is every reason to try and reconstrue the interaction between semantics and pragmatics as the intimate interlocking of distinct processes, rather than, as traditionally, in terms of the output of one being the input to the other” (Levinson 2000: 242; see also Huang 2010: 627). Consequently, the circle can be avoided.¹⁸

¹⁸ Carston (2002a) criticises Levinson’s approach because, according to her, he does not offer an overall solution to Grice’s circle. Rather, he merely assumes that his approach to generalised conversational implicature, which he developed independently of the circularity issue, may soften its harmfulness. Carston also remarks that there are particularised conversational implicatures which influence propositional meaning, while others do not.

Carston's (2002a, b, 2004) relevance-theoretic resolution denies the assumption that there are generalised conversational implicatures as default inferences and claims that all inferences are warranted by contextual relevance. She assumes only a single principle, namely, relevance – in the sense of relevance theory – which is responsible for all kinds of conversational implicature as well as the contribution of pragmatics to truth-conditional meaning. In her view “[t]he mechanism that mediates the inferences from logical form to communicated propositions is one of ‘*mutual parallel adjustment*’ of *explicatures and implicatures*, constrained by the comprehension strategy” (Carston 2002a: 139; emphasis added). Consequently, there is no sequentiality, no input/output, and, consequently, no circle.

These approaches illustrate the status of thought experiments within the overall process of plausible argumentation focusing on the relationship between ‘what is said’ and ‘what is implicated’. Namely, all four approaches make use of *numerous thought experiments* in elaborating their own resolution of the circle. Nevertheless, even if one admits that they involve possible solutions to the problem of the relationship between ‘what is said’ and ‘what is implicated’, the problems they actually tackle are *different* both from those raised by Grice’s thought experiment and from what Levinson explicated as Grice’s circle. *None* of them are resolutions of *the* Gricean circle, but they are resolutions of *prismatically and retrospectively re-evaluated* versions of the latter. New thought experiments motivate, for instance, the application of ‘prisms’ such as the notions ‘generalised conversational implicature as default’, ‘implicature’, ‘free enrichment’, ‘explicature’, ‘mutual parallel adjustment’ by means of which the problems are retrospectively re-evaluated. Liedtke (2011: 46) claims that

(14) “[...] the protagonists (and antagonists) of the debate seem to operate on different levels. Looking for intuitions concerning the limits of what-is-said and elaborating conceptual tools for the description of the different types of reasoning processes do not seem to conflict necessarily, rather they might ‘cooperate’ in the search for an adequate account of layer-specific aspects of meaning.”

(14) can be easily interpreted as referring to the same process which we described above.

From the mechanism of plausible argumentation it also follows that Grice’s thought experiment did not fail in some ‘absolute’ sense. What was conceived of as a failure is merely a *temporarily existing* problematic informational state in particular cycles within the process of plausible argumentation. It disappears during the later cycles, while the latter, in turn, lead to further problematic states triggering new thought experiments that are subject to further re-evaluations and so on.

5.4. *From thought experiments to real experiments in pragmatics*

5.4.1 Example 1: The cyclic, retrospective and prismatic connection between thought experiments and real experiments in pragmatics

Works dealing with experimental pragmatics often mention that armchair linguistics or stories or intuitions, which we interpreted here as thought experiments, are predecessors of real experiments (e.g. Clark and Bangarter 2004, Gibbs 2004, Noveck and Sperber 2004, 2007). In order to illustrate how our framework handles this issue, we choose Noveck and Sperber (2007) as an example.

The authors’ aim is to show how *the limits* of intuitions as manifested in the stories we interpreted as thought experiments can be overcome by real experiments. In our terminology, they point out that thought experiments, which are simultaneously stage setting and

introspective, fail, because they cannot provide a workable solution to a specific sub-problem – i.e. that of scalar implicatures – of the problem of the relationship between ‘what is said’ and ‘what is implicated’. In addition, they also argue that real experiments provide *crucial evidence* with the help of which decisions can be made between alternative approaches that interpret the utterances at issue in the same way, but at the same time draw different conclusions with respect to the cognitive processes underlying these interpretations. These are decisions which the thought experiments they carried out were, due to their alleged failure, unable to trigger.

The authors raise the question of the relationship between ‘what is said’ and ‘what is implicated’ with respect to scalar implicatures. They argue against Levinson’s generalised conversational implicature (abbreviated as GCI) theory and for an account in terms of relevance theory. Relevant features of their line of argumentation can be summarised as follows.

(i) They start with a series of *thought experiments* the function of which is to set the stage for subsequent steps of their argumentation process. The authors put forward their own hypothesis which they contrast with Levinson’s. In Levinson’s view scalar implicatures are paradigmatic cases of generalised conversational implicatures. They are default inferences carried out in one step and require neither the context nor the entire mechanism of implicatures. As opposed to this view – and in accordance with what we have already mentioned in Section 5.3 – Noveck and Sperber’s experiments serve to illustrate that in accordance with relevance theory the interpretation of scalar implicatures is the outcome of mutual parallel adjustment between explicature and implicature, and that linguistic expressions do not encode but rather indicate the speaker’s meaning.

(ii) It is important to remark that these thought experiments fall within the scope of the very abstract characterisations in (SP2) and (SP3) which are merely meant to provide the ‘genus proximum’ of pragmatic thought experiments. However, the thought experiments applied by Noveck and Sperber also show clear differences from Grice’s thought experiment in (3).¹⁹ For example, one substantial difference is that in numerous plausible inferences related to the thought experiments the authors (unlike Grice) continuously change one of the explicit premises or latent background assumptions in order to discover the consequences of the changes. In this way, during a series of plausible argumentation cycles, they consider several alternative hypotheses from which, by the use of further plausible inferences, they try to select the most plausible ones.

(iii) In this way, the thought experiments eventually lead to two rival hypotheses with respect to the speed of interpretation in cases in which an enriched interpretation is not contextually primed. The rival hypotheses are as follows:

- (15) The GCI theory (in the form Noveck and Sperber retrospectively re-evaluate it) predicts that:
 - (a) the literal interpretation of the scalar term is slower when it is enriched by default and then context-sensitively cancelled;
 - (b) the enriched interpretation is computed by default and is hence faster.

- (16) Relevance Theory predicts that:
 - (a) the literal interpretation without enrichment is faster;
 - (b) the context-sensitively enriched interpretation is slower.

¹⁹ The issue of the relationship between ‘philosophical’ and ‘scientific’ thought experiments is an important one, but discussing it would transgress the limits of the present paper.

(iv) At this point *real experiments* enter the scene, whose aim is to support the plausibility of (16) and to reduce that of (15). Within the first sub-cycle of the real experimental argumentation cycle the authors report on three real experiments in which children's reasoning was investigated with respect to scalar inferences. The results of the experiments were published in Noveck (2001). With respect to the decision between the two hypotheses in (15) and (16), Noveck and Sperber's evaluation of the outcome of these developmental experiments was double-sided:

- (17) (a) "If children had been found to perform scalar inferences by default, this would have been strong evidence in favour of the GCI theory approach. However, taken together, developmental data suggest that, for children, enriched interpretations of scalar terms are not default interpretations.
- (b) This data is not knock down evidence against GCI theory, because it is compatible with two hypotheses: 1) scalar inferences are not default interpretations for adults either (even if adults are more likely to derive them because they can do so with relatively less effort and because they are more inclined to invest effort in the interpretation of an utterance given their greater ability to derive from it cognitive effects). Or, 2) in the course of development, children become capable and disposed to perform scalar inferences by default. The first hypothesis is consistent with the relevance theory approach while the second is consistent with the GCI approach.
- (c) To find out which approach has more support, further work had to be done with adults." (Noveck and Sperber 2007: 203)

(17)(a) claims that the data obtained by these experiments increase the plausibility of the hypothesis of relevance theory and reduce that of GCI theory.

(17)(b) re-evaluates this conclusion by taking further information into account which may speak both for assumption 1) and assumption 2) in the quotation. Thus, a local inconsistency between (17)(a) and (b) arises which corresponds to informational overdetermination and is problematic.²⁰

(17)(c) indicates that, in order to make the decision between the alternatives, another sub-cycle within the plausible argumentation process is to be carried out which once again re-evaluates this informational state through the prism of the information provided by future experiments.

This example illustrates that in current research, thought experiments and real experiments may be *directly connected*. But this connection involves much more than the fact that "pragmatic intuitions about exemplary utterances might be backed by an experimental account that might strengthen the evidence of certain claims about the limits of what-is-said [...]" (Liedtke 2011: 46). Namely, the connection between the thought experiments and the real ones is, as opposed to what is assumed by Liedtke, *not linear*, but cyclic. In the terminology of our metascientific framework, the relation between thought experiments and real ones can be characterised as the transgression between two argumentation cycles in the following way:

(i) The argumentation process based on the plausible inferences, which thought experiments consist of, is continued by a new argumentation cycle based on real experiments.²¹ In this way, during the real experimental cycle the findings provided by

²⁰ See (iv) in Subsection 2.4 for these notions.

²¹ In fact, it is not the experiment itself, but the experimental report that is to be considered as plausible argumentation. The experimental report is for example part of Noveck and Sperber (2007) and thus the argumentation cycles it consists of are comparable to the argumentation cycles including the thought

thought experiments are made use of as *stage setting* devices without which real experiments could not have been designed.

(ii) The results of the real experiments retrospectively *re-evaluate* the conclusions obtained by the plausible inferences in the thought experiments in that they increase the plausibility of (16)(a) and (b) and decrease that of (15)(a) and (b). The results of the thought experiments are viewed through the prism of the new pieces of information, which include, among others, the experimental design and the outcome of the real experiment.

5.4.2. Example 2: Thought experiments as parts of real experiments in pragmatics

There is also another important kind of relationship between thought experiments and real experiments: thought experiments may be substantial *components* of what pragmatists treat as real experiments. Again, the illustration will be taken from the controversy about the problem of ‘what is said’ and ‘what is implicated’.

The reason why despite its well-known shortcomings we choose Gibbs and Moise (1997) as an illustrative example is that, on the one hand, it was the first attempt to examine experimentally whether people distinguish systematically between ‘what is said’ and ‘what is implicated’.²² On the other hand, the discussion which the paper raised is still used as a point of departure in current research (see e.g. Larson et al. 2009, Liedtke 2011).

In one of the experiments the authors report on the experimentees were asked to read stories like the following:

(18) “Bill wanted to date his co-worker Jane. Being rather shy and not knowing Jane very well, Bill asked his friend, Steve, about Jane. Bill didn’t even know if Jane was married or not. When Bill asked Steve about this, Steve replied *Jane has three children.*” (Gibbs and Moise 1997: 61; Gibbs 2004: 64)

Next, they had to choose the best paraphrase of the final expression from these three options:

- (19) (a) Jane has at least three children.
(b) Jane has exactly three children.
(b) Jane is already married.

(19)(a) is the minimal interpretation of ‘what is said’, (19)(b) is the pragmatically enriched interpretation and (19)(c) is the particularised conversational implicature. The result of the experiment was that the majority of the participants chose the enriched interpretation. Consequently:

(20) “These findings show that pragmatics strongly influences people’s understanding of both what speakers say and communicate. It appears that Grice’s examples of generalised conversational implicatures are not implicatures at all but understood as part of what speakers say. More generally, the Gibbs and Moise (1997) findings

experiments. In this context we remark that, first, it would be necessary to ask questions with respect to pragmatic experiments in analogy to (P2) and (P3) – that is, what kind of structure they have and what their functions are. However, for lack of space we refer to Kertész and Rákosi (2012) where these questions are raised and partially answered in an extensive case study within the framework of plausible argumentation. Second, the philosophical literature also discusses the fact that every real experiment has to be carried out in thought before it is carried out in reality (see e.g. Buzzoni 2008).

²² Gibbs and Moise (1997) was fiercely criticised in Nicolle and Clark (1999); see also Gibbs’ (1999) answer.

suggest that the distinction between saying and implicating is orthogonal to the division between semantics and pragmatics.” (Gibbs 2004: 64)

From the point of view of the present paper, this example illustrates the following:

(i) Sorensen (1992: 76-86) and Cohnitz (2006: 80-83) characterise stories in real experiments similar to (18) as thought experiments ‘embedded’ into a real experiment.

(ii) From the point of view of the experimenter, there is an underlying ‘What if?’ question the answer to which is expected to support the plausibility that the hypothesis in (20) is adequate. This process can be reconstructed as a series of plausible inferences in analogy to those in Section 3.

(iii) (18) also shows characteristics of introspective thought experiments. It is built on two kinds of intuitions. It involves the semantic intuition of both the experimenters and the experimentees who have to judge the conventional meaning of the italicised sentence. In addition, it involves pragmatic intuition, which concerns the context presented (Meibauer 2012).

(iv) A thought experiment like (18) may be a necessary component of a real experiment without which the latter could not have been carried out.

(v) As in the preceding subsection, it should be pointed out here, too, that due to their high level of abstraction, (SP2) and (SP3) are assumed to apply to such thought experiments as well. Nevertheless, they may have additional features (‘*differentia specifica*’) making (18) differ both from (3) and from the thought experiments applied in Noveck and Sperber (2007). The question of the exact nature of these differences has to be left open here.

The latest literature abounds in reports on real experiments tackling the problem of the relationship between ‘what is said’ and ‘what is implicated’. Many of them include thought experiments similar to (18) (see e.g. Breheny et al. 2006, Guasti et al. 2005, Katsos and Cummins (2010), Larson et al. 2009, Liedtke 2011 etc.).

5.5. *The solution to (P4)*

Now we can summarise our solution to the problem (P4):

- (SP4) (a) Although thought experiments may fail, they are indispensable for the success of pragmatic inquiry.
- (b) There may be a cyclic, prismatic and retrospective connection between thought experiments and real experiments within the overall process of plausible argumentation in that
- the latter might remedy the potential failure of the former;
 - thought experiments may work as stage setting devices for real experiments; and
 - real experiments may increase or decrease the plausibility of a hypothesis obtained by means of a series of plausible inferences initiated by a thought experiment.
- (c) Thought experiments may correspond to subcycles of the plausible argumentation process involving the real experiment as manifested in the experimental report.

6. **On (P5): The puzzle of thought experiments in pragmatics**

Having illustrated the structure and function of thought experiments as they appear in a classical contribution to pragmatics as well as some aspects of the relationship between thought experiments and real experiments, we now turn to our solution of the problem (P5). The key idea of the solution follows from (SP2)-(SP4): Thought experiments in pragmatics do not provide new experiential information directly; they do so *indirectly*. On the one hand, new experiential information is obtained from sources which are outside the thought experiment: for example, from real experiments or personal experiences with real communicative situations. On the other hand, thought experiments may *feed* experiential information rooted in such sources *into* particular cycles of the plausible argumentation process. Thereby, they cannot generate new experiential information, but they contribute to the re-evaluation of experiential information already given.²³ This key idea boils down to the following solution to (P5):

- (SP5) Thought experiments in pragmatics *may* contribute to feeding new experiential information into the process of plausible argumentation indirectly by means of
- (a) the latent background assumptions of plausible inferences as a result of which the information content of the conclusion may transcend that of the explicit premises;
 - (b) the comparison of an imaginary communicative situation with experiences of similar communicative situations in the real world;
 - (c) the cyclic, prismatic and retrospective connection between thought experiments and real experiments;
 - (d) the integration of thought experiments into real experiments.

Let us add the following comments to (SP5):

Ad (SP5)(a). In (SP2)(c) we pointed out that in pragmatic thought experiments enthymematic plausible inferences as introduced in (iii) in Subsection 2.4 may be present. In these cases the information content of the conclusion, due to the latent background assumptions, goes beyond the information content of the explicit premises. Thus, those thought experiments which are built on enthymematic inferences, *may* yield *new* knowledge – nevertheless, this knowledge is not new in some ‘absolute’ sense, but is only new *relative to the explicit premises*. Even in this case, the new information need not be experiential, though it *may* be. If it is, then the conclusion may contain experiential information not inherent in the explicit premises – as we have seen in (SP2)(e) and in (10). But the conclusion cannot include more experiential information than the latent background assumptions. Thereby, the source of the experiential information in the latent background assumptions is something external to the thought experiment and, accordingly, the corresponding cycle of the argumentation process at issue – for example, personal experience as witnessed by the example in (10). Thus, in certain cases a thought experiment containing at least one enthymematic inference can feed experiential information into the argumentation process indirectly, through the latent background assumptions of plausible inferences.

Ad (SP5)(b). From (SP2)(d) it follows immediately that through the comparison between an imaginary communicative situation which was referred to in the thought experiment and real communicative situations already experienced, insights can be obtained with respect to the way real communication works. This claim is in accordance with Sorensen’s (1992: 89) and Thomason’s (1991: 248) stance. Accordingly, the conclusion of the analogical inference in (9) contains experiential information which, nevertheless, has already been included in the explicit premises and/or the latent background assumptions. However,

²³ This claim is in accordance, for example, with Gähde (2000) and Rescher (2005).

the sources on which the explicit premises and/or the latent background assumptions lie, are outside the thought experiment. Here again, the effect of the thought experiment is indirect in that through such an analogical inference it adds experiential information – which has already been given quite independently of the thought experiment – to the argumentation process.

Ad (SP5)(c). On the one hand, in agreement with (SP3)(a), the second claim of (SP4)(b) says that thought experiments in pragmatics may set the stage for real experiments. Thus, they *indirectly* contribute to the results of the latter. This finding is in agreement with the claim that “[t]hought experiments anticipate the results of real experiments and in this way they inductively extend our knowledge” (Buzzoni 2008: 96). On the other hand, the new experiential information obtained by carrying out the real experiment may retrospectively re-evaluate the outcome of the thought experiment through the prism of the experimental design, the materials and the results themselves. In this case the real experiment works as an *experiential* source on the basis of which the plausibility of the hypotheses the thought experiment leads to can be judged. Consequently, the outcome of this judgement may be experiential – but only indirectly, obtained in the course of the cycles of retrospective re-evaluations through the prism of the real experiment.

Ad (SP5)(d). As (SP4)(c) maintains, thought experiments may be components of real experiments. In accordance with Sorensen (1992: 76-86) and Cohnitz (2006: 80-83), they work as new data sources and may support the experiential findings obtained by the real experiment.

The way and the extent to which some or all of these factors are present and interact depends on the particular properties of the plausible argumentation process at issue and cannot be generalised.

7. Concluding remarks

By proposing possible solutions to the problems (P1)-(P5), we seem have achieved the aim of the present paper. Yet, our findings as summarised in (SP1)-(SP5) raise further problems among which the following are especially important:

(i) Throughout our line of reasoning we reflected on the philosophical literature on thought experiments in order to demonstrate that our findings partly integrate some of its insights, and partly go beyond the latter. In our comments on (SP5) we cited the philosophical literature which our findings are in agreement with. However, in spite of this, our approach differs substantially from any other account of thought experiments we are familiar with. In particular, our claim that thought experiments in pragmatics are pieces of the *dynamic* processes of plausible argumentation in the way we characterised it, goes *far beyond* the approaches discussed in the philosophical literature. Accordingly, the question arises, in what way and to what extent more detailed applications of Kertész and Rákosi (2012) would shed fresh light on this process.

(ii) (SP2)-(SP5) also show that in pragmatics thought experiments are still *indispensable* tools of research and cannot be simply substituted by real experiments. Nevertheless, their role with respect to experimental pragmatics is certainly much more sophisticated than we could indicate here and needs, therefore, further scrutiny.

(iii) Our argumentation theoretic solution to the puzzle of thought experiments in pragmatics raises the question of whether it can be applied to thought experiments outside pragmatics. If so, then pragmatics may *contribute to* the solution of a methodological puzzle which is a hot topic in the contemporary philosophy of science.

(iv) Both thought experiments and real experiments are sources of the *data* on which hypotheses rest (see Kertész and Rákosi 2012). In this respect, it is important to touch briefly

on the current discussion on data in linguistics (see. e.g. Borsley (ed.) (2005), Penke and Rosenbach (eds.) 2007, Kepser and Reis (eds.) (2005), Sternefeld (ed.) (2007), Featherston and Winkler (eds.) (2009), Winkler and Featherston (eds.) (2009) etc.). The main findings of the present paper may contribute to the discussion by calling attention to the necessity to *integrate* different data sources and data types in pragmatics (see e.g. Clark and Bangartner 2004, Meibauer 2012 etc.). As we have seen, the integration of stage setting thought experiments, introspective thought experiments and real experiments as different *data sources* is well-motivated. These sources yield different *data types* each of which seems to be relevant for theory formation in pragmatics; consequently, semantic intuition, pragmatic intuition and experimental data should be used in combination. How these data sources can be integrated and how these data types interact is a central and still open methodological question of current research in pragmatics.

(v) Our paradigmatic example which served as a point of departure for solving (SP2)-(SP5) was a *single* thought experiment, taken from classical philosophical pragmatics. Throughout our line of reasoning we referred to the diversity of thought experiments and indicated some of the properties which might distinguish the thought experiments mentioned in Subsection 5.4 from our paradigmatic example in (3). However, we did not systematically go into the question of what the ‘*differentia specifica*’ are that may define particular types of pragmatic thought experiment.

Due to these problems, whose discussion must be left for future research, any hasty generalisation of our solutions to the problems (P2)-(P5) would be misguided.

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