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Abstract

Linguistic expressions frequently make reference to the situation in which they are uttered. In fact, there are expressions whose whole point of use is to relate to their context of utterance. It is such expressions that this article is primarily about. However, rather than presenting the richness of pertinent phenomena (cf. Anderson & Keenan 1985), it concentrates on the theoretical tools provided by the (standard) two-dimensional analysis of context dependence, essentially originating with Kaplan (1989a) – with a little help from Stalnaker (1978) and Lewis (1979a, 1980), and various predecessors including Kamp (1971) and Vlach (1973). The current article overlaps in content with the account in Zimmermann (1991), which is however much broader (and at times deeper).

1. Contexts

Whether spoken, signed, written, telegraphed – whenever language is used, an utterance is produced, under circumstances to which we will henceforth refer as [utterance] contexts. It is a characteristic feature of certain expressions – words, phrases, constructions,

features, etc. – that they directly relate to the very context in which they are uttered. Personal pronouns are cases in point. Given an utterance context c , the first-person pronoun I refers to whoever produced the utterance – SPEAKER(c) for short. We thus have:

$$(1) \quad /I/^c = \text{SPEAKER}(c),$$

where $/A/^c$ is the referent of a given (referential) expression A in a given utterance context c . It should be noted that the equation (1) is *schematic* in that it applies to any context c . Hence SPEAKER is a function assigning persons to utterance contexts. In fact, this particular function may be thought of as a *communicative rôle*, and (1) as saying that the pronoun I expresses that rôle in that it always, i.e. in any utterance context, refers to the person playing it. Utterance contexts may in turn be characterized as those situations in which someone plays the rôle expressed by I , i.e. those situations for which SPEAKER is defined.

In a similar vein, the (singular) pronoun *you* can be seen to express a communicative rôle in that it is used to refer to the person addressed in a given context c :

$$(2) \quad /you_{sg}/^c = \text{ADDRESSEE}(c)$$

Traditionally, expressions of communicative rôles are categorized as *person deixis*. Languages not only differ as to the expressive means of person deixis, there is also ample variation as to the rôles expressed. Some languages (like French) distinguish more than one second person, depending on the social relationship between speaker and hearer, a phenomenon known as *social deixis*; another common distinction (to be found, e.g., in Tagalog) is between an inclusive and an exclusive first person plural, depending on whether the addressee does or does not belong to the group designated (and thus avoiding embarrassing misunderstandings caused by the indeterminacy of sentences like *We have been invited to the President's dinner*).

Communicative rôles are one example of *contextual parameters* that are commonly used to determine reference. Others include the *time* and *place* of utterance that help determining the referents of *today* (= the day on which the utterance is made); *tomorrow* (= the day after the utterance); *ago* (= before the utterance); and *here* (= the place of the utterance). Traditionally, such expressions are categorized as *temporal* and *local* deixis, respectively. Extending the above notation, one may capture them by means of functions assigning times and places to utterance contexts. Then the most basic deictic expressions directly denote the values of these functions:

$$(3) \quad \begin{array}{l} \text{a. } /now/^c = \text{TIME}(c) \\ \text{b. } /here/^c = \text{PLACE}(c) \end{array}$$

In (3), TIME and PLACE are functions assigning to any (utterance) context its temporal and spatial location, respectively. These locations may be thought of as points, intervals or more complex constructions, depending on the semantic operations performed on them. And the denotations of other deictic expressions may be expressed in terms of these functions, or derived from them with the help of standard temporal and spatial measures:

- (4) a. $/today/^c = \text{DAY}(\text{TIME}(c))$
 b. $/yesterday/^c = \text{DAY}(\text{TIME}(c) - 24\text{HRS})$
 c. $/ago/^c (X) = \text{TIME}(c) - X$

While the expressions mentioned so far make reference to various *objective* features of utterances, a number of locutions and constructions seem to bring more *subjective* contextual factors into play (cf. Borg 2004: 29ff.):

- (5) a. *This belongs to me.*
 b. *He is an enemy.*
 c. *John's book is expensive.*
 d. *Everybody had a great time.*

Demonstratives like the subject of (5a) are frequently accompanied by a pointing gesture that helps the hearer to identify their referents. Arguably, it is this *demonstration* that determines the referent. Of course, as a bodily movement, the gesture itself is as objective a part of the context as the speaker or the addressee. However, the referent of the demonstrative is not the gesture but its target, which may not be so easily identified (*pace* von Kutschera 1975: 127); arguably and within certain limits, what this target is, is up to the person performing the gesture, i.e. the speaker. Hence, inasmuch as the demonstration determines the referent of the demonstrative, the speaker's intentions are decisive, and they make this kind of expression context-dependent in a more subjective way; see Kaplan (1978, 1989b: 582ff.), Wettstein (1984), Bach (1987: 182ff., 1992), and Reimer (1991, 1992a, 1992b) for more (and different views) on the subject. Despite this subjectivity, there is little doubt that the referent of *this* depends on the utterance context and could therefore be provided by a (speaker-dependent) parameter:

- (6) $/this/^c = \text{DEMONSTRATUM}(\text{SPEAKER}(c))$

Third person pronouns and *implicit arguments* seem to work in a similar way, except that they are not normally accompanied by demonstrations; but their referents are usually taken to be supplied by the background. This is illustrated by (5b), which may be used to subsume a male person as among the foes of a community to which the speaker belongs – which person and which community depending on the circumstances in which the sentence is uttered. Again, it would seem that, within certain limits, the speaker has the last word about who precisely is referred to by these, presumably context-dependent, devices.

Possessives come in a variety of guises and with a variety of functions (cf. article 45 (Barker) *Possessives and relational nouns*). A common core is that they express a relation between the referents of two nominal expressions. In many cases the relation is supplied by a (relational) possessor noun like *surface* or *father*; in others it is some default like ownership or a part-whole relation. In typical utterances of (5c) the relevant relation would be reading, writing, or, per default, owning; but it is not hard to imagine situations in which it is the relation holding between *x* and *y* if *x* writes a term paper about *y*, etc. (Williams 1982: 283). It thus seems that the relation a possessive construction expresses is a matter of the circumstances in which it is used; hence possessives are candidates for context-dependent expressions. More precisely, it is the grammatical construction itself,

or the constellation in which possessor and possessee stand, that makes reference to context, possibly by introducing an un-pronounced functional morpheme that expresses a relation whose precise identity may depend on the utterance context (cf. Cresswell 1996: 50ff.). However, unlike the other contextual parameters mentioned above, the possessive relation cannot always be read off from the utterance context all that easily.

Quantifiers have domains that are understood as given by their linguistic and extra-linguistic environment. (5d), taken from von Stechow (1996: 28), is a case in point: if the sentence is used as an answer to *How was the party?*, its subject is likely to be construed as quantifying over the participants in the event mentioned in the question – as it would be if the sentence is uttered after said occasion, with happy people leaving the premises in the speaker's view. The phenomenon has aroused much interest among philosophers of language (e.g., Stanley & Williamson 1995; Reimer 1992c, 1998), not least because it is paralleled by definite descriptions whose quantificational status has been under dispute ever since Russell (1905). Again, it is hard to pin down objective features of contexts that would correspond to domains of quantifiers, which in general do not seem to be identifiable without knowing what the speaker has in mind. (But see Gauker 1997 for a skeptical view.)

What the phenomena illustrated in (5) have in common, and what distinguishes them from the classical cases of deixis, is their lack of objectivity: misunderstandings as to what was pointed to, who was left implicit, which possessive relation was alluded to, or who is quantified over arise rather easily – more easily than when it comes to determining who the speaker is, or where and when the utterance is made. If worse comes to worst, the speaker using a possessive would have to make herself clear. Of course, this does not make speakers Humpty-Dumpties, who arbitrarily decide what their words mean: what is intended and left implicit must be salient and accessible to the audience (Lewis 1979b: 348ff.); otherwise the speaker may be perceived as uncooperative, obscure, or even deranged. But within a certain range, it seems to be at the speaker's discretion to decide what the sentences in (5) are about. So there is something ultimately subjective in the way quantifier domains, possessive relations, implicit arguments, and the referents of 3rd person pronouns and demonstratives may depend on the context, which distinguishes them from the classical deictics in (1)–(4).

It is important to distinguish the subjective nature typical of the locutions in (5) from other sources of referential indeterminacy like vagueness and ambiguity. If a speaker uses the (complex) demonstrative *this mountain* to refer to the Eiger, this reference may be quite vague because the Eiger does not have clearly determined boundaries, and presumably the speaker does not (want to) impose or presuppose such boundaries by his utterance either. However, this vagueness has nothing to do with the subjective nature of the demonstrative; in fact, it also occurs with ordinary deictic expressions like *here* (cf. Klein 1978). The subjective nature of the demonstrative shows in the fact that the speaker may refer to the Eiger even though his gesture alone could be interpreted as relating to the Jungfrau, or even a heap of rocks. And these alternatives do not constitute different readings of the sentence; otherwise English syntax would have to supply indefinitely many underlying forms suiting the referential possibilities of arbitrary speakers in arbitrary environments – which is highly implausible, to say the least (cf. Stanley & Szabó 2000: 223, fn. 16). In sum, it is not vagueness or ambiguity that distinguishes the cases in (5) from the context-dependencies in (1)–(4) but the fact that matters of reference are – at least in part – determined by the speaker's intentions.

The subjectivity of certain context-dependent expressions and constructions must also be distinguished from uncertainties in the identification of the utterance situation. Thus, e.g., the hearer does not always know who is speaking or writing, anonymous phone calls and letters being cases in point; still, the hearer does know that the speaker is referring to him- or herself when using a first-person pronoun. Similarly, if a speaker uses local or temporal deixis, the hearer may be uncertain as to which places she is referring to because he might not know where or when the utterance was made; still she does know that the speaker was referring to the time and place of utterance. This kind of ignorance may even occur with speakers who are confused as to where they are, what time it is, and maybe even who they are. (The latter possibility appears hard to imagine, but see Perry (1977: 492f.) and Lewis (1979a: 520f.) for pertinent *gedanken-experiments*.) In all these cases though, the deictic expressions work as usual; it is only the communicants that lack knowledge of the utterance situation and are thus not in a position to fully exploit their meaning. The epistemic uncertainty about the utterance context may also concern the question which situation should count as the context in the first place. For sometimes an utterance is properly understood only under the pretense that it had been uttered under different circumstances. This is the case with certain recorded utterances in which the speaker pretends to be speaking at a later time (as in some TV shows), but also in more remote ‘utterances’ like first-person inscriptions on tombstones (Kratzer 1978: 17ff.), where the intended utterance context may well be an impossible scene! Note that in all such cases despite the pretense concerning the exact circumstances, the utterance as such is not taken to be fictional as it would be the case in a theatre performance. In sum, even with classical deictics like those in (1)–(4) matters of reference are not always as clear as we have been assuming; but the unclarity lies in the utterance situations at large, not in the meanings of these expressions.

What follows is a survey of one type of semantic analysis of context dependence. In it we will not bother to distinguish between various forms of context dependence. In fact, most of the time we will concentrate on the 1st person pronoun as given in (1), with occasional glimpses of other deictic expressions like those in (2)–(4). Still whatever will be said below is meant to apply, *mutatis mutandis*, to all context-dependent expressions alike, whether relating to objective features of the utterance situation or to more subjective, intentional aspects like those in (5), which may be thought to be interpreted by subjective, speaker-dependent contextual parameters as indicated in (6).

2. Trivialities

In the above examples (aspects of) the utterance situation played a crucial role in determining the reference of the expressions under scrutiny. However, this alone is not what makes these expressions deictic or context-dependent. In fact, to the extent that an expression can be said to refer to anything at all, what it refers to usually depends on the utterance situation. For instance, when used around the time of writing this contribution, the definite description *the German chancellor* refers to Angela Merkel, whereas some ten years ago its referent would have been Gerhard Schröder. Hence what the expression refers to may change with, and depends on, when it is or was uttered, and thus on the utterance situation. In this respect the definite *the German chancellor* is like the first-person pronoun *I*. To highlight the context-dependence of the referent of the description and bring out the analogy with the personal pronoun, we may use the same kind of notation:

- (1) $I^c = \text{SPEAKER}(c)$
 (7) $\textit{the German chancellor}^c = \text{GC}(c)$,

where GC is a function assigning to any utterance context c that person (if any) that happens to be the German chancellor at the utterance time, $\text{TIME}(c)$. To be sure, there is an obvious difference between (1) and (7): while the SPEAKER rôle is likely to be associated with the pronoun I for lexical reasons, the equation in (7) would have to be derived by general compositional mechanisms from the meanings of the lexical items that somehow conspire to express GC. This difference also accounts for the relatively idiosyncratic nature of the function GC as opposed to the arguably more natural and straightforward SPEAKER aspect of utterance contexts. These differences notwithstanding, it would still seem that both the reference of first person pronoun I and that of the definite description *the German chancellor* depend on the utterance context, and this common feature shows clearly in (1) and (7).

Given the rough analogy between (1) and (7), it is tempting to regard context dependence as a special case of the more general phenomenon of the situation dependence of reference. Yet although (1) and (7) will fall out of the standard approach to context dependence, these equations are deceptively simple: as it turns out, the two cases at hand differ fundamentally in the precise way reference depends on the utterance context. This can be seen by looking at *uninformative* statements like the following:

- (8) *No bachelor is married.*
 (9) *The German chancellor is a politician.*
 (10) *I am here.*

(8) is clearly trivial: being a bachelor means, among other things (like being a male person), never having married. Consequently, an utterance of (8) is likely to be construed in some non-literal sense, or to be used in some purely rhetorical function. We may take it for granted that, whatever the communicative effects of utterances of (8) may be, and however they may come about, they do not constitute the literal, conventional meaning of the sentence. If it were only for its literal meaning, (8) would be totally pointless. And it is easy to see why this is so: to use a Kantian phrase, the predicate concept of being married is contained in the subject concept of not applying to bachelors. Extending our notation to nouns and (predicative) adjectives, we may write the two extensions as $\textit{bachelor}^c$ and $\textit{married}^c$, the upper index indicating that the extension depends on the utterance context c . Since the function of the determiner *no* is to express disjointness of the two extensions, the *truth condition* (8) imposes on c can now be formulated as follows:

$$(11) \textit{bachelor}^c \cap \textit{married}^c = \emptyset$$

Indeed, it is hard to see how any context c could fail to meet (11), which is why (8) is trivial.

(9) too has an air of triviality: being the chancellor of Germany means holding a particular political office, and holding a political office makes a politician. Maybe (9) is not *entirely* trivial in that there are (or rather: were) contexts in which Germany did not have a chancellor. However, as long as we fix the general political situation, (9) is not really helpful. Consequently, an utterance of (9) is likely to be construed in some non-literal sense, perhaps as an allusion to certain stereotypes. Again we take it that whatever the

communicative effects of (9) may be, and however they may come about, they do not constitute the literal, conventional meaning of the sentence. Rather, given a context c , (9) is literally true just in case (12) obtains:

(12) $GC(c) \in /politician/^c$

This truth condition is trivially satisfied by any context c in which the subject of (9) has a referent; and for simplicity we will not bother about other contexts, in which the use of (9) would be inappropriate anyway.

(10) parallels (8) and (9) in its triviality: given an utterance context, the speaker in that context is certainly located at the place where the utterance is made. This truth condition can be brought out in terms of a binary ‘locality’ relation between objects and their locations, which we take to be the extension of the preposition *at* (in its locative sense) and which depends on the context c , because in different contexts, things may be in different places:

(13) $(\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(c) [= /at/^c]$

Again it would seem that no context could fail to satisfy (13), which is why (10) cannot be uttered falsely and thus appears trivial.

While there is doubtlessly something trivial about (10), the sentence is not quite as uninformative as (8), and not in the same way. In fact, an utterance of (10) may tell the hearer something she did not know before – which is hardly possible with (8). One may imagine John coming home unexpectedly early to hear his wife speak to someone over the phone, saying that she is not expecting her husband before the end of the week – whereupon he enters the room uttering (10), and surprising Mary. Though the surprise effect may be attributed to the very fact that John is standing there visibly and audibly, it also appears that the very *content* of John’s utterance, i.e. what is (literally) said by it, expresses precisely what Mary is surprised about. For even though the surprise could not have been smaller had John uttered (8), say, the content of that utterance would not have been the object of her surprise, only the fact that an utterance with such content is made.

The contrast between (8) and (10), then, turns on a difference in their *content*, i.e. what is (or can be) said, or expressed, by uttering these sentences. To the extent that content is a semantically relevant notion, so is the difference in the kind of triviality these two sentences exemplify. Indeed, it would seem that the content of a sentence depends on its meaning. However, it is not determined by its meaning alone. Had Mary’s son Peter uttered (10) on the same occasion, he would have expressed something much less surprising – as John might have, had he made his utterance somewhere else. In other words, what John expressed with (10) in the circumstances was that he, John, was at the place of his utterance, viz. John and Mary’s home; whereas Peter would have expressed that he, Peter, was at that same place; etc. And clearly, none of these contents would have been as trivial as what anybody would (literally) express by uttering (8). Hence which content is expressed by a given sentence may depend on the context in which the utterance is made. So while (8) and (10) are both trivially true whenever uttered, the content of the latter need not be trivial, whereas that of the former always is. That the content of (10) as uttered on the occasion described above is non-trivial can be seen from the fact that there

are many circumstances that it rules out. In this respect, it differs from what is expressed by (8), in whichever context it may be uttered: even if things get as crazy as one may imagine, there will be no married bachelors. However, things do not have to be particularly wild for John to not be at home; in fact, this is what Mary thought would be the case, and she is pretty down to earth.

In order to model these differences in informativity, we will identify the content of a sentence with the circumstances to which it truthfully applies, i.e. those situations that it does not rule out. (Cf. article 33 (Zimmermann) *Model-theoretic semantics*, sec. 2, for more on the general setting.) More specifically, we will take the content $\llbracket S \rrbracket^c$ of a sentence S to be a subset of the stock of all possible situations, a set called *Logical Space*: $\llbracket S \rrbracket^c \subseteq LS$. Thus, if c^* is the above context in which John utters (10), we find that $\llbracket 10 \rrbracket^{c^*} \neq LS$, because $\llbracket 10 \rrbracket^{c^*}$ only contains the situations in which John is at home, leaving out innumerable situations in which he is not. More generally, if a speaker x utters (10) at a place y , x thereby expresses a content that rules out the situations in which x is not located at y . We thus have:

- (14) a. $\llbracket (10) \rrbracket^{c^*} = \{s \mid (\text{John, Home}) \in \text{AT}(s)\}$
 b. $\llbracket (10) \rrbracket^c = \{s \mid (\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(s)\}$

According to (14a), whether a situation s ends up in the content expressed by (10) in c^* , then, depends on John's location in that situation: if s is such that John is at his (actual) home, then $s \in \llbracket 10 \rrbracket^{c^*}$; otherwise $s \notin \llbracket 10 \rrbracket^{c^*}$. Hence $\llbracket 10 \rrbracket^{c^*} \neq LS$ because there are various possible (and actual) scenarios in which John is not at home; so the content of (10) as uttered in c^* is not trivial in that it excludes a host of possible situations. On the other hand, in c^* , John is at home, and thus $c^* \in \llbracket 10 \rrbracket^{c^*}$. According to (14b), whether a situation s ends up in the content expressed by (10) in an arbitrary context c , depends on where the speaker in c is in that situation: if s is such that the speaker (in c) is at the place where c is located, then $s \in \llbracket 10 \rrbracket^c$; otherwise $s \notin \llbracket 10 \rrbracket^c$. Hence $\llbracket 10 \rrbracket^c \neq LS$ because the location of individuals is a contingent matter; so the content of (10) is never trivial. On the other hand, quite generally the speaker is where the utterance is made, and thus $c \in \llbracket 10 \rrbracket^c$. This is what makes (10) trivial, although its content is not.

Readers are advised to briefly stop to ponder over the difference between the truth condition (13) of (10) and the general characterization (14b) of its content (in a context c). On the one hand, a context c satisfies condition (13) just in case it is a member of the set in (14b); in other words, (10) is true in c just in case it is among the situations the content of (10) as expressed in c , applies to:

- (15) $c \in \{s \mid (\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(s)\}$
 iff $(\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(c)$

On the other hand, the set characterized in (14b) is not the set of contexts in which (10) is true. To begin with, as we have just seen, the content of (10) in a given context c does not only contain utterance contexts, but all sorts of possible situations including ones in which no utterance is made. More importantly, not every context in which (10) is true, ends up in $\llbracket 10 \rrbracket^c$: what (10) expresses *in a context* c – viz. that the speaker *in* c is at the place of c – need not be true in a context d . Take c^* again where John is speaking at home. Since John's home is far away from Rome, $(\text{SPEAKER}(d^*), \text{PLACE}(d^*)) = (\text{John, Rome})$

$\in AT(d^*)$, $(SPEAKER(c^*), PLACE(c^*)) = (John, Home) \notin AT(d^*)$. Consequently, $d^* \notin \llbracket 10 \rrbracket^c$, though (10) is true in d^* as in any other context; indeed, $d^* \in \llbracket 10 \rrbracket^{d^*}$.

What makes (10) trivial, then, is the fact that its content is true in that context – despite the fact that its content does not apply to every context; in particular, its content varies from context to context. In this respect, (10) differs from (8); for no matter what the context is, the content of (8) is always the same triviality, applying to all possible situations alike, whether utterance contexts or not. Plainly, for any context c we have:

$$(16) \llbracket (8) \rrbracket^c = LS$$

Now for (9), which we placed in the middle, because it seems to share features of both (8) and (10). We have already said that it is next to tautological. However, its triviality notwithstanding, there is a sense in which it conveys, or may convey, genuine information. For instance, if it is used as (part of) an explanation of, or a comment on, what Angela Merkel did in a certain situation, it may be understood as expressing the content that she, Angela Merkel is a politician. This content is by no means trivial, and the way it relates to the trivial, tautological construal of (9) may be reminiscent of the triviality of (10) and its content in a given utterance context: the non-trivial content (17a) associated with (9) results from understanding the subject as getting its referent ‘directly’ from the utterance context – just like the 1st person pronoun and the locative adverb in (10); cf. (15). On the other hand, on its near-tautological construal, subject and predicate are ‘evaluated’ relative to the same situation:

$$(17) \begin{array}{ll} \text{a. } \{s \mid GC(c) \in /politician/s\} & [\neq LS] \\ \text{b. } \{s \mid GC(s) \in /politician/s\} & [\approx LS] \end{array}$$

The squiggly equality in (17b) is meant to capture the fact that GC is not defined throughout LS , because there are situations s without German chancellors; however, whenever it is defined, its value is a member of $/politician/s$, or so we have been assuming. It seems that both sets in (17) are plausible candidates for the content expressed by (9). We will return to the shifty ‘character’ of (9) in due course.

(8)–(10) show that there are at least two different ways in which a (declarative) sentence may be trivial: it may be that, in any context in which it could be uttered, it carries a content that does not exclude any possibilities whatsoever; and it may so happen that, in any context in which it could be uttered, it carries a content that does not exclude the context itself. To be sure, both kinds of triviality result in total pointlessness; for in both cases the sentence is guaranteed to be true no matter where and when it is uttered, or by whom. But the cases differ in that the pointlessness of the utterance is not due to its content; that this is possible is due to the fact that this content varies from context to context.

3. Characters

Summing up these observations, we arrive at the following general picture, not just of informational voidness but also of (sentential) meaning at large. The content of a sentence is a set of possible situations, and what the content of a particular sentence is, depends on the context of utterance. A sentence has trivial content in a given context if its content

in that context coincides with the set LS of all possible situations; it is trivially true when uttered if every context of utterance is itself a member of its content at that context. The following definitions reformulate these findings in standard terminology, mostly due to Kaplan (1989a):

Definition

Let S be a (declarative) sentence, and let $C \subseteq LS$ be the set of all utterance contexts.

- a) The *character* of S is a function $\llbracket S \rrbracket: C \rightarrow \wp(LS)$ that assigns to any utterance context $c \in C$ a set $\llbracket S \rrbracket^c \subseteq LS$ of (possible) situations, the *content* of S in c .
- b) S is *true* of a situation $s \in LS$ in a context $c \in C$ iff $s \in \llbracket S \rrbracket^c$; and S is *false* of s in c iff $s \notin \llbracket S \rrbracket^c$.
- c) S is *necessarily true* [*false*] in a context $c \in C$ iff S is true of every possible situation, i.e. iff $\llbracket S \rrbracket^c = LS$ [$\dots = \emptyset$].
- d) S is *true* [*false*] in a context $c \in LS$ iff S is true [*false*] of c in c , i.e. iff $c \in \llbracket S \rrbracket^c$ [$c \notin \llbracket S \rrbracket^c$].
- e) S is *a priori true* [*false*] iff S is true [*false*] in every context $c \in C$.

Some remarks on these definitions are in order. Taken together, they form the core of the *two-dimensional* theory of context-dependence; note that they presuppose the general notions of a possible situation, an utterance situation, and Logical Space. *a)* should be read as programmatic rather than abbreviatory: a full account of linguistic meaning must be inclusive enough so that the character function can be determined from it. This need not mean that meaning, or even literal meaning, *coincides* with character. Neither does the notion of character have to be confined to sentences; in fact we will soon see how to construct characters of arbitrary expressions. – *b)* brings out that, once characters come into play, truth and falsity is a matter of two parameters, viz. the context in which the sentence is uttered and the situations to which its content may be applied. Intuitively, this difference may be described as that between the situation in which an utterance is made and the situations that the utterance is about. However, this characterization should be taken with a grain of salt. After all, characters are defined for all contexts of utterance whether or not the sentence (or expression) analyzed is uttered in it; and it is not obvious which situations intensions are about, given that they are defined for all of LS (for the time being, anyway). – *c)* defines the kind of triviality exemplified by (8). However, note that (8) is special in that its content is the same across arbitrary contexts (or so we have assumed); this is not a requirement of necessity as defined in *c)*. We will later see examples of necessary truths and falsehoods with ‘unstable’ characters. – *d)* shows how the ordinary notion of truth (and falsity) relative to an utterance context is grounded in the binary notion defined in *b)*, viz. by having the context play two rôles: determining content, and applying the latter to it. This rôle identification is a key tool of the theory presented here, known as *diagonalisation*. We will meet it in various guises as we go along. – To prove the point, it already makes an appearance in *e)*, where the kind of triviality exemplified by (10) is defined.

In order to generalize characters from sentences to (almost) arbitrary expressions, we return to the dependence of reference and extension on situations but now take the two parameters into account. We illustrate the general strategy with a few simple examples:

$$(18) \llbracket I \text{ am married} \rrbracket^c = \{s \mid \text{SPEAKER}(c) \in /married/s\}$$

In (18), c is an arbitrary context, and the extension of *married* consists of all persons that are married in the situation at hand. Then, like (14b), (18) reflects the fact that the content of the sentence depends on the utterance context: if John utters it, he expresses that he is married, and the content consists of the (possible) situations in which John is married; if Jane utters it, she expresses that she is married, etc. Of course, this time there are contexts to which the resulting content does not truthfully apply: *I am married* is not *a priori* true. Still what (18) and (14b) have in common is the fact that the referent of the subject solely depends on the context c whereas the extension of the predicate solely depends on the situation s the content is applied to. This asymmetry of subject and predicate is somewhat coincidental, as the following example shows:

$$(19) \llbracket No \text{ politician is married} \rrbracket^c = \{s \mid /politician/s \cap /married/s = \emptyset\}$$

If uttered in a context $c \in C$, the sentence whose character is described in (19), expresses that there are no married people among the politicians, thereby ruling out those possible (in fact, likely) situations in which the extensions of *politician* and *married* overlap. Hence neither the extension of the subject nor that of the predicate depend on the utterance context. (Remember that we ignore temporal reference altogether.) So it is not in the nature of subjects to bring context into play, as (18) may have suggested; rather it is the very context-dependence of the personal pronoun that does. The following example confirms this, at least at first blush:

$$(20) \llbracket The \text{ German chancellor is married} \rrbracket^c = \{s \mid GC(s) \in /married/s\}$$

The sentence interpreted in (20) may be used to rule out the possibility that the German chancellor is unmarried, i.e. those situations in which there is a spouseless German chancellor – *whoever he or she may be*. Given this, the referent of the subject should not depend on the utterance context; otherwise the content of the sentence would come out as ruling out that Angela Merkel – *chancellor or not* – is unmarried (given a realistic context at the time of writing this). So, as in (19) there is no context-dependence in the subject (nor elsewhere in the sentence). On the other hand, it would seem that the sentence may be used to convey precisely a piece of information about a certain person. If so, its content would have to look different. To avoid ambiguity, we may use a notational device distinguishing this, somewhat more unusual construal:

$$(21) \llbracket The_d \text{ German chancellor is married} \rrbracket^c = \{s \mid GC(c) \in /married/s\}$$

The above examples may suggest that the reference (or extension) of subjects is always exclusively a matter of context or else not a matter of context at all. However, there are also mixed cases, i.e. subjects whose referents depend on both the context of utterance and the situation to which the content is applied:

$$(22) \llbracket No \text{ friend of mine is married} \rrbracket^c = \{s \mid /friend/s(\text{SPEAKER}(c)) \cap /married/s = \emptyset\}$$

In (22) we have assumed that the extension of the relational noun *friend* is the function assigning to each individual the set of his or her friends. If uttered by John, say, the

sentence rules out the possible situations in which John has any married friends. Hence, obviously, the 1st person possessive relates to the speaker at the context of utterance. Had the set of friends been determined by context too (i.e. had we written ‘/friend/^c’ instead of ‘/friend/^s’), the content would have ruled out that any of a particular group of people, viz. those who happen to be John’s friends at the context of utterance, is married. Now, even though – somewhat analogously to (20) – the sentence might be interpreted that way (which we will leave open here), this is certainly not its most straightforward reading, let alone the only one. It appears that a more obvious way of understanding what it says is given in (22), according to which the extension of the subject partly depends on the utterance context, but not entirely so.

In general, nominal constituents (noun phrases, determiner phrases, quantifiers, etc.), like sentences, have extensions that depend on both the context of utterance and the situation to which the (sentential) content is ultimately applied. As it turns out, the same goes for verbal constituents, and almost any other kind of expression (logical words being famous exceptions). In order to combine these extensions in a consistent and compositional way, it is thus natural to assume that the extensions of *all* expressions depend on the utterance context and a situation to which the content is applied. Hence, we may generalize (and slightly adjust) the above definition *a*):

Definition

Let α be an expression (of any category), and let $C \subseteq LS$ be the set of all utterance contexts.

*a**) The *character* of α is a function $\llbracket \alpha \rrbracket$ that assigns to any utterance context $c \in C$ a function $\llbracket \alpha \rrbracket^c: LS \rightarrow D_\omega$, the *intension* of α in c , where D_α is the set of possible extensions of α .

*a**) presupposes the notion of a possible extension of a given expression, which needs to be settled independently. For the purpose of this survey we continue to assume that certain category-dependent restrictions apply; in particular, we take it that the extensions of (declarative) sentences are truth values, that those of nouns and predicates are sets of individuals, and that the extensions of referential expressions like proper names, personal pronouns, and definite descriptions coincide with their referents.

To see that *a**) does generalize *a*), one needs to identify sets $M \subseteq LS$ of possible situations with their *characteristic functions* f_M , which distinguish members of M from other situations by assigning corresponding truth values: $f_M(s) = 1$ if $s \in M$; and $f_M(s) = 0$ if $s \in LS \setminus M$. Due to this correspondence, the contents assigned to sentences by characters conforming to *a*) may be represented by their characteristic functions, which assign truth values to situations. Since truth values may be regarded as the extensions of sentences, sentential characters according to *a*) turn out to be special cases of *a**)); and the intensions of sentences come out as functional representatives of their contents as conceived above. But, of course, *a**) is much more general. In particular, the characters of referential expressions α are said to assign *individual concepts* to contexts, i.e. functions from possible situations to individuals; and the extensions of predicates will be *properties*, i.e. sets of individuals depending on contexts and situations.

Following *a**), the extensions of the context-dependent expressions considered above can now be assigned by their characters:

- (23) a. $\llbracket I \rrbracket^c(s) = \text{SPEAKER}(c)$
 b. $\llbracket you \rrbracket^c(s) = \text{ADDRESSEE}(c)$
 c. $\llbracket now \rrbracket^c(s) = \text{TIME}(c)$
 d. $\llbracket here \rrbracket^c(s) = \text{PLACE}(c)$

The equations in (23), which must be read as generalizing over arbitrary utterance contexts $c \in C$ and situations $s \in LS$, all conform to a^*). In each case, the character of an expression α assigns to a given context an individual concept (assuming that times and places are individuals). However, in each of these cases, the individual concept is constant across all of Logical Space: $\llbracket \alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^c(s')$ whenever $s, s' \in LS$. This is so because the referent of a deictic expression only depends on the context in which it is uttered, not on the situation to which the content of the sentence in which it occurs is applied; this much can be gleaned from the above description of a typical sentence like (18):

$$(18) \llbracket I \text{ am married} \rrbracket^c = \{s \mid \text{SPEAKER}(c) \in /married/s\}$$

So the situations s in (23) are there but for uniformity: characters in general need them, even though these particular ones could do without them. This hybrid treatment pays once we turn to the predicates considered above, which come out as the mirror images of deictic expressions in that their extensions are determined exclusively relatively to the situations that make up sentence content, without the utterance context coming in. Again, this can be seen from a typical case like (18) above, where *be married* is the predicate under scrutiny and its extensions are all of the form $/married/s$ where s is a situation in Logical Space. According to a^*), these extensions should be thought as given by the character of the predicate, which for reasons of uniformity again, comes out as somewhat redundant in that it assigns the same property to every context:

- (24) a. $\llbracket be \text{ married} \rrbracket^c(s) = /married/s = \{x \mid x \text{ is married in } s\}$
 b. $\llbracket be \text{ a politician} \rrbracket^c(s) = /politician/s = \{x \mid x \text{ is a politician in } s\}$

The difference in character between the deictic expressions in (23) and the predicates in (24) gives rise to a natural distinction (cf. Zimmermann 1991: 162):

Definition

- f) An expression α is *direct* iff $\llbracket \alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^c(s')$, for any context c and situations s and s' .
 g) An expression α is *absolute* iff $\llbracket \alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^{c'}(s)$, for any contexts c and c' and situations s .

Hence the deictic expressions under (23) are direct, whereas the predicates in (24) are absolute. Note that directness does not *per se* imply context dependence in that a character may be *both* direct *and* absolute, and thus the extension would not depend on the utterance context after all. Logical words like *and* and *every* are cases in point; so may be proper names (according to Kaplan 1989a: 558ff., anyway). The term (which generalizes the more common *directly referential*) is meant to suggest that no content layer gets in the way between context and extension: the intension is a degenerate, constant function; such

intensions are also called *rigid*, in the tradition of Kripke (1972) where, famously, proper names are argued to be ‘rigid designators’. The term defined in *g*) is meant to suggest independence from context.

One should note that characters may be *mixed*, i.e. neither direct nor absolute. As a case in point, the truth of the sentence *I am married* as analyzed in (18), depends on both the context of utterance and a situation to which its content is applied. In other words, it is neither direct, because its content (in a given context) may assign different truth values to different situations, nor absolute, because its character may assign different contents to different contexts. (We note in passing that none of our sample lexical items has a mixed character, which gives rise to the conjecture that this is always so; cf. Zimmermann 1995 and Bierwisch 2004 for more on this so-called *Hypothesis (L)*, originating with Zimmermann 1991: 164.) It is obvious how the predicates analyzed in (24) combine with deictic subjects to produce doubly-dependent sentence characters, viz. by way of the following *character composition* rule:

$$(25) \quad \llbracket SUBJ PRED \rrbracket^c(s) = \begin{cases} 1, & \text{if } \llbracket SUBJ \rrbracket^c(s) \in \llbracket PRED \rrbracket^c(s) \\ 0, & \text{otherwise} \end{cases}$$

(25) is a *pointwise* characterization of the characters of sentences with referential subjects: for each context $c \in C$ it says which truth value the content of the sentence in c assigns to any situation $s \in LS$; under the assumption that a function is completely characterized by its course of values (i.e. the set of its argument-value pairs), this fixes the content at each c , which in turn fixes the character. Alternatively, the combination defined in (25) may be formulated in terms of characteristic functions, rather than sets, as predicate extensions:

$$(25') \quad \llbracket SUBJ PRED \rrbracket^c(s) = \llbracket PRED \rrbracket^c(s)(\llbracket SUBJ \rrbracket^c(s))$$

As long as it is unlikely to lead to confusion, we will not bother to distinguish between (25) and (25').

It is readily seen that (25) yields (18) when applied to the characters given in (23a) and (24a). And we also obtain the intended (and expected) result when applying the combination to sentences with non-deictic subjects, like (9) above:

$$(26) \quad \begin{aligned} \llbracket \textit{the German chancellor is married} \rrbracket^c(s) &= 1 \\ \text{iff } \llbracket \textit{the German chancellor} \rrbracket^c(s) &\in \llbracket \textit{is married} \rrbracket^c(s) \\ &= \textit{the German chancellor}^s \in \{x \mid x \text{ is married in } s\} \end{aligned}$$

Sentences with quantificational subjects may be treated in a similar way, the difference lying in the direction of application: whereas the truth value in a predication like (26) ensues from applying the extension of the predicate to that of the subject, quantificational subjects work the other way round. The tautology (8) discussed earlier is a case in point:

$$(27) \quad \begin{aligned} \llbracket \textit{no bachelor is married} \rrbracket^c(s) &= 1 \\ \text{iff } \llbracket \textit{is married} \rrbracket^c(s) &\in \llbracket \textit{no bachelor} \rrbracket^c(s) \\ \text{iff } \dots & \\ \text{iff } \{x \mid x \text{ is a bachelor in } s\} \cap \{x \mid x \text{ is married in } s\} &= \emptyset \end{aligned}$$

The intermediate steps, which only involve standard combinations and denotations of quantifier extensions, have been skipped. Since the condition in the final line of (27) does not mention the context, (8) turns out to be absolute in the sense of *g*), i.e. it has the same content in every utterance situation; and since the condition is met by any situation $s \in LS$, this content coincides with LS . As a consequence, (8) also comes out as an *a priori* truth: its (rigid) content contains all situations whatsoever – and thus *a fortiori* the (changing) utterance context.

The character (14b) of (10) is different:

$$(14) \text{ b. } \llbracket (10) \rrbracket^c = \{s \mid (\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(s)\}$$

In order to derive it compositionally, we first have to dissect its predicate into the locative adverbial and a corresponding reading of the copula. Since the latter relates the referent of the subject and a location in the situation the content is applied to, it is absolute:

$$(28) \llbracket be_{LOC} \rrbracket^c(s) = \text{AT}(s) = \{(x,y) \mid \text{in } s, x \text{ is located at } y\}$$

The general definition of the character composition corresponding to locative predicate formation is left to the reader. Its effect on the case at hand is straightforward:

$$(29) \begin{aligned} & \llbracket be_{LOC} \text{ here} \rrbracket^c(s) \\ &= \{x \mid (x, \llbracket here \rrbracket^c(s)) \in \llbracket be_{LOC} \rrbracket^c(s)\} \\ &= \{x \mid (x, \text{PLACE}(c)) \in \text{AT}(s)\} \end{aligned}$$

Note that according to (29), the predicate of (10) is no longer absolute, due to the directness of *here*. Neither is the whole sentence whose character can now be determined with the help of (25):

$$(30) \begin{aligned} & \llbracket I \text{ am}_{LOC} \text{ here} \rrbracket^c(s) = 1 \\ & \text{iff } \llbracket I \rrbracket^c(s) \in \llbracket \text{am here} \rrbracket^c(s) \\ & \text{iff } (\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(s) \end{aligned}$$

Thus unlike (8), (10) never expresses a necessary truth, for reasons we have already seen: the location of any individual, including the speaker at a given context, is instable across Logical Space, and so the content will never cover all of the latter. However, it will always contain the utterance situation, which means that the sentence comes out true in every context and is thus *a priori* true, in the sense of Definition *e*).

4. Diagonals

The two kinds of triviality thus come out as reflected by a difference in character. Sentences like (8) are necessarily true and express trivial content, coinciding with Logical Space. Sentences like (10) are *a priori* true and thus true in every context. The difference did not show in their respective truth conditions (11) and (13), which are equivalent because (8), apart from always being necessarily true, is an *a priori* truth too:

$$(11) \ /bachelor/^c \cap /married/^c = \emptyset$$

$$(13) (\text{SPEAKER}(c), \text{PLACE}(c)) \in \text{AT}(c)$$

From the character point of view, these truth conditions pertain to the unary notion of truth in a context, as introduced in Definition *d*), and thus water down the binary one of Definition *b*) by selecting those contexts to which the content expressed by the sentence applies. Technically this step comes down to an identification of the two parameters, which is quite a general procedure:

Definition

- h*) The *extension* $/\alpha/^c$ of an expression α in a context $c \in C$ is the value α 's intension at c assigns to c itself: $/\alpha/^c = \llbracket \alpha \rrbracket^c(c)$.
- i*) The *diagonal* of a character $/\alpha/$ (of an expression α) is the function $/\alpha/: C \rightarrow D_\alpha$ that assigns to each context c the extension of α at c : $/\alpha/(c) = /\alpha/^c$.

Using the above terminology (and our identification of sets with their characteristic functions), we thus see that the diagonal of a sentence is the set of contexts in which it is true. In particular, *apriority* turns out to be a matter of the diagonal: according to Definitions *d*) and *e*) a sentence S is *a priori true* iff for any $c \in C$, $c \in \llbracket S \rrbracket^c$, which means that $/S/ = C$, by Definition *i*); and similarly for *a priori* falsehoods, whose diagonal is empty. Given that contexts are situations, i.e. $C \subseteq LS$, diagonals may be conceived of as (possible) sentence contents. Hence *apriority* is to the diagonal what necessity is to content. It is in view of this distinction between the content of a sentence (or more generally: the intension of an expression) on the one hand and the diagonal of its character on the other, that the current approach has been dubbed ‘two-dimensional’. Hence the dimensions are not the two parameters extensions depend on but the two kinds of content deriving from this dependence: ordinary content as expressed in a given context distinguishing between genuine possibilities and situations that may be ruled out; and diagonal content as determined by the character at large and distinguishing between contexts in which the sentence is (or would be) true or false when uttered. The current section takes a closer look at the relation between these two dimensions.

The term ‘diagonal’ derives from a representation of characters in terms of look-up tables with lines (conventionally) corresponding to contexts of utterance, columns to arbitrary possible situations, and cells containing the extensions. This is what the character of the first-person pronoun I looks like:

Tab. 89.1: The character of I

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	Σ_0	Σ_0	Σ_0	Σ_0	...	Σ_0	Σ_0	...
c_1	Σ_1	Σ_1	Σ_1	Σ_1	...	Σ_1	Σ_1	...
c_2	Σ_2	Σ_2	Σ_2	Σ_2	...	Σ_2	Σ_2	...
c_3	Σ_3	Σ_3	Σ_3	Σ_3	...	Σ_3	Σ_3	...
...

Each row represents the intension of I in a given context c , by running through LS (as represented by the columns) and assigning the referent of I in c to each of the situations. Since the referent coincides with the speaker in c , it will be the same one in each

situation; consequently the columns all look the same. For convenience we abbreviated ‘ $\text{SPEAKER}(c_n)$ ’ by ‘ Σ_n ’; this is not meant to exclude that in some cases $\Sigma_n = \Sigma_m$, even though $n \neq m$ and consequently $c_n \neq c_m$. Note that we are using subscripts to distinguish different contexts and superscripts to distinguish possible situations that do not happen to be utterance contexts. Also note that the columns have been arranged so that the contexts $c \in C \subseteq LS$ come first, and in the same order as in the rows. This helps keeping track of the diagonal, which we have moreover shaded. Finally note that the diagonal only cuts through part of the character, because there are no rows for non-contexts.

Using similar notational devices, our representation of the character of *here*, or in fact any direct expression, would look almost the same, with each row repeating the place of utterance (‘ Π_n ’) all over the place (= LS); we do not bother to write this down. Absolute expressions are, of course, a different matter. Thus, e.g., the character of locative *be* has the following form:

Tab. 89.2: The character of be_{LOC}

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	AT ₀	AT ₁	AT ₂	AT ₃	...	AT ⁰	AT ¹	...
c_1	AT ₀	AT ₁	AT ₂	AT ₃	...	AT ⁰	AT ¹	...
c_2	AT ₀	AT ₁	AT ₂	AT ₃	...	AT ⁰	AT ¹	...
c_3	AT ₀	AT ₁	AT ₂	AT ₃	...	AT ⁰	AT ¹	...
...

Of course, $AT_n = AT(c_n)$, and $AT^n = AT(s^n)$. In this case the rows all look the same; this is of course, due to the fact that the extension of locative *be*, like that of any absolute expression, does not depend on the context of utterance. One restriction, not visible in the table but important in what follows is that for any subscript n , it holds that $(\Sigma_n, \Pi_n) \in AT_n$ (cf. Kaplan 1979: 89, clause 10). Given this restriction and the fact that according to our above analysis (30), (10) is true of a situation s in a context c_n if $(\Sigma_n, \Pi_n) \in AT(s)$, we may conclude that the diagonal of its character is entirely made up of 1s; the other truth values depend on the specifics of the situations s and contexts c_n and have been filled in arbitrarily:

Tab. 89.3: The character of (10)

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	1	1	0	0	...	0	1	...
c_1	1	1	0	0	...	1	1	...
c_2	0	0	1	1	...	0	0	...
c_3	1	1	1	1	...	1	1	...
...

To get a grip on Tab. 89.3, suppose that $\Sigma_0 = \text{Mary}$ and $\Pi_0 = \text{Frankfurt}$. Then the first row has a 1 in a given column representing a situation s if s is a situation in which Mary is in Frankfurt (which we take to be immovable). Arguably, this row represents the content of:

(31) *Mary is in Frankfurt.*

To actually derive the equivalence in content between (31) and (10) as used in c_0 , we must make the (debatable) assumption that the reference of proper names is neither context-dependent nor a matter of intension. Consequently, their characters are completely degenerate, with all cells filled in by the same individual (per name):

Tab. 89.4: The character of *Mary*

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	m	m	m	m	...	m	m	...
c_1	m	m	m	m	...	m	m	...
c_2	m	m	m	m	...	m	m	...
c_3	m	m	m	m	...	m	m	...
...

Tab. 89.4 gives the simplistic character of *Mary*; a similar table, full of ‘f’s would represent that of *Frankfurt*. Hence, given the above treatment of locative predications, (31) comes out as having an absolute character:

- (32) $\llbracket(31)\rrbracket^c(s) = 1$
 iff $(m, f) \in AT(s)$
 iff $(\Sigma_0, \Pi_0) \in AT(s)$
 iff $\llbracket(10)\rrbracket^c(s) = 1$

Note that (32) holds for any context $c \in C$; indeed, (31) is absolute, with the first line of Tab. 89.3 repeating itself all the way down (C):

Tab. 89.5: The character of (31)

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	1	1	0	0	...	0	1	...
c_1	1	1	0	0	...	0	1	...
c_2	1	1	0	0	...	0	1	...
c_3	1	1	0	0	...	0	1	...
...

The treatment of *Mary* as in Tab. 89.4 also gives rise to the construction of a kind of sentence character that we have not met so far, exemplified by:

(33) *I am Mary.*

Under the (uncontroversial) assumption that *identity statements* are true just in case the extensions of the equated expressions coincide, the character of (33) is split into two parts: in any context c in which Mary is speaking, it is necessarily true, because all situations are such that Mary (= SPEAKER(c)) is identical with Mary (= the extension of

Mary according to Tab. 89.4); but in a context c in which Mary is not the speaker, (33) is necessarily false, because all situations are such that $\text{SPEAKER}(c) \neq \text{Mary}$. We thus arrive at the following character, where Mary is speaking in c_0 and c_1 , but not in c_2 and c_3 :

Tab. 89.6: The character of (33)

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	1	1	1	1	...	1	1	...
c_1	1	1	1	1	...	1	1	...
c_2	0	0	0	0	...	0	0	...
c_3	0	0	0	0	...	0	0	...
...

As one can immediately tell from the diagonal of its character depicted in Tab. 89.6, sentence (33) is not *a priori* true; in particular it is not tautological in the way (8) is. Still, like (8), it is necessarily true in some contexts, viz. those in which Mary is speaking. Hence (33) comes out as trivial in the restricted sense that its content may be uninformative, depending on the context. The fact that it is not trivially true in every context may be seen as the beginning of an explanation why it is not uninformative *tout court* even though its content is. A hearer who is not fully informed about the context – and particularly about who is speaking – may rule out (being part of) any context in which the speaker is not Mary, as long as (s)he is prepared to trust the speaker. Such a hearer could take the diagonal of the character as a substitute for the content expressed by the sentence, thereby eliminating all contexts in which Mary is not speaking and thus learning that Mary is the speaker. This *pragmatic* analysis, which makes heavy use of the diagonal, may even be applied to utterance situations in which the speaker does not know which person is being referred to by the name *Mary*, thus extending well beyond the semantics-pragmatics divide. However, it also has to rely on a wider conception of contexts and characters and thus goes far beyond this short survey. A fuller story along these lines can be found in Stalnaker (1978) and Haas-Spohn (1991); see also Haas-Spohn (1995) for a different (though related) approach.

The diagonal may also be seen to play a rôle in the shifty interpretation of the (surface) sentence (9), to which we attributed two different characters, repeated here:

$$(20) \llbracket \textit{The German chancellor is married} \rrbracket^c = \{s \mid \text{GC}(s) \in \textit{married}^s\}$$

$$(21) \llbracket \textit{The}_d \textit{ German chancellor is married} \rrbracket^c = \{s \mid \text{GC}(c) \in \textit{married}^s\}$$

The difference between the two analyses lies in the interpretation of the subject, which is absolute according to (20) and direct according to (21):

$$(34) \llbracket \textit{the German chancellor} \rrbracket^c(s) = \text{GC}(s)$$

$$(35) \llbracket \textit{the}_d \textit{ German chancellor} \rrbracket^c(s) = \text{GC}(c)$$

Comparing the corresponding character tables reveals how one can be derived from the other:

Tab. 89.7: The character of *the German chancellor*

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	CG ₀	GC ₁	GC ₂	GC ₃	...	GC ⁰	GC ¹	...
c_1	GC ₀	GC ₁	GC ₂	GC ₃	...	GC ⁰	GC ¹	...
c_2	GC ₀	GC ₁	GC ₂	GC ₃	...	GC ⁰	GC ¹	...
c_3	GC ₀	GC ₁	GC ₂	GC ₃	...	GC ⁰	GC ¹	...
...

Tab. 89.8: The character of *the_d German chancellor*

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	GC ₀	GC ₀	GC ₀	GC ₀	...	GC ₀	GC ₀	...
c_1	GC ₁	GC ₁	GC ₁	GC ₁	...	GC ₁	GC ₁	...
c_2	GC ₂	GC ₂	GC ₂	GC ₂	...	GC ₂	GC ₂	...
c_3	GC ₃	GC ₃	GC ₃	GC ₃	...	GC ₃	GC ₃	...
...

A quick inspection shows that both tables contain the same function f from contexts c to the German chancellor GC_c in c , only arranged in different ways: whereas Tab. 89.8 repeats f in every column, Tab. 89.7 has f on the left side of every row. Hence the character in Tab. 89.8 can be obtained from that in Tab. 89.7 by inserting its diagonal into each column; in fact, this operation is perfectly general and does not even require absoluteness:

Definition

- j) The *direct interpretation* $\nabla\alpha$ of an expression α is that character that assigns to every context $c \in C$ the intension that assigns to every situation $s \in LS$ the extension of α in c : $\nabla\alpha(c)(s) = / \alpha^c = \llbracket \alpha \rrbracket^c(c)$.

Obviously, the direct interpretation of an expression is always direct in the sense of Definition f) – thence the term; moreover, it is easy to verify that the direct interpretation of a direct expression coincides with its ordinary character: $\nabla\alpha = \llbracket \alpha \rrbracket$. If direct interpretation could be shown to be the result of a general interpretative strategy of applying the intension directly to the context of utterance, then the uncertainty as what kind of content is expressed by sentences like (9) might be approached in pragmatic terms (cf. Kripke 1977); in fact, it is even conceivable that separate pragmatic processes make use of the (ordinary) character and the direct interpretation of one expression at the same time. Alternatively, one may try and seek an explanation in terms of ambiguity, in which case ∇ would have to be an operator in the object language embedding (suitable) expressions α (cf. Kaplan 1978, relating to Donnellan 1966):

$$(36) \quad \llbracket \nabla\alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^c(c)$$

When restricted to referential expressions α , the operator in (36) is also known as *dthat*, which is short for ‘demonstrative *that*’ and pronounced [dðæt]; applied to sentences α , it

boils down to a combination of the operations expressed by certain readings of *actually* and *now* (cf. Kaplan 1979).

It is tempting and natural to consider a reversal Δ of direct interpretation that turns any character into an absolute one. Whereas ∇ pastes the diagonal into each column, Δ would have to insert it in the rows of the resulting table. In analogy with (36), Δ would thus have to satisfy the equations:

$$(37) \quad \Delta\alpha(c)(s) = \llbracket \alpha \rrbracket^s(s)$$

However, there is an obvious problem with this construction, due to the asymmetry of characters: they are only defined for utterance contexts, and not for the remaining situations in Logical Space. In the case of absolute expressions α the intension assigned by their character is the same across C and may thus be generalized to all of LS . However, with direct or even mixed expressions, this "extrapolation" obviously does not work. Hence the right side of (37) is not always defined; as a consequence, the intensions assigned by characters $\Delta\alpha$ would have to be partial, only defined for situations $s \in C$.

Definition

- k) The *diagonal character* $\Delta\alpha$ of an expression α is that function that assigns to every context $c \in C$ the partial intension that assigns to every utterance situation $s \in C$ the extension of α in s : $\Delta\alpha(c)(s) = \llbracket \alpha \rrbracket^c = \llbracket \alpha \rrbracket^s(s)$.

Note that we continue to use 's' as a variable for situations to which intensions apply, even if they are restricted to members of C , as in k); this should remind of their rôle as determining extensions. Obviously, the diagonal character of an expression is always absolute in the sense of Definition g); moreover, it is easy to verify that the diagonal character of an absolute expression coincides with its ordinary character if the values are restricted to utterance contexts (or "extrapolated" in the sense indicated above): $\Delta\alpha \approx \llbracket \alpha \rrbracket$.

The partiality of the intensions assigned by diagonal characters may be construed as presuppositional. Take the character of the first-person pronoun, I , given in Tab. 89.1. The result of applying the operation defined in (37) to it may be represented as in Tab. 89.9, where '#' stands for undefinedness:

Tab. 89.9: The partial character ΔI

	c_0	c_1	c_2	c_3	...	s^0	s^1	...
c_0	Σ_0	Σ_1	Σ_2	Σ_3	...	#	#	...
c_1	Σ_0	Σ_1	Σ_2	Σ_3	...	#	#	...
c_2	Σ_0	Σ_1	Σ_2	Σ_3	...	#	#	...
c_3	Σ_0	Σ_1	Σ_2	Σ_3	...	#	#	...
...

The character depicted in Tab. 89.9 is gappy for a systematic reason: there are no extensions $\Sigma^n = \text{SPEAKER}(s^n)$ because only utterance situations have (uniquely defined) speakers. Hence the partial character presupposes that the content is applied to utterance

situations only, i.e. to situations with speakers. This partial character may be described somewhat more perspicuously (and revealingly) by the following equation:

$$(38) \quad \Delta I(c)(s) = \begin{cases} \text{SPEAKER}(s), & \text{if } s \in C \\ \#, & \text{otherwise} \end{cases}$$

According to (38), the intension ΔI assigns to a context is always the SPEAKER function. Hence ΔI coincides with the (ordinary) character of *the speaker*, which refers to the speaker in a given utterance situation. In a similar vein, Δ may be combined with other deictics like *here* and *now*, always resulting in absolute expressions that turn their context-dependence into a partial intension: Δ *here* comes out as expressing the character of *the place of utterance*; Δ *now* corresponds to *the time of utterance*; etc. In order to better understand operation Δ , one may study its effect on various kinds of sentences:

- (39) a. $\Delta I \text{ am married}(c) = \{s \in C \mid \text{SPEAKER}(s) \in /married^s\}$
 b. $\Delta I \text{ am here}(c) = \{s \in C \mid \text{SPEAKER}(s), \text{PLACE}(s) \in \text{AT}(s)\}$
 c. $\Delta I \text{ am Mary}(c) = \{s \in C \mid \text{SPEAKER}(s) = \text{Mary}\}$

For simplicity, (39) ignores the differentiation between utterance contexts of which the content (intension) is false and non-utterance situations of which it is undefined. In any case, due to the presupposition introduced by Δ , the situations to which it assigns the truth value 1 are confined to utterance situations; and these are the ones mentioned in (39). As expected, these diagonal characters (which may be derived by combining interpretive mechanisms introduced above) correspond to certain absolute expressions:

- (40) a. $\llbracket \text{The speaker is [identical with] Mary} \rrbracket^c(s) = \{s \in LS \mid \text{SPEAKER}(s) = \text{Mary}\}$
 b. $\llbracket \text{The speaker is married} \rrbracket^c(s) = \{s \in LS \mid \text{SPEAKER}(s) \in /married^s\}$
 c. $\llbracket \text{The speaker is at the place of the utterance} \rrbracket^c(s) = \{s \in LS \mid (\text{SPEAKER}(s), \text{PLACE}(s)) \in \text{AT}(s)\}$

The sentences analyzed in (40) all have straightforward presuppositional readings, which on closer inspection coincide with the corresponding diagonalized characters given in (39), due to the fact that the SPEAKER function is defined for utterance situations and only them and provided that *the place of the utterance* expresses a partial intension defined on utterance situations and assigning their respective location to them. So the characters in (40) may be seen as equivalent to the diagonal characters in (39), thereby offering a glimpse of what diagonalization in general amounts to: instead of taking their referents directly from the utterance situations, the diagonal character takes them from the situation described by the content of the sentence. In the case of (40a), which has been disambiguated to avoid unwelcome (e.g., information-structural) side-effects, we have already seen that this is the non-trivial content that a hearer who is initially unaware of the speaker's identity, may associate with an utterance of *I am Mary*; such a hearer may thus be said to *diagonalize* the utterance, thereby learning who is speaking. And a hearer who does not know who is uttering *I am married*, may still learn that the speaker – *whoever she is* – is married; again he may do so by diagonalization (Stalnaker 1978). But nothing can be gained by diagonalizing *I am here*: the result is just as uninformative as the content it expresses according to its ordinary character.

The uses of diagonalization indicated here are all pragmatic. As we already mentioned, we will not go into the full story here, because it ultimately necessitates a much more refined setting. Apart from these pragmatic applications, there is reason to believe that diagonalization is of no avail to semantic analysis. In particular, we will soon (in Section 7) see reasons why it should not be rendered by an operator in the object language, modelled after (and mirroring) ∇ as analyzed in (36):

$$(41) \quad \llbracket \Delta\alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^s(s)$$

5. Extensionality

The examples discussed so far suggest that the characters of complex expressions can be derived by combining those of their immediate parts. In fact, in all the above cases, this could be achieved by pointwise combinations, proving them to be extensional:

Definition

- l) A syntactic construction Σ is *extensional* if, for every context $c \in C$ and situation $s \in LR$, there is a corresponding operation $\Gamma^{c,s}$ on (possible) extensions such that for any expression α built up by Σ from expressions β_1, \dots, β_n , the following equation holds:

$$\llbracket \alpha \rrbracket^c(s) = \Gamma^{c,s}(\llbracket \beta_1 \rrbracket^c(s), \dots, \llbracket \beta_n \rrbracket^c(s)).$$

As is common in the algebraic approach to compositionality (cf. Janssen 1997), we take syntactic constructions (or environments, constellations, . . .) Σ to be n -place structure-building operations. Note that the combination of extensions corresponding to an extensional construction may depend on the context and situation relative to which the extension of the whole expression is determined. If it does not, i.e. if $\Gamma^{c,s}$ is the same for all $c \in C$ and $s \in LR$, the construction Γ is called *canonically extensional*:

- m) An extensional syntactic construction Σ is *canonically extensional* if there is a corresponding operation Γ on (possible) extensions such that for every context $c \in C$, situation $s \in LR$, and any expression α built up by Σ from expressions β_1, \dots, β_n , the following equation holds:

$$\llbracket \alpha \rrbracket^c = \Gamma(\llbracket \beta_1 \rrbracket^c(s), \dots, \llbracket \beta_n \rrbracket^c(s)).$$

Also note that for the equations in Definitions l) and m) to hold, it is not enough (though, of course, necessary) that the extensions of α in *all contexts* c behave compositionally:

$$(42) \quad /\alpha/^c = \Gamma^{c,c}(/ \beta_1 / ^c, \dots, / \beta_n / ^c)$$

Rather, in order for the construction building up α to be extensional, *all* extensions determined by α 's intension (in arbitrary contexts c) must behave compositionally. As a consequence, the equations in Definition l) and m) fully determine the character of α . In Section 3, we have already seen an example of such a pointwise definition of the character combination corresponding to an extensional construction, viz. *subject predication*:

$$(25') \quad \llbracket SUBJ PRED \rrbracket^c(s) = \llbracket PRED \rrbracket^c(s)(\llbracket SUBJ \rrbracket^c(s))$$

In (25'), the syntactic construction is the formation of simple sentences by putting together referential subjects with their predicates; and the corresponding operation on extensions is *functional application* – ‘APP’, for short – combining a (characteristic) function f with its argument x to yield the value $f(x)$: $APP(f, x) = f(x)$. (To shun set-theoretic paradoxes, one must restrict APP and, e.g., prevent it from applying to itself; we are ignoring such complications here.) Using this notation, (25') can be reformulated as:

$$(25'') \quad \llbracket SUBJ PRED \rrbracket^c(s) = APP(\llbracket PRED \rrbracket^c(s), \llbracket SUBJ \rrbracket^c(s))$$

Note that, since APP in (25'') does not depend on c or s , subject predication turns out to be canonically extensional; in fact, it may well be that all extensional constructions are canonical (Zimmermann 1991: 167).

Given the generality of (25''), the equation fully determines a function that combines the characters of (referential) subjects and predicates into the characters of the corresponding sentences. More specifically, the relevant character composition is (*pointwise*) *functional application* – APP*, for short – combining two characters χ_1 and χ_2 into one that assigns to each context $c \in C$ an intension $F(c)$ that in turn assigns $APP(\chi_1(c)(s), \chi_2(c)(s))$ to each situation $s \in LR$. Using this notation, (25'') can be reformulated as:

$$(25^*) \quad \llbracket SUBJ PRED \rrbracket = APP^*(\llbracket PRED \rrbracket, \llbracket SUBJ \rrbracket)$$

Generalizing from this example, it is readily seen that for any (not necessarily canonically) extensional construction Σ satisfying the equation in Definition 1) there is a (unique) corresponding pointwise operation Γ^* on characters satisfying the general compositionality equation (43); the pointwise definition of Γ^* is given in (43*), where the $\Gamma^{c,s}$ are as in Definition 1) and χ_1, \dots, χ_n are (suitable) characters:

$$(43) \quad \llbracket \alpha \rrbracket = \Gamma^*(\llbracket \beta_1 \rrbracket, \dots, \llbracket \beta_n \rrbracket)$$

$$(43^*) \quad \Gamma^*(\chi_1, \dots, \chi_n)(c)(s) = \Gamma^{c,s}(\chi_1(c)(s), \dots, \chi_n(c)(s))$$

A function like Γ^* that combines the characters of the (immediate) parts of an expression α into the character of α itself, will be called the *character composition* associated with the pertinent syntactic construction. Hence APP* is the character composition associated with subject predication, which is (canonically) extensional, given (25''); derivatively, APP* will also count as (canonically) extensional. As pointed out above, many more syntactic constructions and their associate character compositions are extensional, prime examples being the combination of determiners with noun phrases, and of (ordinary, ‘extensional’) verbs with their quantificational subjects or any kind of (nominal) objects.

6. Attitude reports

It has been well known since the beginnings of modern semantics that not all syntactic constructions are extensional (let alone canonical). In particular, classical substitution arguments show that *clausal embedding* cannot be so interpreted (Frege 1892). Sentences of the following form are cases in point (where S is any declarative sentence):

(44) *John thinks that S*

Whatever the exact parts of such *attitude reports* are – *John; think; thinks that S; . . .* –, as long as *S* itself is one of them, the whole sentence is a (possibly quite complex) syntactic combination Σ of them. Now, if all syntactic constructions were extensional, then so would be all combinations of them. In particular, Σ would have to be associated with an extensional character composition Γ^* . By (42), then, the following equation would hold for any sentences *S* and contexts *c*:

(45) $\llbracket \textit{John thinks that S} \rrbracket^c = \Gamma^{c,c}(\llbracket \textit{John} \rrbracket^c, \dots, \llbracket S \rrbracket^c)$

Obviously, this cannot be right. Otherwise any two sentences of the form (44) would have to have the same truth value as long as the embedded clauses do; in other words, substituting the embedded clause in (44) by an extensionally (or ‘materially’) equivalent one would not affect the truth value of the attitude report:

(46) If $\llbracket S_1 \rrbracket^c = \llbracket S_2 \rrbracket^c$, then $\llbracket \textit{John thinks that } S_1 \rrbracket^c = \llbracket \textit{John thinks that } S_2 \rrbracket^c$.

Readers are invited to instantiate the well-known absurdity (46) by their favourite counter-example.

While such *substitution arguments* show that not all syntactic constructions are extensional, they do not affect the compositionality of characters, i.e. the assumption that any (*n*-place) syntactic construction Σ may be associated with a character composition Γ that determines the characters of expressions constructed by Γ from the characters of its immediate parts (Montague 1970):

(47) $\llbracket \Gamma(\beta_1, \dots, \beta_n) \rrbracket = \Gamma(\llbracket \beta_1 \rrbracket, \dots, \llbracket \beta_n \rrbracket)$

In particular, (47) could still be applicable to the constructions involved in building up sentences of the form (44). Instead of (45) we would just have.

(48) $\llbracket \textit{John thinks that S} \rrbracket = \Gamma(\llbracket \textit{John} \rrbracket, \dots, \llbracket S \rrbracket)$

And the consequences from the corresponding substitution argument would be far less absurd than (46):

(49) If $\llbracket S_1 \rrbracket = \llbracket S_2 \rrbracket$, then $\llbracket \textit{John thinks that } S_1 \rrbracket = \llbracket \textit{John thinks that } S_2 \rrbracket$

All (49) says is that substituting the complement of *think* by a clause *with the same character*, preserves the character of the original sentence of the form (44). And, indeed, purported counter-examples to the validity of (49) appear far less obvious than the ones against (47). For the purpose of this survey, we will simply ignore them and assume that characters do behave compositionally. (Cf. Cresswell (1985) and Stalnaker (1991, 1999) for some discussion of compositionality challenges in attitude reports.)

A closer look at pertinent examples suggests that the general mechanisms involved in deriving attitude reports are more restricted than (48) would suggest. Thus, in a context

c_{50} in which Mary is talking to Jane on a Thursday and they are both in Rome, the following two reports amount to the same:

- (50) a. *John thinks that I met you here yesterday.*
 b. *John thinks that Mary met Jane in Rome on Wednesday.*

Of course, in normal circumstances, Mary would not be inclined to express herself by (50b); in particular, she would not refer to herself as *Mary* and to her addressee as *Jane*. These preferences, which are not restricted to attitude reports, ought to be explicable in pragmatic terms, most likely by a principle of *presupposition maximization* (cf. Heim 1991, 2008; Sauerland 2008). Yet apart from its awkwardness, it is hard to see how, in the context given, (50b) could differ from (50a) in truth value; in fact, in the context at hand the two sentences seem to say the same thing. This might not come as a surprise. After all, the two sentences differ only as to their embedded clauses, and the latter coincide in their content in the context assumed here:

$$(51) \llbracket I \text{ met you here yesterday} \rrbracket^{c_{50}} = \llbracket Mary \text{ met Jane in Rome on Wednesday} \rrbracket^{c_{50}}$$

Indeed it would seem that the substitution of co-intensional clauses goes through precisely because attitude reports report a relation holding between the referent of the subject and the truth-conditional content of the embedded clause, i.e. its intension. This impression is confirmed by an influential analysis of attitude reports (Hintikka 1969; cf. article 60 (Swanson) *Propositional attitudes* for alternatives). According to it, an attitude verb expresses a (situation-dependent) relation between persons – the attitude *subjects* – and situations, which make up the person’s pertinent *perspective* in a given situation s ; in the case of *think* (as appearing in (44)), this would be the so-called *doxastic* perspective, which consists of the set of situations that, for all the subject believes (in s), he cannot exclude to be a situation he is in. And a report of the form (44) is true of a situation s just in the content of the complement clause is a superset of John’s doxastic perspective in s , i.e. if that content applies to all situations that John does not exclude – and thus excludes all situations in which it does not; hence (44) comes out as reporting that John’s doxastic perspective is a subset of the content expressed by S :

$$(52) \llbracket (44) \rrbracket^c = \{s \in LS \mid \text{DOX}_{\text{John},s} \subseteq \llbracket S \rrbracket^c\}$$

... where $c \in C$ is an arbitrary context and $\text{DOX}_{x,s}$ is a person x ’s doxastic perspective in a situation $s \in LS$. There are various options of deriving (52) compositionally. E.g., one may determine the character of *think* as in (53) and then employ the general rule (54) for determining the extension of a predicate from the extension of the attitude and the intension of its complement clause:

$$(53) \llbracket \text{think} \rrbracket^c(s) = \{(x,p) \mid \text{DOX}_{x,s} \subseteq p\}$$

$$(54) \llbracket \text{AttVerb} [\text{that}] S \rrbracket^c(s) = \{x \mid (x, \llbracket S \rrbracket^c) \in \llbracket \text{AttVerb} \rrbracket^c(s)\}$$

More generally, a simple (non-quantified) attitude report that derives from (44) by replacing *John* and *thinks* by a (suitable) referential subject and an attitude verb,

respectively, comes out as true of s just in case the content of the complement clause is a superset of the subject's pertinent perspective in s (supplied by the lexical meaning of the verb). In the case at hand, this means that Mary's report (50a), as uttered in c_{50} , is true of a situation s just in case John's doxastic perspective in s only contains situations s' in which $\text{SPEAKER}(c_{50})$ met $\text{ADDRESSEE}(c_{50})$ in $\text{PLACE}(c_{50})$ at $\text{DAY}(\text{TIME}(c_{50}) - 24\text{HRS})$. Given our characterization of c_{50} , (50a) comes out as reporting a situation (s) in which whatever John believes excludes the possibility (s') that Mary did not meet Jane in Rome on Wednesday. At first blush, this looks like an adequate truth condition for (the utterance of) (50a). And it obviously does make (50b) come out equivalent in c_{50} , precisely because, in that context, they express the same content.

So the Hintikka-style analysis of attitude reports supports the initial impression that the substitution of intensionally equivalent complement clauses of attitude reports of the form (44) preserves the content of the report. However, this approach has its limits. In particular, it faces two challenges that go by the name of beliefs (or, more generally: attitudes) *de re* and *de se*:

- A belief *de re* by John is a belief John has *about an object* (= lat. *de re*), i.e. something that he believes *of* something (or someone).
- A belief *de se* (by John) is one that John has *about himself* (= lat. *de se*) *as himself* (as opposed to having it about himself without being aware of this fact); hence every belief *de se* is also a belief *de re* though not *vice versa*.

It is easy to see that (some) sentences of the form (44) can be used to truthfully ascribe beliefs *de re* to John – and thereby present a challenge to semantic analysis, especially (but not exclusively) as based on a Hintikka-style model of attitudes. This is mainly due to two characteristic features of beliefs *de re*:

- (i) In order for John to form a belief *de re* about an *object* (lat. *res*) with a certain property, it is necessary for such an object to exist but not for John to know that it has that property (Quine (1956)). Thus, e.g., if John believes of Mary that she is Swiss and Mary happens to be the shortest Vatican spy, then there is such a spy and John has a belief (*de re*) about her, even though he may not make the connection between her and the Pope (because he only knows her as his polite neighbour, say).
- (ii) Still, in order for John to form a belief *de re*, it is necessary for him to somehow be acquainted with the *res* (Kaplan 1968). Thus, e.g., if John believes that there are Vatican spies without having any specific suspicions, he may deduce, and thus believe, that among them, one is the shortest; yet it seems that even if there is a shortest Vatican spy, John cannot be said to believe of her that she is the shortest spy if there is no connection between him and her.

One problem arising from (i) is that in reports of the form (44), referential expressions occurring within the complement clause S may refer to objects of belief. Hence their content should not contribute to the content of the sentence characterizing the subject's attitude. For example, the scenario in (i) may be reported by the following instance of (44), even though under the circumstances John may be quite neutral as to the existence of Vatican spies, or may even exclude the possibility that there are any:

(55) *John thinks that the shortest Vatican spy is Swiss.*

This observation suggests that the referent of the underlined expression in (55) needs to be determined relative to the situations in which John is reported as holding his belief (*de re*), rather than relative to his doxastic perspective; the latter would then have to only contain situations in which Mary – Vatican spy or (more likely) not – is Swiss. However, closer inspection of that alleged perspective reveals that it would require John to have some error-proof way of identifying the *res* (Mary) – which is beyond his cognitive capacities: ordinary identification procedures mostly rely on perception and memory and are principally prone to mistakes, however improbable. The (vast) literature on attitudes *de re* is full of pertinent (and sometimes rather exotic) examples to prove this point; *vide*, e.g., Lewis (1981) or Aloni (2001). In fact, it seems that the subject's acquaintance with the *res* observed in (ii) comes in here: in the case at hand, the situations that make up John's doxastic perspective would all have to contain someone who fits his way of identifying Mary and at the same time is Swiss; but this individual does not have to be the same across John's perspective, and *a fortiori* it does not always have to be Mary. If this reasoning – basically due to Kaplan (1968) – is on the right track, then the relation between the contents of the complement clauses in *de re* attitude reports of the form (44) and the subjects' pertinent (doxastic, epistemic, . . .) perspectives is much more involved one than subsethood, which is all the Hintikka-style analysis has to offer. One strategy, inspired by Quine (1956), is to assimilate reports of the form (44) to sentences in which the *res* can be treated as an argument of the verb, as in certain infinitival constructions (*wants the shortest spy to leave*). To achieve this one needs to 'dissect' the complement clause in (44) into the expressions that correspond to the *res* (which may be plural!) and a remainder 'predicate' – in (55) this would be the underlined subject and the predicate –, and then describe the content of the report in terms of all these parts. (55) would then come out as akin to (55*), where the embedded clause must denote a property rather than a sentence content; and the verb could then express a ternary relation between a subject, a *res*, and a property:

(55*) *John thinks of the shortest Vatican spy that she is Swiss.*

While compositional treatments of (55*) are conceivable according to which the underlined pronoun is interpreted as property-forming rather than deictic (cf. Chierchia 1989), it is not obvious how to adapt this strategy to (55) and reports of the form (44) in general, given that the number of *res* in them is unlimited; see, however, Cresswell & von Stechow (1982) for a systematic approach within a more fine-grained ('hyperintensional') framework. We will not delve into the details of this discussion but only note that part of the above conclusion that attitude reports only involve the contents of their complement clauses needs to be modified in the light of *de re* reports and depends on a solution of the problems surrounding them.

It should be noted in passing that although sentences like (55) can be used to report beliefs *de re*, they need not. In the scenario described in (ii), e.g., (55) may well be true despite there being no direct connection between John and the Vatican's employees: John may be convinced that only members of the Swiss Guard are eligible for the Vatican Secret Service. In this case, for the report (52) to come out true, the referent of the underlined description needs to be determined relatively to John's doxastic perspective: many

possible situations are compatible with John's beliefs, and though they all contain Vatican spies, they do not all agree as to who is the shortest of them. The description is then said to be construed *de dicto* [= about the expression, or rather its content]. Of course, this is precisely as the Hintikka approach would have it. Given that the difference between reports about beliefs *de re* vs. *de dicto* appears to be an ambiguity (which we will not justify here), the Hintikka analysis turns out to cover part of the reports of the form (44) (which may be better than covering all of them insufficiently). But the *de re* cases remain a challenge to it (and, to be fair, any systematic approach to the semantics of attitude reports).

It should also be noted in passing that although sentences like (55) can be used to report beliefs *de dicto*, those under (50) most likely cannot (*pace* Kripke 1979), due to the fact that the only referential terms they contain are rigid and their truth under a *de dicto* construal would thus require the subject to have 'superhuman' identification procedures at his disposal (cf. Lewis 1981).

Beliefs *de se* pose a different kind of challenge to the two-dimensional approach. To see what is at stake here, let us first look at a famous example, due to David Kaplan (1989a: 533):

If I see, reflected in a window, the image of a man whose pants appear to be on fire, my behavior is sensitive to whether I think, '**H**is pants are on fire' or '**M**y pants are on fire' [. . .]

Kaplan characterizes beliefs in terms of the characters of sentences the subject (Kaplan, in this case) would use to describe them. In the scenario at hand he initially has a certain belief *de re* about himself, and subsequently comes to hold the corresponding belief *de se*, which (by definition) is also a belief *de re*, with the same *res*; in fact, he continues to hold his original belief, but this is of no importance here, only the difference is. And there is a difference in his beliefs, a dramatic change indeed: his initial belief might lead Kaplan to start looking for the unfortunate person to warn him; given his updated belief, he is more likely to feel an urge to look for a hose or a bucket, cry for help, etc. The difference is reflected in the way the subject would describe himself, viz. by a certain 3rd person description (*the man whose reflection is visible in the window*) vs. the 1st person pronoun (*I*). Unlike the former belief *de re*, the latter is also a belief *de se*, a belief the subject holds not only about himself but also about himself *as himself*. As Frege (1919: 66) [(1956: 298)] put it, 'everyone is presented to himself in a particular and primitive way, in which he is presented to no-one else' (cf. Perry (1977), Kaplan (1989a: 529ff.), and Kühne (1997) for reconstructions of Frege's views); and it is this peculiar mode of presentation, this subjective perspective the subject has on himself, that makes a belief *de re* a belief *de se*. The difference in perspective seems to be as obvious as it is hard to pin down. In particular, it does not show in the *contents* of the sentences that a subject is inclined to accept – as Kaplan's example makes clear: initially the subject would express his belief by (56) but not (57), though in the situation at hand the two sentences (as uttered by Kaplan) would express the same content, eliminating any possibility that Kaplan's pants are not on fire:

(56) *His pants are on fire.*

(57) *My pants are on fire.*

This substitution resistance is reminiscent of an observation made above, in connection with beliefs *de re*: (human) subjects' identification procedures are never quite immune

against error, and thus Kaplan's doxastic perspective could not cover exactly the situations to which (56) and (57) apply. Rather, each situation compatible with his belief would have to contain a person – not necessarily Kaplan himself – whose reflection he sees and whose pants are on fire, whereas his own pants are not. Now, by the same reasoning, the underlined pronouns in this characterization of Kaplan's doxastic perspective would also have to correspond to some way in which Kaplan would describe himself. It is not obvious which description this could be if not the 1st person pronoun (or some synonym like *the person with whom I am identical*). Maybe it should contain everything Kaplan knows about himself (as himself, to be sure)? However, various, at times rather exotic scenarios constructed in the literature on beliefs *de se* make it appear unlikely that the descriptions a subject has of himself eventually add up to his subjective perspective; *vide*, e.g., Geach (1957); Castañeda (1967); Perry (1979); Lewis (1979a). Loosely (but intuitively) speaking, the descriptions a person can give of himself without referring to himself as himself all lack the immediacy of what Frege (*ibid.*) called the 'subjective and primitive way' of the self-presentation characteristic of beliefs *de se*. In fact, it seems that any description a subject may have of any object or situation is based on, or relative to, his subjective perspective – as is illustrated by the underlined pronouns in the above account of Kaplan's beliefs. Moreover, unlike other (human) identification procedures, the subject's identification of himself as himself does seem to be immune to error: though, from his own perspective, it could have turned out that the man Kaplan sees is not he himself after all (or even that there was no man in the first place, only what looked like a reflection of one), it is next to impossible to imagine that he misidentified himself as the observer of that scene. These observations turn out to be important for the reconstruction of subjective perspective, as we will soon see.

Despite their coincidence in content (in the situation at hand), (56) and (57) do display a semantic difference, to wit in character. As it turns out, the subjective perspective corresponds to first person reference in the sentences by which the subject would be inclined to (honestly) describe his beliefs: although he believes certain things about himself *de re*, it is only when he realizes that he himself is the *res*, that he refers to himself in the first person. It would thus seem that the subjectivity characteristic of beliefs *de se* is a matter of character. In fact, closer inspection shows that it is not the whole character but only the diagonal that matters when it comes to characterizing belief in terms of sentence meaning (Stalnaker 1981): in describing his beliefs by sentences, the subject takes them to be true in a context; and if he only accepts the first person in a sentence if he has the corresponding belief *de se*, the context is one in which he himself is the speaker. In sum, if the subject uses a sentence to describe something he believes, he takes himself to be the speaker in a context in which the sentence is true. It would thus appear that the doxastic perspective ought to be characterizable in terms of the diagonal of the sentences accepted by a subject; more generally, it would have to consist of the possible contexts the subject might be in, for all he believes. Unfortunately, this cannot be *quite* correct for the simple reason that subjects do not always take themselves to be in utterance situations. A more accurate characterization of the doxastic perspective (in a situation *s*) thus necessitates a substitution of the SPEAKER parameter by a subject parameter: whereas the word *I* refers to SPEAKER(*c*) in any given context *c*, a subject takes himself to be SUBJECT(*s*), i.e. the subject, in any situation he finds himself in. As a case in point, Kaplan's perspective shifts from a set of situations in which someone other than the subject is reflected in the window, to the corresponding situations in which the (respective) subject's pants are burning. More generally, the *epistemological reinterpretation* [*erkenntnistheoretische Umdeutung*]

of the two-dimensional approach to context dependence (Zimmermann 1991: 178ff.) has all pertinent aspects of the context replaced ('subjectivized') by corresponding subjective categories: subject, subjective time, subjective spatial perspective, etc. and assigns to sentences *S* corresponding epistemological characters whose diagonals then turn out to be supersets of the epistemic perspectives of the subjects that would use them to characterize their beliefs. Technically, this shift involves a revision of Logical Space the details of which need not concern us here; it is usually carried out in terms of the parameterization to be discussed in Section 8 and will briefly be addressed there. Varieties of epistemological reinterpretation have some success in current metaphysics and philosophy of mind (e.g., Chalmers 1996, Spohn 2009: Part V), in particular when it comes to tease apart *metaphysical* ('objective', 'perspectiveless') and *epistemic* ('subjective', 'perspectival') informational content. In the semantics of attitude reports, it may therefore be employed to correct the simplified Hintikka-style approach to psychological attitudes. As a case in point, we may look at a report about Kaplan's unfortunate (though, presumably, imaginary) experience where we take it that the possessive pronoun *his* is anaphoric to the matrix subject and may therefore be interpreted as (directly) referring to David Kaplan:

(58) *Kaplan thinks his pants are on fire.*

Since (58) does not contain any context-dependent material (or so we assume), it is absolute and has the same content across all utterance contexts. And it appears that this content applies to both the initial and the subsequent stage of Kaplan's learning process, to which we will refer as ' s_0 ' and ' s_1 ', respectively. This has to do with the fact that the complement clause shares its content with the contents of the sentences under (56) and (57) as uttered by Kaplan. Yet the connection is not as direct as it might seem: as was already remarked, Kaplan's doxastic perspectives in the situations s_0 and s_1 do not cover this content. On the other hand, in s_1 Kaplan sees himself in a position to assent to (57), and the content he expresses (or would express) by (57) in s_1 is precisely the content of the complement in (58). And although he does not assent to (57) in s_0 , he does see himself in the mirror and thus could have described his belief by uttering (56), which again coincides in content with the complement of (58). Now, from this observation we might jump to the general conclusion that, for an attitude report to apply to a situation s , it is necessary and sufficient that (*) the content of the embedded clause must coincide with the content of some sentence that the subject would be inclined to agree to in s . Alas, things are not so simple, basically due to a radical generalization of Kaplan's (1968) infamous shortest spy problem (ii): given certain harmless side-conditions, (*) is met as soon as the complement of the embedded clause happens to be true of s ; rather than pursuing this line of reasoning, we refer the reader to the concise presentation in article 61 (Schlenker) *Indexicality and de se* (p. 1572), based on Crimmins (1998) and von Stechow & Zimmermann (2005). In any case, a more sophisticated account is called for. And though, e.g., the 'hyperintensional' approach (Cresswell & von Stechow 1982) smoothly generalizes from *de re* to *de se* reports (von Stechow 1984), a treatment that conforms to more orthodox compositionality standards is yet to be found.

Sentences of the form (44), then, may be used to report *de se* beliefs. However, as with *de re* beliefs in general, this does not mean that the complement of the attitude verb is something the subject could truthfully utter in the situation described. Otherwise (58*) would be an adequate report about s_1 – no matter who utters the sentence:

(58*) *Kaplan thinks my pants are on fire.*

However, unless (somewhat unidiomatically) Kaplan himself uses (58*), the sentence would be a false report of s_1 – for the simple reason that the content the embedded clause expresses in the reporting context does not match the content of the any sentence Kaplan would assent to in s_0 ; in particular, Kaplan does not believe that the person who happens to describe s_1 by uttering (58*), has burning pants. So although the 1st person as used by the attitude subject expresses his own subjective perspective, in the report it refers to the speaker – despite the fact that it occurs in the clause he uses to describe the subject’s attitude. We will return to this elementary observation in the next section.

The fact that sentences of the form (44) (and similar) can be used to report about attitudes *de re* and *de se* does not mean that they are ambiguous in this respect: by definition, attitudes *de se* are attitudes *de re*, and these reports appear to cover them all. That no ambiguity is likely to be involved is suggested by the observation (frequently misattributed to Zimmermann 1991, methinks) that *quantified attitude reports* may generalize over a mixed bag of attitudes *de re* and *de se*:

- (59) a. *Each of these men thinks that his pants are on fire.*
 b. *Only one of these men thinks that his pants aren’t on fire.*

The reader is invited to fill in the details and then check her intuition: (59a) may be true (though a misleading thing to say) if all but one of the men wrongly think their own pants are on fire (*de se*) and one of them believes that he is watching (precisely) one man with burning pants without realizing he is watching himself (purely *de re*). At the same time, (59b) may be judged true in the same scenario, which does indicate that reports of the form (44) have separate *de se* reading after all. However, it is not obvious how to tell apart semantic and pragmatic effects in these cases. In particular, the source of the ease with which attitudes *de se* can be attributed is not obvious; cf. Percus & Sauerland (2003), Maier (2006), and Anand (2006) for different approaches. Unequivocal *de se* readings may still be found beyond the realm of clausal reports like (44), viz. in certain infinitival constructions involving control-verbs (Chierchia 1989).

- (60) a. *John wants to be president.*
 b. *John wants himself to be president.*

Whereas (60b) can be applied to a situation in which John, who has given up on his political career, sees someone on TV who he judges to be a good candidate without realizing that it was himself, no such interpretation is available to (60a). But for the attitude, the example is quite parallel to Kaplan’s scenario. This suggests that, unlike the reflexive in (60b), which is *de re*, the implicit subject (PRO) of the infinitive in (60b) needs to be restricted to a *de se* interpretation, i.e. as standing for the first person were the subject to describe his wishes. Unlike the *de re* construals of reports of the form (44), neither form in (60) presents a compositionality challenge, because in both cases the position of the *res* is structurally identifiable. In particular, the main verb in (60b) can be interpreted as expressing a ternary relation holding between the attitude subject (John), a *res* (John), and the intension of the infinitive, i.e. a function assigning sets of individuals (the presidents) to possible situations; roughly, the relation holds in a given situation s just in case the

subject's pertinent (in this case: *bouletic*) perspective 'implies' that there is someone he is acquainted with in some way he is actually acquainted with the *res* (as the guy on TV, say) and who is the president. The details of this treatment depend on the precise reconstruction of subjective perspectives within an epistemological reinterpretation. The same goes for the *de se* attitude expressed by (60a), to which we will return in the next section.

In sum, sentences of the form (44) are most easily interpreted as reports about attitudes *de dicto*. As reports about attitudes *de re* they present a serious challenge to compositional interpretation, Hintikka-based or otherwise. The special case of *de se* attitudes adds the complication that the subject's perspective must be taken into account when it comes to characterizing his attitude and his relation to the *res*; moreover it is not clear in which cases they constitute separate readings.

7. Monsters

Let us take a step back. In Section 2 we saw that the 'one-dimensional' approach to extensions as solely depending on contexts cannot explain the difference between two kinds of trivialities: those that come out true whenever uttered, and those that express trivial content. The two-dimensional account of extensions in terms of characters introduced in Section 3 was designed to capture this distinction by sneaking in intensions mediating between contexts of utterance and extensions. In Section 4 we saw that, apart from the ordinary content that excludes possibilities in Logical Space, characters also encode diagonal content, which may serve various pragmatic purposes. However, even though we insisted right from the beginning that the observations and subtleties captured by the two-dimensional approach somehow depend on literal meaning, it is not all that obvious that they are themselves semantically relevant. In particular, one may wonder whether the notion of (ordinary) content that was crucial to the distinction between necessity and *apriority* has a rôle to play in semantics, or whether it is just derived from literal meaning by some pragmatic processes. As it turns out though, there is hope to give a purely semantic motivation of the notion of content (and intension in general). To this we will now turn.

The starting point of the preceding section was a classical substitution argument to the effect that clausal embedding under attitude verbs is not extensional. On the other hand, we also observed that once the utterance context is fixed, substitution of intensionally equivalent material does not bear on the truth value of the report (though it may affect its pragmatic acceptability); hence in a suitable context (like c_{50}) the following two sentences come out as extensionally equivalent because the embedded clauses coincide in their content:

- (50) a. *John thinks that I met you here yesterday.*
 b. *John thinks that Mary met Jane in Rome on Wednesday.*

Now, it is worth noting that these substitution facts are independent of the *de re/de dicto* ambiguities:

- (61) a. *John thinks that Mary's husband is Greek.*
 b. *John thinks that the man who is married to Mary is Greek.*

Given that the underlined descriptions in (61) are intensionally equivalent, both sentences report John to either hold a certain belief *de re* about Mary's husband (whom John

need not associate with Mary then), or else to think that whoever is married to Mary is Greek (in which case Mary could well be husbandless).

Abstracting from the details of the case, we may thus venture the hypothesis that replacing a complement clause in an attitude report of the form (44) by one with the same content does not affect the truth value of the report at large. Instead of the absurd extensional substitution principle (46), the general compositionality principle (49) can be strengthened to (62):

- (46) If $/S_1/c = /S_2/c$, then $/John\ thinks\ that\ S_1/c = /John\ thinks\ that\ S_2/c$.
 (49) If $\llbracket S_1 \rrbracket = \llbracket S_2 \rrbracket$, then $\llbracket John\ thinks\ that\ S_1 \rrbracket = \llbracket John\ thinks\ that\ S_2 \rrbracket$.
 (62) If $\llbracket S_1 \rrbracket^c = \llbracket S_2 \rrbracket^c$, then $\llbracket John\ thinks\ that\ S_1 \rrbracket^c = \llbracket John\ thinks\ that\ S_2 \rrbracket^c$.

Similar observations can be made with other non-extensional constructions. Thus, e.g., in the above context c_{50} , the following sentences appear to pairwise express the same content:

- (63) a. *It is possible that I met you here yesterday.*
 b. *It is possible that Mary met Jane in Rome on Wednesday.*
 (64) a. *I want to meet you tomorrow.*
 b. *Mary wants to meet Jane on Friday.*
 (65) a. *John is looking for a book about Jane.*
 b. *John is looking for a book about you.*

In each of these cases the underlined constituent can be shown to resist substitution by co-extensional expressions *salva veritate* (= thereby preserving truth [values]). Hence, just like in attitude reports of the form (44), the pertinent syntactic construction cannot be extensional. However, the substitutions in (63)–(65) do go through because the underlined constituents happen to have the same (pairwise) intensions in the context at hand. Hence, though not extensional, the constructions in question do seem to have a special property that would explain the substitutivity facts:

Definition

- n) A syntactic construction Σ is *intensional* if, for every context $c \in C$, there is a corresponding operation Γ^c on (possible) intensions such that for any expression α built up by Σ from expressions β_1, \dots, β_n , the following equation holds:
 – $\llbracket \alpha \rrbracket^c = \Gamma^c(\llbracket \beta_1 \rrbracket^c, \dots, \llbracket \beta_n \rrbracket^c)$

A comparison of Definitions l) and n) reveals that every extensional construction is intensional: Γ^c in n) can always be constructed from the $\Gamma^{c,s}$ as given in l) by putting: $\Gamma^c(\iota_1, \dots, \iota_n)(s) = \Gamma^{c,s}(\iota_1(s), \dots, \iota_n(s))$, for any situation $s \in LS$ and (suitable) intensions ι_1, \dots, ι_n . (The verification of the details are left to the reader.) Hence ‘intensional’ means ‘at most intensional’; if a construction is intensional without being extensional, we may say that it is *properly intensional*.

In general, properly intensional constructions are characterized by a failure of extensional substitution, i.e. the fact that the extension of the whole (partly) depends on the

intension of (at least) one of its (immediate) parts; since this intension itself consists of the extensions of that part at all possible situations, one may think of intensional constructions as having the extension of the whole at a given situation depend on the extensions of one of the parts at other situations than that situation alone (otherwise the construction would be extensional and not properly intensional). So intensional construction can be loosely characterized as involving a *shift* from the situation at hand to other situations relevant to determine the intension of the substitution-resistant part, and thus the extension of the whole. As a case in point, if analysed à la Hintikka (1969), belief reports (and attitude reports in general) involve a shift from the situation reported to the subject's doxastic (or otherwise pertinent) perspective. Though this characterization is not without intuitive appeal (which explains its popularity among semanticists, logicians, and philosophers of language alike), one should be aware that it is quite loose in that the purported 'shift' normally does not replace one situation by another *one*, but brings in a whole bagful of relevant alternative situations; it may even bring in all of Logical Space, as in the case of (a certain reading of) the adverb *necessarily* that characterizes a sentence as true if its intension holds of every possible situation. In fact, mere shifts that would replace the situation described by another *one* seem to be unattested; but we will meet something close to it in a minute. Given this, it would be more accurate to speak of *abstraction* from the situation at hand, or *generalizing* over possible situations. Despite these qualms, we will follow tradition and say that the hallmark of intensionality is the *shiftiness* of the situation described.

The case of clausal embedding and the examples in (63) indicate that not every intensional construction is extensional. Neither is every (conceivable) character composition intensional. In fact, we have already seen an example of a non-intensional 'construction', viz. diagonalization:

$$(41) \quad \llbracket \Delta\alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^s(s)$$

Whatever the syntactic details of (presumed) expressions of the form ' $\Delta\alpha$ ', they must involve some non-intensional construction if (41) is to hold. To see this, let us look at c_{50} again, where Mary is speaking in Rome and we thus have:

$$(66) \quad \llbracket I \text{ am here} \rrbracket^{c_{50}} = \llbracket Mary \text{ is in Rome} \rrbracket^{c_{50}}$$

However, by the observations made in connection with (39) in Section 4, we may conclude:

$$(67) \quad \begin{aligned} & \llbracket \Delta I \text{ am here} \rrbracket^{c_{50}} \\ &= \{s \in LS \mid \llbracket I \text{ am here} \rrbracket^s(s) = 1\} \\ &= \{s \in LS \mid \llbracket \text{SPEAKER}(s), \text{PLACE}(s) \rrbracket \in AT(s)\} \\ &= C \end{aligned}$$

The last line in (67) is due to the apriority of *I am here* (which takes care of the ' \supseteq '-direction) and the fact that the SPEAKER function is defined for utterance contexts only (' \subseteq '). On the other hand, diagonalizing *Mary is in Rome* is useless because the sentence is absolute:

$$\begin{aligned}
 (68) \quad & \llbracket \Delta \textit{Mary is in Rome} \rrbracket_{50}^c \\
 & = \{s \in C \mid \llbracket \textit{Mary is in Rome} \rrbracket^c(s) = 1\} \\
 & = \{s \in C \mid (\textit{Mary}, \textit{Rome}) \in \textit{AT}(s)\} (= \llbracket \textit{Mary is in Rome} \rrbracket_{50}^c)
 \end{aligned}$$

Clearly, the set in (68) does not coincide with C : it misses out contexts in which Mary (speaker or not) is away from Rome (and, if "extrapolated", it also contains situations in which no word is spoken). Hence although *I am here* and *Mary is in Rome* have the same content (in the context at hand), their diagonalizations do not; as a consequence, diagonalization is not intensional (and cannot be achieved by combining intensional constructions either). Interestingly, its mirror image, direct interpretation operator ∇ (a.k.a. *dthat*), is:

$$(36) \quad \llbracket \nabla \alpha \rrbracket^c(s) = \llbracket \alpha \rrbracket^c(c)$$

The intensionality of the construction in (36) is brought out by the following equation, where (for any $c \in C$) Γ^c is the operation assigning to any intension ι the extension $\iota(c)$:

$$(69) \quad \llbracket \nabla \alpha \rrbracket^c = \Gamma^c(\llbracket \alpha \rrbracket^c)$$

Since Γ^c obviously depends on c , direct interpretation is not a canonically intensional construction though; the verification of (69) and the definition of canonical intensionality are left to the reader.

In Section 4 it was mentioned that diagonalization, understood as replacing the content of an utterance by its diagonal, is a pragmatic repair strategy applied to natural language characters, particularly by hearers that lack sufficient knowledge of the context to determine the content of the utterance. If this is the only kind of use made by diagonalization, then there is no need for a diagonal operator in the (natural) object language, as in (41). Given that this was our only example of a (potential) non-intensional construction so far, one may now wonder whether there are any other ones. As it turns out, this is not obvious. In fact, one of the central tenets of the two-dimensional approach to context-dependence has it that there are none:

Ban on Monsters

All syntactic constructions are (at most) intensional.

The Ban goes back to David Kaplan's (1989a) *Demonstratives* (originally distributed in 1977, and actually dating from the early 1970s), the *locus classicus* of two-dimensionality. Its name alludes to a section heading ('VIII. Monsters Begat by Elegance', p. 510), under which diagonalization (as a language-internal operator) is discussed as a potential counter-example; another formulation is that there are no monsters, which are then defined as non-intensional constructions. The rationale of the Ban on Monsters is that two-dimensional interpretation comes in two steps: first the context fixes the referents of deictic (and similar) expressions, then compositionality takes over, combining extensions and intensions as in the pre-Kaplanian times of so-called Frege-Carnap semantics (Frege 1892, Carnap 1947). Hence the Ban finally gives an answer to the question of whether content has a rôle to play in semantics, or whether it is merely a derivative of sentence meaning that is primarily of pragmatic interest: like intensions in general, the contents of sentences are what counts for compositionality.

Ever since Kaplan placed the Ban on Monsters, ample confirmation has been found in terms of constructions that conform to it. However, Kaplan's Ban has also been subject to numerous attempts at refutation, especially since Schlenker (2003), a paper aptly titled *A Plea for Monsters*. To get the flavour of the most prominent kind of counter-example, it is instructive to once more return to the topic of the preceding section, where we noticed that (44) cannot be made true by plugging in a sentence *S* that John is inclined to agree to (in the circumstances described). Rather, the subject's 1st person reference would have to be replaced by a corresponding 3rd person referring to him as a *res* (given to him as his self). This is a brute fact about the system of personal pronouns in English and many other languages – but not all. For there happen to be languages in which (what looks like) a 1st person pronoun occurring in an attitude report may indicate the subject's perspective on himself, instead of referring to the producer of the report. The following example from the (Indoeuropean) language Zazaki (spoken in Turkey) and collected by Anand & Nevins (2004: 22) is a case in point:

(70) *Rojda ne va ke mi kes paci kerd.*

Word by word, the sentence reads 'Rojda not said that I anyone kiss did', but it means that Rojda did not say that she kissed anyone. The presence of the negative polarity item *kes* ['anyone'] shows that the embedded clause is not a quotation; hence according to the Ban on Monsters, the underlined pronoun ought to refer to the speaker of the report. Note that (70) is indirect speech rather than an attitude report. As a consequence, it is readily interpreted by *diagonalizing* the underlined pronoun, which then comes out as meaning *the speaker*. Moreover, the phenomenon of an unexpected contextual shift is not restricted to the speaker but also affects other contextual parameters such as the addressee, which can be treated in a parallel way. However, such 'local' diagonal operators are obviously monstrous. One way of avoiding them in the case at hand is to treat the personal pronouns as absolute expressions, lexically interpreted by the diagonal content of ordinary personal pronouns; however, this interpretive strategy would not explain the particular distribution of their readings, for which we have to refer the reader to Anand & Nevins (2004) and Anand (2006). More counter-examples to Kaplan's Ban along the lines of (70) have been observed in a variety of languages. Their precise nature and pattern appears to be in need of further exploration but it is clear that the Ban will not emerge from this scrutiny unscathed; see article 61 (Schlenker) *Indexicality and de se* for the current state of research (and much more on the topic).

Apart from such diagonal readings of personal pronouns in reports there are some other phenomena that appear to be difficult (though not impossible) to reconcile with the Ban on Monsters. In particular, sometimes a deictic expression that would normally have its extension determined by the context of utterance, seems to be used in a more general way. Here are four quite different cases:

- (71) a. *Never put off until tomorrow what you can do today.*
 b. *Only I did my homework.*
 c. *Every man faced an enemy.*
 d. *Only one class was so bad that no student passed the exam*

(71a) is mentioned in Kaplan (1989a: 510, fn. 4) and attributed to Richmond Thomason. The natural way to understand this proverb is as a general advice to be followed on a

day-to-day basis. In particular, the temporal adverbs *today* and *tomorrow* are not understood as referring to the day of utterance and its successor. Yet if they have their ordinary, deictic readings in (71a), this reference could only be overridden by a monster. However, even though a lexical ambiguity is unlikely here, a pragmatic analysis seems to be within reach; cf. Zimmermann (1991: 219) for some speculation and Predelli (1996) for a more specific proposal.

The crucial observation about (71b), due to Irene Heim (c. 1991), is that in it the 1st person possessive *my* does not seem to make reference to the speaker. Rather, the whole sentence quantifies over a domain (of students, most probably) and the object *my homework* is understood as ‘co-varying’ with the objects in that domain, i.e. the persons quantified over by the subject *only I*. Hence this particular use of the 1st person is not deictic but quantificational, and again no ambiguity seems to be involved. It may thus appear that (71b) presents another case of generalization over contexts, though one that cannot be explained in pragmatic terms. However a natural explanation may be found on the other side of the semantic interfaces: it is well known that morphological features (like number, gender, . . .) may generally carry meaning without always being semantically active (or *interpretable*). Thus, e.g., the underlined pronoun in (72), though morphologically plural, expresses singular meaning, co-varying with the persons quantified over by the subject:

(72) *Most students did their homework.*

In this case it is rather obvious that the pronoun *their* is both semantically and morphologically dependent on the quantifier *most students*, the former relation being one of binding, the latter consisting in number and person agreement. Arguably, something similar might be going on in (71b): although the form *my* carries first-person morphology due to its syntactic relation to the subject *only I*, and although this relation itself is semantically interpreted (as quantificational ‘binding’), in this specific constellation, the morphological feature is not. In general, then, words like *I*, *you*, or *my* would have to be treated as complex expressions, with person features as their parts; and these person features are deictic expressions, which however need not be semantically active (or occur properly, i.e. semantically visibly). *Vide*, e.g., von Stechow (2003) for a detailed proposal along these lines, and Sternefeld (2008) for some principled criticism and a different approach.

In Section 1, we have seen that the context may supply the referents of implicit arguments of relational nouns like *enemy*:

(5) b. *He is an enemy.*

This construal is also available for (71c), borrowed from Partee (1984: 301): if, e.g., a Norwegian general utters the sentence, he may speak about a battle fought by the Norwegian army and thus express that each of his soldiers faced a member of the same guerilla army. Hence the general would use the subject as quantifying over Norwegian soldiers (in line with the context-dependence of quantifier domains observed in Section 1); and depending on the exact circumstances (including the general’s intentions), the implicit argument might be the Norwegians or the Norwegian army. However, (71c) could also be used by someone who describes the same battle scene from a more neutral point of view, quantifying over Norwegian and guerilla soldiers alike. In that case, the implicit argument could not be supplied by the context; for it would have to depend on

the respective soldiers quantified over. Again this means that we cannot treat the implicit argument as in (5b), where took it to be the value of some contextual parameter. At first blush this looks like a monster is lurking somewhere behind the quantificational construction; but then it is not obvious how to arrive at the correct truth conditions of (the relevant reading of) (71c) by quantifying over contexts; presumably, the contexts quantified over would have to have soldiers as their speakers, but then the quantification should not affect the other contextual parameters. It seems more promising to treat implicit arguments like variables in logic and allow them to be bound by quantifiers in higher positions while the values of free variables depend on the context of utterance. This would also conform to Partee's (1984: 301) observation that there do not seem to be 'any cases of implicit arguments which can be interpreted *only* as bound variables or *only* as indexicals' [= deictic expressions]. We will soon return to this strategy.

(71d), which is von Stechow's (1996: 31) translation of a German example due to Heim (1991: 508), poses similar problems. Although the domain of the underlined quantifier ought to depend on the context, it does not but rather co-varies with the classes quantified over by the matrix subject. Again, a monster seems to be in sight, and again the remedy could be bindable variables on whose values quantificational domains (may) depend; cf. von Stechow (1996: 28ff.) and Stanley & Szabó (2000: 251ff.) for specific proposals along these lines. Hence sometimes what looks like a deictic expressions captured by a monster may turn out to be a variable bound by a quantifier.

The treatment of seemingly deictic expressions as variables can also be applied to 3rd person pronouns, which (as we have seen in Section 1) bear some similarity to demonstratives in that their referents are (sometimes) supplied by the context, to wit by whatever the speaker intends to refer to. However, it is well known that they too can be bound by nominal quantifiers; the following contrast may be used to illustrate this point:

- (73) a. *Mary likes his teacher.*
 b. *Everyone likes his teacher.*

Ignoring irrelevant details and alternative readings, we may bring out the difference in the interpretation of the underlined (possessive) pronouns by a bit of (predicate) logical notation:

- (74) a. $\text{LIKE}(\text{MARY}, \text{TEACHER}(\underline{x}))$
 b. $(\forall x) \text{LIKE}(x, \text{TEACHER}(\underline{x}))$

The formulae in (74) may be seen as approximations to the truth conditions of the corresponding sentences in (73), with underlined occurrences of the variable x corresponding to occurrences of the 3rd person pronouns. The occurrences in (74) differ in their status: the underlined ' x ' in (74a) is free, the one in (74b) is bound (by the universal quantifier). As a consequence, unlike the closed formula (74b), (74a) only denotes a truth value relative to a variable assignment. This may be seen as parallel to the contrast in (73): in (73a) the referent of the pronoun is supplied by the context, in (73b) it is not. In fact, the denotations of both the pronoun in (73b) and the variable in (74b) seem to co-vary with the individuals in the domain of the respective quantifiers, *everyone* and \forall . Hence we would make the parallel perfect by assuming that the context is to the occurrence of *his* in (73a) what the variable assignment is to ' x ' in (74a). In other words, it looks like we

ought to identify 3rd person pronouns with variables and contexts with variable assignments (cf. Montague 1970). As a consequence, though, the very process of binding would come out as a monster: just like the logical formula in (74b) can only be evaluated by going through its truth values under more than one assignment, so would the sentence in (73b) have to be interpreted by comparing its extensions across different contexts. Hence either the parallel between (73) and (74) or the Ban on Monsters has to go (Zimmermann 1991: 201ff.; Rabern 2012a, 2012b).

As it turns out the question whether the Ban should be upheld is quite tricky, which is partly due to its shifty theoretical status. For it may come either in the guise of an empirical hypothesis (as suggested by the discussion so far) or as an analytic theorem. To the second option we now turn.

8. Parameterization

The examples discussed so far suggest that the rôle of the utterance situation in determining extensions is restricted to contributing certain aspects or parameters like SPEAKER, ADDRESSEE, TIME, PLACE, etc. We have treated such parameters as functions assigning extensions to specific (possible) situations. Of course, there are innumerable such functions only very few of which are relevant to determining the extensions of context-dependent expressions (via their characters) – as *contextual* parameters. We have left their precise nature and number open and will continue to do so. However, we will assume that there are enough of them to distinguish any two contexts; in other words, we take the correspondence between contexts and their parametric values to be one-one:

Definition

- o)* A *C*-parameterization is a finite list $\pi = (\pi_1; \dots; \pi_n)$ of functions π_i with domain *C* (and arbitrary ranges) such that,
 (*) for any distinct contexts *c* and *c'*:
 $\pi_i(c) \neq \pi_i(c')$, for some $i \leq n$.
 For any $c \in C$, $c^* := (\pi_1(c); \dots; \pi_n(c))$; hence $c^* \neq c'^*$ whenever $c \neq c'$.

For definiteness, let us zoom in on a particular *C*-parameterization that includes the four contextual parameters mentioned a few lines earlier as well as the spatio-temporally maximal situation of which the utterance situation is part – its (possible) WORLD:

$$(75) \quad c^* = (\text{SPEAKER}(c); \text{ADDRESSEE}(c); \text{WORLD}(c); \text{TIME}(c); \text{PLACE}(c); \dots)$$

We will say that c^* represents the context $c \in C$ (relative to the parameterization given) just in case (75) holds. Since, by assumption, the contextual parameters suffice to determine all extensions, the utterance situations in all their specificity and abundance, may as well be replaced by their representations. More precisely, we may encode characters χ by functions χ^* assigning intensions to representations of parametric values:

$$(75^*) \quad \chi^*(c^*) = \chi(c)$$

C-parameterizations are little more than standardizations of characters, and may even be perceived as notational overkill. Moreover, there may be Ockhamian reasons for mistrusting them, due to the danger of proliferation of contextual parameters *praeter necessitatem*, as caricatured by Cresswell (1972: 8, 1973: 111) with his infamous *previous drinks* coordinate, supposedly to account for *Just fetch your Jim another quart*. On the other hand, there seems to be something natural about parameterizing contexts; the technique has been popular ever since Scott (1970). In any case, it turns out to be useful when we step down from characters to intensions and replace the situations in their domains by corresponding lists.

Before doing so, we need to get clear about what should make the difference between a contextual parameter and one that may be employed in the description of (properly) intensional constructions. As was mentioned near the beginning of the previous section, there is quite some variation among such constructions. In particular, constructions differ as to which aspects of the situation they abstract from: modals tend to bring in other possible worlds (cf. article 58 (Hacquard) *Modality*); some ‘frame-setting’ temporal adverbs and prepositions go back and forth in time (see article 57 (Ogihara) *Tense* and the literature cited there for a fuller picture); and, *pace* Maienborn (2001), presumably the same holds for literal uses of locative frame adverbials (Thomason & Stalnaker 1973). Under the assumption (76) that modification by sentence adverbs is interpreted by combining the extension of the adverb with the intension of the modified sentence, we can illustrate each case by (extremely simplified) character descriptions as in (77):

$$(76) \llbracket ADV_{\{mod, temp, loc, \dots\}} S \rrbracket^c(s) = 1 \text{ iff } \llbracket S \rrbracket^c \in \llbracket ADV_{\{mod, temp, loc, \dots\}} \rrbracket^c(s)$$

$$(77) \text{ a. } \llbracket possibly \rrbracket^c(s) = \{X \subseteq LS \mid s' \in X, \text{ for some } s' \in LS \text{ such that } s \stackrel{W}{=} s'\}$$

$$\text{ b. } \llbracket now \rrbracket^c(s) = \{Y \subseteq LS \mid s' \in Y, \text{ for some } s' \in LS \text{ such that } s \stackrel{T}{=} s' \& \text{ TIME}(s') = \text{TIME}(c)\}$$

$$\text{ c. } \llbracket in Rome \rrbracket^c(s) = \{Z \subseteq LS \mid s' \in Z, \text{ for some } s' \in LS \text{ such that } s \stackrel{P}{=} s' \& \text{ PLACE}(s') = \text{Rome}\}$$

In (77) the relation $\stackrel{W}{=}$ should be understood as holding between two situations that may be part of different Worlds but are otherwise (e.g., with respect to their time and place) as similar to each other as possible; and likewise for $\stackrel{T}{=}$ and $\stackrel{P}{=}$, and the Times and Places of the situations related rather than their Worlds. These manoeuvres are necessary in order to account for nested occurrences of these adverbials, as the reader is invited to verify. Given this background, it is easy to pin down in which sense modal, temporal, and locative adverbials respectively *shift* the modal, temporal, and spatial parameter of the situation described:

$$(78) \text{ If } \left\| \left\{ \begin{array}{l} ADV_{mod} \\ ADV_{temp} \\ ADV_{loc} \end{array} \right\} S_1 \right\| (s) \neq \left\| \left\{ \begin{array}{l} ADV_{mod} \\ ADV_{temp} \\ ADV_{loc} \end{array} \right\} S_2 \right\| (s),$$

$$\text{ then for some } s' \in LS \text{ such that } \left\{ \begin{array}{l} s \stackrel{W}{=} s' \\ s \stackrel{T}{=} s' \\ s \stackrel{P}{=} s' \end{array} \right\} : \llbracket S_1 \rrbracket^c(s') \neq \llbracket S_2 \rrbracket^c(s')$$

We leave it to the reader to verify that each of the characters defined in (77a–c) satisfies one of the conditions in (78), though none satisfies any of the other two. Generalizing from (78), we will say that an n -place construction Γ *shifts* a function π defined on LS just in case there is a place $i \leq n$ such that the following equation holds for any $c \in C$, $s \in LS$, and characters χ_1, \dots, χ_n in the domain of the character composition Γ^* associated with Γ :

$$(79) \text{ If } \Gamma^*(\chi_1, \dots, \chi_n)(c)(s) \neq \Gamma^*(\chi_1, \dots, \chi'_1, \dots, \chi_n)(c)(s), \\ \text{then for some } s' \in LS \text{ such that } s \stackrel{\pi}{\approx} s': \chi_1(c)(s') \neq \chi'_1(c)(s')$$

The relations $\stackrel{\pi}{\approx}$ (and even the notation) are reminiscent of so-called *modified assignments* used in the compositional approach to variable binding in logic. However, situations not being assignments, their exact meaning is less clear. Thus, e.g., some $s \in LS$ could stand in any of these relations to more than one situation, or none at all; which of these cases applies, depends on the specific features of s as well as the structure of Logical Space at large. It seems that an approach to intensions in terms of parameters is far simpler in this respect. In fact, the examples in (77) suggest that three of the contextual parameters listed in (75) may also be used in the characterization of intensional constructions. Though not strictly necessary, one should then split up the interpretation of (sentence-) adverbial modification (76) into different cases (76⁺a–c) according to the parameters targeted by the modifying adverb; this seeming complication, which is independently supported by syntactic considerations, pays when it comes to adapting the extensions of adverbs, as is done in (77⁺):

$$(76^+) \text{ a. } \llbracket ADV_{mod} S \rrbracket^c(w; t; p; \dots) = 1 \text{ iff } \{w' \mid \llbracket S \rrbracket^c(w'; t; p; \dots) = 1\} \in \llbracket ADV_{mod} \rrbracket^c(t; p; w; \dots) \\ \text{b. } \llbracket ADV_{temp} S \rrbracket^c(w; t; p; \dots) = 1 \text{ iff } \{t' \mid \llbracket S \rrbracket^c(w; t'; p; \dots) = 1\} \in \llbracket ADV_{temp} \rrbracket^c(t; p; w; \dots) \\ \text{c. } \llbracket ADV_{loc} S \rrbracket^c(w; t; p; \dots) = 1 \text{ iff } \{p' \mid \llbracket S \rrbracket^c(w; t; p'; \dots) = 1\} \in \llbracket ADV_{loc} \rrbracket^c(t; p; w; \dots)$$

$$(77^+) \text{ a. } \llbracket possibly \rrbracket^c(w; t; p; \dots) = \{X \subseteq W \mid X \neq \emptyset\} \\ \text{b. } \llbracket now \rrbracket^c(w; t; p; \dots) = \{Y \subseteq T \mid \text{TIME}(c) \in Y\} \\ \text{c. } \llbracket in Rome \rrbracket^c(w; t; p; \dots) = \{Z \subseteq P \mid \text{Rome} \in Z\}$$

Obviously, these equations can easily be adapted so that the character depends on the representation of the (arbitrary) context c . In any case, in (76⁺) and (77⁺) intensions are now taken to be functions defined on lists $(w; t; p; \dots)$ of *Worlds*, *Times*, *Places*, and others.

(76⁺) shows more directly than (76) how an intensional construction may select particular parameters of a situation while leaving the others untouched; and according to (77⁺), these parameters are all the extensions of the sentence adverbs care about. Using the above terminology, we may say that modal, temporal, and locative adverbials respectively *shift* the *WORLD*, *TIME*, and *PLACE* parameter of the situation described. So the rationale behind the parameterization should be that it brings out in the open what was implicit in the earlier approach using situations at large: the *shifting* of particular parameters. We thus obtain the following natural construction, where functions that are shifted by some intensional construction are called *shifty*:

Definition

- p*) An *I-parameterization* is a finite list $\rho = (\rho_1; \dots; \rho_m)$ of shifty functions π_i with domain *LS* (and arbitrary ranges) such that,
- (⁺) for any distinct situations *s* and *s'*:
 $\rho_i(s) \neq \rho_i(s')$, for some $i \leq m$.
 For any $s \in LS$, $s^+ := (\rho_1(s); \dots; \rho_m(s))$; hence $s^+ \neq s'^+$ whenever $s \neq s'$.

Condition (⁺) is adopted mainly for parallelism; but it will turn out to be useful. As a matter of fact, it could be dropped if Definition *q*) is slightly strengthened; see below.

Not only elegance and transparency speak in favour of *I-parameterization*. The construction of intensions in terms of lists rather than situations opens the possibility of *free variation* within these lists: instead of defining intensions as operating on lists of the form s^+ , we may extend them to arbitrary combinations of parameters, including those that do not correspond to any situation. Such lists or *indices* are easily constructed if the *I-parameterization* is rich enough. For instance, in order to guarantee condition (⁺), one may include the identity mapping over *LS*; as a result, any minimal modification of a list s^+ would lead to an index that does not represent any situation. Still, free variation would not lead to any change in the formulation of general character descriptions like (76⁺) and (77⁺). In fact, it may even come in handy if parameters get shifted beyond Logical Space but without contradiction. One possible case is discussed in Zimmermann (1991: 170): if, as current-day physics has it, the universe came into existence 14.6 billion years ago, no sentence modified by *16 billion years ago* could be true in an actual situation, which seems to contradict intuition because there would be no way of negating the fact that something or other happened at that time. Again we have to leave the details of this argument for the reader to fill in.

In principle, free variation is also available for contextual parameters, which can be turned against *C-parameterization* (Lewis 1980): since the rôle of contextual parameters is to determine intensions relative to utterance contexts, there seems to be no use of combinations beyond the representations of the latter. However, *C-parameterizations* may still be helpful in reconstructing the ingredients of two-dimensional semantics in terms of *I-parameterization*. In particular, the internal structure of lists of contextual parameters may be exploited in the construction of *diagonals* – provided that the *C-* and *I-*parameters are in tune, in the following sense:

Definition

- q*) A *C-parameterization* $\pi = (\pi_1; \dots; \pi_n)$ fits an *I-parameterization* $\rho = (\rho_1; \dots; \rho_m)$ iff the following conditions hold:
- $n \geq m$;
 - π_i is not shifty if $i < n - m$;
 - $\pi_i = \rho_i$, for any $i \geq n - m$.

In the absence of condition (⁺) in Definition *p*), a further constraint on fitting *I-parameterizations* would have to be imposed, viz. that $(\pi_{n-m}(c); \dots; \pi_n(c))$ uniquely determines *c*.

Hence fitting *C-parameterizations* only add parameters that are not shifty and thus only needed for determining context-dependent intensions (otherwise they should occur in the *I-parameterization*). Thus, e.g., the *C-parameterization*

(SPEAKER; ADDRESSEE; WORLD; TIME; PLACE; ...)

is in tune with the *I*-parameterization

(WORLD; TIME; PLACE; ...)

where $n = m + 2$ and the ‘...’ stand for the same list of (shifty) parameters. Given Definition *q*), it is possible to construct diagonals in quite the same fashion as in Section 4 above. This may come as a surprise, given that lists of contextual parameters are longer than *I*-parameters and thus there appear to be more of them than there are indices – whereas the contexts of utterance form a proper subset of Logical Space. However, as long as we rule out free variation on *C*-parameters, things do not change dramatically, due to the restrictions (*) and (+) in Definitions *o*) and *p*): given fitting *C*- and *I*-parameterizations, any $c \in C$ will be represented by a unique list c^* , and any $s \in LS$ will be represented by a unique list s^+ . Consequently, any c will be represented by a unique pair (c^*, c^+) – and this pair represents the diagonal point (c, c) ! To be sure, characters still look slightly different after (fitting) parameterization, but only because of the free variation among *I*-parameters, which extends their right side but leaves the ‘diagonalizable’ left part untouched.

Parameterization, thus conceived, has deep repercussions on the two-dimensional approach to context-dependence. This is because it makes shiftability the criterion for distinguishing between context and index, and thus between intension and character. More specifically, the Ban on Monsters comes out as an *a priori* truth (though not in the technical sense of Definition *e*) of Section 2) rather than an empirical hypothesis. The rationale behind this is that shifty parameters are more clearly identifiable than the contents of utterances (Lewis 1980; see also Rabern 2012b). In Section 2, following the tradition of Kaplan (1989a), we identified the latter with *what is said*. However, this locution is by now means unequivocal, as becomes clear from dialogues like:

(80) John: *Smith said to me: ‘You are my best friend.’*

Mary: *What Smith said* is what he has been telling me all the time.

Mary’s reply may be (and may meant to be) either reassuring or critical, depending on whether the underlined free relative refers to (a) the situations in which *John* is Smith’s best friend, or (b) the situations in which *Smith’s addressee* is his best friend. Both readings seem plausible and, arguably, neither is the better choice for the literal referent of the underlined clause. But whereas (a) is the content of Smith’s reported (alleged) utterance, (b) involves (local) diagonalization of the 2nd person pronoun. So not all is well with the pragmatic definition of content, and thus intension in general, in terms of what is said by (assertoric) utterances. On the other hand, shiftability does not presuppose the notion of content because it directly shows in, and affects, the truth conditions of utterances. This speaks in favour of an identification of intensions in terms of compositional semantics rather than pragmatics.

However, unlike the distinction between utterance situations and non-utterance situations, that between context and index is language-dependent, because it depends on the semantic properties of grammatical constructions. Therefore, any purported counter-examples to the Ban on Monsters can and must be dealt with by turning purported

C-parameters into *I*-parameters. Thus, e.g., since the implicit argument in (5b) may be quantified, as (71c) shows, it would have to be provided by an *I*-parameter:

- (5) b. *He is an enemy.*
 (71) c. *Every man faced an enemy.*

The fact that the context still provides the value of the parameter thus comes out as merely a reflex of the general dependence of extensions on the utterance situation already observed in connection with Definition *h*) in Section 4: given an utterance context, the extension of an expression is determined by applying its intension to the context itself. As a result, in the absence of any intensional construction shifting the pertinent parameter, the context of utterance provides the values of the *C*-parameters. However, if taken to its limits, the strategy of pushing *C*-parameters into the index runs the risk of eventually emptying the list. Now, this would not make the distinction between context and index totally idle; after all, deictic expressions might coexist with ‘bindable’ ones and share the same parameter. Only in the absence of any deictic expressions, would characters be superfluous because the intensions alone would suffice to determine all extensions relative to any (utterance) situation; and as a consequence, the Ban of Monsters too would be pointless in a language devoid of deixis. This should not come as a surprise, though; for it is deictic expressions that motivated the distinction between intension and character in the first place.

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Thomas Ede Zimmermann, Frankfurt/Main (Germany)