On the Objects of Belief

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1. Introduction

When I talk about the objects of belief I do not mean, e.g., the sun to which my thought that the sun will rise tomorrow refers; I do not mean the objects we think about. I take objects rather in a general philosophical sense; they simply are the bearers of properties and the relata of relations. I am thus concerned with the objects that are related by the belief relation „*a* believes that *p*". In this scheme „*a*" represents a person or an epistemic subject; but I am not going to discuss what a person is. „*p*" or „that *p*" represents an object, namely the object of belief; and I am going to discuss what this is. In other words, I am interested in belief contents – to use a less neutral, narrower and equally unclear term.

More precisely, I am interested in a specific claim: The most popular view presumably is that the objects of belief are propositions. The last fifteen years brought increasing evidence that this propositional view has to be rejected. In fact, I believe it to be false. So, my central claim, to be explained in section 9, is that there is a better conception, which I shall call „the intentional conception". To my knowledge, the intentional conception as I understand it received its first relatively clear statement in Perry (1980). However, it seems less well-respected than it deserves, and it still lacks a precise formulation. My chief concern, pursued in sect. 7-10, is therefore to clarify the intentional conception and to offer some new arguments in its support. I shall end in sect. 11 with a brief description of its rich consequences. I shall start, however, by reaffirming, as a kind of stagesetting, how

central the theory of the objects of belief is kto the whole of epistemology. This requires some sorting out – which occupies the next five sections.[1]

2. Theory of knowledge and theory of belief

Current philosophical epistemology may be divided into two main areas: the theory of knowledge and the theory of belief. The theory of knowledge obviously embraces the problem of scepticism that Descartes once engraved into philosophical thinking: can I know anything at all? This issue struck me as immaterial ever since. It is surely nurtured by a confusion of knowledge and certainty, though its huge impact on the history of ideas is not yet exhausted.[2] Also central to the theory of knowledge is the Theaetetus-Gettier-problem: i.e. the search for the third and fourth condition of knowledge: What distinguishes knowledge from true belief? Reasons. This is not enough, however. What distinguishes knowledge from justified true belief? That's an open question.[3] In contrast, the theory of belief concerns nothing but belief.

Historically, the theory of knowledge certainly dominated the scene and it still seems to attract more attention than its cousin, the theory of belief. I hold this to be rather unfortunate because it does not mirror the order of things. The theory of knowledge depends upon the theory of belief at two points. First of all, the concept of belief obviously figures directly in the analysis of knowledge. Second, the concept of justification plays an important role in the analysis of knowledge, and this concept is closely connected with changes of our doxastic states, i.e. belief states: ideally or rationally a change in our beliefs follows the reasons we get, or, as we might also say turning things upside down in a Humean fashion, reasons are what changes beliefs in accordance with rational rules of belief change. Thus, a

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1 I would like to thank Wolfgang Benkewitz who has tried to convince me for more than ten years of the plausibility of the line of thought I am pursuing here and especially my wife Ulrike Haas-Spohn for the numerous thorough-going discussions about this inexhaustible subject matter which reach back till summer 1988. Moreover I am indebted to Martin Anduschus for translating my original paper into English.

2 Compare, for example, Goodman's continuation of Hume's skepticism about induction (in Goodman, 1955, esp. ch.3 and Kripke, 1988, esp. p.55ff.).

3 See, for example, the papers translated in the first part of Bieri (1987).

theory of knowledge needs to be based upon an adequate theory of belief. I am therefore more interested in the latter.[4]

3. Pure and embedded theory of belief

Chiefly, the theory of belief is not discussed in its pure form, but in the context of its input-output relations. There are, on the one hand, non-linguistic connections: beliefs are continually initiated and shaped by perceptions and they manifest themselves in our intentional and non-intentional behaviour. There are, on the other hand, linguistic connections – at least for beings like us: our beliefs are continually influenced by written or oral utterances of others and they manifest themselves in our own utterances.

It is absolutely necessary to investigate these connections because the theory of belief is partially an empirical theory.[5] As such it is subject to the same tests as other empirical theories. Therefore, a theory of belief remains empty unless it says something about the genesis and manifestation of beliefs and generally about the causal web in which they are located. This much we learned from the positivists, even though they exaggerated their insights.

It is nevertheless somewhat dangerous to approach the theory of belief from this point of view; we thereby narrow our perspective: If we consider linguistic connections we are likely to get stuck with belief de dicto.[6] If we focus on the connection between beliefs and the perception of non-linguistic events we arrive at belief de re[7] ; since perception typically leads to knowledge this path might also

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4 The main motive for ranking the theory of knowledge before the theory of belief lies in the idea that knowledge is the original form of belief and that beliefs not amounting to knowledge are somehow deviant and dependent on a rich background of knowledge (similarly, lies seem to exist only when sincerity is the rule). This idea is widespread; e.g. it forms the basis of Davidson's theory of interpretation (see, for example, Davidson, 1990, sect. II and III). I feel the pull of this idea, but it cannot reverse the outlined order of things. At best the idea might occur as a theorem of a theory of knowledge, but this theory would have to rest on a theory of belief.

5 More precisely, it is part of the general theory of rationality the hybrid character of which as an empirical *and* a normative theory I tried to describe in Spohn (1993). This will become relevant in sect. 5.

6 The basic linguistic connection is given by the disquotation principle which is concerned with belief de dicto. For an extended discussion see Kripke (1979).

7 Even though plausible and important, this claim does not seem to be sufficiently acknowledged in the literature.

take one to the theory of knowledge. If one is finally concerned with non-linguistic behavior one has great trouble in identifying beliefs to begin with because beliefs typically manifest themselves in behavior only in complicated mixtures with other psychological states.[8]

Moreover, it must not be overlooked that these connections do not exhaust the theory of belief. This theory owes its unity to a deeper core that allows substantial claims irrespective of the aforementioned connections. I would like to call this core the pure theory of belief. It forms the subject matter of the remaining sections.

4. The main tasks of the pure theory of belief

The pure theory of belief has two tasks which may be read off from its basic term. This term designates a four-place relation: „subject *a* believes at *t* to degree *r* that *p*". I shall say something about the degrees of belief, but the first question obviously is what „*p*" or „that *p*" stands for; that is, we have to investigate the objects of belief. There is reason to think that this basic concept is somehow ambiguous; the de re/de dicto distinction is known for long, and this distinction probably hides several distinct phenomena.[9] If there is such an ambiguity, then we have to clarify the various readings and their interrelations, possibly via a single basic belief relation. This belongs to the first task of a pure theory of belief.

The second task first concerns the laws of coexistence that organize the interrelations between beliefs. The overall doxastic state of a person usually deals with many objects of belief and is therefore restricted in its organization by certain laws. To mention two examples: doxastic logic states such laws for non-graduated plain beliefs, and the mathematical theory of probability, if subjectively interpreted, delivers the most important model for graduated belief.[10]

Chiefly, the second task concerns the dynamics of the belief relation or its laws of succession which govern the changes of doxastic states. At this point the

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8 This is a well known fact; see Hempel (1961/62, section 3.3) for a good explanation.

9 Haas-Spohn (1988) provides an overview.

10 See Hintikka (1962) and Lenzen (1980) concerning doxastic logic. Lenzen also provides an extensive discussion of the possible interrelations between doxastic logic and the theory of probability.

recognition of various degrees of beliefs becomes relevant; there is no adequate formulation of the dynamics of belief without them.[11] Again the theory of probability provides the main example, but various alternatives have come up in the last 20 years. The amount of literature which deals with this topic is increasing rapidly.[12]

In this paper I am concerned with the first task. The second task must also be mentioned for the sake of completeness. I find it regrettable that these tasks are usually pursued independently and without much knowledge or understanding of one another. This practice is even dangerous since the issues appear to be interrelated. In fact, my thesis concerning the objects of belief will rest on arguments deriving from the dynamics of belief.[13]

5. Computational versus semantic characterizations of the objects of belief

There are, roughly, two ways to characterize objects of belief in the literature: they are either identified with propositions or with sentences. More precisely, the classification is as follows: Characterizations of objects of belief may either focus on semantic aspects, on the fact that beliefs are true or false; or they may focus on the fact that beliefs have to have some encoding or some syntactic structure and are thus apt for a computational treatment.

This classification can be clarified through a few examples. Consider semantic characterizations. These are as numerous as theories of meaning themselves. There are, for example, the thoughts of Frege (1918)[14], the singular and general propositions of Russell (1910/11 and 1918/19), the intensions of Carnap (1947), the model sets of Hintikka (1962), the characters of Kaplan (1977), the

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11 See, e.g., the discussion in Spohn (1988, sect. 2 and 3).

12 The three most important alternatives are Shafer (1976), Gärdenfors (1988) and Spohn (1988, 1990). The relevant discussion is still found in the theoretical spheres of artificial intelligence rather than in philosophy.

13 Nida-Rümelin (1993) also points to interrelations between these issues. She argues that various probabilistic puzzles like Freund's problem or the problem of the three prisoners derive from the fact that probabilistic statements also exhibit a de re/de dicto ambiguity.

14 Frege is a problematic case, however. The only identity criterion for thoughts he actually gives is a psychological one which does not necessarily support this subsumption of Frege; c.f. Kemmerling (1990, pp.161ff.) on this issue.

propositional concepts and their diagonals introduced by Stalnaker (1978), properties as Lewis (1979) conceives them, and the situations of Barwise and Perry (1981 and 1983, ch. 9-10) and various constructions thereof. All these things and several more besides have been proposed as objects of belief. It is hard to overstress the main strength of these proposals, namely that they allow the construction of substantial theories, with respect to the other main task of a pure theory of belief as well as with respect to its embedding in pragmatics and in theories of action and perception. Their main weakness, which in fact motivates the search for alternatives in the first place, is that they allow too much theory construction. It is the well-known ‚problem of deduction', as Stalnaker (1984, ch. 5) once called it:

Whether two sentences express the same object of belief obviously depends on the semantic characterization we choose. However, almost all semantic characterizations yield the result that logically equivalent sentences express the same object of belief. According to this result the complement clause of a belief sentence like „*a* believes that *p*" ought to be substitutable for a logically equivalent sentence salva veritate. This, however, seems patently wrong.[15] It is quite simple to confront me with one of my beliefs in a different, but logically equivalent form which I do not recognize as such and thus do not affirm. In such a case it seems quite pointless to insist that I have the belief in both forms.

In order to solve this problem it seems necessary to refer in one way or other to the syntactic structure of the sentences expressing the objects of belief. This move takes us to the family of what I shall call computational characterizations of the objects of belief. As far as I know, Carnap (1947, sect. 14f.) developed the first account in this camp by limiting substitutions of complement clauses to intensionally isomorphic sentences. There is the idea championed by Quine (1960, §§ 44f.) that propositional attitudes are relations directly to sentences. The family also includes the structured propositions of Cresswell and von Stechow (1982), the propositions of type 2 and type 3 of Bealer (1982, sec. 14 and 43) and various constructions from relevance logic.[16] Some of these proposals come in a semantic disguise (e.g. Bealer 1982) and might thus seem misplaced in my classification. I find, however, that even in these proposals the syntactic structure

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15 Barwise's and Perry's theory is the only one in my list of semantic characterizations that does not generally allow for the substitution of logical equivalents. However, even their stricter conditions for substitutions in attitude ascriptions do not solve the deduction problem.

16 These have been both partially summarized and partially initiated by Anderson and Belnap (1975). For a recent attempt see Schurz (1991).

clearly shimmers through. The arguments for these accounts may be persuasive, but they suffer from a decisive weakness: they do not deliver anything like a theory of belief. There is nothing that is even remotely like the achievements I mentioned in connection with the semantic characterizations of belief.

Which characterization should we prefer? Even though computational approaches are in a very incomplete state, they are likely to dominate the future. This is so because the theory of belief is (partially) an empirical theory about empirical subjects which can hardly be conceived as something like pure content-machines (i.e. as epistemic systems operating directly with pure contents), in particular if there are infinitely many contents. This thought led Fodor (1980) to the formulation of his computational or syntactic theory of the mind (which appears in Fodor 1987, ch.1, as the representational theory of the mind). However, the syntax of the mind should presumably not be considered as analogous to natural or formal languages; very likely our models of a biological computer are still very far from the truth.

Of course, it is not at all clear whether an appropriate syntactic theory of the mind can ever lead to a theory of belief. This is indeed disputed by philosophers as different as Churchland (1981) and Burge (1979). Eliminative materialists like Churchland believe that the concept of belief will once evaporate and anti-individualists like Burge claim that there is no way to get hold of this concept on the individual level on which a syntactic theory would have to be situated. I shall not take side in this dispute, since I have another reason for preferring semantic accounts over computational characterizations of objects of belief.

The reason is that philosophical theories of belief belong to the large set of theories of rationality which are normative, on the one hand (from whence they allow armchair investigations), and deliver empirical idealizations, on the other hand (because we want to understand ourselves and others as actually being rational. or almost rational). The essential point now is that normative theories of rationality in effect always refer to semantically characterized objects of propositional attitudes. This is true of usual epistemic logic, of probability theory, of utility, decision and game theory as well as of more exotic corners of the theory of rationality. There is a good reason for the fact that these theories cannot be stated on the computational level: The standards of rationality like the standards of correctness belong to the semantic level, and computational rules only admit of a distinction between admissible and inadmissible rules relative to these standards.

There are no further rules for rationality on the computational level. Consider a simple example: How much is 13 ∞ 19? Right, it's 247. How did you figure that out? I assume some calculated (10 ∞ 19) + (3 ∞ 19), others 13 ∞ 20 - 13, a smarty may have used the formula $16^2 - 3^2$, and still others simply know the answer by heart. Each method is admissible if it leads to the right answer; no rationality judgement is able to differentiate between the methods.[17]

Of course, crowds of mathematicians and programers are occupied with finding clever algorithms and with minimizing the use of computer capacities. However, as far as I know the relevant theories about how to do this are extremely complex and at best fragmentary; a similar example is given by the attempts to take the costs for optimizing decisions into account within the decision process itself. Moreover, it is totally unclear whether such attempts are of any help when we turn to optimizing human information processing. Finally, the standards of the rationality of computations are again set on the semantic level. Hence, I think that the conclusion in the last paragraph is confirmed by pointing to such attempts. Since I am concerned with theories of rational belief I shall therefore focus on semantic characterizations of the objects of belief or, as I may say now, on belief contents.

6. Wide versus narrow contents

How, precisely, are we to conceive of belief contents? One aspect of this question was particularly vigorously discussed in the last fifteen years. Individualists conceive of belief contents in a narrow sense. Whether someone has a belief with a certain content is claimed to depend on nothing but her intrinsic, non-relational properties; hence, the environment does not play any role whatsoever and might change without changing belief contents. Anti-individualists can conceive of belief contents but in a wide sense. Whether someone has a belief with a certain content depends on her relations to her environment; beliefs are thus relational states that depend on the environment of the subject of the belief.

Before the terms ‚wide contents' and ‚narrow contents' came to be used everything seemed to be relatively straightforward. One simply distinguished de re

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17 I discussed this point in Spohn (1993, sect. 7).

and de dicto beliefs. De re beliefs obviously had contents in a wide sense and de dicto beliefs were generally assumed to have contents in the narrow sense. De dicto beliefs therefore seemed to be more basic than de re beliefs and there were several attempts to define the latter in terms of the former (for example Quine 1956 and Kaplan 1969).

This state of harmony was completely destroyed by Putnam (1975) and Burge (1979) with their convincing case that de dicto beliefs have wide contents as well; the issue whether or not de re beliefs could be defined in terms of de dicto beliefs was thereby deprived of its relevance. The argument between individualists and anti-individualists is still undecided. Individualists like Fodor (1987, 1991) claim that psychological states have to fit into the causal order of the world and they argue that this demand clashes with the relational individuation of mental states proposed by the anti-individualists. The latter insist, however, that it does not make sense to talk about narrow contents unless one is, at least in principle, able to specify them, a task which turned out to be surprisingly difficult. There are, for example, the context relative contents of Fodor (1987, p. 47-53), the partial characters introduced by White (1982), the realization conditions of Loar (1986) and other things. However, these proposals have not been worked out in sufficient detail and are still quite problematic. This state of affairs rather sustains the position of the anti-individualists. These in turn explain that one might as well live without narrow contents and that wide contents would not necessarily strain our picture of the causal structure of the world. Again, individualists remain unconvinced.

My intuitions are in favor of individualism. It is quite difficult, however, to defend these intuitions in the face of this discussion which appears to be stuck on a very high argumentative level. I shall not even try, but rather circumvent the discussion by outlining a concept of belief which respects anti-individualistic insights even though it is quite clearly individualistic and which has thus the potential to satisfy both sides in the debate.[18]

7. The basic characterization of contents

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[18] I shall build on Haas-Spohn (1995) who investigated the semantic issues that are relevant for my project. Concerning these issues I refer the reader to her work.

So I have finally arrived at the main topic of my investigation. How are we to characterize objects of belief in a semantic way, i.e. as belief contents? As I said, there are about as many alternatives as there are theories of meaning. There is, however, a common basic idea behind the alternatives: namely the idea to characterize contents via the exclusion of possibilities. For example, if I believe that the sun will rise tomorrow I exclude all possible cases in which it does not rise. This is not to say that I admit all cases in which the sun rises; my further beliefs exclude many of them as well. However, if we consider all of my beliefs and all the cases that they exclude we arrive at a positive rest embracing the cases I admit as possible. These states are called my doxastic alternatives[19] and the set embracing my doxastic alternatives is called my belief set.

This characterization of contents explicitly forms the technical basis of the standard systems of doxastic logic. According to these systems one believes each super set of one's belief set, one excludes each set of cases disjoint with the belief set, and one remains neutral towards the rest. The same idea occurs also in theories of graduated beliefs, e.g. subjective probability theory, and in many other places. However, this idea is just a leitmotif. The crucial point is how one precisely construes what I have neutrally called possibilities or possible cases and their exclusion.

When Carnap implemented this idea for the first time he took possible cases to be state descriptions. In this framework a subject excluded a possibility by rejecting a certain state description, for example by saying, „No, it's not like that“. This procedure helps to explain de dicto belief, at least for those subjects whose language is the one used to formulate state descriptions.

This characterization of possible cases has two problems, however. First, speakers of different languages ought to be able to exclude the same cases. Thus possible cases have to be something which is language independent. For this reason Carnap (1971), in the last version of his inductive logic, constructed simple and complex states of affairs from objects and properties; the logically strictest consistent states of affairs then corresponded to the former state descriptions. Second, there may be more possible cases than one is able to describe in a given vocabulary. These two criticisms combined suggest the conclusion that possible cases are complete possible worlds. I shall not decide whether we ought to

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19 This term was coined by Hintikka (1962, p.49).

understand a possible world in a Wittgensteinian manner as a maximal state of affairs or à la Lewis (1986) as an individual which is maximal in a certain way. There is, in any case, no good reason to exclude possible worlds from philosophical discourse. In the sequel I shall rely on this characterization of possible cases.

Thus the next question is: what does it mean to say that a subject excludes a possible world? Strangely, I did not find any explicit account in the literature, but rather only somewhat indeterminate functional descriptions of a subject's excluding a proposition, i.e. a whole set of possible worlds.[20] However, it is not so hard to find an answer when we look at how people argue about examples. Consider, for instance, the famous water-example of Putnam (1975). Some three hundred years ago, before the discovery of modern chemistry, Oscar thinks about water while standing at the Rhein which is actually filled with H_2O. In another world Oscar's life is not a bit different. Again, he is standing at the Rhein which, however, is filled with XYZ in this world. Now, in a sense made clear by Putnam (1975) and Burge (1979) Oscar does not think the same as before, but in another intuitive sense he does. Without modern chemistry H_2O and XYZ are totally indistinguishable, in particular for Oscar. Oscar does not know that water is H_2O; as far as he knows it might as well turn out to be XYZ, i.e., it is doxastically possible for him or not excluded that water is XYZ. So, in general, worlds that are indistinguishable for a subject are either both excluded or not excluded for that subject.

This suggests the following criterion (one might call it operational if it were not so hypothetical): Take a certain doxastic state of a subject. Suppose we somehow deep-freeze this state in such a way that nothing is lost or added. Now we send the subject into another possible world. In this world it is allowed to investigate everything, from the very beginning of the world to its end. The subject might observe every molecule under the microscope, it might learn every language, take on every role and every perspective, etc. If there is anything in this world that the subject would not have expected according to its frozen doxastic state this world is excluded according to this state.[21]

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20 See, for example, Lewis (1986, sect. 1.4, in particular pp. 36ff.).

21 This criterion plays a decisive role in Haas-Spohn, 1995. I adopt it from sec. 1.3.

For example, I believe to be living with one and only one woman. Suppose I visit another world which contains just one person that could be me. It seems at first that this person lives with just one woman that could be my wife. There is no perceptual difference for me between this world and the real world. However, since I am allowed to undertake any investigation whatsoever in the possible world I visit I discover that there are two women resembling my wife and changing places every night while my doppelgänger is sleeping. Since my doppelgänger lives with two women this world is excluded by my doxastic state.

The belief set of a person consists of all possible worlds which are not excluded in this sense. The real world is believed by her to be in this set, and she believes every proposition that is a super set of this belief set and that is hence believed to contain the real world.

Of course, this characterization of someone's belief set is not only unduly hypothetical, it is also unduly idealized. Even if we ignore the fictional character of this test the person would, of course, often be unable to clearly say, „yes, that might be the real world," or „no, this cannot be the real world". Rather, the person will usually vacillate, because she is unsure or indeterminate about many things, because the way and the order in which she is presented the alternatives will influence her answer, etc; psychological experiments uncovered many problems in this area. In the present context, however, this point is not a serious objection. It concerns the simplifying assumption that we are dealing with belief simpliciter rather than graduated beliefs, a simplifying assumption which we need not improve upon.

Note, however that this characterization of the belief set of a person and therefore of the propositions she believes is internal or individualistic. To have a certain belief set is not to be in a relational state and whether or not one has a certain belief set does not depend on external conditions. This seems evident to me. Moreover, the burden of proof seems to be on the skeptical side which has to argue for some external dependency. How could the belief set of a subject change just because one changes her environment? Or how could the belief sets of two internally identical twins differ simply because they were raised in different environments? I do not see how this might be the case, since in our hypothetical test the affirmative or negative responses of the subject do not in the least depend on changes in the environment.

8. Two problems with the basic characterization

If the given characterization is granted to be individualistic a first problem immediately emerges. I agreed with Burge (1979) that all of our de re and de dicto beliefs and therefore also all of our everyday belief ascriptions are non-individualistic. Since I advanced an individualistic characterization of the belief set of a person and of its super sets I have to conclude that the content clauses of these attitude ascriptions do not exactly capture these propositions or sets.

This result is not really surprising. In general it is very hard for people to put their discriminative capacities, e.g. the capacity to recognize a face, into words. And descriptive psychologists have different, but equally hard problems to describe these discriminative capacities. To put the same point differently: Due to the work of Kripke (1972) it is generally agreed that names are rigid designators of objects. However, our capacity to identify an object is, so to speak, not rigid. One might always foist another object on us. It is therefore impossible to capture our discriminative or identifying powers with proper names.[22] There is no principled reason why we should be unable to describe belief sets, but due to our limited knowledge we are presently bound to fail.

This raises the real problem, viz. the question of how our usual de dicto and de re belief ascriptions relate to my characterization of a belief set. The former appear to be rather imperfect attempts to approximate the latter. Of course, one would like to learn more about the nature of this approximation. The literature offers an extensive discussion of this issue under the title "disjunction problem" (for example Fodor 1990, ch. 3 and 4). For my present purposes, however, I do not have to evaluate this discussion.[23]

There is a second, even more basic problem. Our characterization of belief sets and belief contents is still inadequate. Until this point I have assumed the conventional view that belief contents are sets of possible worlds and I explained how one might understand this view. However, this view is too simple. The reason is that this perspective does not seem to allow characterizations of attitudes de se and de nunc. Castañeda (1966) was the first to notice this point and Perry (1979)

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22 Lewis (1981) makes this quite clear.

23 See Haas-Spohn (1995, ch. 3.9) for some discussion.

and Lewis (1979) offered strong arguments in its support. According to the standard solution of this problem the doxastic alternatives of a subject include not only a possible world, i.e. a *here* in logical space, so to speak, but also an *I* and a *now*. Lewis (1979) therefore takes belief contents to be properties of subject-time-slices. It is more conventional to say that a belief content is a set of triples <*w*, *s*, *t*>, consisting of a possible world *w*, an object *s* and a time *t*, at which the object *s* exists in *w*.[24] Such a triple <*w*, *s*, *t*> is the doxastic alternative of a certain subject at a certain time if the beliefs of the subject at the time do not exclude that *t* is this time and that *s* is herself in *w*. This in turn means that the subject may undertake any investigation in *w* and assume the perspective of any object in *w* at any time whatsoever (for all objects that have a perspective at all) and that, when comparing all this with her actual deep-frozen doxastic state, she concludes that she might be *s* at *t* in *w*.

9. The thesis

I think it is generally agreed that we need some such modification of a semantic characterization of the objects of belief. In any case, this is something I shall take for granted.[25] What I want to argue is that this modification does not go far enough: doxastic alternatives need yet another amendment. Some may have believed in this amendment all along, but the majority still seems to fail to appreciate it. Here is my thesis: Doxastic alternatives must at least be understood as quadruples <*w*, *s*, *t*, *d*> consisting of a world *w*, a subject *s*, a time *t* and a se–quence of objects $d = \langle d_1, d_2, \ldots \rangle$ existing in *w*. This sequence of objects might be taken to be finite (for ease of understanding) or infinite (for technical advantages).

Let me reformulate these abstract claims in more familiar terminology. If we disregard the localizing components *s* and *t* we arrive at the old conception that belief contents are simply propositions, i.e. sets of possible worlds. These are truth conditions of closed sentences (of first-order logic). According to the new thesis belief contents are sets of pairs consisting of a world and a sequence of

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[24] This is more conventional because it does not rely on Lewis' (1979) haecceitistic assumption that each possible individual exists in just one possible world.

[25] The arguments for my thesis will offer additional support for this point; see section 10.

objects (still ignoring localization). Where these sequences have always the same length sets of such pairs are the satisfaction conditions of open formulae of first-order logic. So, what I am claiming is that belief contents are satisfaction conditions of open formulae rather than truth conditions of closed sentences.

To some extent this might be a helpful explanation. It is, however, also misleading. It is not to say that a subject ought to express its beliefs with open formulae rather than closed sentences or that the content clauses of everyday attitude ascriptions are to be understood as open formulae rather than closed sentences. In both contexts the occurring free variables would have to be understood as rigid designators (indeed, they are the paradigmatic rigid designators), but in our context this would be totally out of place. It is again relevant to observe here that the level on which I am characterizing belief contents is more basic than the level of the linguistic expressability and describability, that the relation between the two levels is indirect and an open problem, and that my thesis is about the basic and not about the linguistic level, as my explanation may have suggested.

There are two catch words characterizing the epistemic picture behind my thesis: that of a file consisting of various file cards and that of a discourse representation with various discourse parameters.[26] In nuce, the picture is simple that we think of objects or have objects in our minds and that this is a basic and irreducible epistemological fact. This is why I call the new picture the *intentional* conception of doxastic states as opposed to the old *propositional* conception.

According to this picture a subject's epistemic system has addresses for objects, i.e. discourse parameters or file cards. If the subject encounters, perceptually or linguistically mediated, an object she takes interest in she creates a new card or address. All subsequent information which she takes to be about the same object will then be stored at this address; of course, since she might misidentify objects she might store information also at the wrong address. Note that this picture also allows for relational information, i.e. information that relates various adresses and that is not stored at any specific address. It is also compatible with general information that does not concern any specific address. These cases illustrate that the vivid picture of a file is not as broad as the formal model of a belief set as a set of doxastic alternatives.

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26 The first catchword is due to Perry (1980) and Heim (1982), the second to Kamp (1981).

This picture also indicates how my hypothetical-operational test is to be modified for the more complex doxastic alternatives: The quadrupel <*w, s, t, d*> is a doxastic alternative of a subject at a certain time if and only if she would admit after most scrupulous investigation of *w* and all the objects in *w* from all perspectives available in *w* that *s* conforms with her self-image, *t* with her image of the presence, the objects d_1, d_2 ... with the images stored at her adresses 1,2, ..., and *w* with her picture of the world, all these pictures being taken from her actual doxastic state as fixed at the relevant time. Note that the numbering of the addresses is quite inessential. Instead of numbers one might thus prefer to use any (unordered) finite or infinite index set *I*. What is essential is the assignment of the possible objects in a doxastic alternative to the numbered or indexed adresses.

This is a useful picture, but it must be used with care. It has a semantic heritage, just like the catchwords I have used. By contrast, my quasi-operational test again makes clear that I have moved beyond semantic issues. Moreover, the picture does not yield a justification of my thesis. Providing it is my concern in the next section.

10. Three arguments for the thesis

First I have to admit that I do not see how my thesis could be justified within the framework of a static theory of belief. In order to provide such a justification one would have to formulate the static theory of belief for the simple as well as for the complex doxastic alternatives – presumably with the help of probability and decision theory – and one would have to check whether the formulations reveal differences that could be turned into arguments for the thesis. As far as I know nobody ever tried this strategy, perhaps because of too little hope.

On the other hand I do not have any arguments to the effect that the static framework does not allow a justification of the thesis. Suppose we understand belief contents as I suggested, i.e. as satisfaction conditions. This conception allows an easy derivation of the old belief contents, i.e. truth conditions, via the existential closure of satisfaction conditions. Logicians are used to associate open formulas with universal closures. In this case, however, this would be inappropriate. To believe a satisfaction condition means to believe that there exist objects corresponding to the information stored at the various addresses, and that amounts

to the existential closure of the satisfaction condition. Now, it seems arguable that a static theory of belief would be concerned only with truth conditions and not with satisfaction conditions. As I said, however, I do not have an argument for this either.

In any case, all the existing arguments in the vicinity of the intentional conception refer to the dynamics of belief. This is true, for instance, of the arguments for the irreducibility of beliefs de se and de nunc; unfortunately, these arguments do not seem to be transferable to our case. The arguments of Perry (1980) also concern the dynamic level; but since he operates with wide contents I did not see how I could use them for my purpose. Moreover, he motivates his talk about files and file cards (he explains them just like I do) only negatively by showing various attempts to do without them to be unsatisfying. Finally, concerning the semantic realm the relevant theories have already proved their linguistic utility. As to Kamp (1981), however, it is quite unclear how one might transfer his arguments from discourse semantics to our epistemic case. Only in Heim's file change semantics[27] did I find an argument that applies to our case. It draws upon the dynamics of belief and goes like this:

Typically, changes in beliefs are driven by perception, and typically we use indexical descriptions for perceived objects. The girl about ten meters to the left of me just cut her knee open – this is what I just saw and what I came to believe. There are two ways two describe my increase in beliefs: according to the propositional conception my old belief set is conjoined with the truth condition of the sentence „The girl about ten meters to the left of me just cut her knee open“. (Let us ignore that the content of my perception obviously exceeds the content of this sentence.) According to the intentional conception my old doxastic state is enriched by adding a new address and storing at it the information „is a girl, is about ten meters to the left of me, just cut her knee open“. So far both descriptions seem to be equally accceptable.

The story continues, however. I realize that I know the girl; it is my neighbour's daughter. I shall soon have forgotten the indexical description; perhaps there were several girls around, and it is just too much work to memorize where all of them were located. So, the other day all I remember is that my neighbour's

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27 More exactly in her discussion of Evans' (1980) theory of „E-type pronouns“; see Heim (1982, sect. 1.2. and 2.3). Her argument reminds me of an observation of Bohnert (1967) that occurred in a rather different context, i.e. in connection with the Ramsey-eliminability of theoretical terms.

daughter cut her knee open. However, since I still rely on a description of the girl the situation did not really change. The only difference to the first case is that according to the intentional conception the new information will be stored at an old address, namely the address that already contains the information „daughter of my neighbour“. So. it is again hard to see why one ought to prefer one description over the other.

However, the whole story goes like this: Actually, my neighbour has two daughters. You will not be surprised to hear that they are identical twins. Despite numerous encounters I am still unable to tell them apart. In this case it is plausible to maintain that I have exactly the same information about both girls. Let us summarize this information by the rather complex predicate *F*. So, according to the propositional conception my old doxastic state (as far as these girls are concerned) may be characterized by the following sentence:

(1p) $\exists x \, \exists y \, (x \neq y \, \& \, Fx \, \& \, Fy)$.

According to the intentional conception this state is best captured by the open formula:

(1i) $x \neq y \, \& \, Fx \, \& \, Fy$.

Now I said I remember from the aforementioned incident that one of the girls cut her knee open, i.e., for short, that she has property *G*. According to the propositional conception my new doxastic state is represented by the sentence:

(2p) $\exists x \, \exists y \, (x \neq y \, \& \, Fx \, \& \, Fy \, \& \, Gx)$.

According to the intentional conception the new state is represented by one of the following formulae:

(2i') $x \neq y \, \& \, Fx \, \& \, Fy \, \& \, Gx$, or

(2i") $x \neq y \, \& \, Fx \, \& \, Fy \, \& \, Gy$, or

(2i"') $x \neq y \, \& \, Fx \, \& \, Fy \, \& \, (Gx \vee Gy)$.

(2i') and (2i'') apply if, for whatever reason, I come to store the information at a specific address. (2i''') applies if I have no idea which of the two girls injured herself. The latter is the more plausible version, though I shall explain later why the former may not be disregarded.

This scenario constitutes the setting of my first argument which I take from Heim (1982). How should we describe the increment in belief? According to the intentional conception the increment may be simply described as a conjunction; in the three variants of (2i) Gx or, respectively, Gy or $Gx \vee Gy$ is added as a conjunct. The case is not so simple, however, with the propositional conception. The first two unproblematic versions of the story still allowed the conjunctive addition of $G(\iota xFx)$. In the last problematic version, however, this is impossible because this version assumed that the description ιxFx does not refer according to my beliefs and that I do not know any identifying description of the girls. So, logically speaking, the whole new doxastic state

$$\exists x \exists y (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx)$$

may be taken as the increment in belief; but intuitively the increment is not that big. The other extreme is to take the material implication

$$\exists x \exists y (x \neq y \,\&\, Fx \,\&\, Fy) \varnothing \exists x \exists y (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx)$$

as increment; but we thereby ascribe a surprisingly complex logical form to a rather simple information. One might also try something in between these extremes, for which, however, no simple logical form is in sight, either. So, here is the first argument: In the example the increase in information appears to consist in a rather simple conjunctive addition but the increase cannot be captured as such within the propositional conception, in contrast to the intentional conception which is able to do so.

The second argument refers to the same problematic scenario. It starts from an observation already made, namely that the intentional conception allows for three different increments in information from (1i) to (2i), namely Gx, Gy, or $Gx \vee Gy$. These increments result in three different belief states. However, their existential closures are logically equivalent; it does not make a logical difference

whether Gx or Gy or $Gx \vee Gy$ is added as a conjunct within the scope of the existential quantifiers $\exists x \exists y$. So, according to the propositional conception there is a unique new belief state. One may already intuit what is more appropriate: a unique increase or the unfolding into three possibilities. I would like to force our intuitions even more in one direction.

Let me introduce a second piece of information about one of the girls consisting in the predicate H. I do not think of a new observation. This would not bring substantial news because the intentional conception would again allow three ways to account for the new piece of information and the propositional conception would do so as well, since the first piece of information about the injured knee already destroyed the symmetry of the bound variables. I am rather thinking of a case in which I suddenly remember, say, that one of the twins has a liver spot under her left eye and that this mark in principle allowed me to distinguish the twins, even though I almost always confused them because I used to forget about the distinguishing mark.

So, suppose H is the predicate „has a liver spot under her left eye“ and that the free variable x represents the address for the girl with the liver spot within the intentional conception. This conception allowed three ways for accounting for the perception about the injured knee. Because of my recollection we now have to add the conjunct Hx in each case. So, there are again three possibilities to account for the resulting doxastic state:

(3i') $x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx \,\&\, Hx$, or

(3i'') $x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gy \,\&\, Hx$, or

(3i''') $x \neq y \,\&\, Fx \,\&\, Fy \,\&\, (Gx \vee Gy) \,\&\, Hx$.

Note that this continuation of the story also supports the idea that there are three ways to account for the first increase in information. At first blush it seemed that I could only add the information $Gx \vee Gy$ because I did not have any clue which of the twins injured her knee. However, a mark like the liver spot might cause me to store the information at a specific address even if I am not aware of the mark and could not tell afterwards why I did so.

The propositional conception leads to a different treatment of my recollection. According to this conception there are three possible final doxastic states:

(3p') $\exists x\, \exists y\, (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx \,\&\, Hx)$, or

(3p") $\exists x\, \exists y\, (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx \,\&\, Hy)$, or

(3p'") $\exists x\, \exists y\, (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, Gx \,\&\, (Hx \vee Hy))$,

where (3p'")is logically equivalent to

$$\exists x\, \exists y\, (x \neq y \,\&\, Fx \,\&\, Fy \,\&\, (Gx \vee Gy) \,\&\, Hx) .$$

Which variant applies depends on whether the recollection concerns the girl with the injured knee, as in (3p'); the other girl, as in (3p"); or none of the girls specifically, as in (3p'"). So, what seemed to be one specific recollection is here split into three possible recollections. It might be suggested that the order of changes in my doxastic states should be reversed, i.e. that the recollection has to come first and that the observation joins. In this case the recollection would bring about a unique change and the observation would result in three possible changes. This would then correspond to what you get according to the intentional conception. Indeed, past observations are sometimes reinterpreted in the light of emerging recollections. However, this does not happen all the time, and and in my version of the story it did not happen.

So, this is the second argument: According to the propositional conception the observation leads to a unique change of my doxastic state and the recollection may then take three different forms. Intuitively, however, it is just the other way round, and so it is represented by the intentional conception. Hence, the propositional conception gives an incorrect account of the succession of observation and recollection and can render it correct only by artificially reversing the real succession of events.

There is, finally, an abstract version of these arguments: We have seen that the notion of a doxastic alternative lies at the bottom of semantic characterizations

of the objects of belief. This point extends to all propositional attitudes.[28] Any theory which delivers a semantic characterization of the objects of these attitudes will represent these objects by sets of perceptual, epistemic, buletic, etc. alternatives. Now, our theorizing about propositional attitudes (in the wide sense) seems to obey an important principle, namely the principle that the theorizing remains invariant under the coarse- and fine-graining of the underlying alternatives, i.e. that the static and dynamic laws for the attitudes remain the same, no matter whether one conceives of the alternatives more finely or more coarsely. For instance, if the alternatives are just possible worlds, the laws remain the same, no matter whether you understand worlds rather coarsely as finite state descriptions, or very finely like David Lewis' maximally inclusive possible worlds.[29] I did not find any general statement of the principle in the literature, but there are several half-explicit applications of it. The first I know of is the theory of so-called small worlds that is contained in Savage's (1954) path-braking formulation of decision theory.[30] The principle also seems to decide the discussion about the need for the generalized probabilistic conditionalization of Jeffrey (1965, ch. 11) in Jeffrey's favour.[31] Moreover, some problems with the standard version of game theory (that is, already in the theory of two-person zero-sum games) seem to result from a violation of the principle.[32] And so forth. In any case, I believe the principle is correct and important, even though I do not know how to further justify it.

In any case, if you accept the principle you get a simple argument for the intentional conception. According to the propositional conception a typical piece of experience or information is that an object described in a certain way has a certain

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28 In the wide sense according to which they are described with verbs taking that-clauses as complement and not in the narrow sense according to which they conform to the propositional conception.

29 An exact formulation of the principle requires some technical apparatus: In addition to the set Ω of all possible alternatives one has to specify an algebraic structure A on Ω containing the relevant objects of the respective propositional attitude (the algebra will typically be a Boolean algebra which is complete to some degree). The principle then says that the laws of the respective theory hold in a coarsening A' of the algebra A just like in A itself. So, strictly speaking, the principle is about an invariance concerning coarsenings of the algebraic structure and not of the alternatives themselves.

30 See Spohn (1978, sect. 2.3 and 3.6). There I argue that it takes additional assumptions to ensure that Savage's version of decision theory remains invariant under coarsenings of the algebraic structure and that other versions do not need such additional assumptions – a fact which counts against Savage's version.

31 See Spohn (1978, sect. 4.2).

32 See Spohn (1982, sect. 3).

property. This works if the subject has a definite description of the relevant object. However, relative to smaller, i.e. more coarse-grained worlds, such descriptions may easily cease to exist. This is simply the effect of the coarser description and does not depend on complicated stories about completely similar twins. Now if definite descriptions get lost, the increase in information cannot be accounted for by the propositional conception in its typical way; this account is simply not invariant to the granularity of the doxastic alternatives. The intentional conception avoids this difficulty. According to this conception a typical experience or information consists in the subject's storing a certain property under the address she takes to be relevant for the given object. And this does not depend on whether or not this address can be qualitatively distinguished from other addresses. This is the third, very abstract argument.

In fact, this point was at the bottom of the first two arguments. Both of them depended on the assumption that the subject forgot or neglected something and this is just a more vivid version of a coarsening of the relevant alternatives.[33]

At this point I would like to make a short comment on the arguments for the subject component *s* in doxastic alternatives, e.g. the stories of Lewis (1979) about the amnesiac Rudolf Lingens or the two propositionally omniscious gods. Basically the argument says that it is always possible that there is another object about which one has exactly the same beliefs as about oneself, so that in all doxastic alternatives there will exist two objects with which one could be identical according to what one believes. However, in order to defend this idea against the arguments of Stalnaker (1981) one has to make rather fancy additional assumptions, e.g. the assumption that poor Lingens is telepathically linked to another person with exactly the same perceptions, or that the two gods do not have any perspectival perceptions, i.e. either no perceptions at all or allembracing perceptions.[34] This point does not refute Lewis' arguments, but it weakens their case considerably.

My arguments for the intentional conception help Lewis in two respects. First, it would be strange to refuse to an epistemic subject an address for itself once one appreciates the general need of addresses for doxastically relevant objects. Secondly, the third abstract argument should also work for de se cases since

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[33] Or rather of a coarsening of the algebra over the set of doxastic alternatives which does not contain the sets representing the forgotten or neglected piece of information.

[34] Haas-Spohn (1995, sect. 2.2) makes this very clear.

it does not require one to have the same beliefs about oneself and someone else absolutely, but only within a limited realm; and then one does not need to rely on fancy assumptions.

11. Some consequences of the thesis

These were my attempts to provide a direct justification of my thesis. I am not so sure how convincing they are. Here, as elsewhere, a thorough justification would probably require a detailed elaboration of the various consequences of the thesis; it should be obvious that it must be very consequential to fumble with the structure of something so epistemologically fundamental as the doxastic alternatives. I shall not attempt now to provide such a holistic justification. I would like to mention, however, six fields deeply affected by my thesis, in order to make my case a bit more vivid.

First, there is the problem of intentional identity which is exemplified by so-called Hob-Nob sentences.[35] The propositional conception appears to provoke rather artificial solutions of this problem. By contrast, the richer recources of the intentional conception allow a straightforward theoretical reconstruction of the most intuitive account.[36]

Second, the intentional conception affects the analysis of de re belief ascriptions. A subject can have a de re belief about an object *a* only if it has an address for *a*, i.e. an address that was created in response to *a* itself or, as Kamp (1990, sect. 4.1) puts it, that is externally anchored in *a*.[37] Moreover, we will arrive at a different logical form of de re ascriptions if we follow the intentional conception and assign a different logical form to the basic belief predicate.

Third, even though I stressed that I am concerned with epistemic rather than semantic issues both areas are obviously closely connected. For example, the

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35 This discussion was initiated by Geach (1967) who presented the following sentence: „Hob thinks a witch has blighted Bob's mare, and Nob wonders whether she (the same witch) killed Cob's sow“. How are we to understand the pronominal reference of „she“ in the second that-clause if there is no witch?

36 This is, in any case, my assessment of Zeevat (1986). Compare also Kamp (1990, sect. 5.2).

37 Of course, this is roughly the same condition as Kaplan's condition that the subject has to have a „vivid name“ of *a*; (cf. Kaplan (1969, sect. IX).

structure of doxastic alternatives will have consequences for the format to be used for the description of linguistic meanings if one tries to capture the cognitive significance of utterances with the help of Stalnaker's diagonalization device.[38] These consequences particularly affect the semantics of noun phrases.[39]

This takes me, fourthly, to the discourse representation theory of Kamp (1981) and to the file change semantics of Heim (1982), both of whom have offered accounts that shed new light on noun phrases. Obviously, these theories have decisively inspired my own considerations. Since the theories of Heim and Kamp are concerned with the subjective meaning of utterances and texts for speakers or hearers there clearly exists mutual support between them and mine: My account provides an epistemological basis for their theories and the linguistic output of these theories[40] sheds a positive light on my account.

Fifth, the intentional conception appears to undermine the so-called context principle, i.e. the principle of the primacy of sentence meaning over word meaning. Frege already put it thus: „It is only in the context of a sentence that a word has a meaning“ (1884, §62). This principle came to play a prominent role in philosophy, for instance in Quine's theory of meaning and translation. According to Quine meaning is primarily a matter of items capable of being directly confronted with observation, i.e. of observation sentences or more complex theoretical constructions.[41]The principle also occurs in Davidson's theory of interpretation. This theory makes use of the principle of charity and thus constructs the meaning of expressions (of a subject or a speech community) with an eye on the truth of the beliefs expressed by utterances of complete sentences in which they occur.[42] The

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38 See Stalnaker (1984); Haas-Spohn (1995) applies this device in a very general and detailed way.

39 To be a bit more specific: The meaning of a linguistic expression is something like a Kaplanian character (Kaplan 1977), i.e. a function from contexts and indices to appropriate extensions see also Lewis (1980). The diagonal of a character is a function that assigns to each context directly an extension, namely the extension the character assigns to this context and the index corresponding to the context. If we take the diagonal to represent the cognitive significance of an expression we arrive at the important conclusion that contexts have the same formal structure as doxastic alternatives. (This is explained in Haas-Spohn, 1995, sect. 1.2 and 2.1.) Therefore, the former have to have the form $\langle w, s, t, d \rangle$ as the latter where d then plays the role of a contextually interpreted variable assignment. (Montague, 1970, proposed something like this for the first time, though only half-heartedly; cf. p. 379).

40 For a very readable up-to-date summary see Kamp and Reyle (1993).

41 See Quine (1960), ch. 1 and 2.

42 See Davidson (1984).

context-principle also inspired various kinds of skepticism, e.g. Quine's theory of the indeterminacy of translation (Quine, 1960, ch. 2) and several proposals in its wake (e.g. Putnam, 1980). In the end the principle and its applications rest on the assumption that doxastic attitudes are propositional attitudes whose content can be judged only as true or false. According to the intentional conception, however, we may also consider the reference or external anchoring of the component *d* of doxastic alternatives. Philosophical accounts, therefore, that rest on the context principle seem in need of reconsideration.

The same, finally, holds of Grice's account of meaning[43], since Grice has as well endorsed and relied upon the principle of the primacy of sentence meaning. Burge (1979, p. 109) already remarked that his anti-individualistic conception of the attitudes undermines the Gricean program. To my surprise I do not know of any convincing refutation of this remark. The intentional conception places the basic concepts of this program (i.e. beliefs and desires or intentions) in yet another light. Since, however, there is much to be said in favour of Grice's work we ought to reconsider his account in light of the new results.

I am not sure what the judgement of the intentional conception will be in the long run. However, this essay should have made clear that many points are involved in this issue, many points which have already received careful consideration and many points which require ongoing scrutiny.

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43 The basic ideas are due to Grice (1957). Bennett (1976) has, in my view, provided the best elaboration of these ideas.

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