Consequence in Context:
Two-Dimensional Semantics meets Logical Consequence

MSc Thesis (*Afstudeerscriptie*)

written by

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Abstract

Two-dimensional semantics is a formal framework used to characterize the meaning of sentences and sub-sentential expressions and distinguished by the view according to which the extension of an expression depends on two dimensions. Contextual philosophical interpretations of that framework intend to capture how the extension of an expression depends on context. These interpretations have been argued to provide insight into questions related to logical consequence.

This thesis is concerned with problems having to do with logical consequence and the role of context in the determination of truth – with contextual interpretations of two-dimensional semantics constituting theories in which solutions to those problems can be devised. The main problem that will be addressed is the *logically possible cases problem*, the problem of what are the logically possible cases – that is, what are those things x such that, if the premise of an argument is true relative to x while the conclusion of an argument is false relative to x, an argument is logically invalid. Linked to the logically possible cases problem, and thus also of interest in the present thesis, is the *relata problem*, the problem of what are the things that the relation of logical consequence relates. In particular, the interest will reside in whether the *contexts as cases thesis* – the thesis that logically possible cases are just contexts / context-related entities – and the *context-sensitive relata thesis* – the thesis that the relata of logical consequence are context-sensitive, in the sense that their truth is determined relative to contexts / context-related entities – hold. I will argue that the contexts as cases thesis does not hold, and that the context-sensitive relata thesis does.

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Contents

Introduction

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The present essay is concerned with problems having to do with logical consequence and the role of context in the determination of truth – with contextual interpretations of two-dimensional semantics constituting theories in which solutions to those problems can be devised. The main problem that will be addressed is the *logically possible cases problem*, the problem of what are the logically possible cases – that is, what are those things x such that, if the premise of an argument is true relative to x while the conclusion of an argument is false relative to x, an argument is logically invalid. Linked to the logically possible cases problem, and thus also of interest in the present thesis, is the *relata problem*, the problem of what are the things that the relation of logical consequence relates. In particular, the interest will reside in whether the *contexts as cases thesis* – the thesis that logically possible cases are just contexts / context-related entities – and the *context-sensitive relata thesis* – the thesis that the relata of logical consequence are context-sensitive, in the sense that their truth is determined relative to contexts / context-related entities – hold. I will argue that the contexts as cases thesis does not hold, and that the context-sensitive relata thesis does.

Structure of the argument

The structure of my argument will be as follows. I will present different options on what is the class of logically possible cases which are distinguishable in the two contextual interpretations of the two-dimensional framework – Kaplan's *semantic interpretation* and Stalnaker's *meta-semantic interpretation* – and dismiss some of them as clearly wrong from the outset. After being left with three options, all of them assuming Kaplan's semantic interpretation of the two-dimensional framework, I address Kaplan's thesis, so far the most relevant defense of the context as cases thesis, and which coincides with one of the options distinguished – the position according to which an argument is valid just in case there is no context at which all the premises are true and the conclusion is false. I argue that Kaplan's thesis is false,

as well against the two other options. Kaplan's thesis was also committed to the claim that the only relata of logical consequence are sentence-types (and thus that the context-relative relata thesis holds). Since Kaplan's thesis is shown to be false, no commitment to a *monism* concerning the relata of logical consequence follows.

Afterwards I address two puzzles concerning the *primary relata* and analyticity theses – the primary relata thesis having some initial plausibility and the assumption that the analyticity thesis is the case being a non-negotiable assumption of the present essay–, where the primary relata thesis is the position according to which the relation of logical consequence between secondary truth-bearers holds in virtue of the fact that the relation holds between the propositions they stand for. The primary relata thesis seems to entail that the context as cases thesis is not the case. The puzzles are important since they seem to entail the rejection of the primary relata thesis, and this rejection provides some initial plausibility to the contexts as cases thesis. The puzzles are also important insofar as a proposed solution to the second puzzle – a solution which I call the *semantic solution* – implies that the contexts as cases thesis is in fact the case (despite the fact that none of the different options for being the class of logically possible cases distinguished in chapter 2. would be *the* class of logically possible cases under the semantic solution, since the solution implies a three-dimensional semantics).

I show that both puzzles can also be solved without the rejection of the primary relata thesis, through a solution which I call the *pragmatic solution*. This is done in part by adopting some considerations arising from the meta-semantic interpretation of two-dimensional semantics, and also by taking the primary relata thesis seriously. I also argue that the pragmatic solution to the puzzles is more plausible than the semantic solution. The outcome is that the primary relata thesis preserves its initial plausibility, and thus the contexts as cases thesis ought to be rejected. Other important consequences of the plausibility of the primary relata thesis are that it allows for a pluralist position on the nature of the relata of logical consequence – some of these being context-sensitive – that the class of logically possible cases should be understood as the class of all circumstances of evaluation, that logical consequence, when the relata are taken to be context-sensitive truth-bearers, gets to obtain relative to contexts / context-related entities.

The dialectics can thus be summarized as follows: there is a distinguished position on the nature of logical consequence – Kaplan's thesis – which enjoys considerable popularity and entails that the contexts as cases thesis is true; and there are puzzles posing some threat to the primary relata thesis, a seemingly plausible thesis about logical consequence entailing that the contexts as cases thesis is not the case. Furthermore, these puzzles are (arguably) solved by endorsing a position according to which the contexts as cases thesis *is* the case.

By arguing that Kaplan's thesis ought to be rejected doubts are raised on whether the contexts as cases thesis does in fact hold. In addition, by showing that the puzzles can be solved without rejecting the primary relata thesis and that this solution to the puzzles is better than a different solution entailing the rejection of the primary relata thesis and that the contexts as cases thesis ought to be accepted it is shown that the doubts previously raised are justified, and that the most plausible position on the logically

possible cases problem is the rejection of the contexts as cases thesis.

Structure of the thesis

In the first chapter the theoretical background required to appreciate the problems and deal with the subsequent discussion is introduced, as well as the problems with which the thesis will be concerned and the available positions and their proponents. On what concerns the theoretical background the most prominent interpretations of two-dimensional semantics are presented, and the contextual interpretations of two-dimensional semantics are distinguished, since they will provide the needed theoretical apparatus on how to conceive the role of context on the determination of truth. Afterwards several views on the nature of logical consequence are distinguished, and our own commitments are signaled, since these will constrain what solutions to the problems can plausibly be accepted. One of the most important commitments will be to the truth of the *analyticity thesis*, the position according to which if an argument is logically valid whenever the meanings of its premises are true, so is the meaning of the conclusion. Finally, the problems to be investigated and the available positions are presented.

In the second chapter the logically possible cases problem is exhibited within a two-dimensional framework, the upshot being that of distinguishing different options concerning candidates for being the class of logically possible cases within the semantic and the meta-semantic interpretations of the framework. Of the different candidates distinguished three options are found to have some plausibility, all of them within a semantic interpretation of the framework: i) the class of all pairs constituted by a context and a circumstance of evaluation; ii) the class of all pairs constituted by a context and *its* circumstance of evaluation; and iii) the class of all pairs constituted by a distinguished context c^* and any circumstance of evaluation whatsoever.

In the third section it is investigated whether Kaplan's thesis holds, a thesis committed to the positions that the relata of logical consequence are sentence-types and that option ii) constitutes the class of logically possible cases. It is also investigated whether position i) and iii) hold. It is concluded that all options should be rejected.

In chapter 4. two puzzles threatening the truth of the analyticity thesis are presented. The importance of these puzzles is two-fold. On the one hand they are behind the rejection of *the primary relata thesis*. On the other hand the semantic solution to the puzzles provided by Gillian Russell, if adequate, has the consequence that the contexts as cases thesis is in fact true. I present the semantic solution, and then my own pragmatic solution is presented. Afterwards, some arguments are given to the effect that the pragmatic solution is more plausible than the semantic solution.

Chapter 1

Logical consequence and the role of context in the determination of truth

In Monty Python's comic sketch *Argument Clinic* Michael Palin pays John Cleese in order for them to have a discussion. At some point Cleese stops the discussion, claiming that their debating time is over. Palin rejects that this is so, and starts discussing the topic with Cleese. In the interest of keeping the discussion going on, Palin adduces something like the following argument:

(1)   Ah ah! I got you! You'll be having a discussion with me for as long as I have payed you to. You're having a discussion with me. Hence, I have payed you for this time of discussion.

Cleese rejects Palin's argument by remarking the following:

"No, no, no. I could be arguing in my spare time."

Cleese's reply shows that there is a sense in which something is *wrong* with Palin's argument, a sense in which Palin's argument is *bad*. The argument is, in logical jargon, a *non-sequitur*. What is wrong with it is that its conclusion is not a *logical consequence* of its premises.

The relation of logical consequence plays an important part in our daily lives. Palin's argument was intended to lead Cleese to accept the conclusion that they were both in the time corresponding to Palin's payment. If Palin's argument had been valid, he might have been more successful in convincing Cleese that they should proceed with the discussion. Politicians regularly adduce arguments with the same intent of persuading their hearers of one or another claim, and sometimes try do so by giving arguments whose conclusions are accepted as logically following their premises. In different fields of inquiry (mathematics, the natural and social sciences, etc.) one of the means through which knowledge is amplified is through acknowledging the existence of arguments with accepted premises and with conclusions that follow logically from those premises, since acknowledging the existence of such arguments - and that they have the relevant property - leads to the acceptance of the conclusions, thus amplifying our knowledge.

Despite the importance of the relation of logical consequence in our lives, we seem to have an imperfect grasp both of the nature of the relation and of the extension of the class of arguments whose conclusions logically follow from the premises. The present thesis deals with problems in the philosophy of logic having to do with the nature of logical consequence. The interest will be on whether and how considerations stemming from the role of context in the determination of truth are relevant for accounting for the nature of logical consequence.

1.1   The role of context in the determination of truth

Two-dimensional semantics is a formal framework used to characterize the meaning of sentences and sub-sentential expressions and distinguished by the view according to which the extension of an expression depends on two dimensions. Some philosophical interpretations of the framework provide the theoretical background required for an account of how context is relevant in the determination of truth.

An important example of such application of the two-dimensional framework is provided by Kaplan. In [Kaplan, 1989a] an account is given of how the conventional semantic rules governing the use of indexical expressions such as 'I' and 'here' determine the extension of those expressions, and of the sentences containing them, relative not only to *circumstances of evaluation* but also to *contexts of use/generation*. Consider sentence (2):

(2)   I was in Amsterdam all day on the 18th of March 2010.

The truth of sentence (2) depends on what is the context in which it is being used/generated. The context provides the reference of 'I', which consists of the person using the sentence on that context. The truth of sentence (2) depends also on what is the circumstance with respect to which the sentence is being evaluated. If the circumstance is such that the contextually determined reference of 'I' was in Amsterdam all day on the 18th of March 2010, then (2) will be true. Otherwise, (2) will be false.

The dependence of the extension of an expression on two dimensions can be illustrated by the use of two-dimensional matrices for those expressions. These are matrices whose rows and columns are labeled, respectively, with whatever objects belong to the first-dimension and whatever objects correspond to the second-dimension; and whose entries $\langle i, j \rangle$ correspond to the extensions of the expression with respect to the object in row i and column j. As an example, consider a possible two-dimensional matrix for 'I', according to Kaplan's context-dependent treatment of indexicals:

	ev_1	ev_2	ev_3
c_1	Yossarian	Yossarian	Yossarian
c_2	Orr	Orr	Orr
c_3	McWatt	McWatt	McWatt

Figure 1.1: Kaplanian two-dimensional matrix for 'I'

The above matrix encodes the information that the speaker of context c_1 is Yossarian, the speaker of c_2 is Orr, and the speaker of c_3 is McWatt. In addition, it also exhibits the fact that 'I' is a rigid designator (something which is the case with respect to all indexicals), where a rigid designator is an expression that, relative to a context of use, designates the same individual in all circumstances of evaluation. Kaplan [Kaplan, 1989a] not only holds that indexicals are rigid designators, but also that they are directly referential, in the sense that they refer without the mediation of any Fregean sense or sense-like entity. A possible two-dimensional matrix for (2) is as follows:

	ev_1	ev_2	ev_3
c_1	T	F	F
c_2	F	T	F
c_3	F	F	T

Figure 1.2: Kaplanian two-dimensional matrix for 'I was in Amsterdam all day on the 18th of March 2010'

From the matrix one can obtain, for instance, the information that Yossarian was not in Amsterdam all day on the 18th of March 2010 at circumstances of evaluation ev_2 and ev_3, and that McWatt was in Amsterdam all day on the 18th of March 2010 in circumstance of evaluation ev_3.

Two main ways of distinguishing the different philosophical interpretations of two-dimensional semantics have been proposed. Stalnaker [2006] proposes to distinguish the interpretations depending on whether these are *semantic* or *meta-semantic*, while Chalmers [2006a] distinguishes *contextual* from *epistemic* interpretations.

The idea behind Stalnaker's distinction is based on what the dependence of the extension on two dimensions is intended to capture: if an interpretation intends to account for some semantic object - such as the *meaning* of an expression - through the dependence of the extension of the expression on two-dimensions, then the interpretation is semantic. If instead what an interpretation intends to account for is how the facts determine that the expression has one or another meaning, then the interpretation is meta-semantic.

The distinction between contextual and epistemic interpretations groups interpretations of the two-dimensional framework depending on whether the rows of a two-dimensional matrix are intended to capture the way the extension of an expression depends on context, or if instead they are intended to capture some kind of epistemic dependence.

For obvious reasons the present essay will be focused on the contextual interpretations of two-dimensional semantics. Within these, the main interpretations are the *semantic interpretation* offered by Kaplan [1989a] and the *meta-semantic interpretation* proposed by Stalnaker [1978].

The semantic interpretation

Kaplan's *semantic interpretation* corresponds to the view that the extension of linguistic types depends on both contexts of use/generation and circumstances of evaluation. That the extension of linguistic types is context-dependent as depicted in Kaplan's framework is nowadays a consensual position (as Soames puts it, "In Kaplan's benign sense, we are all two-dimensionalists now"[1]). Nonetheless, there is some divergence with respect to what is the nature of contexts and circumstances of evaluation and how they should be represented. Two proposals of how to represent contexts depict them as centered worlds, either as worlds centered in an agent and time – that is, as triples $c = \langle w, s, t \rangle$ (with w a possible world, s an agent of w and t a time of w) –, or as worlds centered in a token of the expression and a time – that is, as triples $c = \langle w, p, t \rangle$ (with w a possible world, p the token of the expression in w and t a time in w). There have also been different proposals as to what constitutes a circumstance of evaluation, and how these should be represented. For instance, it has been proposed that circumstances of evaluation be represented as triples $ev = \langle w, t, l \rangle$, where w is a possible world and t and l are times and locations of that possible world, as pairs $ev = \langle w, l \rangle$, or even just as possible worlds (i.e., $ev = w$).

Character and *content* are two important notions in Kaplan's theory. The content of an expression consists in a function from circumstances of evaluation to extensions. For instance, the content of 'runs' maps circumstances of evaluation to sets of objects, and the content of 'John runs' maps circumstances of evaluation to truth-values. The content of a sentence is such that it maps a circumstance of evaluation ev to truth if the sentence is true with respect to $\langle c, ev \rangle$, where c is a particular context of use, or to falsity, if the sentence is false with respect to $\langle c, ev \rangle$. Contents of sentences play, for Kaplan, the role of propositions. However, it is more correct that to say that, in Kaplan's view, propositions determine contents (see [Kaplan, 1989a, pp. 502]). The character of a sentence is a function from contexts of use to contents. A character maps a context c to a content mapping each circumstance ev to a truth-value T if and only if the sentence has the truth-value T with respect to $\langle c, ev \rangle$. A full two-dimensional Kaplanian matrix for some linguistic expression (that is, a matrix whose rows and columns are labeled by contexts of use and circumstances of evaluation respectively, and that for each context of use and each circumstance of evaluation there is exactly one row and column labeled by them) can be seen as modeling that expression's character, and each of the rows as modeling the content of the expression with respect to some context of use. Even though Kaplan distinguishes between these two kinds of meanings – character and content – it is not the case that every expression of the language is seen as possessing a character; or, if preferred, it is not the case that the character of every expression of the language is sensitive to the context of use. Some expressions possess a constants character, qua functions from contexts of use to contents, while others possess variable characters. The expressions of the language with variable characters are called *indexicals*[2].

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[1] In [Soames, 2006].

[2] Of these, Kaplan distinguishes two kinds: *pure indexicals* and *true demonstratives*; the difference is, roughly, that in order for the contents of true demonstratives to be determined the speaker is required to accompany its use with some demonstration or intention, while for the reference of pure indexicals to be determined such demonstrations or intentions are not required (or so Kaplan believes). The difference could be heuristically put by saying that the reference of true indexicals is automatic, whereas

The upshot of the notions of character and content is that they provide two different accounts of meaning. Content corresponds to the meaning of an expression required in order for the truth of a sentence in which it occurs to be evaluated. In order for the truth of (2) to be evaluated, the sentence is required to express a determinate content (for instance, the same content expressed by 'Orr was in Amsterdam all day on the 18th of March 2010), and it will be true if the actual circumstances of evaluation are such that Orr was in fact in Amsterdam all day on the 18th of March 2010. Character provides a notion that is more general than content, in the sense that it incorporates the context-dependence of expressions, and also in that it 'is close to the intuitive idea of linguistic meaning' [Kaplan, 1989b, pp. 568]. It determines the content of an expression with respect to a determinate context of use/generation.

The interplay between character and content allows us to better understand what contexts of use/generation of a sentence are intended to stand for in a theory of linguistic meaning of expression-types: even though contexts of use are intuitively conceived as metaphysical and spatio-temporal locations (the location of the speaker, or alternatively, that of a token of the sentence-type), their role in a theory of linguistic meaning shows that what is important is that they are "parametrized", in the sense that their role is to supply parameters (a speaker, a possible world, a time, etc.) required for sentences to express one or another content. Hence, for the purposes of a formal semantics for a particular language, contexts of use/generation need only be represented by tuples of parameters.

Kaplan's interpretation of the two-dimensional framework provides an interesting insight with respect to the truth of some sentences. Let a sentence be true at a context of use c just in case it is true at c and $ev(c)$, the circumstance of evaluation determined by c. For instance, if a context c is represented by a triple $c = \langle w, s, t \rangle$ and circumstances of evaluation are represented by possibilities, then the circumstance of evaluation $ev(c)$ determined by c is such that $ev(c) = w$. There are sentences which are true whenever used (i.e., true in every context of use), despite the fact that they are not necessarily true. An example is sentence (3):

(3)   It is raining if and only if actually, it is raining.

Assume that that contexts are triples $c = \langle w, s, t \rangle$ and circumstances of evaluation are possible worlds. Sentence (3) is true whenever it is used, that is, at every pair $\langle c, ev(c) \rangle$, due to the meaning of 'actually', since a sentence $\ulcorner$actually $\varphi\urcorner$ is true at a context c and circumstance of evaluation ev if and only if φ is true at context c and circumstance of evaluation k, where k is the world of the context c. That is, $k = ev(c)$.

But (3) is not necessarily true. A sentence of the form $\ulcorner$necessarily $\varphi\urcorner$ is true at a context c and circumstance ev if and only if φ is true at context c and all circumstances of evaluation (possible worlds) whatsoever. Since there are both circumstances of evaluation in which it is not raining and circumstances of evaluation in which it is raining, if it is true that actually it is raining, then (3) will be false with respect to its context of use and those circumstances in which it is not raining; and if it is false that actually it

that of pure demonstratives is not. For more on the distinction, see [Kaplan, 1989a, Braun, Summer 2010 Edition]

is raining, then (3) will be false with respect to its context of use and those circumstances in which it is raining. Either way, there will be circumstances of use such that (3) will be false with respect to its context of use and those circumstances, and therefore (3) is not necessarily true.

The meta-semantic interpretation

The *meta-semantic* interpretation intends to account for how the extension of an expression-token could have been different had the facts of the world determined a different meaning for the expression-type of which the token is a token of. It thus intends to capture how the extension of an expression depends not only on what are the facts, but also on what happens to be the meaning of the type of which it is a token. Consider the following sentence:

(4)   Hesperus is Phosphorus.

Assuming both that the meaning of a name is given solely by the object it stands for and that names refer to the same object in every possibility (that is, that names are both directly referential expressions and rigid designators), sentence (4) is a necessary truth, no matter its context of utterance. Still, if the meaning of 'Hesperus' or 'Phosphorus' had been different, then (4) would not have been a necessary truth. For instance, in a possibility where the evening star is Mars, the morning star is Venus, the name 'Hesperus' denotes the the evening star, 'Phosphorus' denotes the morning star (and 'is' just means identity), sentence (4) will be false.

This dependence of extensions on both the meaning of the expression and what is the case is captured by positing possible worlds as the objects in both the first and the second dimensions. However, the roles they play are different depending on whether they are being considered as elements of one or the other dimension: in the first-dimension, they capture what the content of an expression would have been, had that possibility been the case (in the case of sentences, they capture what the proposition expressed by the sentence would have been, had that possibility been the case); in the second dimension what is captured is what the extension of the expression would have been at a possible world, with respect to the content determined by the possible worlds on the first-dimension.

Stalnaker's motivation for adopting the two-dimensional framework is different from Kaplan's. While the point of the latter was to give a fuller account of linguistic meaning, one that incorporates context-dependence, the former intends to characterize how what is communicated by an assertion depends on two different roles played by the context in which the assertion takes place. Stalnaker, influentially, proposed that the purpose of making an assertion is that of leading the audience to which the assertion is directed to exclude certain possibilities being held as live possibilities at a particular context. This corresponds to the first role played by context: it is that which assertions intend to affect. For instance, an assertion of

(5)   I have moved to my recently bought house

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aims at excluding from the context the possibilities being held as live possibilities in which the speaker still lives in his old house. The second role of context has to do with the determination of what is expressed by an assertion. For assertions to achieve their desired effect the participants on the conversation must share some *presuppositions* concerning both the meaning of the words used and the actual circumstances. If the audience did not understand English, then the assertion of (5) would not achieve the desired effect; and if the audience was ignorant of who performed the utterance of (5) (for instance, because two friends were on another room when one made the utterance, making the audience unaware of which one of the two made it), then the assertion would also not have achieved its desired effect. Thus, in order for an assertion to achieve its desired effect, some presuppositions must be in force in the context that the assertion intends to affect.

One can thus represent a context as a set of possibilities, the *context set*, which contains all possibilities where the shared presuppositions of the participants on the conversation hold. The desired effect of an assertion in a particular context is to exclude some of the possibilities in that context set, and what is communicated by an assertion is determined with respect to the possibilities in that context.

Given this picture of a context and of the aim of an assertion, what is communicated by an assertion can be modeled by a two-dimensional matrix, where rows and columns are labeled by possibilities in the context set. For instance, if what is presupposed is that the language being spoken is English and that John is the person uttering (5), the following is a possible two-dimensional matrix for the utterance of the expression:

	w_1	w_2	w_3
w_1	F	T	T
w_2	F	T	T
w_3	F	T	T

Figure 1.3: Two-dimensional matrix for (5)'s utterance.

Each world represents a possibility compatible with the presuppositions of the participants, and the truth-values of each row represent what the content of (5) would be if the possible world labeling that row would happen to be the actual world. Since the shared presuppositions are that the language is English and the speaker is John (and that the time is t), the content of (5) is the same no matter the possibilities. In such case, the possibility that the assertion of (5) is intended to exclude is w_1, for the content of (5) will be false with respect to that possible world, no matter what possibility turns out to be the one where the utterance takes place. At this point a remark should be made. I began by characterizing Stalnaker's interpretation as intending to account for how the extension of an expression depends both on the facts of the world and the expression's meaning. This characterization can now be qualified: what Stalnaker interpretation of the two-dimensional framework intends to account for is how the extension of an expression-token as it occurs in an assertion depends not only on what would be the case in each possibility in the context set, but also on what would be the meaning of that expression with respect to

each possibility.[3]

There are, however, assertions that, prima facie, fail to determine which possible world is to be excluded. Assume participants in a conversation are unaware of the fact that 'Hesperus' and 'Phosphorus' have the same reference, even though they are English speakers aware that proper names rigidly designate. In such case, an utterance of (4) by one of the participants would seem to fail in proposing the exclusion of any possibility, due to the fact that, relative to each possibility in the context set, the content of (4) would be different. A possible two-dimensional matrix depicting this situation is the following:

	w_1	w_2
w_1	T	T
w_2	F	F

Figure 1.4: Two-dimensional matrix for (4)'s utterance.

The audience is unaware whether w_1 or w_2 is the world where the assertion is being performed, and depending on whether it takes place in w_1 or w_2, it either proposes to eliminate no possibility, or to eliminate all possibilities. None of these cases is desirable: to propose to eliminate all the possibilities in the context set is 'self-defeating', for it is to assert something that is contradictory with what is already being presupposed; to propose to eliminate no possibility in the context set is to go against the aim of making an assertion.

In order to account for assertions like that of (4), Stalnaker proposes that what is being pragmatically communicated is something different from either of the propositions that are determined, depending on whether w_1 or w_2 is the actual world. Since such assertions violate the rational maxim of conversational cooperation according to which the same content should be expressed relative to every possible world in the context set, the audience seeks for a non-standard interpretation of the utterance. The proposal is that what is pragmatically communicated by (4) is that *the content of (4) is true*, where 'the content of (4)' may refer to different contents in different worlds. That is, what is communicated is the *diagonal proposition*[4], where this is the content that is true at a possibility w if and only if the content expressed in w is true at w. In the case of the assertion of (4), it corresponds to cells $\langle w_1, w_1 \rangle$ and $\langle w_2, w_2 \rangle$. The following two-dimensional matrix captures what is pragmatically communicated:

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[3] As Stalnaker [2006] points out, this immediately answers an objection by Chalmers [2006a] to the effect that in some possible worlds it would be quite difficult to pinpoint if a token of a sentence being asserted was the same as the original token, and what the criteria for such trans-world identification would be, thus making the question of what content to be assigned to the utterance with respect to those possibilities a difficult one to answer. However, once the scope of the meta-semantic interpretation is appropriately delineated, the problem vanishes, for the token just has to be the unique epistemically salient token at each of the relevant worlds. The participants of the conversation will be aware that a particular assertion takes place, and thus such token is guaranteed to exist at each of the possible worlds of the context set.

[4] I will be using 'content' and 'proposition' interchangeably, in the current presentation of the meta-semantic interpretation, since Stalnaker uses these terms in the same way. I have chosen the phrase 'diagonal proposition' instead of 'diagonal content' since this is the designation adopted by Stalnaker.

	w_1	w_2
w_1	T	F
w_2	T	F

Figure 1.5: Two-dimensional matrix for what (4) pragmatically communicates

By reinterpreting the assertion of (4) as expressing the diagonal proposition with respect to each possibility taken as actual, the participants in the conversation are able to make sense of the assertion, and it achieves its target: that of proposing to exclude world w_2. The diagonal proposition thus captures a sort of pragmatic content, highly dependent on both literal content (for the determination of the truth-values of each row) and on what are the 'live' possibilities of the participants (for the determination of both the rows and the columns of the matrix).

It is important to note how Stalnaker's and Kaplan's interpretations are not rivals, but intend to account for different phenomena. Consider the following example: Orr wants to warn Yossarian that they're just passing above the target that they're supposed to drop the bombs on. Orr says the following to Yossarian:

(6)   The target is below us now.

It can be assumed that neither Orr nor Yossarian know exactly what time it is, but that they presuppose that it is either 21h00m or 22h00m. Given Kaplan's theory, if the sentence were used at 21h00m, then it would express the same proposition as that expressed by the sentence 'The target is below us at 21h00m', and if it were used at 22h00m, it would express the same proposition as that expressed by the sentence 'The target is below us at 22h00m'. Different propositions are expressed by the assertion, depending on whether it is 21h00m or 22h00m. The following two-dimensional matrix depicts the situation:

	9PM & target at 9PM (w_1)	9PM & target at 10PM (w_2)	10PM & target at 9PM (w_3)	10PM & target at 10PM (w_4)
9PM & target at 9PM (w_1)	T	F	T	F
9PM & target at 10PM (w_2)	T	F	T	F
10PM & target at 9PM (w_3)	F	T	F	T
10PM & target at 10PM (w_4)	F	T	F	T

Figure 1.6: Two-dimensional matrix for what (6) pragmatically communicates

Since different propositions are expressed by the assertion, what is being communicated is not (6), but that *sentence (6) is true*, a proposition that is true at possibilities w_1 and w_4, and false at w_2 and w_3.

As was the case with respect to sentence (4), sentence (6) determines different propositions depending on the possibility in which it is uttered, and therefore violates the aforementioned rational maxim of cooperation. Hence, what is being communicated is not (6) but that *sentence (6) is true* (i.e., the diagonal proposition), a proposition that is true at possibilities w_1 and w_4, and false at w_2 and w_3. Thus, the two-contextual interpretations aim at accounting for different phenomena, and as the example shows, without Kaplan's theory Stalnaker's interpretation would not be able to account for what is pragmatically communicated in cases like that of the assertion of (6).

The example also allow us to assess the difference between the roles that the notion of context is required to play in Kaplan's and Stalnaker's theories: for both the intuitive idea of a context is that of a metaphysical and spatio-temporal location, that of the speaker or of the sentence-token that is being used to make an assertion. However, for Stalnaker, what is important in a context is that: i) there are some presuppositions in force at that metaphysical and spatio-temporal location; ii) the resulting proposition, modeled as a set of worlds, is true if the possible world where the utterance takes place belongs to that set of possible worlds.

Chalmers's epistemic interpretation

Before concluding the present section Chalmers's *epistemic interpretation* [2006a] will be introduced, by way of contrast with both contextual interpretations of the two-dimensional framework, and also due to

the fact that in recent years it has gained some prominence.

Chalmers intends to account for how the extension of expression-tokens depends both on an epistemic dimension and a metaphysical dimension. Epistemic dependence is intended to capture a dimension of meaning usually associated with Fregean senses, in that it is capable of distinguishing (at least in part) expression-tokens relative to their cognitive significance. The objects in the first dimension are thus to be understood as *scenarios/epistemically possible worlds*. Each scenario consists of a maximally specific hypothesis about what one's actual environment and one's location in that environment might be like that cannot be ruled out by apriori reasoning alone (a hypothesis is maximally specific if it leaves no other hypothesis open; and a hypothesis $H1$ leaves another hypothesis $H2$ open if and only if both the conjunctions of $H1$ with $H2$ and its negation are epistemically possible). The extension of a sentence-token φ at a scenario s is determined in such a way that φ is true if and only if it is apriori incoherent that both s and $\ulcorner$not $\varphi\urcorner$; and a sentence-token's *primary intension* is a function from epistemic possibilities to truth-values, such that an epistemic possibility is mapped to truth if the sentence-token is true at that scenario, and to falsity if the sentence-token is false at that scenario.

The objects in the second dimension are *uncentered scenarios*, maximally specific hypothesis about what one's actual environment might be like that cannot be ruled out by apriori reasoning alone. The *secondary intension* of a sentence-token 'p' is a function from 'uncentered' scenarios to truth-values, mapping an 'uncentered' scenario to the the truth-value that the token as is actually used would have had in that scenario. A *two-dimensional intension* is a function mapping pairs $\langle s, w \rangle$, of scenarios s and 'uncentered' scenarios w to truth-values, where a pair $\langle s, w \rangle$ is mapped to truth if and only if, if s is the case, then if w had been the case then p would have been the case. For instance, consider sentence (7)

(7)   Water is XYZ.

Suppose that in the epistemically possible world s_1 the drinkable liquid in oceans and lakes is H_2O, and that in the epistemically possible world s_2 the drinkable liquid in oceans and lakes is XYZ, and that w_1 and w_2 are, respectively, the epistemically possible worlds s_1 and s_2 when these are stripped of their center. Then, the following two-dimensional matrix would reflect the position of the proponents of the epistemic interpretation:

	w_1	w_2
s_1	F	F
s_2	T	T

Figure 1.7: (Partial) two-dimensional matrix for (7)

If the epistemic possibility s_1 is the case, then water is not XYZ, and thus, had w_2 been the case, water would still not have been XYZ, for water could not have been different of itself: than H_2O. That is, if s_1 is the case what can be concluded is that water is not the drinkable liquid in oceans and lakes of w_2. And if s_2 is the case, then water is XYZ, and thus it would have been XYZ had w_2 been the

case or had w_1 been the case. The matrix (partially) depicts the primary intension, secondary intension and two-dimensional intension of (7). The primary intension of (7) is a function that maps the epistemic possibilities s_i labeling the rows of the matrix to the truth-values in the cells $\langle s_i, w_i \rangle$; the secondary intension of (7) is a function that maps the 'uncentered' scenarios w_i labeling the columns of the matrix to the truth-values in the cells $\langle s_1, w_i \rangle$; and the two-dimensional intension of (7) maps the pairs $\langle s_i, w_j \rangle$ to the truth-values on cells $\langle s_i, w_j \rangle$ of the matrix.

Chalmers argues that both primary and secondary intensions explain different aspects of meaning (the same happening with two-dimensional intensions). The secondary dimension explains the connection between meaning and modality, while the epistemic dependence is intended to capture a dimension of meaning usually associated with Fregean senses. According to Frege, two token names 'A' and 'B' have the same sense if and only if the identity '$A = B$' is cognitively insignificant, and two token sentences 'p' and 'q' have the same sense if and only if the equivalence 'p if and only if q' is cognitively insignificant. A common understanding of cognitive significance is that sentences r and s differ in cognitive significance if: i) r and s differ in informativeness; or ii) one of the sentences is knowable *apriori* while the other is knowable only aposteriori; or iii) r and s differ in cognitive value (that is, if it is possible for an agent who understands both p and q to sincerely assent to one of them and sincerely dissent to the other. The primary intension of a sentence accounts for differences in apriori knowability, since, given the way primary intensions are defined, a sentence will be a priori if and only if it its primary intension maps all scenarios to the truth-value truth. Thus, primary intensions resemble Fregean senses. Nonetheless, there are cases with respect to which it is possible to see that the two yield different results. For instance, mathematical truths p and q will have both the same primary intension and the same two-dimensional intension, since they are both a priori knowable, while differing in cognitive significance, and thus in its Fregean sense.

The interpretation of two-dimensional semantics proposed by Chalmers is part of a broader project which consists in, as Chalmers puts it, restoring the golden triangle of constitutive relations between meaning, modality and reason. The connection between meaning and reason would be established by the fact that in most cases two expressions are equally cognitively significance if they are the apriori equivalent, which is captured by the fact that their primary dimension is the same (this restores the link between meaning and reason due to the fact that a common position with respect to sameness of meaning, originating in Frege, has it that two expressions differ in meaning if and only if they differ in cognitive significance). The link between reason and modality is restored by a claim endorsed by Chalmers according to which the space of epistemic possibilities is the same as the space of centered metaphysical possibilities. In such case, to each scenario corresponds a metaphysical possible world, the intuitive differences between the two realms being explained by the fact that sometimes one considers a scenario/metaphysically possible world w as actual (when dealing with claims related to apriority), and at other times one considers w as counterfactual (when dealing with claims related to metaphysical necessity). As to the link between meaning and modality, it is restored by the fact that the space of epistemically/metaphisically possible

worlds provides a way to capture the meaning of different expressions.

1.2 Logical consequence

One of the main problems in philosophy of logic has been that of providing a proper explanation of the nature of the relation of logical consequence. The history of the problem dates back to Aristotle, and among the philosophers who have addressed it are, besides Aristotle, Buridan, Bolzano, Frege, Russell, Tarski and Quine.

The following three arguments are all examples of *good* arguments, in the sense that their conclusions *logically follow* from their premises:

(8)   All men are animals; John is a man. Therefore, John is an animal.

(9)   John is a student. Therefore, John is a student or John is intelligent.

(10)   John is hungry or John is sad; John is not hungry. Therefore, John is sad.

However, the next three arguments are *bad* in the same sense that Palin's argument (1) was, since their conclusions do not logically follow from their premises:

(11)   All men are animals; John is an animal. Therefore, John is a man.

(12)   John is a student. Therefore, John is a student and John is intelligent.

(13)   John is hungry or John is sad; John is hungry. Therefore, John is not sad.

In what follows I will say of an argument that it is *logically valid* when its conclusion logically follows from its premises, and that it is *logically invalid* otherwise. Other logical properties are related to logical consequence. A set of sentences is *logically consistent* if and only if no contradiction is a logical consequence of that set. A sentence is *logically independent* of a set of sentences just in case the sentence is not a logical consequence of the set. And a sentence is a *logical truth* if and only if it is a logical consequence of any set of premises.

Even though, as noted, there is an imperfect grasp of the nature of logical consequence, there are some features that have been attributed to it. These features are possibly behind our judgments of logical validity/logical invalidity. Crucially, they constitute a theoretical start-point in the inquiry into the nature of the logical consequence relation.

At least five notions have been associated with logical consequence, those of *modality*, *analyticity*, *formality*, *rationality* and *normativity*. Accounts of logical consequence based on these notions are distinguished by Stewart Shapiro in [1998] and [2005].

Modality

It has been proposed in the literature (e.g., [Etchemendy, 2008] and [Rumfitt, 2010]) that there is a notion of *logical necessity*, of which the following biconditional is true: it is logically necessary that φ if and only if it is logically contradictory that not φ. Ian Rumfitt [2010], one of the proponents of this notion, provides a rough characterization of logical contradictoriness, according to which ψ is logically contradictory just in case some overt contradiction logically follows from the supposition that ψ (where overt contradictions include not only formal contradictions such as $\ulcorner \chi$ and not $\chi \urcorner$, but also sentences such as 'This is both green and yellow all over'). The notion of logical necessity has lead to the formulation of the *logical necessity thesis*, endorsed by Etchemendy and Rumfitt:

Logical Necessity Thesis The conclusion of an argument follows logically from its premises if and only if it is logically impossible that the premises are true and the conclusion is false.

Modality has been associated with logical consequence ever since Aristotle. In the following passage, one way to understand Aristotle is as proposing something akin to the logical necessity thesis:

> A syllogism is a discourse in which, certain things having been supposed, something different from the things supposed results of necessity because these things are so. By "because these things are so," I mean "resulting through them" and by "resulting through them," I mean "needing no further term from the outside in order for the necessity to come about." (Prior Analytics, book I, ch. 2).

In the present thesis I will assume that there is indeed a notion of logical necessity, and that the logical necessity thesis holds. Assuming this notion the question arises of what is the nature of logical necessity, and in particular whether logical necessity is nothing but some other kind of necessity. As has been extensively noted throughout the literature (e.g., [Burgess, 2009]), there are (arguably) different notions of necessity and possibility. The following notions are distinguishable: *physical necessity*, where it is physically necessary that φ just in case φ could not have been otherwise, so long as the laws of nature remained the same; *epistemic necessity*, where it is epistemically necessary that φ just in case, for all one knows, it is not the case that φ could not have been the case; *deontic necessity*, where it is deontically necessary that φ if and only if it is not the case that φ could not have permissibly have been done; and *metaphysical necessity*, where φ is metaphysically necessary if and only if it is not the case that φ could not have been the case, no matter what.

Of the different notions of necessity just distinguished, logical necessity is usually equated with metaphysical necessity. For instance, Shapiro advances a way to understand Aristotle according to which 'necessity' stands for metaphysical necessity. If it accepted that logical necessity just is metaphysical necessity, then the following thesis holds:

Metaphysical Necessity Thesis The conclusion of an argument follows logically from its premises if and only if it is metaphysically impossible for the premises to be true and the conclusion to be false.

Even rejecting that logical necessity just is metaphysical necessity, one can be lead to equate it to some different notion of necessity. An interesting question concerning all notions of necessity is what is their comparative strength, and in particular whether logical necessity is at least as strong as any other notion, where a notion of necessity *necessity*$_1$ is at least as strong as a notion *necessity*$_2$ just in case, for all φ, *necessary*$_2$ φ is a logical consequence of *necessary*$_1$ φ. Arguments in defense of this position have been presented in the literature both by McFetridge [1990] and Rumfitt [2010].

In the present essay the logical necessity thesis will be assumed to hold. As will be seen later on, a related but stronger thesis – the *generalized Tarski's thesis* – will be assumed to hold as well.

Analyticity

Analyticity has also been regarded as an important feature of logical consequence (e.g., [Read, 1994, Shapiro, 2005]). Two families of conceptions of analyticity have been distinguished: metaphysical conceptions of analyticity and epistemological conceptions of analyticity [Boghossian, 1996, 1997, Williamson, 2007]. Metaphysical conceptions are, roughly, those that take a sentence to be analytically true just in case it is true in virtue of its meaning. Epistemological conceptions share the view that a truth is analytic just in case the true sentence or thought has a "privileged status in respect to knowledge or justification (...) in virtue of the conditions for understanding its constituent words or possessing its constituent concepts" [Williamson, 2007]. Common examples of analytic truths are:

(14)   Yossarian is a bombardier or Yossarian is not a bombardier

(15)   If Yossarian is a bombardier, then Yossarian is a bombardier

(16)   If Doc Daneeka is Yossarian's doctor, then Yossarian is Doc Daneeka's patient

(17)   Red is a color

while the following are examples of synthetic truths:

(18)   Yossarian is a bombardier

(19)   Doc Daneeka is Yossarian's doctor

(20)   The range of the wave length of red is roughly between 630 and 740 nm.

Metaphysical conceptions of analyticity

Sentences are usually said to be true because they mean what they do and because what they mean is the case. For instance, sentence (18) is true because it means that Yossarian is a bombardier and because Yossarian *is* a bombardier.

A distinguished metaphysical conception of analyticity takes it that analytic truths contrast from synthetic truths in that analytic truths are true just because of what they mean. For instance, on such

view, sentence (14) is true just because it means that Yossarian is a bombardier or Yossarian is not a bombardier.

It has been objected that this conception of analyticity is flawed, since no sentence is true just because of what it means, and thus the conception does not accommodate the fact that sentences (14) - (17) are analytic. The conception can be characterized as the view that analytic truths are those truths that have no truthmakers. Williamson [2007] has cogently argued against this conception. The argument is that, according to general truthmaker principles for disjunctive sentences, what makes a disjunction true is what makes one of its disjuncts true. Hence, whatever makes (18) true, also makes true both sentence (21),

(21)   Yossarian is a bombardier or Yossarian is a pilot

and sentence (14). But sentence (14) is a prime example of an analytic truth. Hence, analytic truths are not adequately conceived as those truths that have no truth-makers.

A different conception of analyticity, *Frege-analyticity*, takes it that a sentence is analytic just in case it is a logical truth or synonymous with a logical truth. Frege-analyticity also does not seem to constitute an adequate conception of analyticity. The problem is that sentences such as (16) and (17) are not synonymous with logical truths, despite the fact that they are both analytic. Furthermore, a different problem arises for Frege-analyticity on the present setting. The point of relating logical consequence with analyticity is to constrain our perspective on what counts as a logical consequence of what. But Frege-analyticity is itself characterized in terms of logical truth, which, as has been pointed out, can itself be characterized in terms of logical consequence (a sentence is a logical truth just in case it is a logical consequence of any premise(s) whatsoever). Hence, Frege-analyticity is unable to play the role that is presently required of analyticity – that of constraining our perspective on logical consequence – and thus a different conception is required.

A third conception of analyticity has it that a sentence φ is analytically true just in case its meaning is *sufficient* for its truth, which is further explained by the meaning of φ being such that φ is true *no matter what*. As presented in the last section, the meaning of a sentence can be understood (at least) as its character, or as its content. This third conception of analyticity, *modal-analyticity* [Williamson, 2007], will be understood as neutral with respect to the notion of meaning being assumed. That is, it can give rise to a conception of analyticity taking characters as the meaning of sentence, to a different conception of analyticity taking contents as the meaning of sentences, or even to other conceptions of analyticity taking other entities as being the meaning of sentences.

Epistemological conceptions of analyticity

A distinct perspective on analyticity has it that a sentence s is analytic just in case "necessarily, whoever understands s assents to s" [Williamson, 2007, p.74]. However, this also does not seem to constitute an appropriate characterization of analyticity. The problem is that clearly analytic sentences such as

(22)   Every bachelor is an unmarried man

fail to count as analytic on such conception. An argument is that a competent philosopher may not assent to s on the grounds that there are no bachelors. Such philosopher (call it 'McWatt') may take it that a necessary condition for the truth of (22) is that there are bachelors, and also endorse the view that, as a matter of fact, there are no bachelors. McWatt may be wrong in both respects (that is, in holding that a necessary condition for the truth of (22) is that there are bachelors, and in holding that, as matter of fact, there are no bachelors), but this would not count as failure to understand (22). One can assume without any implausibility that McWatt is as proficient in English as any native speaker, and that his views on what is required for the truth of (22) arise solely from the fact that he has an incorrect theory on the meaning of 'every' (as Williamson correctly notes, "Giving an incorrect theory of the meaning of a word is not the same as using the word with an idiosyncratic sense - linguists who work on the semantics of natural languages often do the former without doing the latter" [Williamson, 2007, p.89]). This means that McWatt understands (22) without assenting to it, and thus that the conception of analyticity in question does not count (22) as analytic. But (22) is a paradigm example of an analytic sentence. Hence, it is not the case that a sentence s is analytic if and only if necessarily, whoever understands s, assents to it".[5]

I will assume that the conception of analyticity which is of importance to the analyticity feature of logical consequence is modal-analyticity. Thus, the following thesis will be endorsed:

Analyticity thesis The conclusion of an argument follows logically from its premises if and only if the meanings of the premises and conclusion of the argument are such that no matter when the meaning of the premises are true, the meaning of the conclusion is true as well.[6]

The analyticity thesis yields the outcome that a sentence is logically true if and only if its meaning is true no matter what; i.e., if and only if it is an analytic truth.

I wish to point out two things with respect to the analyticity thesis. The first is that it is not the case that the analyticity thesis is true if and only if the metaphysical necessity thesis is true. A straightforward way to appreciate that the biconditional may fail is that when meanings are taken as characters, there might be metaphysically true sentences which are not analytic truths.

The other thing that I wish to point out is that I am aware that modal-analyticity is not the notion of analyticity philosophers are most used to. However, philosophers such as Timothy Williamson [Williamson, 2007] and Gillian Russell [Russell, 2010] do endorse this or related views. Hence, on this respect I am not completely at odds on what concerns other philosophers usage of the term and under-

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[5]For more on the present argument, and on other arguments against this conception of analyticity, see [2007, section 4].

[6]Given the commitment to the analyticity thesis as a non-negotiable component of the present essay it might have been more adequate to call it 'Analyticity *conception*', since this would signal the fact that this how the relation of logical consequence is being conceived.

standing of the concept. Furthermore, the point of the preceding considerations was to show that other conceptions of analyticity are not, arguably, coherent conceptions.[7]

Formality

The idea that logically valid arguments are those that instantiate logically valid argument-forms can be traced back to Bolzano [1837]. According to this view, arguments (8), (9) and (10) are logically valid in virtue of exhibiting, respectively, the argument-forms:

(23) All As are Bs; c is A. Therefore, c is B

(24) p. Therefore, p or q

(25) p or q; Not p. Therefore, q.

while arguments (11), (12) and (13) are invalid, for they exhibit, respectively, the argument-forms:

(26) All As are Bs; c is B. Therefore, c is A

(27) p. Therefore, p and q

(28) p or q; p. Therefore, q.

An argument's argument-form can be characterized in either syntactic or semantic terms. According to the syntactic characterization, an argument-form is obtained by substituting some of the expressions present in the sentences composing it for schematic expressions of the same type. As for the semantic characterization, the form of an argument is obtained by "unsaturating" at least some of the semantic values s that compose the semantic values S expressed by the premises and conclusion of the argument, the result being an argument-form composed of semantic value functions $F_S()$.

Consider, for instance, argument (8). (23) can be straightforwardly conceived as providing the syntactic argument-form of (8), A and B being schematic expressions for common nouns, and c being a schematic expression for a name.

Assuming that the semantic value of a sentence which is relevant for the relation of logical consequence is the proposition expressed by the sentence, and the view that propositions are *structured* (where a structured proposition is a structured entity, containing individuals, functions, properties, relations, etc. as constituents), the argument-form of (8) can be semantically characterized as follows:

(29) $\langle ALL \langle X, Y \rangle \rangle; \langle X \langle z \rangle \rangle$. Therefore, $\langle Y \langle z \rangle \rangle$.

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[7]In this respect, Gillian Russell [Russell, 2010] also presents some interesting considerations to the effect that the conception of analyticity to which we are most used is a consequence of our wrong (as she claims) folk-theory of meaning. Replacing that theory requires a different notion of analyticity, one in the lines of analyticity as meaning being *sufficient* for truth.

Characterizing argument-forms in syntactic (semantic) terms yields syntactic (semantic) accounts of the logical validity of argument-forms.

Definition (Logical validity of syntactic argument-forms). *A syntactic argument-form is logically valid just in case there is no argument that results from substituting the schematic letters for expressions of the appropriate type which is such that the premises of the argument are true while the argument's conclusion is false.*

For instance, argument-form (23) is logically valid just in case there are no *common nouns* C_1 and C_2, and no *proper name* n_1 such that the argument

(30)   All C_1s are C_2s; n_1 is C_1. Therefore, c is C_2

has true premises and false conclusion.

The logical validity of semantic argument-forms is defined as follows:

Definition (Logical validity of semantic argument-forms). *A semantic argument-form is logically valid just in case there are no semantic values s of the appropriate type such that the semantic values $F_{S_P}(s)$ resulting from saturating the semantic value functions $F_{S_P}()$ are all true (where, for each premise P, $F_{S_P}()$ is the semantic value function resulting from unsaturating the semantic value S_P expressed by P), while the the semantic value $F_{S_C}(s)$ which results from saturating the semantic value function $F_{S_C}()$ is false (where $F_{S_C}()$ is the semantic value function that results from unsaturating the semantic value S_C expressed by C, the argument's conclusion).*

Thus, the argument-form (29) is logically valid just in case there are no (first-order) *properties* P_1 and P_2, and no *object* o_1 such that $\langle ALL\langle P_1, P_2\rangle\rangle$ and $\langle P_1\langle o_1\rangle\rangle$ – the propositions expressed by the premises – are both true, while $\langle P_2\langle o_1\rangle\rangle$ – the proposition expressed by the conclusion – is false.

The semantic characterization has an obvious advantage over the syntactic characterization. Whereas what counts as a logically valid argument according to the syntactic characterization depends on the expressive power of the language, what counts as as logically valid according to the semantic characterization does not. For instance, if the language has only one common noun and at least a proper name, the syntactic argument-form (24) will not have as instances arguments with true premises and a false conclusion, but it will have as instances arguments with true premises and a false conclusion if the language has, at least, the common nouns 'French' and 'Men', as well as the proper name 'Stalnaker'. The following is an instance with true premises and false conclusion:

(31)   All French are men; Stalnaker is a men. Hence, Stalnaker is French.

However, the semantic argument-form

(32) $\langle ALL\langle X, Y\rangle\rangle;\langle Y\langle z\rangle\rangle$. Therefore, $\langle X\langle z\rangle\rangle$

will not be logically valid, since the propositions $\langle ALL\langle French, Men\rangle\rangle$[8] and $\langle Men\langle stalnaker\rangle\rangle$ are both true, while the proposition $\langle French\langle stalnaker\rangle\rangle$ is false. This will be so regardless of the language's expressive power.

In providing the syntactic argument-form of (8) not all expressions in (8) were substituted by schematic letters. The expression 'all' remained unsubstituted. Similarly, in providing the semantic argument-form of (8) the semantic value of 'all' was not unsaturated from the proposition expressed by the first premise. It is easy to see that, if all expressions in (8) were substituted by schematic letters, then (8)'s argument-form would be logically invalid, provided that the language had sufficient expressive power. Similarly, abstracting all component semantic values from the semantic values expressed by the premises and conclusion would have as result that the semantic argument-form of of (8) would be logically invalid.

This raises the question of which expressions/semantic values should remain unsubstituted in an argument's argument-form. This is nothing but the problem in philosophy of logic of demarcating the logical expressions/logical notions, the expressions/semantic values which are present not only in an argument but also in the argument-form of the argument. Arguments have been presented in defense of different classes as constituting the class of logical expressions – also called 'logical constants' – and of different classes constituting the class of logical notions. Philosophers such as Sher [2008] have argued that among the logical constants are the expressions 'and', 'or', 'not', 'if... then...', 'all', 'some' and '... is the same as...' (while among the logical notions are the semantic values of these expressions, at least according to some understanding of them). Still, a more liberal view [Tarski, 2002] has also been proposed, the claim being that the argument-form of an argument is determined relative to a choice of logical constants/logical notions. If this latter position is correct, then the logical validity of an argument turns out to also be relative to a choice of logical expressions/logical notions.

Given the above considerations, the view that logical consequence exhibits the formality feature can thus be put under the following thesis:

Formality thesis The conclusion of an argument follows logically from its premises if and only if the argument exhibits a semantic argument-form which is logically valid.

The formality thesis will not be assumed to be the case in the present essay. As a matter of fact, it will be assumed not to hold. An important reason for this assumption is that, since I adhere to the analyticity thesis, I am convinced by Read's argument [1994] to the effect that either there are logically valid arguments that do not exhibit a logically valid semantic argument-form, or there are logically invalid arguments that do exhibit logically valid semantic argument-forms. Read asks us to consider the following argument:

(33)   Iain is taller than Bill; Bill is taller than Mary. Therefore, Iain is taller than Mary.

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[8]This is an extremely rough (and incorrect) characterization of the structured proposition expressed by 'All French are men'. For more on the issue, see, for instance, [Soames, 2010].

Assuming the analyticity thesis, argument (33) is logically valid. However, under the (absurd) assumption that the formality thesis holds, abstracting the semantic value of 'is taller than' has the effect that (33)'s semantic argument-form is logically invalid, and thus the argument itself is logically invalid. On the other hand, if the semantic value of 'is taller than' is assumed to be a logical notion then the following argument turns out to be logically valid – on the assumption that the semantic values of 'no one', 'everyone', 'someone' and 'someone else' are all logical notions (something which agrees with the orthodoxy concerning the division between the notions which are logical and those which are not) –, contra its obvious logical invalidity:

(34)   No one is taller than everyone. Therefore, someone is taller than someone else.

No matter whether there are logically valid arguments that do not exhibit a logically valid semantic argument-form, or there are logically invalid arguments that do exhibit logically valid semantic argument-forms, the class of logically valid arguments will be different of the class of arguments which exhibit logically valid semantic argument-forms. Since either there are logically valid arguments that do not exhibit a logically valid semantic argument-form, or there are logically invalid arguments which exhibit a logically valid semantic-argument-form, it follows that the class of logically valid arguments will be different of the class of arguments which exhibit logically valid semantic-argument forms. But this means that the formality thesis does not hold.[9][10]

Rationality and normativity

A different account of logical consequence is based on the rationality feature. Shapiro [2005] formulates the relation between rationality and logical consequence through the *rationality thesis* (where Γ stands for

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[9]For more on this argument see [Read, 1994].

[10]The argument is not "bullet-proof". The second horn of the dilemma – that there are logically invalid arguments that exhibit logically valid argument forms – can be objected to with some plausibility. Existential and universal quantifiers are known to take their domain of quantification from context. For this reason, the proposition expressed by 'someone is taller than someone else' will be different depending on the context where the sentence is used (assuming that the context-sensitivity of quantifiers is a phenomenon present at the level of the proposition expressed, not one concerning the circumstance of evaluation with respect to which truth is evaluated). Things being so, it is natural to suppose that there is some element in the proposition expressed corresponding to the domain of quantification. The effect of such supposition is that even though the semantic value of 'someone' is a logical notion, the domain of quantification need not be. Thus, there will be domains of quantification D with respect to which $F_{S_C}(D)$ is false while $F_{S_P}(D)$ is true (where P stands for the premise of (34) and C for (34)'s conclusion), an example being when D is an empty domain.

This objection brings with it important questions in the philosophy of language, such as whether the domain of quantification should somehow be a component of the proposition expressed (and how to conceive of structured propositions with such component) or if it should be a component of circumstances of evaluation instead.

It seems to me that the argument can be objected to by taking the semantic values of 'someone' and 'everyone' to be unrestricted quantifiers (where 'quantifier' is applying now not to the linguistic item but to its semantic value), assuming that there are in fact such quantifiers (and I am aware that the plausibility of unrestricted quantification is a "big" assumption, a position that has been subject to much scrutiny in the last years).

A reply to my objection could be that these unrestricted quantifiers are not logical notions. However, I fail to see why they should not be considered to be logical. This points to another reason why I am uncomfortable with the formality thesis: I find the distinction between the logical and non-logical notions to be ad hoc, my preconception being that it is not grounded in everything valuable to logic. This is not, however, the place to (further) address the tenability of the formality thesis.

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the set of premises of an argument Γ; Φ, while Φ stands for its conclusion):

Rationality thesis "Φ is a logical consequence of Γ if it is irrational to maintain that every member of Γ is true and that Φ is false. The premises Γ alone *justify* the conclusion Φ" [Shapiro, 2005, p. 659].

The rationality feature seems to be linked to the thesis that logical consequence is *normative*. The normativity thesis can be (roughly) put as follows:

Normativity thesis If the conclusion of an argument logically follows from its premises, then one ought to accept the conclusion of the argument if the premises of the argument are accepted.

As Beall and Restall put it, "In an important sense, if an argument is valid, then you somehow go *wrong* if you accept the premises but reject the conclusion" [Beall and Restall, 2006]. If you accept the premises, then you *ought* to accept the conclusion, and by not accepting them you go wrong by being, in some sense, *irrational*. Harman [1986] has raised several difficulties to the idea that logic has to do with correct reasoning, a criticism that has inspired both MacFarlane [2004] and Field [2009] to develop work on the direction of appropriately characterizing the relationship between logical consequence and correct reasoning (remarkably, Field's work on the subject has lead him not only to endorse the view that logic must somehow be connected to the laws of rational thought, but also to reject the thesis that logic is the science of what forms of inference necessarily preserve truth, even when the necessity is restricted to logical necessity – and thus, to reject the logical necessity thesis).

In what follows no stance will be taken with respect to the rationality and normativity theses. All other things being equal, if an account A of the nature of logical accommodates something like the rationality and normativity theses, while an account B does not accommodate at least one of the accounts, account A is to be preferred.

Apriority, and generality are three other features attributed to logical consequence. Whether the relation holds is something taken to be knowable apriori, at least to the extent that it is knowable at all that an argument is valid [Hanson, 1997]. As for logical consequence's maximal generality, the rationale is that the relation is not applicable to one or another field of inquiry, but is taken as holding (or not) of the premises and conclusion of any argument whatsoever, no matter whether the argument is one in mathematics, physics, biology, sociology, politics, etc.

1.3   The problems

Logically possible cases and the contexts as cases thesis

Beall and Restall [2000, 2006] propose that the notion of *case* decisively constrains the concept of logical consequence. They endorse the position according to which φ is a logical truth if and only if there are no counterexamples to it - in the sense that there are no *cases* in which φ is false -, and also the *generalized Tarski's thesis*:

Generalized Tarski's thesis An argument is valid if and only if, in every case in which the premises are true, so is the conclusion.

Beall and Restall furthermore propose that the generalized Tarski's thesis provides the sense in which logical truths are logically necessary and the logical necessity thesis holds: a logical truth is logically necessary since it is true at *every* case, and the logical necessity thesis holds in virtue of *there being no* case at which the premises of a logically valid argument are true while the conclusion is false.

The parallelism is with the notion of metaphysical necessity and talk of metaphysically possible worlds. Just like the metaphysical possibility of φ is cashed out in terms of the truth of φ at some metaphysically possible world, the logical possibility of φ is cashed out in terms of the truth of φ at some case (or, as I will also say, at some *logically possible case*). This does not necessarily imply that the generalized Tarski's thesis provides an analysis of logical necessity in a non-modal idiom, just like accepting the truth of the equivalence φ is metaphysically possible if and only if there is a metaphysical possible world at which φ is true does not necessarily imply that one endorses the view according to which talk of metaphysically possible worlds provides an analysis of metaphysical necessity in a non-modal idiom. Such talk about logically possible cases may constitute nothing but an auxiliary device for our thought about logical necessity and logical consequence, just like some philosophers (e.g., Kripke [1980]) endorse the position that talk about metaphysically possible worlds constitutes nothing but an auxiliary device for our thought about metaphysical necessity.

Besides the logical necessity thesis, it will also be assumed that the generalized Tarski's thesis holds. Furthermore, the possibility of equating logically possible cases with entities whose nature need not be described in logical terms will be investigated. That is, in the present essay one of the problems that will be addressed is the following:

Logically possible cases problem What is the nature of logically possible cases?

As previously mentioned, the interest of the essay is on whether and how considerations stemming from the role of context in the determination of truth are relevant for accounting for the nature of logical consequence. This interest will bring the focus of the essay into investigating whether the following thesis holds:

Contexts as cases thesis Logically possible cases are just contexts / context-related entities, or are determined by reference to contexts.

The relata of logical consequence and the context-sensitive relata thesis

A problem which goes hand in hand with the logically possible cases problem is the *relata problem*:

The relata problem What are the relata of logical consequence?

Given the assumption that the generalized Tarski's thesis holds, the premises and conclusion of an argument are taken to be truth-bearers, entities which are true / false. However, depending on what are the truth-bearers that are related by logical consequence, different answers to the logically possible cases problem may be correct, for the bearers of truth may be such that their truth is relative to different entities (cases).

Usual candidates for being truth-bearers are, besides sentences, propositions, characters, assertions, utterances, occurrences of sentences, beliefs and judgments [Russell, 2008][11]. The expressions 'assertion', 'utterance', 'belief' and 'judgment' are ambiguous between, respectively, the acts of asserting, uttering, believing and judging, and those things asserted, uttered, believed and judged. The expression 'proposition' has also been understood in different ways. In this essay 'proposition' will be taken to stand for the objects of the propositional attitudes – that is, for those things that are believed, doubted, imagined, etc. Characters provide (as already mentioned) one kind of linguistic meaning, captured as functions from contexts of use to propositions. 'Sentence' can also be understood in at least two ways: as the marks in a paper or sounds that occur when, for instance, something is stated, or alternatively, as types of these.

Propositions are also held by several authors (e.g., [Soames, 1999], [McGrath, Fall 2008 Edition]) to be the *primary* truth-bearers, where a truth-bearer X is primary just in case the fact that other entities are truth-bearers is explained in terms of X being a bearer of truth. This can be put by saying that a truth-bearer Y inherits its truth from the truth of the primary truth-bearer X that Y, in some sense, stands for. I will assume this position, since it is assumed in both Kaplan's and Stalnaker's theories (for Kaplan a sentence-type is true at a context c just in case the character associated with that sentence-type is such that, given context c, the proposition that is its value is true with respect to c's circumstances of evaluation; and Stalnaker identifies propositions with what is said by an assertion and evaluable for truth).

Given the assumption that propositions are the primary truth-bearers, statements, utterances, beliefs and judgements are said to be true in virtue of the truth of the proposition being stated, uttered, believed in, and judged to hold, and characters are said to be true at a context c in virtue of the truth of the proposition that is the value of the character, given context c. Sentences, understood either as marks in a paper, sounds, or types of these, are not truth-bearers at all, since they lack an interpretation [Blanchette, 2001, Russell, 2008, Corcoran, 2009]. However, Russell [2008] and Corcoran [2009] point out that 'sentence' can be understood as standing for composite entities $\langle S, M \rangle$ of marks in a paper, sounds, or types of these S, and a meaning/interpretation M (M is to stand for a truth-bearer, and propositions are an obvious choice for M; despite the fact that Kaplan's framework also legitimizes the view that M stands for a character). On this understanding of the expression, sentences can be said to be truth-bearers, owing this property to the truth-bearer M of which they are composed.

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[11]In fact, [Russell, 2008] talks about statements instead of assertions. Following Corcoran [2009] I will take 'statement' and 'assertion' as standing for the same thing.

Two conceptions of propositions

However, Kaplan and Stalnaker have different conceptions of what propositions are, or how best to model them. Stalnaker adopts an analysis of propositions as sets of metaphysically possible worlds (or, alternatively, as functions from metaphysically possible worlds to truth-values), his rationale being that the essential function of a proposition, as that which is believed, doubted, entertained, etc., is to distinguish between different possible ways the world might be, and that this can be captured by the set of possible worlds that *are* the way that it is believed, doubted, entertained, etc., that the (actual) world is. As for Kaplan, he adopts the position according to which propositions are structured entities, with individuals, functions, properties and relations as constituents (for instance, the sentence 'John sleeps' would express the proposition $\langle Sleeps\langle john\rangle\rangle$, where $john$ is John and $Sleeps$ is the property of sleeping).

Kaplan's conception of propositions is more fine-grained than Stalnaker's, in the sense that a structured proposition determines a unique proposition qua set of possible worlds, but a proposition qua set of possible worlds determines several structured propositions. For instance, the proposition $\langle Sleeps\langle john\rangle\rangle$ determines a unique set of possible worlds, those where John has the property of being sleeping. However, the set of all possible worlds fails in determining a unique structured proposition. The structured propositions expressed by '$2+2=4$' and '$503+3=506$' are different, even though both of them are true in all possible worlds.

I will remain neutral on whether propositions are best conceived as sets of possible worlds or as structured entities. However, I will assume that propositions are not true relative to contexts, and also that they are not true *simpliciter*, but only relative to circumstances of evaluation, since Kaplan's and Stalnaker's theories share this assumption (with Stalnaker also assuming that circumstances of evaluation are just possible worlds).

Answers to the logically possible cases problem are not independent of the answers to the relata problem. In particular, it seems that if contexts are logical possibilities, then the relata of logical consequence are such that their truth is determined relative to contexts. Due to the interest on the role of context in matters having to do with the nature of logical consequence, another major topic of inquiry in this essay will be on whether the *context-sensitive relata thesis* holds:

Context-sensitive relata thesis (Some of) the relata of logical consequence are context-sensitive, in the sense that their truth is determined relative to contexts / context-related entities.

The truth-bearers which are relevant for the semantic interpretation of two-dimensional semantics, and which may constitute plausible candidates for being the relata of logical consequence are, besides propositions, either pairs ⟨sentence-type, character⟩ or just characters themselves, highlighting how the truth of the pairs (characters) depend on whether the proposition determined by the character at a given context is true. If the proposition is true, then the pair (character) is true at that context, and if it is not true, then the pair (character) is not true at that context.

The meta-semantic interpretation of the two-dimensional framework focuses, besides propositions, on sentence-tokens, those used in acts of assertion. The sentence-token itself is not a truth-bearer, but instead the pair ⟨sentence-token, proposition⟩. Strictly speaking, the truth of these pairs is not context-sensitive. What is context-sensitive is the proposition with which a particular sentence-token is paired. This highlights the meta-semantic nature of the interpretation of the two-dimensional framework. However, truth with respect to a sentence-token can be defined in a way exhibiting a kind of context-sensitivity similar to the one distinguished with respect to the semantic interpretation: a sentence-token is true at a context just in case the proposition the token ends up expressing at that context is true at the metaphysical possibility providing the (metaphysical) location of the context.

1.4   The positions

The most distinguished contender of the view that logically possible cases are just contexts is David Kaplan. In fact, in [Kaplan, 1989a,b], he advocates the following thesis:

Kaplan's thesis   An argument is logically valid if and only if there is no context c at which the characters of the premises are all true, while the character of the conclusion is false.

Kaplan's insight in advancing Kaplan's thesis can be appreciated by considering the case of logical truths. These will be constituted by those pairs of a sentence-type and a character that are such that they cannot be used to express some falsehood. Similarly, the insight behind Kaplan's thesis in what concerns logical consequence is that whenever the premises are used to state something true, the conclusion cannot be used to state something false.

On the other side of the spectrum seems to be Stalnaker himself. In 'Indicative Conditionals' [1975], Stalnaker distinguishes the notion of *reasonable inference* from that of *entailment*. Stalnaker says that an "inference from a sequence of assertions or suppositions (the premises) to an assertion or hypothetical assertion (the conclusion) is *reasonable* just in case, in every context in which the premises could appropriately be asserted or supposed, it is impossible for anyone to accept the premises without committing itself to the conclusion" [Stalnaker, 1975]. Entailment is defined as follows: "a set of propositions (the premises) *entails* a proposition (the conclusion) just in case it is impossible for the premises to be true without the conclusion being true as well" [Stalnaker, 1975]. Stalnaker sees entailment as a purely semantic relation, while reasonable inference is of a pragmatic nature. Prima facie, Stalnaker endorses the view that the relation of logical consequence is that of entailment, with the outcome that logically possible cases are metaphysical possibilities, not contexts or context-related entities.

In 'One True Logic?' [2008] Gillian Russell addresses the question of why logicians seem not to be interested in the relata problem, and hypothesizes that this is so due to the fact that, just like the truth of a truth-bearer is taken as being inherited from the truth of the proposition it expresses, the relation of

logical consequence between other truth-bearers is inherited from the relation of logical consequence that obtains between the propositions the truth-bearers express. For instance, if truth-bearers are judgments, the relation of logical consequence holds between them in virtue of holding between the propositions that are judged to be the case; and, in the case of sentence-tokens, we have seen that what is a truth-bearer is the pair ⟨sentence-token, proposition⟩, in which case the relation holds in virtue of the propositions with which the tokens are paired.

This seems to lead to the conclusion that, by endorsing the *primary relata thesis*,

Primary relata thesis The conclusion of an argument logically follows from its premises if and only if the proposition expressed by the conclusion logically follows from the propositions expressed by the premises

logicians should reject the contexts as cases thesis. Since the truth of propositions is not relative to contexts nor context-related entities, the class of logically possible cases is not constituted by such entities, at least when the relation relates propositions. And since logical consequence holds between other relata in virtue of the relation holding between propositions, the conclusion would follow that, in general, the contexts as cases thesis does not hold. Russell rejects the primary relata thesis. If she is right, then the question of whether the contexts as cases thesis holds is in fact an open one.

Concerning Kaplan's and Stalnaker's positions on the nature of the relata of logical consequence, Kaplan adheres to the context-sensitive relata thesis, since he takes the relata of logical consequence to be pairs of sentence-types and characters, while Stalnaker does not adhere to the context-sensitive relata thesis, in virtue of taking the relata of logical consequence to be propositions. It might seem that the context-sensitive relata thesis holds if and only if the contexts as cases thesis holds. In particular, it is prima facie reasonable to assume that the context-sensitive relata thesis holds only if the contexts as cases thesis holds: if the relata of logical consequence is context-sensitive, then its truth is determined relative to contexts / context-related entities, and thus the contexts as cases thesis holds.

However, if the primary relata thesis *is* the case, then the option of both the context-sensitive relata thesis being the case and the contexts as cases thesis not being the case gains some plausibility. For instance, if the *primary* relata of logical consequence are propositions, cases can be taken to be just metaphysically possible worlds. But since logical consequence may also relate relata different than propositions, these may be context-sensitive. Possible worlds may still do all the work as logically possible cases, since in order to determine whether the conclusion of an argument follows from its premises, what is required is that every case in which the proposition expressed by the premises is true be one where the conclusion expressed by the premises is true.

The other side of the equivalence may also plausibly be rejected. One can endorse the contexts as cases thesis not because cases are contexts / context-related entities, but because the set of all relevant logically possible cases is, for instance, determined with respect to one or another context, in which case one need not subscribe the context-sensitive relata thesis.

Chapter 2

Logically possible cases and 2D semantics

The aim of the present chapter is to motivate the logically possible cases problem within a two-dimensional framework, and to investigate the tenability of different options as being *the* class of logically possible cases that result from adopting one or the other of the contextual interpretations of two-dimensional semantics.

I will begin by introducing the Zalta-Nelson vs. Hanson debate on the existence of contingent logical truths, with the purpose of showing how that debate can be recast as a debate concerning the logically possible cases problem.

In section 3., 'Logically possible cases and the semantic interpretation of $2D$ semantics' plausible candidates for being the class of logically possible cases will be distinguished under the adoption of a semantic interpretation of two-dimensional semantics. Issues concerning logical pluralism will also be approached, since a possible answer to the logically possible cases problem is that different classes may all be classes of logically possible cases. In the remaining of the section some arguments will be provided against the reasonableness of having some of the distinguished classes be the class of logical possibilities.

The purpose of section 4., 'Logically possible cases and the meta-semantic interpretation' will be to argue that classes straightforwardly definable given Stalnaker's interpretation of two-dimensional semantics are not plausible candidates for being the class of logically possible cases, and that a natural strategy to adopt in Stalnaker's framework leading to different classes as plausible candidates fares no better.

The upshot of the chapter is to show the need for further investigation on the tenability of particular classes as the class of logicaly possible cases, thus setting the stage for chapter 3., where the tenability of particular classes will be addressed.

2.1 The Zalta-Nelson vs. Hanson debate on the existence of contingent logical truths

Zalta's paper 'Logical and Analytic Truths That Are Not Necessary' [1988] has been the source of a recent debate on what should be the formal notion of logical consequence for the language $@MPL$ -

consisting on propositional modal logic augmented with a propositional operator @ -, where $\Box$ is to be understood as standing for metaphysical necessity and @ is an actuality operator. On the one side of the debate, Michael Nelson and Ed Zalta [Zalta, 1988], [Nelson and Zalta, 2010] argue that, given that the two operators are interpreted in the manner just described, the appropriate formal notion of logical consequence for $@MPL$ is *real-world consequence*, while William Hanson argues that the appropriate formal notion of logical consequence is *general consequence*.

Let a NZ-model for $@MPL$ be a structure $M = \langle W_M, w_M, I_M \rangle$, where W_M is a non-empty set of possible worlds, w_M is a member of W_M and I_M is a function from the propositional letters to a subset of W_M, and let truth in a NZ-model be defined as follows:

Definition. Truth in a NZ-model. A formula φ is true at a NZ-model M, $M \models_{NZ} \varphi$, iff $M, w_M \models_{NZ} \varphi$[1].

Real-world consequence is defined in the following way:

Definition. Real-world consequence A well-formed formula φ is a real-world consequence of a set of well-formed formulas Γ, $\Gamma \models_{RWC} \varphi$, if and only if there is no NZ-model M such that $M \models_{NZ} \psi$ for all ψ in Γ and $M \not\models_{NZ} \varphi$.

As for general consequence, the notion is defined as follows:

Definition. General consequence A well-formed formula φ is a general consequence of a set of well-formed formulas Γ, $\Gamma \models_{GC} \varphi$, if and only if there is no NZ-model M and world $w \in W_M$ such that $M, w \models \psi$ for all ψ in Γ and $M, w \not\models \varphi$.

Even though real-world consequence and general consequence are extensionally equivalent when the language in question is modal propositional logic (MPL), this is not so with respect to $@MPL$. Well known examples involve formulas such as $@p \rightarrow p$, a formula which is not a general validity, and yet is a real-world validity. In general, general consequence implies real-world consequence, the opposite not being the case. Formulas such as $@p \rightarrow p$ also constitute examples of real-world validities which are not necessary, while all general validities are true in every possible world of every model. The fact that Nelson and Zalta endorse the thesis that real-world validity is the appropriate formal notion of logical consequence for $@MPL$ has lead them to defend the position that there are are contingent logical truths.

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[1]The truth of a formula φ at a world $w \in W_M$ and NZ-model M, $M, w \models_{NZ} \varphi$ is recursively defined as follows:

1. If φ is an atomic propositional letter, then $M, w \models_{NZ} \varphi$ iff $w \in I_M(\varphi)$;
2. If $\varphi = \neg\psi$, then $M, w \models_{NZ} \varphi$ iff $M, w \not\models_{NZ} \psi$;
3. If $\varphi = \psi \wedge \chi$, then $M, w \models_{NZ} \varphi$ iff $M, w \models_{NZ} \psi$ and $M, w \models_{NZ} \chi$;
4. If $\varphi = \Box\psi$, then $M, w \models_{NZ} \varphi$ iff for all $w' \in W_M$: $M, w' \models_{NZ} \psi$;
5. If $\varphi = @\psi$, then $M, w \models_{NZ} \varphi$ iff $M, w_M \models_{NZ} \psi$.

The present interest in the real-world consequence vs. general consequence debate lies in Hanson's reply to Zalta's [1988] argument according to which general consequence is not the appropriate formal notion of logical consequence for the language $@MPL$, due to the fact that general consequence does not consist in preservation of truth in every model. I suggest that what motivates Zalta's objection is the idea that models are the *logical possibilities*, which makes natural the rejection of general consequence: since a sentence is required to be true not only relative to logical possibilities, but also relative to other entities, general consequence is more restrictive than required, and thus ought to be rejected.

Hanson replies by noting that NZ-models are not the only option available as models for the language $@MPL$. He proposes that models for $@MPL$ be H-models, where an H-model is a structure $M = \langle W_M, w_M, v_M, I_M \rangle$ such that W_M and w_M and I_M are as before, and $v_M \in W_M$. Truth in a H-model is defined in the following way:

Definition. Truth in a H-model A formula φ is true at a H-model M, $M \models_H \varphi$, iff $M, v_M \models_H \varphi$[2]

Equipped with such notion of a model and of truth in a model, Hanson can define a notion of consequence which is extensionally equivalent to general consequence:

Definition. General* consequence A well-formed formula φ is a general* consequence of a set of well-formed formulas Γ, $\Gamma \models_{G^*C} \varphi$, if and only if there is no H-model M such that $M \models_H \psi$ for all ψ in Γ and $M \not\models_H \varphi$.

Hanson succeeds in showing that, at the very least, H-models for $@MPL$ are not arbitrary. The possible world w_M of a NZ-model M plays two different roles: it is required in the recursive clause for the truth of formulas of the form $@\varphi$ at possible worlds, and it is that world with respect to which truth in model M is determined. But these roles can be distinguished, and by doing so, one obtains H-models. Furthermore, preservation of truth in every H-model consists in general-consequence, not real-world consequence. This raises the question of whether H-models or NZ-models are the logical possibilities, and shows that Zalta's [1988] argument in favor of real-world consequence, as initially presented, is insufficient to establish the claim that the appropriate formal notion of logical consequence for $@MPL$ is real-world consequence, since general consequence also preserves truth in every model (i.e., in every H-model).

Hanson's move also allows for the definition of a consequence relation coextensive with real-world consequence:

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[2] The recursive definition of truth of a formula φ at a world w in W_M and H-model M, $M, w \models_H \varphi$, is as follows:

1. If φ is an atomic propositional letter, then $M, w \models_H \varphi$ iff $w \in I_M(\varphi)$;
2. If $\varphi = \neg\psi$, then $M, w \models_H \varphi$ iff $M, w \not\models_H \psi$;
3. If $\varphi = \psi \wedge \chi$, then $M, w \models_H \varphi$ iff $M, w \models_H \psi$ and $M, w \models_{NZ} \chi$;
4. If $\varphi = \Box\psi$, then $M, w \models_H \varphi$ iff for all $w' \in W_M$: $M, w' \models_H \psi$;
5. If $\varphi = @\psi$, then $M, w \models_H \varphi$ iff $M, w_M \models_H \psi$.

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Definition. Real-world* consequence A well-formed formula φ is a real-world* consequence of a set of well-formed formulas Γ, $\Gamma \models_{RW^*C} \varphi$, if and only if there is no H-model M such that $w_M = v_M$, and $M \models_H \psi$ for all ψ in Γ and $M \not\models_H \varphi$.

The role of a H-model M in determining truth in a model at a possible world w is that of providing an interpretation function I_M, a set of possible worlds W_M, and possible world w_M, allowing for the determination of the non-constant expressions of $@MPL$. For this reason, if a fully interpreted language is considered (let $I@MPL$ be one such language), the role of M in the determination of truth in M at w is fully exhausted by the indication of possible world w_M (this is so due to the fact that all H-models are assumed to have the same set of possible worlds W_M - given the fact that $\Box$ stands for metaphysical necessity, and thus W_M stands for the set of all metaphysically possible worlds -, and in such case, for any interpretation functions I_M, I'_M and formulas φ, the H-models $M = \langle W_M, w_M, v_M, I_M \rangle$ and $N = \langle W_M, w_M, v_M, I'_M \rangle$ are such that $M, w \models_H \varphi$ iff $N, w \models_H \varphi$). Furthermore, the role of a H-model M in the posterior stage of determining truth in M is that of providing the possible world v_M, truth in v_M being truth in M. For this reason, models for $I@MPL$ can be seen as just pairs of possible worlds $M = \langle w_M, v_M \rangle$.

This provides a different way to understand the debate between Nelson-Zalta and Hanson, the question being what are the logically possible cases. Nelson and Zalta argue that these are the elements of the class of all pairs $\langle w, w \rangle$, for any metaphysically possible world w, while Hanson takes them to be the elements of the class of all pairs $\langle w, v \rangle$, for any metaphysically possible worlds w and v. Hanson's semantics is two-dimensional in nature, since determination of truth in a model requires elements from two dimensions (or elements playing two distinct roles): a possible world w_M required for the truth-conditions of formulas of the form $@\varphi$, and a possible world v_M, truth in which constitutes truth in the model.

2.2 Logically possible cases and the semantic interpretation of 2D semantics

The question of which are the logically possible cases - if any pairs $\langle w, v \rangle$, where $w, v \in W_M$, or just pairs $\langle w, w \rangle$, where $w \in W_M$ - requires the semantic apparatus to be interpreted. The basic elements of such interpretation have already been provided: the set W_M is to be conceived as the set of all possible worlds, $\Box$ as a necessity operator, and $@$ as an actuality operator. The need for a philosophical interpretation of the two-dimensional apparatus becomes particularly salient once an interpretation of the possible worlds w_M and v_M is required, as well as an interpretation of the interpretation function I_M. A semantic interpretation for Hanson's semantics for $I@MPL$ is straightforward. The world w_M of each H-model M consists on the possible world of the context with respect to which the proposition expressed by the formula is determined. As for v_M, it corresponds to the possible world of the circumstance of evaluation. The idea is thus that each H-model contains a specification of an element of a context and of an element of the circumstance of evaluation, those elements (possible worlds) required by the context and circumstance

sensitive expressions of the language (@ and □, respectively). The interpretation function I_M depicts the *modal profile* of a formula φ (or of the sentence the formula can be seen as being a *model* of), given that the context of use of the sentence is w_M. That is, it consists of the set of all possible worlds where the proposition expressed by φ at w_M is true.

For the purpose of a semantics for $I@MPL$, w_M and v_M can thus be seen as representations of, respectively, a context c_M and a circumstance of evaluation e_M. By augmenting the language with other context-sensitive propositional operators such as N – standing for 'now' –, and context-*in*sensitive operators such as A – a propositional operator standing for 'always' –, the notion of a context (or its representation) needs to be extended, the same occurring with respect to the representation of circumstances of evaluation. Concerning the language $AN@MPL$ resulting from the addition to $@MPL$ of the operators A and N, a better representation of contexts and circumstances of evaluation is obtained by taking these to be pairs $\langle w, t \rangle$ of a metaphysically possible world w and a time t. Instead of H models, the language requires generalized H-models for its semantics, where a GH-model M is such that $M = \langle W_M, T_M, E_M, c_M, e_M, I_M \rangle$, where W_M stands for a set of metaphysically possible worlds, T_M for a set of times, $c_M = \langle w_{c_M}, t_{c_M} \rangle$ and $e_M = \langle w_{e_M}, t_{e_M} \rangle$ (with $w_{c_M}, w_{e_M} \in W_M$, and $t_{c_M}, t_{e_M} \in T_M$) fulfill the role of, respectively, w_M and v_M in H-models, $E_M = W_M \times T_M$ is a set of evaluation points, and I_M is a function assigning to every propositional letter of $AN@MPL$ a subset of E_M. Truth in a GH-model M of a formula φ, $M \models_{GM} \varphi$, is truth at e_M, the circumstance of evaluation of the model[3].

Representing contexts and circumstances of evaluation as possible worlds, or as pairs of a possible world and a time, constitutes a particular view on what are contexts and circumstances of evaluation, once the semantic interpretation of 2D semantics is adopted, since no matter how contexts of use and circumstances of evaluation are represented, these will be the elements relevant for the determination of truth. Hence, the move to contexts and circumstances of evaluation constitutes a generalization of the step of having models M be constituted by possible worlds w_M and v_M. This step also allows for the Nelson-Zalta vs. Hanson debate to be recast in more general terms. If the language is fully interpreted, then any of its models M and M' will be such that $W_M = W_{M'}$, $T_M = T_{M'}$ (and thus $E_M = E_{M'}$), and $I_M = I_{M'}$. This means that the role of models in determining whether the relation of logical consequence holds is played by pairs $\langle c, e \rangle$ of contexts of use c and circumstances of evaluation e, and that Nelson and

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[3]The following clauses provide the recursive definition of truth of a formula φ of $AN@IMPL$ at a circumstance of evaluation $e \in E_M$ and GH-model M. $M, e \models_{GH} \varphi$:

1. If φ is an atomic propositional letter, then $M, e \models_{GH} \varphi$ iff $e \in I_M(\varphi)$;

2. If $\varphi = \neg\psi$, then $M, e \models_{GH} \varphi$ iff $M, e \not\models_{GH} \psi$;

3. If $\varphi = \psi \wedge \chi$, then $M, e \models_{GH} \varphi$ iff $M, e \models_{GH} \psi$ and $M, e \models_{GH} \chi$;

4. If $\varphi = \Box\psi$, then $M, e \models_{GH} \varphi$ iff for all $e' \in E_M$ such that $t_e = t_{e'}$: $M, e' \models_{GH} \psi$;

5. If $\varphi = A\psi$, then $M, e \models_{GH} \varphi$ iff for all $e' \in E_M$ such that $w_e = w_{e'}$: $M, e' \models_{GH} \psi$;

6. If $\varphi = @\psi$, then $M, e \models_{GH} \varphi$ iff $M, \langle w_{c_M}, t_e \rangle \models_{GH} \psi$;

7. If $\varphi = N\psi$, then $M, e \models_{GH} \varphi$ iff $M, \langle w_e, t_{c_M} \rangle \models_{GH} \psi$.

Zalta can be associated to the view according to which the class of logical possibilities consists in the class of all pairs $\langle c, ev(c) \rangle$, while Hanson can be seen associated to the position according to which the class of logical possibilities consists in the class of all pairs $\langle c, e \rangle$. If the former class is the one of logical possibilities, then there are contingent logical truths, while if the latter is the class of logical possibilities, then there are not.

Logical pluralism and the class of logically possible cases

The semantic interpretation of 2D semantics allows for the distinction of more classes as candidates for being the class of logically possible cases. Where c^* and e^* are particular contexts and circumstances of evaluation, the following classes can be distinguished:

1. The class of all pairs $\langle c, e \rangle$, where c and e are, respectively, any context of use and any circumstance of evaluation;

2. The class of all pairs $\langle c, ev(c) \rangle$, where c is any context of use;

3. The class of all pairs $\langle c^*, e \rangle$, where e is any circumstance of evaluation;

4. The class of all pairs $\langle c, e^* \rangle$, where c is any context of use;

5. The unit class whose only member is $\langle c^*, e^* \rangle$.

Suppose contexts and circumstances of evaluation are just pairs $\langle w, t \rangle$, that $c^* = e^*$, and that $e_c = c$. Consider the following argument:

(1) Actually, if Yossarian is a bombardier, then Yossarian is flying over Bologna. Yossarian is a bombardier. Therefore, Yossarian is flying over Bologna.

Let P = 'Yossarian is a bombardier' and Q = 'Yossarian is flying over Bologna'. Assume furthermore that $I(P) = \{e | w_e = w_{e^*} \text{ or } w_e = w_{e'}\}$ and that $I(Q) = \{e | w_e = w_{e^*}\}$; i.e., that Yossarian is a bombardier at all circumstances of evaluation e such that $w_e = w_{e^*}$, or $w_e = w_{e'}$ and that Yossarian is flying over Bologna at all circumstances of evaluation e such that $w_e = w_{e^*}$. The following two-dimensional matrices depict the truth-conditions of, respectively, the first premise $Pr_1 = @(P \rightarrow Q)$ and the second premise $Pr_2 = P$ (c and e stand, respectively, for any context of use c and circumstance of evaluation e such that $c \neq c^*$ and $c \neq c'$; and $e \neq e^*$ and $e \neq e'$):

	e^*	e'	e
c^*	T	T	T
c'	F	F	F
c	T	T	T

(a) Two-dimensional matrix for Pr_1

	e^*	e'	e
c^*	T	T	F
c'	T	T	F
c	T	T	F

(b) Two-dimensional matrix for Pr_2

Figure 2.1: Two-dimensional matrices for Pr_1 and Pr_2

The following matrix exhibits the truth-values of premises Pr_1 and Pr_2, and conclusion $Cn = Q$ at each context-circumstance of evaluation pair (where, at each cell $\langle i, j\rangle$, a sequence such as T;F.T means that Pr_1 is true at $\langle i, j\rangle$, Pr_2 is false $\langle i, j\rangle$, and Cn is true at $\langle i, j\rangle$):

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

Figure 2.2: Two-dimensional matrix for Pr_1,Pr_2 and Cn

The highlighted cells of the matrices below indicate the pairs that are taken to be logical possibilities according to each of the options 1-5:

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

(a) Option 1.

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

(b) Option 2.

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

(c) Option 3.

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

(d) Option 4.

	e^*	e'	e
c^*	T;T.T	T;T.F	T;F.F
c'	F;T.T	F;T.F	F;F.F
c	T;T.T	T;T.F	T;F.F

(e) Option 5.

Figure 2.3: Two-dimensional matrices for the different options on the logically possible cases problem

The darker cells in the matrices, when they occur, exhibit a pair context-circumstance of evaluation at which the premises are true and the conclusion is false, showing that the argument is invalid with respect to the option in question. Hence, if either options 2., 4. or 5. end up corresponding to the class of logically possible cases, the argument is logically valid (given our assumptions), and if either option 1. or option 3. turn out to be the class of logically possible cases, then it is logically invalid. The relations between the resulting consequence relations are easy to assess. Let valid-1 arguments be the arguments

that are logically valid if option 1. holds, valid-2 arguments be the arguments that are logically valid if option 2. holds, etc. All valid-1 arguments are valid-n arguments, for $1 \leq n \leq 5$; and for all n ($1 \leq n \leq 5$), an argument is valid-n only if it is valid-5. Furthermore, it is not the case there are n, $n' \neq n$ such that the class of valid-n arguments is the same as the class of valid-n' arguments. That is, adopting one of the options 1.-5. will always yield a consequence relation not coextensive with that which would have resulted from the adoption of a different option.

The distinction of these five classes raises the question: which one of these classes should be considered as the true class of logically possible cases? It also leads to the question of whether (at most) just one of the resulting consequence relations is the appropriate consequence relation, since a prima facie available way to reconcile Nelson-Zalta with Hanson would be through adherence to some sort of *logical pluralism* that would take as appropriate the consequence relations resulting both from the adoption of option 1. and option 2. A currently popular version of logical pluralism which might allow for both of the consequence relations to be assumed is that endorsed by Beall and Restall [2000, 2006]. Beall and Restall endorse the view according to which the generalized Tarski's thesis suffers from the kind of 'unsettledness' that, according to some views on vagueness, also affects vague expressions. The source of the unsettledness is located in the expression 'case', the point being that the settled parts of the language possibly allow for different specifications of what counts as a case, none of those specification faring better than the others with respect to the question of which is the correct specification. This has lead them to endorse a strand of *logical pluralism* characterized by adherence to both of the following thesis: i) the generalized Tarski's thesis and ii) the claim that there are at least two different and admissible instances of what counts as a *case*.

On the face of it, Beall and Restall's pluralist position could provide some "middle ground" between Nelson-Zalta and Hanson (and in general, on the question of which option 1-5 is the option providing the logical possibilities). Pairs $\langle c, e \rangle$ and pairs $\langle c, e_c \rangle$ could be seen as constituting different admissible specifications of what counts as a case, each of the specifications yielding a different logic. Beall and Restall seem committed, however, to the *cases as circumstances of evaluation* thesis, the position that cases, no matter how they are specified, consist in circumstances of evaluation. Even though commitment to the thesis is never explicitly stated, this seems to be inferable, to begin with, from statements such as

> The validity of reasoning must depend only on the *content* of what is at question, and not on its mode of presentation. Furthermore, this content must, to some degree, be public and shared, if logic is to have any role in the analysis and evaluation of discourse. None of this is to say, of course, that logic is the *only* tool for the analysis and evaluation of discourse. We are only committed to the claim that it is an important tool in the analysis of the *content*, or what is said in discourse [Beall and Restall, 2006].

The above statement can be seen as an indication that Beall and Restall are committed to the claim that the relata of logical consequence are contents. If this is the case, then logically possible cases must consist

in circumstances of evaluation, since it is with respect to circumstances of evaluation that contents (the premises and conclusion of arguments) are true, and thus Beall and Restall do in fact endorse the cases as circumstances of evaluation thesis. One other sign that might indicate such commitment stems from the kind of cases that Beall and Restall discuss. All the examples (Tarskian models, metaphysical possible worlds, situations, stages, etc.) consist in (putative) examples of circumstances of evaluation. More general kinds of cases (such as pairs context-circumstance of evaluation) are never discussed. In what follows I will assume that Beall and Restall are in fact committed to the cases as circumstances of evaluation thesis.[4] Hence, the kind of pluralism they endorse (call it *BR-pluralism*) is characterized by adherence to: i) the generalized Tarski's thesis; ii) the thesis according to which there are at least two different and admissible instances of what counts as a $case_x$; iii) the cases as circumstances thesis, according to which $cases_x$ are just circumstances of evaluation$_x$. Thus, BR-pluralism does not constitute a position endorsement of which allows for the different consequence relations resulting from the different classes of context-circumstance of evaluation pairs to be seen as equally appropriate.

However, a simple tweak to BR-pluralism seems to be sufficient. Call *pair pluralism* the strand of pluralism that shares thesis i) and ii) with BR-pluralism, and advocates iii) the *cases as pairs context-circumstance* thesis. A pair pluralist thus endorses the position according to which different specifications of 'case' determine different classes of pairs $\langle c, e \rangle$. Even though pair pluralism and BR-pluralism are jointly inconsistent, there is a sense in which one can be both a pair pluralist and a *circumstance of evaluation pluralist*, where circumstance of evaluation pluralism consists in the position according to which there are at least two different and admissible instances of what counts as a circumstance of evaluation. For instance, one might hold that the options 1. and 2. are both plausible, and thus be a pair-pluralist, while also holding that *metaphysical possibilities* and *situations* both constitute admissible instances of what counts as a circumstance of evaluation. It is easy to see that any combinations between pair monism/pair pluralism and circumstance of evaluation monism/circumstance of evaluation pluralism are possible. That is, one can be a pair monist and a circumstance of evaluation pluralist, a pair and circumstance of evaluation monist, a pair pluralist and a circumstance of evaluation monist, and finally, a pair and circumstance of evaluation pluralist. Finally, BR-pluralists and pair-pluralists can both be seen as instances of the same type of logical pluralism, *case pluralism*, characterized by adherence to both the generalized Tarski's thesis and the thesis that there are at least two different and admissible instances of what counts as a case.

In what follows pair-pluralism will be assumed not to be the case. The value of this assumption can be seen as heuristic, forcing a proper assessment of the merits and shortcomings of the different options available, since, given the assumption, (at most) only one such class constitutes the class of logical possibilities.

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[4]Even though what is important is not to have them committed to such thesis, but to distinguish the kind of pluralism that arises from such commitment from pluralist positions that take as appropriate more than one consequence relation arising from the endorsement of more than one of the options concerning the class of pairs context-circumstance of evaluation.

What is the class of logical possibilities?

The natural way to understand the distinguished context c^* and circumstance of evaluation e^* is as the context where the premises and conclusion are used and the circumstance of evaluation of that context.

Option 3. seems to share some affinities to a position advocated by Warren Goldfarb. In the beginning of *Deductive Logic* [2003] Goldfarb approaches the question of what are the relata of logical consequence. He takes these to be statements; i.e., sentences with a truth-value. In order for logic to deal with other kinds of sentences, such as those possessing context-sensitive expressions, Goldfarb advances two different options: i) 'to paraphrase each sentence under consideration by a statement' (for instance, the sentence 'I am hungry' is not a statement, since it has different truth-values at different contexts; Goldfarb's suggestion is to paraphrase it by the statement 'John is hungry', assuming that the sentence was used at a context which had John as its speaker); ii) to paraphrase statements *uniformly*, "That is to say, we imagine them [the sentences of everyday discourse] to have been uttered by a single speaker, at a single time, in a conversational setting that uniformly resolves any ambiguities" [Goldfarb, 2003, pp.6-7].

Goldfarb's second solution seems to commit him to the position according to which pairs $\langle \Gamma, \varphi \rangle$, where Γ is a set of declarative sentences and φ is a (declarative) sentence can only be seen as constituting arguments after the provision of a context (and thus, arguments can be seen as pairs $\langle c, \langle \Gamma, \varphi \rangle \rangle$, where c is a context). Such position is somewhat akin to that resulting from adoption of option 3. as the class of logically possible cases (even though Goldfarb does not take logical consequence as preservation of truth of the propositions expressed in every metaphysically possible world). While Goldfarb takes the notion of an argument to be context-relative, adoption of option 3. leads to the view that logical consequence itself is context-relative. That is, if option 3. is adopted, then an argument will be logically valid if, with respect to the context c^* in which it is used (or assumed to be used), the conclusion is true at every pairs $\langle c^*, e \rangle$; and if the context where the argument is assumed to be used is different than c^*, then the class of logically possible cases with respect to which its logical validity is determined will be a different class. As for Goldfarb's position, a pair of $\langle \Gamma, \varphi \rangle$ is only an argument relative to a context c^* where the elements of Γ and φ are used (or assumed to be used) while the validity of arguments themselves is not context-relative: if the elements of Γ and φ are assumed to be used at a context different than c^*, then the resulting argument will be different.

The position according to which arguments are context-relative seems easily associated with the position that the class of all logical possibilities is just the class of all metaphysically possible worlds. The position resulting from endorsement of both thesis shares a particular relation to the view that option 3. provides the class of logical possibilities. Let an argument $\langle c', \langle \Gamma, \varphi \rangle \rangle$ be said to be *valid-GW* if and only if there is no possible world w such that the proposition (literally) expressed by φ at c' is false at w while for each $\gamma \in \Gamma$, the proposition (literally) expressed by γ at c' is true at w; and an argument $\langle \Gamma, \varphi \rangle$ be said to be *valid-3*, *relative to* c, if and only if there is no pair $\langle c', e \rangle$ such that φ is false at $\langle c', e \rangle$ while all the $\gamma \in \Gamma$ are true at $\langle c', e \rangle$. Then, an argument $\langle c', \langle \Gamma, \varphi \rangle \rangle$ is valid-GW if and only if $\langle \Gamma, \varphi \rangle$ is valid-3 at c'.

In *The Concept of Logical Consequence* [1990] Etchemendy distinguishes two positions on how to

philosophically interpret model theory, the *representational view* and the *interpretational view*. Stephen Read describes both views as follows: "In representational semantics we describe a situation, perhaps different from how things actually are, in which the propositions take various values. In interpretational semantics, we interpret certain expressions differently from their actual interpretation to much the same effect" [Read, 1994].

If one adopts an interpretational view on model-theory, then some explanation of why some first-order models have different domains is required, for such variability seems more in line with a representational view, with different domains describing different situations. Proponents of the interpretational view can account for such variability by taking the different sizes of the domain to reflect the context-sensitivity of the quantifiers. If Yossarian says in some context c_1 that he is carrying everything in his backpack, and in some other context c_2 that everything is in the fridge, he may be speaking truly in both contexts, despite the fact that the situation, the way the world is, is just the same in both contexts. Thus, in a fully interpreted (formal) language where every expression is treated as a logical constant the interpretational view may still allow for different models, if the language is context-sensitive. Option 4. seems to be in line with the interpretational view of model-theory, with models standing for logically possible cases such that the circumstance of evaluation is always the "actual" world, the way the world actually is, and with different contexts of use/generation.

Option 4., however does not constitute the class of logically possible cases. Consider the following argument:

(2)   Rudyard Kipling was British. Therefore, Rudyard Kipling wrote *The Jungle Book*.

There are no context-dependent expressions in argument (2). Hence, for all c, both the premise and conclusion will be true at $\langle c, e^* \rangle$. Assuming (for reductio) that option 4. consists in the class of logically possible cases, argument (2) turns out to be logically valid. But, argument (2) is not logically valid. This is not only intuitively so, but is further warranted by the assumption that the analyticity thesis is true of logical consequence, since regardless of what the meanings of the premises and conclusion are taken to be, there are cases with respect to which the meanings of the premises are true and the meaning of the conclusion is false. In particular, this will be the case no matter whether the meanings are taken to be characters or propositions. Therefore, option 4. does not consist in the class of logically possible cases.

Option 5. consists in the limit case where there is only one logically possible case, the one with the actual context of use/generation and the actual circumstance of evaluation. Adoption of option 5. yields the result that logical truth is just plain truth, and that the conclusion of an argument is a logical consequence of its premises just in case the material conditional having the conjunction of the premises as antecedent and the conclusion as consequent is true, if the premises of the argument are finitely many.

Concerning logical truth, this yields the undesirable result that the plain truth of any sentence makes it be logically true (and its falsity, logically false). This result seems to clash with our ordinary perspective on the truth of many sentences, such as 'Yossarian is a bombardier', 'I am a student', 'every bombardier

is married', etc. These are examples of sentences which, regardless of whether they are true or false, are not true/false as a matter of logic. The argument above against option 4. as the class of logically possible cases also shows that option 5. is not the class of logically possible cases. The argument is in fact logically invalid, since it is logically invalid according to the analyticity thesis. But if option 5. constituted the class of logically possible cases, then argument (2) would be logically valid. Hence, option 5. does not constitute the class of logically possible cases.

Thus, both options 4. and 5. are to be rejected qua the set of logically possible cases. In the next chapter the motivations behind options 1. and 2. will be discussed, and the plausibility of these options will be assessed. Particular emphasis will be given to the position according to which option 2. is the class of logically possible cases, due to its importance since Kaplan [1989a, 1989b] proposed that the resulting consequence relation is *the* relation of logical consequence. As for the tenability of option 3., it will be addressed later on.

2.3   Logical possibilities and the meta-semantic interpretation

Adopting a meta-semantic interpretation of $I@MPL$, the world w_M of each H-model consists on a (metaphysical) possible world *qua* hypothesis concerning how the world is. Such possible world will typically be such that there is an epistemically salient speech-act occurring, where what is communicated by that speech-act is communicated in some language, where the speech-act is being performed to a given audience, etc. The (metaphysical) possible world v_M corresponds to the possible world where the proposition expressed at the possible world w_M is assessed for truth. Options analogous to the ones presented as candidates for logical possibilities once a *semantic* interpretation is adopted can also be distinguished with respect to a *meta-semantic* interpretation. Let w^* be a distinguished possible world. The options are the following:

6. The class of all pairs $\langle w, v \rangle$, where w and v are possible worlds;

7. The class of all pairs $\langle w, w \rangle$, where w is any possible world;

8. The class of all pairs $\langle w^*, v \rangle$, where v is any possible world;

9. The class of all pairs $\langle w, w^* \rangle$, where w is any possible world;

10. The unit class whose only member is $\langle w^*, w^* \rangle$.

The most plausible interpretation for the world w^* seems to be as that possible world where the assertion takes place. This leads option 3. and option 8. to stand or fall together, since the content expressed by a sentence at w^* will be that which is expressed by the sentence at the epistemically salient context c^* of w^*, that tuple containing as elements the epistemically salient speaker in w^*, the epistemically salient

time of w^* where the epistemically salient speech-act was performed, etc. As mentioned before, whether option 3. is tenable is a question that will be addressed in fourth chapter.

The position resulting from endorsement of option 10. as the class of logically possible cases faces the same difficulty as that which arises from adoption of option 5. To wit, argument (2) also turns out to be logically valid under the assumption that option 10. is the class of logically possible cases, despite the fact that argument (2) is logically *invalid*, since it does not exhibit the analyticity feature. Hence, option 10. does not consist in the class of logical possibilities.

Options 6., 7. and 9. all fall prey to the same problem. Assume option 9. is the class of logical possibilities. Consider the following argument:

(3)   Woody Allen is a jazz musician and Woody Allen is a professional basketball player. Therefore, Woody Allen is a jazz musician.

Argument (3), I take it, is obviously logically valid. However, under the assumption that option 9. is the class of logical possibilities, the argument turns out to be logically *invalid*. Consider the possible world w where the language is English*, a language just like English, except for the fact that 'and' means *or* and 'or' means *and*; and the (actual) possible world, w^* where Woody Allen is no professional basketball player, but is a jazz clarinetist. The premise of the argument will be true at $\langle w, w^* \rangle$, for Woody Allen *is* a jazz musician or a professional basketball player, while the argument's conclusion is false at $\langle w, w^* \rangle$, since Woody Allen does not play basketball professionally. This would make the argument logically invalid, under the assumption that the class of logically possible cases consists in the class of pairs $\langle w, w^* \rangle$. But since argument (3) is logically valid, the conclusion is reached that the class of pairs $\langle w, w^* \rangle$ does not consist in the class of logically possible cases.

Furthermore, let an argument be *valid-6* if and only if there is no pair $\langle w, v \rangle$ such that the contents that each of the premises would express if w was the possible world where the argument was formulated are all true at v, while the content that the conclusion would express if w was the possible world where the argument was formulated is false at v; and be *valid-9* if and only if there is no pair $\langle w, w^* \rangle$ such that the contents that each of the premises would express if w was the possible world where the argument was formulated are all true at w^*, while the content that the conclusion would express if w was the possible world where the argument was formulated is false at w^*. It is easy to see that, if an argument is *in*valid-9, then it is *in*valid-6. Hence, argument (3) is *in*valid-6. However, the argument is logically valid. Therefore, option 6. is not the class of logically possible cases.

Concerning option 7., suppose that it is the class of logically possible cases. Consider the possible world w' which is just like w^*, except for the fact that in w' English* is spoken instead of English. It is easy to see that the premise of (3) is true at $\langle w', w' \rangle$, while the conclusion of (3) is false at $\langle w', w' \rangle$. This means that the argument is logically invalid, under the assumption that option 7. is the class of logically possible cases. Since argument (3) is in fact logically valid, it follows that the assumption is false, and thus

that option 7. is not the class of logically possible cases.

The logical validity of argument (3) constitutes an objection to options 6., 7. and 9. in virtue of the fact that all those options have *too many* possible worlds taking the place of those worlds with respect to which the proposition expressed by an assertion is determined. This makes it so that there is always a possible world w where the content that the sub-sentential expressions occurring in the premises and conclusion of an argument have at w is such that the propositions expressed by the premises are true at w while the proposition expressed by the conclusion is false at w; and that there is always a possible world w where the content that the sub-sentential expressions occurring in the premises and conclusion of an argument have at w is such that the propositions expressed by the premises at w are true at w^* while the proposition expressed by the conclusion is false at w^*.

The problem resembles the one that Stalnaker himself has pointed to when dealing with instances of the contingent a priori. In 'Assertion' [1978] Stalnaker claims that a sentence is *a priori* if and only if it is true at every pair $\langle w, w \rangle$. However, in later writings, (e.g. 'Assertion Revisited: On the Interpretation of Two-Dimensional Modal Semantics' [2006]) Stalnaker has endorsed the position that a priori truth is not truth of the diagonal, except if the notion of a prioricity in which one is interested is a "very local and context-dependent one" [Stalnaker, 2006]. The reason why a priori truth cannot be identified with truth of the diagonal is the same that leads to the conclusion that options 6., 7. and 9. are not logically possible cases: too many possible worlds take the place of those worlds with respect to which the proposition expressed is determined. This is highlighted by the following example:

(4) $7 + 5 = 12$.

Clearly, (4) is an a priori truth, if anything is. However, the sentence will not be true at every pair $\langle w, w \rangle$. Consider a possible world w' where '7', '5' and '12' retain their usual meanings, while the content of '+' in w' is that of subtraction. In such case (4) is not true at $\langle w, w \rangle$, and thus, under the assumption that a priori truth is truth at every pair $\langle w, w \rangle$, it is not an a priori truth. Hence, a priori truth cannot in fact be truth at every pair $\langle w, w \rangle$.

However, as Stalnaker points out, if the notion of a priori truth in which one is interested is a context-dependent one, then truth of the diagonal can still be seen as an priori truth. For instance, in a context c_1 where it is presupposed that the language being used is such that mathematical symbols retain their actual meaning, then, with respect to all the possible worlds w compatible with what is being presupposed, sentence (4) is true at $\langle w, w \rangle$. Another example is the a priori truth of Kripke's

(5)   Stick S is one meter long,

in a context c_2 where S is presupposed to refer to the standard meter bar. In such context, the diagonal propositional will be true at all possible worlds compatible with the context's context set. However, it will not be true at every pair $\langle w', w' \rangle$, and thus not at a context c_3 whose context set is the set of all possible worlds. Stalnaker's idea is thus that one can say that sentence (4) is a priori true *relative*

to context c_1, while sentence (5) is a priori true *relative* to context c_2, and not a priori true relative to context c_3.

Stalnaker's considerations concerning a priori truth and a related context-dependent notion suggest a strategy for 'eliminating' some of the possible worlds with respect to which the proposition expressed by an assertion is determined. The strategy is to take logical consequence to itself be context-dependent. Let c^* be a context where an argument is used, or assumed to be used. The available options concerning logically possible cases are the following:

11. The class of all pairs $\langle w, v \rangle$, where w and v are possible worlds in c^*'s context-set;

12. The class of all pairs $\langle w, w \rangle$, where w is any possible world in c^*'s context-set.

Options 8., 9. and 10. have no correlates when logical consequence is taken itself to be context-dependent in this way. The reason is that the possible world of c^* is not guaranteed to be an element of c^*'s context-set, since the presupposition in play at c^* may be incompatible with what is the case at c^* possible world (this can happen because in c^* it is pretended that the world is rather different - as is the case with theatre plays -, or because as a matter fact, the participants in the conversation are *wrong* in how they take the world to be).

However, there are also plausible reasons not to take neither option 11. nor option 12. as being the class of logically possible cases. In what follows, I wish to focus on one particular reason to dismiss both options.

Consider the following sentence:

(6)   There are at least six objects.

If it is assumed that option 11. consists in the class of logical possibilities, then the sentence turns out being a logical truth in contexts c where it is assumed that those expression-tokens were uttered and that the language being spoken was English (*normal* contexts, I would say). This is so because in every world of c's context-set, there will in fact exist at least six objects, the six expression-tokens composing the sentence-token. The sentence is also logically valid with respect to contexts c, and for the same reason, under the assumption that option 12. is the class of logical possibilities. However, I take it to be uncontroversial, sentence (6) is logically *in*valid. Hence, the conclusion is that neither options 11. nor 12. consist in the class of logical possibilities.

The problem with the suggested strategy is, as I see it, that the possible worlds with respect to which the truth of the propositions is evaluated are necessarily elements of the context set of the context where the argument is (assumed) to be used; that is, are necessarily compatible with the presuppositions at play in the context. However, what examples such as (6) show is precisely the need for the truth of the propositions expressed to be evaluated also at worlds different than those compatible with the presuppositions at play in the context. It is easy to see that this is precisely what yields the result that (6) is logically true, under the assumption that option 11./option 12. is the class of logical possibilities.

Chapter 3

Kaplan's thesis

The main aim of the present chapter is to show that one of the most promising thesis on the nature of logical consequence – Kaplan's thesis – resulting from the adoption of the semantic interpretation of two-dimensional semantics, and in line with both the context as cases thesis and the context-sensitive relata thesis, is faulty.

Besides showing that the thesis is false, attention will be given to other theses resulting from the semantic interpretation of the two-dimensional framework that could be seen as 'in the same direction' as Kaplan's thesis. It will be shown that these other theses are also incorrect theses on the nature of logical consequence. To the extent that these positions also constitute defenses of some of the options for being the class of logically possible cases distinguished in the last chapter, the plausibility of these options will be rejected.

I will start the chapter in an 'ostrich-like' fashion, drawing a distinction between *presemantics*, *compositional semantics* and *postsemantics*, and showing how these distinctions lead to another distinction, that between *contexts* and *n-contexts*. The main motivation for drawing the distinctions comes from the fact that they will be fundamental in understanding why some assumptions related to Kaplan's thesis are faulty, as well as why some arguments are non-sequiturs. In the second section I introduce the distinctive features of Kaplan's thesis, the rationale for holding it to be true of logical consequence, and I also show that Kaplan's thesis has an interesting consequence with respect to the problem of what is the strength of logical necessity. In the third section the question of what is, as a matter of fact, the class of logical consequences – under the assumption that Kaplan's thesis holds – is investigated. The fourth section is dedicated at showing that Kaplan's thesis is false. The considerations occurring there can are taken from [Predelli, 2010], and to some extent, are already present in [Predelli and Stojanovic, 2008]). In the last section the question of whether the semantic interpretation of two-dimensional semantics makes room for different conceptions of consequence which may plausibly be equated with logical consequence is addressed. Three relations of consequence are distinguished, and it is argued that none of them corresponds to logical consequence.

3.1 Presemantics, compositional semantics and postsemantics

MacFarlane [2003a, 2003b] distinguishes four parts in the theory of meaning for a language: syntax, compositional semantics, postsemantics and the theory of speech acts. In a similar vein, Predelli [2004] distinguishes three different stages of a semantic theory, qua a systematic account able to assign truth-conditions to utterances: presemantics, compositional semantics and postsemantics.

Predelli's presemantic stage includes – but is not exhausted by – the syntax part of MacFarlane's theory of meaning. Besides a syntactic account of the structure of the sentence used in a particular utterance, presemantics also includes the provision of a tuple of parameters. Compositional semantics is understood in more or less the same way by both authors. At this stage an intension (understood as a function from circumstances of evaluation to truth-values) is assigned to the utterance, determined via the character associated with the syntactic structure determined at the presemantic stage and the n-tuple also determined at that stage. At the postsemantic level a definition of truth (at a context) for utterances is provided, such that, at this stage, the utterance is determined as (literally) true or false. Finally, the theory of speech-acts provides an account of various speech-acts in terms of the literal use of declarative sentences. In what follows I will assume Predelli's distinction between presemantics, compositional semantics and postsemantics, since, on the one hand, it provides a fuller account of what the presemantic stage is required to provide to the compositional semantics to generate the intention intention of an utterance, and on the other hand the theory of speech-acts will not be required in what follows.

In 'Demonstratives' [1989a] Kaplan has shown that providing an appropriate compositional semantics for sentence-types with their linguistic meaning requires the consideration of two different dimensions. In the first dimension tuples of parameters are required, while the second dimension requires circumstances of evaluation. For instance, the sentence-type

(1)   It is necessarily so that I am in Amsterdam

with its customary, linguistic meaning is true at a n-tuple $\langle n_w, n_a, n_l, n_t, \ldots \rangle$ and circumstance of evaluation ev – where n_w is a possible world, n_a is an agent, n_l is a location and n_t is a time – if and only if the following sentence-type, with its linguistic meaning,

(2)   I am in Amsterdam

is true at $\langle n_w, n_a, n_l, n_t, \ldots \rangle$ and every circumstance of evaluation e', if and only if, at every circumstance of evaluation ev, n_a belongs to the extension, at ev, of 'am in Amsterdam'. Compositional semantics is the stage at which the truth of sentence-types is recursively defined, relative to n-tuples and circumstances of evaluation [MacFarlane, Forthcoming, Predelli, 2011]. The presemantic stage is required for the determination of both the sentence-type of the utterance, and the n-tuple with respect to which the intension of the utterance will be determined, given the character associated with the sentence-type of the utterance. Getting the compositional semantics right is a step required for the *postsemantics*. At this later stage the

interest is not in getting the truth-conditions of sentence-types right, but in accounting for how uses of sentences get to be true/correct/etc.

Contexts of use, qua metaphysical and spatio-temporal locations (or "situations in which particular episodes of language use take place" [Predelli, 2011, p. 292]) play an important role in the present understanding of a semantic theory. To begin with, they are important in the presemantic stage, both in the determination of the syntactic structure of the sentence by which an utterance is made, and of the n-tuple required for the compositional semantics. This n-tuple is constituted by different parameters, which are determined in function of the context of use and which are relevant for the determination of the intention to be associated with the utterance. An utterance taking place at a context c is such that the compositional semantics will determine its intention with respect to the character associated to the syntactic structure of the sentence used in performing the utterance, *and* to the *n-tuple* determined by the context in which the utterance took place (from now on I will refer to these n-tuples n-contexts).

Contexts customarily play yet another important role in a semantic theory, since the postsemantic stage generally determines the truth of utterances *relative to contexts*. An example of a postsemantic position to hold with respect to the truth of declarative uses of sentences-tokens is that a literal, declarative use of a sentence-token φ is true at a context c just in case the pair constituted by φ's sentence-type and φ's sentence-type's character is true at the n-context $n(c)$ *determined* by c and the circumstance of evaluation $ev(c)$ *determined* by c. Understanding a semantic theory in this way raises interesting questions, such as the one concerning the nature of the relation of determination between a context and a n-context, and a context and a circumstance of evaluation. For instance, are the parameters of a n-context determined by a context c the same as the corresponding parameters in the circumstance of evaluation determined by c?[1] Are the parameters of a n-context $n(c) = \langle n_w, n_a, n_l, n_t, \ldots \rangle$ determined by a context c such that $n(w)$ is the possible world of c, n_a is the speaker of c, n_l is the location of c, n_t is the time of c, etc.?

It is also worth mentioning that post-semantics is not committed with the classical position. Another available position is that the truth of literal, declarative uses of sentence-tokens should be determined not only with respect to the context where the token is being used, but also with respect to the context in which the token's truth is being assessed.[2]

The distinction between presemantics, compositional semantics and postsemantics highlights another important distinction: that between contexts and n-contexts. In the present chapter these distinctions will be required in order to show that Kaplan's thesis is not as plausible as it may seem.

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[1] Suppose n-contexts n and circumstances of evaluation ev are both pairs of possible worlds and times (that is, $n = \langle n_w, n_t \rangle$, and $ev = \langle ev_w, ev_t \rangle$). Suppose furthermore that context c determines a time $n(c)_t$ for the n-context $n(c)$ determined by c which is distinct than the time of c itself (such post-semantic position will be presented later in this chapter). The question is the following: does c determine $ev(c)_t$, the time of the circumstance of evaluation, in such a way that $ev(c)_t = n(c)_t$, or can these be distinct?

[2] This position can be seen as corresponding (or at least sharing some commonalities) with *semantic relativism*. For more on semantic relativism, see [MacFarlane, Forthcoming].

3.2 Kaplan's thesis

As mentioned in the first chapter, Kaplan's semantic interpretation of two-dimensional semantics has lead him to develop a thesis on the nature of logical consequence in line with both the context as cases thesis and the context-sensitive relata thesis. A pair constituted by a sentence-type Φ and Φ's character is logically valid, according to Kaplan, just in case "No matter what the *context* were, Φ would express a truth in the circumstances of that context"[3] [Kaplan, 1989b, p. 596]. The thesis is, as already mentioned, *Kaplan's thesis*:

Kaplan's thesis The conclusion of an argument is a logical consequence of its premises if and only if there is no context where the characters of the sentence-types of the premises are true and the character of the sentence-types of the conclusion is false.

As Kaplan puts it, "Validity is truth-no-matter-what-the-circumstances-were-in-which-the-sentence-was-used"[4]; that is, validity is truth in every context and circumstance of the context.

Kaplan's thesis is committed to a position about the relata of logical consequence:

Characters as relata thesis The relata of logical consequence are characters – or pairs of a sentence-type and its (literal) character.

The following quote shows Kaplan's adherence to the characters as relata thesis:

I find it useful to think of validity and necessity as *never* applying to the same entity. ... The former states a property of sentences (or perhaps characters): validity; the latter states a property of the content of a sentence (a proposition): necessity. [Kaplan, 1989b, p. 596]

Prima facie, Kaplan's thesis follows from assuming that both the analyticity thesis and the characters as relata thesis are the case. If characters are true at contexts, and the analyticity thesis requires that no matter when the meanings of the premises are true, so is the meaning of the conclusion, then Kaplan's thesis follows. Logical truth can, in such case, be straightforwardly understood as analytic truth: the character of φ is sufficient for its truth if and only if φ is logically true.

Some of Kaplan's remarks on 'Demonstratives' [1989a] and 'Afterthoughts' [1989b], arguably point in the direction that the motivation behind Kaplan's thesis came from the fact that it is prima facie implied by the analyticity thesis and the characters as relata thesis. An example is the following:

... there are sentences which express a truth in certain contexts, but not if uttered. For instance, 'I say nothing'. Logic and semantics are concerned not with the vagaries of actions, but with the verities of meanings [Kaplan, 1989a, pp. 584-585].

In what follows I will assume that the above argument constitutes the defense of Kaplan's thesis has being true of logical consequence.

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[3]My italics.
[4]In *op. cit.*, p. 595.

Kaplan's thesis and n-contexts

As it stands, Kaplan's thesis seems false, or to be expressed in terms of something like a categorical mistake. It mentions the truth of characters at *contexts*, but characters are functions from *n-contexts* to functions from circumstances of evaluation to truth-values. Talking about the truth of characters requires that this notion be relativized both to *n-contexts* and circumstances of evaluation – or at most only to *n*-contexts – but not that it be relativized to *contexts*.

This is what Kaplan turns out to do in "Demonstratives". When talking about truth at a context, Kaplan formally defines the notion as truth at a n-context. A sentence is true at a n-context $n = \langle n_w, n_a, n_l, n_t, \ldots \rangle$ if and only if it is true at n and the circumstance of evaluation $\langle n_w, n_t \rangle$ (since Kaplan takes circumstances of evaluation to be possible worlds and times).

That is, strictly speaking, what Kaplan is endorsing is *Kaplan's thesis**:

Kaplan's thesis* The conclusion of an argument is a logical consequence of its premises if and only if there is no n-context where the characters of the premises' sentence-types are true and the character of the sentence-type of the conclusion is false.

Furthermore, the above argument in defense of Kaplan's thesis (and Kaplan's thesis*) also seems to require a further premise. Besides the analyticity thesis and the characters as relata thesis, it also depends on the single relativization thesis:

Single relativization thesis The truth of characters is relative solely to n-contexts, in such a way that a character is true at a n-context n if and only if it is true at n and the circumstance of evaluation $ev(n) = \langle n_w, n_t \rangle$ (or at the circumstance of evaluation n_w if circumstances of evaluation are taken to be just possible worlds, or $\langle n_w, n_l, n_t \rangle$ if circumstances of evaluation are taken to be triples of a possible world, a location and a time, etc.).

Kaplan's thesis* and the strength of logical necessity

Endorsement of Kaplan's thesis*, the characters as relata thesis and the single relativization thesis yields the result that some logical truths are not metaphysically necessary. This makes Kaplan's thesis* a particularly interesting position on the nature of logical consequence, for despite the fact that it does not go against the logical necessity thesis, it implies the rejection of the metaphysical necessity thesis, one of the positions available concerning the nature of logical necessity.

A typical example is provided by argument (2):

(3)   It is raining. Therefore, it is actually raining.

There is no context where the premise is true while the conclusion is false. However, it could have been the case that it was not raining, while it is actually raining. Besides arguments such as (3), Kaplan

mentions the following contingently true sentences as examples of logical truths, once Kaplan's thesis* is adopted:

(4)   I am here now

(5)   Something exists

and

(6)   It is raining if and only if actually it is raining.

As mentioned in the first chapter, McFetridge and Rumfitt have provided arguments in defense of the claim that logical necessity is as least as strong as any other kind of necessity, where the notion was defined in such a way that a notion of necessity$_1$ is at least as strong as a notion of necessity$_2$ if and only if for all φ, necessarily$_2$ φ is a logical consequence of necessarily$_1$ φ. Kaplan's thesis entails that logical necessity is not at least as strong as any other kind of necessity. In particular, that it is not as strong as metaphysical necessity. Sentence (6) provides a counterexample, since (6) is logically necessary (it is not a logical truth once Kaplan's thesis* is endorsed), despite the fact that is its not a logical consequence of (6) that it metaphysically necessary that it is raining if and only if actually it is raining.

In 'Modality' [1999] Bob Hale gives his own version of McFetridge's argument in defense of the claim that logical necessity is at least as strong as any other kind of necessity. It is interesting to see what premise/step in the argument must be refused by endorsing Kaplan's thesis*. Let $\ulcorner \varphi \models \psi \urcorner$ express that φ is a logical consequence of ψ, and $\ulcorner \Diamond \varphi \urcorner$ express that φ is possible, where the modality in question may be of any kind. The argument assumes the following premises:

(A1)   If $A \models B$, then $A \wedge C \models B$ and $C \wedge A \models B$
(A2) $A \models A$
(A3)   If $A \models B$ and $A \models C$, then $A \models B \wedge C$
(A4)   If $\Diamond A$ and $A \models B$, then $\Diamond B$
(A5) $\neg \Diamond (A \wedge \neg A)$

Under the above assumptions, it can be shown that if $A \models B$, then $\neg \Diamond (A \wedge \neg B)$:

1	(1)	$A \models B$	Assumption
2	(2)	$\Diamond (A \wedge \neg B)$	Assumption
2	(3)	$A \wedge \neg B \models B$	(1) by A1
	(4)	$\neg B \models \neg B$	by A2
	(5)	$A \wedge \neg B \models \neg B$	(4) by A1
1	(6)	$A \wedge \neg B \models B \wedge \neg B$	(3), (5) by A3
1,2	(7)	$\Diamond (B \wedge \neg B)$	(2), (6) by A4
	(8)	$\neg \Diamond (B \wedge B)$	by A5
1	(9)	$\neg \Diamond (A \wedge \neg B)$	(2), (7), (8) by reductio

From the fact that if $A \models B$, then $\neg\Diamond(A \wedge \neg B)$ it follows that if B is a logical necessity, then $\Box B$. Let $\Box_L \varphi$ express that φ is a logical necessity. If φ is a logical necessity, then φ logically follows from whatever set of premises. From this, it follows that if $\Box_L \varphi$, then $\neg\varphi \models \varphi$. Assume $\Box_L C$. Then, $\neg C \models C$. Since if $A \models B$, then $\neg\Diamond(A \wedge \neg B)$, it follows that $\neg\Diamond(\neg C \wedge \neg C)$. Since possibility and necessity are duals, $\neg\Diamond(\neg C \wedge \neg C)$ logically implies that $\Box\neg(\neg C \wedge \neg C)$. Furthermore, $\Box\neg(\neg C \wedge \neg C)$ logically implies $\Box C$. Hence, the above argument, if all the premises hold, establishes that $\Box_L C$ logically implies $\Box C$, regardless of whether $\Box$ stands for metaphysical necessity, epistemic necessity, or some other kind of necessity.

Kaplan's thesis* implies the rejection of (A4), the only premise accounting for the interaction between logical consequence and other modalities. In particular, it implies that (A4) is false when the possibility in question is metaphysical possibility. Assume that Kaplan's thesis* holds. Assume also that, as a matter of fact, it is not raining. However, it is metaphysically possible that it is raining. Furthermore, that it is actually raining logically follows from it being raining. Hence, if (A4) holds, then it is metaphysically possible that it is actually raining. But for this to be metaphysically possible, then there must be a possibility such that it is actually raining; i.e., such that, as things currently are, it is raining. But, we have assumed that, as a matter of fact, it is not raining. Thus, (A4) is false.

What this means is that one can infer metaphysical impossibilities from metaphysical possibilities if Kaplan's thesis* holds. That (A4) was proposed as a premise of Hale's argument means that the principle has some intuitive plausibility. Prima facie, going from possibilities to impossibilities should be something logically disallowed. However, one can also see Kaplan's thesis* as showing that (A4) is perhaps too strong, and that what should be logically disallowed is going from something that is actually the case to something which is not actually the case. In this chapter it will be argued that Kaplan's thesis* does not hold of logical consequence. However, the argument against Kaplan's thesis* will not be based on assuming that (A4) is the case.

3.3 The class of Kaplan-validities

Let me say of an argument that it is Kaplan-valid if it turns out to be logically valid under the assumption that Kaplan's thesis* is true, and of a sentence that it is Kaplan-true if it turns out to be a logical truth under the assumption that Kaplan's thesis* is true. As already mentioned, Kaplan provides the sentences-types 'I am here now' and 'something exists' as examples of logical truths not traditionally held to be so (in particular, of logical truths whose necessitation is not logically true). Predelli [2011] points out that these sentences turn out to be Kaplan-truths just in case the *propriety thesis* is true. Assume n-contexts are tuples $n = \langle n_w, n_a, n_l, n_t \ldots \rangle$. The propriety thesis is the following position:

Propriety thesis Every n-context is such that n_a is in n_l at n_t and n_w.

I will call n-contexts with this property *proper* n-contexts. It is easy to see that if the propriety thesis does not hold, there are contexts in which the sentence 'I am here now' is not true. The customary

characters of 'I', 'here' and 'now' are functions whose value is, for each n-context $n = \langle n_w, n_a, n_l, n_t, \ldots \rangle$, respectively, n_a, n_l and n_t. Assuming the single relativization thesis, the truth-conditions of 'I am here now' (at a n-context n) are the following:

- 'I am here now' is true at $n = \langle n_w, n_a, n_l, n_t, \ldots \rangle$ if and only if 'I am here now' is true at n and $ev(n)$ (which we can assume to be constituted solely by a possible world, and thus $ev_n = n_w$), if and only if $\langle n_a, n_l, n_t \rangle$ belongs to the extension, at $ev(n) = n_w$, of 'is in ... at ...' (if and only if, at n_a is in n_l at n_t and nw).

If the propriety thesis does not hold, then there will be n-contexts $n = \langle n_w, n_a, n_l, n_t, \ldots \rangle$ such that n_a is not in n_l at n_t and n_w, with the result that 'I am here now' is not true at n, and thus is not Kaplan-true.

Furthermore, if there are improper n-contexts, Kaplan is also no longer justified in holding the view that 'something exists' is Kaplan-true, even in a logic countenancing empty circumstances of evaluation. His justification for the Kaplan-truth of the sentence resides in the fact that, for any context, the domain of the circumstance of evaluation $ev(n)$ of the n-context n (for the present purposes, the possible world n_w) will not be empty, since n_a will exist at that circumstance of evaluation.[5] Since 'something exists' is true at n if and only if it is true at n and n_w, then there will be no n-context n at which the sentence is false, and thus it is Kaplan-true, assuming propriety holds. And if propriety does not hold, then there will be n-contexts n such that n_a is not in n_l at n_t and n_w, and some of those contexts will thus be such that the domain of n_w is empty.

Other philosophers besides Kaplan have subscribed the position that these sentences are not only Kaplan-true, but also logically true. To give but one example, in arguing that it is not the case that non-propositional relata of logical consequence inherit their validity in virtue of the propositions they express, Gillian Russell [2008] presents 'I am here now' as a case of a logically true relatum which does not express a logically true proposition (assuming that propositions are logically true just in case they are true in every possible world). Concerning the empty premise argument with 'I am here now' as a conclusion, Russell states the following:

> This argument is *valid*, since 'I am here now' is a logical truth of Kaplan's logic LD [Kaplan, 1989a], yet the sentence did not inherit its validity from the proposition it expresses (...). What is special about this sentence is not that the proposition it expresses cannot be false, but rather that it cannot express a false proposition. [Russell, 2008, pp. 599].

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[5] This justification - just as the one for the Kaplan-truth of 'I am here now' - does not depend on circumstances of evaluation being equated with possible worlds instead of being equated with pairs of a possible world and a time or even with triples of a possible world, a time and a location. The point is that the parameters of the circumstance of evaluation $ev(n)$ of a n-context $n = \langle n_w, n_a, n_l, n_t, \ldots \rangle$ will be the identical to the ones present in n. That is, the possible world of n will be that of $ev(n)$, the same being the case with respect to the time of n and the place of n, in which case the sentence will be Kaplan-true, assuming that the propriety thesis is true.

Kaplan's justification for the propriety thesis seems to be of a post-semantic nature, originating from the *classical position* alluded above. As I see it, it originates from two post-semantic thesis. A natural stance to adopt once one adheres to the classical position is that the way in which contexts determine n-contexts is by providing them the parameters which are *present* at that context. If John utters 'I am in Amsterdam' while speaking on the phone, his use of the sentence-token is true (at that context where the utterance took place), just in case the corresponding sentence-type is true at an n-context that has John as the speaker-parameter (and, if circumstances are equated with possible worlds, at the world of the context). Prima facie, this applies generally, and thus the parameters in a n-context – when accounting for the truth of a use of a sentence-token at a context – are just the parameters present at the context. The first thesis required for the justification of the propriety thesis is thus presentism:

Presentism A sentence-token is true at a context c if and only if the character (associated with the sentence-type of which the token is a token of) is true at the n-context $n(c) = \langle n_w, n_a, n_t, n_l, \ldots \rangle$ determined by c, and the determination relation is such that $n(c)_w$ is the possible world present at the context, $n(c)_a$ is the agent present at the context, $n(c)_l$ is the location of the context and $n(c)_t$ is the time of the context.

The rationale behind the attribution of truth-conditions to sentence-types lies ultimately on how we perceive the truth of sentence-tokens should be accounted for, and given *presentism*, the role of n-contexts in the semantic stage seems to be to register all the parameters present at a context. Hence, presentism seems to entail that for each n-contexts, its parameters are those present at a given metaphysical and spatio-temporal location in which an episode of language use took place.

As shall be shown, *presentism* is not sufficient to establish propriety. The other position to which Kaplan seems to be adhering is the *production* thesis:

Production The contexts with respect to which the truth of uses of sentence-tokens is relative are those in which the speaker *produces* the sentence-token.

If production holds, then in every context the speaker is in the location, time and possible world of the context, and by presentism every n-context is such that the parameters it contains are those *present* at some context. Hence, the propriety thesis is true.

But there are some examples which seem to point in the direction that the propriety thesis is unjustified, in that their appropriate explanation leads to the rejection of presentism or production. The following example is provided in Predelli [1998, pp.402]:

> As you can see I am not at home now. If you hurry, you'll catch the evening flight to Los Cabos. Meet me in six hours at the Hotel Cabo Real.

The situation is that of a man who writes this message to his wife before leaving home, at 8 in the morning, being aware that she will come home at 5 in the evening. As Predelli notes, "Clearly, the note

does not convey the false content that Jones is not at home at the time the note was written, nor does he request that Mrs. Jones be at the Cabo Real at 2 in the afternoon, i.e., six hours from the time of inscription" [1998, p. 402].

I will focus on two explanations for how to account for the example. The first consists in endorsing an *intentionalist* stance on the determination of n-contexts by contexts, according to which the parameters of the n-context $n(c)$ of a given context c are determined, at least in part, by the *intentions* of the speaker at c. The other explanation is given by the *reproduction thesis*, according to which the contexts with respect to which the truth of (literal, declarative) uses of sentence-tokens is determined are those where the use is *received* by the participants in the conversation. *Intentionalism* is endorsed by, among others, Predelli [1998], and if it is true, then it entails that presentism is false.[6] As for the reproduction thesis, it is already mentioned by Kaplan [1989a], and attributed by him to Donnellan, and militates against the production thesis. Either way, the propriety thesis is shown not to be justified (note that the reproduction thesis is compatible with either presentism and intentionalism, and that intentionalism is compatible with production; and that if both the reproduction thesis and presentism are true, then the propriety thesis is false).

In addition, there are examples where sentence-tokens of the sentence-type 'I am not here now' seem to be used truthfully, arguably with their literal meaning. Examples include written messages left, for instance, at the door of a cabinet, in order to indicate that the cabinet's user is not there, recorded messages in answering machines, and also, in our days, messages left by internet users at instant messaging applications in order to indicate that their *status* is *away*. These examples, by themselves, already seem to militate against the Kaplan-truth of the sentence-type 'I am here now', since there must be n-contexts corresponding to the contexts where the token is false such that the sentence-type is false at those n-contexts and circumstances of evaluation of the n-contexts. In [2011] Predelli has argued that most of the available explanations of why tokens of 'I am not here now' are true at the relevant contexts imply the rejection of propriety (in fact, all of those he considers), thereby leading to the rejection of the Kaplan-truth of 'I am here now' and 'something exists'.

I don't think the propriety thesis is true. Post-semantic theses such as intentionalism and reproduction illustrate that assuming propriety would be adopting a biased view on compositional semantics originating from post-semantic considerations. In order for the theses of presentism and production to in fact entail that all n-contexts are proper, a further premise is required: that there all and only the n-contexts determined by a context. But the compositional semantics stage itself works as well as anyone could expect without crippling the set of n-contexts. Intentions can successfully be determined relative to any n-context n, regardless of whether there is a context determining n. Hopefully, post-semantic inquiry will reveal what are the relevant n-contexts determined by contexts (and it might just so happen that for any n-context there is some context determining it). But this is post-semantics. Determining the truth of *sentence-types* and *characters* does not require such inquiry, and should be compatible with the different

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[6]In [1998], Predelli even presents some putative examples of how the possible world of the n-context may differ from the possible world of the context (where the sentence-token is produced by the speaker).

positions on that inquiry. Hence, I reject the propriety thesis.

Even if the propriety thesis is in fact false, this does not imply that the class of Kaplan-validities is no different than the class of sentence-types usually taken to be logically true (in particular, it does not imply that the necessitation of all Kaplan-validities are Kaplan-validities). Despite the fact that 'I am here now' and 'something exists' turn out not to be Kaplan-truths, sentence-types ⌜actually φ if and only if φ⌝ are still Kaplan-valid, since their Kaplan-truth is independent of whether n-contexts are proper or improper, even though their necessitations are not Kaplan-valid.[7]

3.4 The problem with Kaplan's thesis*

Kaplan presents the following considerations for supporting the single relativization thesis:

> Every context occurs in a particular circumstance, and there are demonstratives such as 'actual' which refer to that circumstance. If you try out the notion of truth on a few examples, you will see that this is correct. If I now utter a sentence, I will have uttered a truth just in case *what I said*, the content, is true in *these* circumstances. [Kaplan, 1989a, pp. 522-523]

Recalling the distinctions between presemantics, compositional semantics and postsemantics, it can be seen that Kaplan's considerations in defense of the single relativization thesis are of a postsemantic nature, for they apply to the truth of (declarative, literal) uses of sentence-tokens. In this respect, Kaplan seems to be adopting a strand of the postsemantic position distinguished in the first section of the present chapter, by endorsing the view that *sentence-tokens* are true with respect to *contexts*. But it is difficult to see how such postsemantic considerations can justify a position on the truth of characters, given the fact that character truth is a notion of compositional semantics, not of postsemantics (unlike the notion of sentence-token truth).

Clearly, such singly relativized notion of character truth *can* be defined, but the question is whether it does the work it is supposed to do. The justification for Kaplan's thesis* stems not only from the single relativization thesis, but also from the analyticity thesis and the characters as relata thesis. What must be questioned is whether a singly relativized notion of truth for characters can make sense of logical truths as being such that their meaning is sufficient for their truth. It seems not, since at the level of compositional semantics n-contexts and circumstances of evaluation play different roles: n-contexts are the arguments required for the character of each sentence-type to yield a function from circumstance of evaluation to truth-values.

Kaplan himself, when addressing the question of whether sentences such as 'I say nothing' are logically true, explicitly says that they are not, since "Logic and semantics are concerned not with the vagaries of actions, but with the verities of meanings" [Kaplan, 1989a, pp. 584-585]. However, by providing a postsemantic justification for the single relativization thesis, Kaplan seems to be backpedaling on the matter

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[7]If circumstances of evaluation are pairs $ev = \langle ev_w, ev_t \rangle$, then ⌜now, φ if and only if φ⌝ is also Kaplan-valid (as is the sentence-type ⌜actually, now, φ if and only if φ⌝).

of whether logic and semantics are concerned with the vagaries of actions or the verities of meanings, since such postsemantic considerations would bring the vagaries of actions into the heart of logical consequence. But logic, it is assumed by holding that the analyticity thesis is true, is concerned with the verities of meaning. Hence, given the assumptions that the analyticity thesis and the characters as relata thesis hold, the singly relativized thesis must be rejected. Thus, Kaplan's thesis* is false, since it requires such notion of truth for characters.

3.5 The semantic interpretation and alternative theses on the nature of logical consequence

Even though Kaplan's thesis is false, it might be so that the semantic interpretation of two-dimensional semantics still makes room for more plausible positions on the nature of logical consequence, in particular for positions in line with both the contexts as cases thesis and the context-sensitive relata thesis.

Two alternative routes present themselves. The first consists in something like Kaplan's thesis*, with the difference that the truth of characters is taken as being relative both to n-contexts and circumstances of evaluation. The second position arises from considering the possibility that the relata of logical consequence are not, contra Kaplan, pairs of a sentence-type and a character, but sentence-tokens. This would allow for a notion of truth akin to a singly-relativized notion of truth for characters.

Doubly relativized truth of characters

The position arising from considering the truth of characters as doubly relativized is the following:

Doubly-relativized Kaplan's thesis* The conclusion of an argument is a logical consequence of its premises if and only if there is no n-context and circumstance of evaluation where the characters of the premises' sentence-types are true and the character of the sentence-type of the conclusion is false.

Doubly-relativized Kaplan's thesis* is a straightforward consequence of the analyticity thesis and the characters as relata thesis. Let me say of an argument that it is doubly-relativized Kaplan-valid if it turns out to be logically valid under the assumption that the doubly-relativized Kaplan's thesis* is true. It is easy to see that all doubly-relativized Kaplan-valid arguments are Kaplan-valid arguments. However, the converse does not hold. For instance, the necessitation of a doubly-relativized Kaplan-validity is also a doubly-relativized Kaplan-validity. However, this is not the case with respect to Kaplan-validity. This means that not only sentence-types such as 'I am here now' and 'something exists' are not doubly-relativized Kaplan-validities, but also that the same applies to ⌜actually φ if and only if φ⌝.

This means that if the doubly-relativized Kaplan's thesis* is true, then the conclusion of an argument follows logically from its premises only if it is metaphysically impossible for the premises to be true and the conclusion to be false. However, this does not mean that the doubly-relativized Kaplan's thesis*

implies the metaphysical necessity thesis, for that it is metaphysically impossible for the premises to be true and the conclusion to be false does not imply that an argument follows logically from its premises. For instance, let us assume that it is raining here and now. In such case, it is metaphysically impossible for 'actually it is raining here and now' not to be true (at the present context). However, the sentence is not a doubly-relativized Kaplan-truth, since there are contexts different than the present one at which it is not raining.

If the characters as relata thesis holds, then the doubly-relativized Kaplan's thesis* is in fact true – with the consequence that both the contexts as cases thesis and the context-sensitive relata thesis are true – since it is assumed that the analyticity thesis is true. Despite the fact that the class of doubly-relativized Kaplan-validities is a subclass of the class of Kaplan-validities, it will later on be seen that the doubly-relativized Kaplan's thesis* has the unfortunate consequence that if it is true, too many arguments turn out to be logically valid, contrary to what is in fact the case.

Sentence-tokens as the relata of logical consequence

Perhaps more sense can be made of Kaplan's proposal if logical consequence is, at least in some attenuated sense, taken to be more concerned with 'the vagaries of actions', something Kaplan himself would not subscribe to. The following position consists in a first attempt at making sense of Kaplan's proposal, where the relata of the relation constitute of *sentence-tokens*:

Warranted utterability thesis The conclusion of an argument is a logical consequence of its premises if and only if there is no context where the premises and conclusion are used with their customary meaning such that the premises are true and the conclusion is false.

Warranted utterability, however, also seems not to be true of logical consequence. As Predelli and Stojanovic mention [Predelli and Stojanovic, 2008], sentences-tokens such as 'there are at least six objects' turn out to be logically true under the assumption that the warrantedly utterability thesis holds, since in every context where they are uttered, there will be at least the six expression-tokens uttered. Yet, no one would grant that those sentence-tokens are true 'as a matter of logic'. John Buridan provides an example of an argument which illustrates the same point:

(7)   No sentence is negative. Therefore, no donkey is running.

Notice that the premise of the argument is 'self-defeating', in the sense that it is false whenever it is used with its customary meaning. Hence, the argument is logically valid, under the assumption that the warranted utterability thesis holds. As Buridan remarks, to accept the logical validity of (7) would cripple logic, in the sense that one would not be legitimized to use modus tollens, since the the conclusion of the following argument does not follow from its premise under the assumption that the warranted utterability thesis holds:

(8)   'Some donkeys are running. Therefore, some sentences are negative.'

Perhaps valuable reasons might be found for the rejection of modus tollens, but this does not seem to be one of them. In particular, 'no sentence is negative' should not result as being false 'as a matter of logic'. Resorting once again to the analyticity thesis, it seems clear that the reason why the conclusion of (7) is true in every context in which the premise of (7) is true is not that the meanings of the premise and conclusion of the argument are such that whenever the meaning of the premise is true, so is the meaning of the conclusion. Hence, the warranted utterability thesis violates the analyticity thesis, and thus is not a correct thesis on the nature of logical consequence.

It seems to me that an account having sentence-tokens as the relata of logical consequence would be closer to what Kaplan had in mind if sentence-tokens were *divorced* from their contexts of use. This would lead to a thesis on the nature of logical consequence that could perhaps be put in line with the analyticity thesis: since the sentence-tokens do not impose anything on the contexts where they are used, if they do turn out to be true in every context, it will have to be because their meanings (and how a sentence-token gets to be true in a context) suffices for their truth. This leads the way to the *tokened Kaplan's thesis*:

Tokened Kaplan's thesis A conclusion of an argument is a logical consequence of its premises if and only if there is no context where the premises (sentence-tokens with their customary meaning) are true and the conclusion (sentence-token with its customary meaning) is false, where a sentence-token with its customary meaning is true at a context c just in case the character of the sentence-token's type is true at $n(c)$ – the n-context determined by the context – and $ev(n(c))$.

Tokened Kaplan's thesis seems to be, in a sense, more in agreement with Kaplan's views on logical consequence, despite the fact that the position implies that the relata of logical consequence are sentence-tokens. In particular, it makes more sense of the position according to which "Validity is truth-no-matter-what-the-circumstances-were-in-which-the-sentence-was-used".

Endorsing the tokened Kaplan's thesis would have as a result that arguments such as 'it is raining. Therefore, it is actually raining' would be logically valid. The logical validity of the sentence-tokens 'I am here now' and 'something exists' would depend on whether all the n-contexts determined by a context c are proper (assuming that $ev(c) = ev(n(c))$). This means that – assuming that the tokened Kaplan's thesis holds – the necessitation of logical truths are not guaranteed to be logical truths.

Furthermore, arguments such as (7) ('No sentence is negative. Therefore, no donkey is running') would be logically invalid under the assumption that the tokened Kaplan's thesis holds. Despite the fact that uttering the premises of (7) is self-defeating – since by uttering it one would be contradicting the sentence – its character is in fact true at the n-contexts $n(c)$ of some contexts c and circumstances of evaluation $ev(n(c))$.

The tokened Kaplan's thesis seems nevertheless to go against the analyticity thesis. It is not the case that no matter when the meanings of the premises are true, the meaning of the conclusion is true as

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well. Clearly, the tokened Kaplan's thesis is incompatible with the analyticity thesis when the meanings in question are taken to be the propositions expressed by the premises and the conclusion of arguments. For instance, 'it is raining. Therefore, it is actually raining' is a tokened Kaplan-valid argument, while there are circumstances of evaluation at which the proposition expressed by the premise is true, while the proposition expressed by the conclusion is false. Hence, on such understanding of the analyticity thesis, the argument should not be logically valid, even though it turns out to be logically valid under the assumption that the tokened Kaplan's thesis holds. Furthermore, given the arguments above in defense of the view that the truth of characters ought to be doubly relativized, then the argument 'it is raining. Therefore, it is actually raining ' is not logically valid on the assumption that the analyticity thesis holds (of characters), even though it is logically valid under the assumption that the tokened Kaplan's thesis holds.

An argument against Kaplan's thesis*, doubly-relativized Kaplan's thesis*, and tokened Kaplan's thesis

Of the different thesis resulting from the adoption of the semantic interpretation of the two-dimensional framework only the doubly-relativized Kaplan's thesis* seems to more plausibly constitute a correct thesis on the nature of logical consequence. However, arguments such as the one to be presented constitute counterexamples not only to Kaplan's thesis* and the tokened Kaplan's thesis, but also to the doubly-relativized Kaplan's thesis*. The argument is the following:

(9)   Hesperus is Hesperus. Therefore, Hesperus is Phosphorus.

Argument (9) is Kaplan-valid, doubly-relativized Kaplan-valid, and tokened Kaplan-valid. However, the argument is generally assumed not to be logically valid. Arguably, one of the reasons why its logical validity is rejected is that it violates the rationality thesis and the normativity thesis. It seems that one is not irrational in maintaining that the premise of the argument is true while maintaining that the conclusion of (9) is false, and that it is not the case that one ought to accept the conclusion if the premise of the argument is accepted.

The argument turns out to be logically valid on the assumption that either Kaplan's thesis* holds, or the doubly-relativized Kaplan's thesis* holds, or that the tokened Kaplan's thesis holds, in virtue of the fact that the character of the premise is the same as the character of the conclusion. This forces the conclusion that none of these thesis on the nature of logical consequence is correct, a conclusion that I will accept.

Kaplan's thesis* and tokened Kaplan's thesis constitute defenses of option 2. (mentioned in the previous section) as the class of logically possible cases, while the doubly-relativized Kaplan's thesis* constitutes a defense of option 1. Insofar as both thesis are rejected, options 1. and 2. are taken to be implausible. Finally, since if an argument is valid-1 (in the sense of chapter 2) it is valid-3, argument (9) is valid-3. Hence, the reason for rejecting options 1. and 2. is also a reason for rejecting option 3. as being the class

of logically possible cases.[8]

Argument (9)'s logical invalidity seems to pose a more general problem. Under the assumption that the meanings of the premise and conclusion of (9) are either characters or propositions, the meaning of the premise will be true if and only if the meaning of the conclusion is true. Hence, adoption of the analyticity thesis seems to entail that the argument is in fact logically valid.

I think that Kaplan's surreptitious move towards a more 'speech-act oriented' conception of logical consequence brings some prospects with it. The idea is to conceive logic in a more pragmatic fashion, since, I believe, such conception promises to conciliate analyticity with some epistemic phenomena that, as I see it, account for the fact that the above argument is not logically valid *tout court*. The semantic interpretation of two-dimensional semantics is not appropriate for such purpose, but the meta-semantic interpretation of two-dimensional semantics seems to be. The main aim of the next section will be to try to account for the nature of logical consequence in such lines, and to see what follows with respect to the logically possible cases problem and the relata problem.

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[8]Argument (9) could be argued not to constitute a counterexample to any of the positions on logical consequence arising from the semantic interpretation of two-dimensional semantics since the character of proper names is better conceived of as not being constant, and thus the character of 'Hesperus' is different than that of 'Phosphorus', with the consequence that (9) is in fact logically invalid under the assumption that any one of the three thesis holds.

A view sharing some affinities to this position on the character of proper names will be considered in the next chapter, and its tenability will be questioned. The reason presented there is mainly the one why I am skeptical towards positions taking the character of proper names as being variable (a reason presented by Kaplan himself [Kaplan, 1989a]): these theories seem to confuse meta-semantic facts about reference fixing with semantic facts. For this reason in the present essay the position according to which the characters of proper names should be constant will be the one endorsed (nevertheless, I am aware that this is a question to be considered case-by-case, theory-by-theory, and that some theories about the character of proper names might be able to present persuasive reasons for why the characters of proper names should be variable).

Chapter 4

Logical consequence and the meta-semantic interpretation

The aim of the present chapter is to present two puzzles concerning logical consequence and the analyticity thesis, and to show that the meta-semantic interpretation constitutes a theoretical framework in which a solution to the puzzles can be provided.

The solution will be contrasted with a different one, of a semantic nature. It will be argued that the pragmatic solution seems more appropriate. Two reasons will be adduced for why this is so: i) the semantic solution implies the rejection of the primary relata thesis, a thesis that apparently has some plausibility, while the pragmatic solution does not; ii) contrary to what is the case with respect to the semantic solution, the pragmatic solution solves the puzzles without the need to postulate yet another level of meaning, a level which is arguably grounded on a confusion between semantics and meta-semantics. This last reason can be seen as an application of the law of parsimony: if our theory is already able to account for the data, there is no need to postulate another dimension of meaning.

The structure of the chapter is as follows: I begin by introducing the two puzzles; afterwards Gillian Russell's semantic solution is considered; in the third section a different, pragmatic solution to the puzzles based on the meta-semantic interpretation of two-dimensional semantics is presented; in the final section of the chapter it is argued that the pragmatic solution is to be preferred to the semantic solution.

4.1   Two puzzles concerning logical consequence and the analyticity thesis

In the first chapter the *primary relata thesis* was mentioned as a position on the relata of logical consequence adhered to by several logicians (or at least this was conjectured to be so by Gillian Russell [2008]):

Primary relata thesis The conclusion of an argument logically follows from its premises if and only if the proposition expressed by the conclusion logically follows from the propositions expressed by the premises, no matter what is the nature of the truth-bearers standing for the premises and

conclusion of the argument.

The primary relata thesis is not a thesis to the effect that the only relata of logical consequence are the primary relata (in the present essay understood as consisting in propositions). The thesis consists in the position that, whatever is taken to be the relata of logical consequence, the logical consequence relation obtains between those relata in virtue of the logical consequence relation obtaining between the propositions those relata express. There is an exact parallel with the notion of truth, since accepting that there are primary truth-bearers is not accepting that only primary truth-bearers are bearers of truth. It is only to accept that other truth-bearers are true in virtue of the propositions they express being true. Just as accepting the existence of primary truth-bearers is compatible with a *truth-bearer pluralism*, a position according to which there is more than one kind of truth-bearers, accepting the primary relata thesis is compatible with a *relata pluralism*, a pluralism about the relata of logical consequence. This contrasts, for instance, with Kaplan's thesis*, which is a *monist* position on the relata of logical consequence (according to which only sentence-types / sentence-type and character pairs are the relata of logical consequence).

In 'One True Logic?' [Russell, 2008] Russell points out that the primary relata thesis yields some prima facie disastrous conclusions concerning the class of logically valid arguments. She provides some arguments as examples of arguments generally accepted as logically invalid, whose logical validity is, prima facie, a consequence of the primary relata thesis; and other arguments as examples of arguments generally accepted as logically valid, whose logical invalidity is, prima facie, a consequence of the primary relata thesis. The point of Russell's argument is thus that i) there are truth-bearers and arguments such that when the premises and conclusion of the argument are those truth-bearers the relation of logical consequence does not hold between them, despite the fact that it holds between the propositions the premises stand for and the proposition that the conclusion stands for; and ii) there are truth-bearers and arguments such that when the premises and conclusion of the argument are those truth-bearers the relation of logical consequence holds between them, despite the fact that it does not hold between the propositions the premises stand for and the proposition the conclusion stands for. The examples provided can be separated into two classes: those with premises and conclusion involving indexicals and those with premises and conclusion involving proper names.

I am on the side of logicians in that I endorse the primary relata thesis, which already justifies my interest in Russell's arguments. Gillian Russell's argument for the logical validity of the examples assumes that propositions are structured, in the sense presented in chapter 1, and I show that by dropping this assumption the same conclusions that Russell reaches seem to follow. In the case of indexicals, the conclusions follow from the assumption that both the primary relata thesis and analyticity thesis hold; while in the case of proper names the conclusions seem to follow solely under the assumption that the analyticity thesis is true. This stresses my interest in Russell's examples, since they constitute puzzles concerning the truth of the analyticity thesis, an important assumption of the present essay.

Puzzles with indexicals

Consider the following arguments:

(1)   I am in Amsterdam. Therefore, you are in Amsterdam

and

(2)   I am here now.

Concerning (2), Gillian Russell argues that despite the fact that it *is* logically true, the assumption that the primary relata thesis holds implies that (2) is *not* logically true. Assuming that propositions are structured, this is so because (2), as used by Gillian Russell, expresses the proposition

(3) $\langle IsIn, \langle gr, banff \rangle \rangle$

(where $IsIn$ is the relation of being in, gr is Gillian Russell, and $banff$ is the town of Banff), a proposition that is not true at every circumstance of evaluation. Russell's reason for adopting the position that (2) is logically true stems from the fact that it is logically true on Kaplan's Logic of Demonstratives. However, it has been shown that this does not constitute a good reason to adopt the view that (2) is logically true, since the general theses behind Kaplan's logic are problematic, as argued in the previous chapter. Hence, (2) will not be regarded as posing any threat to the primary relata thesis, since besides the primary relata thesis predicting that it is logically invalid, it is not clear that this should not be the case.

With respect to argument (1), when Yossarian utters its premise to Orr and Orr communicates (1)'s conclusion to Yossarian, the logical validity of the argument seems to follow from the assumption that the primary relata thesis holds. The proposition (literally) expressed by the premise of (2), when Yossarian communicates it to Orr, is the following:

(4) $\langle IsIn, \langle yossarian, amsterdam \rangle \rangle$

Where $Isin$ is the relation of being in, $yossarian$ is Yossarian, and $amsterdam$ is the city of Amsterdam. This result is in line with the fact that Kaplan takes indexicals to be directly referential – directly contributing their reference to the proposition expressed, not some other "construct" under which the indexical's reference falls – and with the analysis of 'I' as directly referring to the speaker of the context. The structured proposition communicated by Orr's utterance of (1)'s conclusion is also (4), since the addressee of the context where Orr's utterance is performed is Yossarian. Under the minimal assumption that the logical consequence relation between propositions is reflexive (and that the primary relata thesis holds), it follows that argument (1) is logically valid. However, Gillian Russell takes it that argument (1) is generally accepted as logically invalid, this leading to the conclusion that the primary relata thesis must

be rejected.

One does not need to endorse a structured view on propositions for the conclusion that the argument is logically valid to be reached. The same conclusion can be reached by endorsing both the primary relata and the analyticity theses. Ever since Kaplan's work indexicals are widely accepted as being *rigid designators*, where this means that, relative to a context, they designate the same individual in all metaphysical possibilities where that individual exists, and that they designate nothing else in possible words where the object does not exist.[1] This has lead to the position (also endorsed by several philosophers of language, among them Kaplan himself) that, relative to a context, indexicals designate the same individual in all circumstances of evaluation (the circumstances with respect to which the truth of a proposition is evaluated) where the individual exists, and that they designate nothing else at the circumstances of evaluation where the object does not exist.[2][3]

That indexicals are rigid designators (relative to a context, and with respect to circumstances of evaluation) suffices for the conclusion to be reached that argument (1) is logically valid under the assumption that the primary relata and the analyticity theses hold. In the relevant contexts, the individual designated by the premise of (1) and the conclusion of (1) is the same, and thus it is the same in every circumstance of evaluation where that individual – Yossarian – exists. The proposition expressed by the premise will be true at a circumstance of evaluation *ev* if that individual – Yossarian – is in Amsterdam at *ev*; and the proposition expressed by the conclusion will be true at a circumstance of evaluation *ev* if that individual – Yossarian – is in Amsterdam at *ev*. The propositions have precisely the same truth-conditions. Hence, it follows that the argument is logically valid, on the assumption that both the primary relata thesis and the analyticity thesis hold.

Nevertheless, argument (1) is typically not taken to be logically valid. The reasons why the logical validity of the argument is rejected may be related to some pull felt in favor of the rationality and the normativity theses: it does not seem irrational to accept the truth of the premise of the argument without accepting the truth of its premise, and it seems that it is not the case that one ought to accept the conclusion if the premise of the argument is accepted.

Regardless of whether this is the reason why one is lead to the thought that argument (1) is logically invalid, the fact is that this is generally accepted to be the case. This means that the apparent logical invalidity of argument (1) constitutes a puzzle for proponents of the analyticity thesis such as myself. Given the puzzle, two options are available: i) to bite the bullet and accept that the argument is in fact logically valid, a plausible story concerning the reason why there is the illusion that it is logically invalid being also required; ii) to show that the argument is not cogent, in which case a) the primary relata thesis

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[1] See *Naming and Necessity* [Kripke, 1980] for more on rigid designation.

[2] This version of rigid designation for circumstances of evaluation is reject by some theorists – for instance, those that take metaphysically impossible epistemic possibilities to be circumstances of evaluation.

[3] Rigid designation can be *persistently rigid* or *obstinately rigid*, as Salmon calls designates the two varieties [Salmon, 1981, p. 34]. It is persistently rigid if the same individual is designated in every metaphysical possibility in which it exists, and nothing is designated in metaphysical possibilities in which it does not exist, and it is obstinately rigid if the same individual is designated in every metaphysical possibility, even those where the individual does not exist (both persistently rigid designation and obstinately rigid designation have correlates for the general case of circumstances of evaluation).

is rejected, or b) the argument is shown to be invalid (given the assumption of the present essay that the analyticity thesis is true).

A puzzle with proper names

Gillian Russell's puzzle involving proper names is directly related to the argument

(5)   Hesperus is Hesperus. Therefore, Hesperus is Phosphorus

presented in the last chapter. Assuming once again that propositions are structured, the premise of (5) expresses the proposition

(6) $\langle \doteq, hesperus, hesperus \rangle$

where $\doteq$ is the identity relation, and *hesperus* is Venus.

If *Millianism* is endorsed then the meaning of proper names is just their reference, and thus this is the only constituent that proper names provide to propositions expressed by sentences in which they occur). This means that the proposition expressed by the conclusion of argument (5) is also proposition (6). From this it follows – again by the reflexivity of the logical consequence relation – that argument (5) is logically valid, under the assumption that the primary relata thesis holds. However, as was the case with respect to argument (1), argument (5) is commonly taken as being logically invalid. Hence, it seems that the primary relata thesis must be rejected.

Even dropping the assumption that the primary relata thesis holds, the conclusion that argument (5) is logically valid still follows, now on the assumption that the analyticity thesis holds. Furthermore, one does not need to subscribe to a view of propositions as being structured in order to reach such conclusion. Kripke [1980] has persuasively argued that proper names are *rigid designators* (with respect to metaphysical possibilities). Other philosophers of language have gone beyond Kripke, endorsing the position that proper names rigidly designate with respect to every circumstance of evaluation.

The thesis that proper names rigidly designate (with respect to circumstances of evaluation) yields the result that 'Hesperus is Hesperus' and 'Hesperus is Phosphorus' are true with respect to the same circumstances of evaluation. 'Hesperus' and 'Phosphorus' actually designate the same object – Venus – and identity is a relation that holds between an object and itself, in which case whenever the proposition expressed by 'Hesperus is Hesperus' is true, so is the proposition expressed by 'Hesperus is Phosphorus', and vice-versa. Furthermore, the premise and conclusion of (5) have constant characters: the value of their characters will always be the same, no matter the context that is taken as an argument of the (character) function. This means that whenever the character of the premise of (5) is true, so is the character of the conclusion (and vice-versa). Hence, it seems to follow from the analyticity thesis that argument (5) is logically valid, if character and content exhaust the available options concerning the meaning of an expression (in terms of truth-conditions).

Just like argument (1) is commonly taken to be logically invalid, the same is the case with respect to argument (5). Again, the reason might be some adherence to the rationality and normativity theses. This constitutes another puzzle for the analyticity thesis. As before, two solutions are available, to endorse the position that the argument is logically valid and explain the illusion of logical invalidity, or to reject the cogency of the argument showing that (5) is logically valid. There is nevertheless an important difference between the two puzzles: if the cogency of the argument is rejected, it cannot be argued that this is so because one of its premises is false. The only premise of the argument is the analyticity thesis itself, and the supposition of its truth is being taken as non-negotiable in the present essay.

4.2   Reference determiners: a semantic solution

In the previous section I have shown that Gillian Russell rejects the primary relata thesis. Nonetheless, I take her as endorsing the analyticity thesis. In fact, she explicitly says that "analyticity is quite naturally regarded as a kind of natural language analogue to formally defined logical truth" [Russell, 2010, p. 189]. Hence, argument (5) and the fact that its logical validity seems to follow just from the analyticity thesis is something that constitutes a worry also for Russell.

In [Russell, 2010] Russell argues for the existence of a level of meaning, *reference determiner*, distinct from both character and content. She motivates this level of meaning by distinguishing three semantic roles usually associated with meaning, those of i) determining extension, ii) being known to speakers and iii) being contributed to propositions. The role of being that which is contributed to propositions is associated to content, and the role of being what is known to speakers is associated with character. Concerning this novel level of meaning, it is characterized in the following way:

> The *reference determiner* of an expression is what determines the function from the way the world is to the extension of the expression. ... The usual facts about the reference-determining of meaning all hold; if two expressions have the same reference determiner, they have the same referent with respect to all possible worlds. [Russell, 2010, p. 193]

In the same manner as Kaplan about character, Russell provides the following way of thinking about reference determiners:

> I suggest that we think of a reference determiner for an expression as a function from contexts of introduction and contexts of utterance to contents, or what amounts to much the same thing, a function from a context of introduction, context of utterance and a circumstance of evaluation to a referent. [Russell, 2010, p. 195]

Contexts of introduction are required in order to account for the reference determiners of proper names and natural kind predicates. The context of introduction of an expression consists in the state of the world at the time when the expression was introduced.

Gillian Russell defines analyticity in the following way:

A sentence S is analytic just in case for all pairs of context of introduction (c_i) and context of utterance ($c_u = \langle a_{c_u}, p_{c_u}, t_{c_u}, t_{c_u} \rangle$), the proposition expressed by S with respect to $\langle c_i, c_u \rangle$ is true at w_{c_u} and t_{c_u}. [Russell, 2010, p. 195]

A sentence is thus taken to be analytic by Russell just in case having the reference determiner it has is sufficient for it to be true.

It is straightforward to see how reference determiners allow the puzzle with proper names to be solved. The argument for the logical validity of (5) is seen as possessing a false hidden premise: that meanings of sentences are either characters or propositions. But, reference determiners provide a different kind of meaning, relative to which the analyticity thesis may hold without it being the case that (5) is logically valid. It will not be logically valid, Russell argues, for the reference determiners of 'Hesperus' and 'Phosphorus' are different. Assuming that the reference determiner for 'Hesperus' is something like *the brightest object in the night sky* and that the reference determiner for 'Phosphorus' is something like *the brightest object in the morning sky*, there will be contexts at which the reference determiner of 'Hesperus' will pick an object different from the object picked by the reference determiner of 'Phosphorus'.

4.3 What is *really* expressed: a pragmatic solution

While Russell's solution to the puzzle is of a semantic nature, arguing that the puzzle arises from not acknowledging the existence of another dimension of meaning, my own solution to both puzzles is that they only arise because pragmatic mechanisms through which secondary truth-bearers are associated to propositions are not taken into account. If such mechanisms are taken into account, the puzzle dissipates.

In what follows I will not only endorse the analyticity thesis, but also the primary relata thesis. Thus, whether the relation of logical consequence holds between secondary truth-bearers depends on the propositions with which those truth-bearers are associated.

The following thesis corresponds to what must be the case when the primary relata of logical consequence are taken to be propositions and the analyticity thesis is assumed to hold:

Propositional consequence thesis If the relata of logical consequence are taken to be propositions, then the conclusion of an argument is a logical consequence of its premises if and only if there is no circumstance of evaluation ev such that the premises are true at ev and the conclusion is false at ev.

The primary relata thesis also makes natural a pluralism about the relata of logical consequence. Since sentence-types express propositions relative to n-contexts then the following is a plausible position on logical consequence when its relata are taken to be sentence-types:

Sentence-type consequence thesis If the relata of logical consequence are taken to be sentence-types, an argument is logically valid *at n-contexts* n_0, n_1, n_2, ... if and only if there is no circumstance of evaluation at which the propositions expressed by premises P_1, P_2, ... at n_1, n_2,... are all true and the proposition expressed by the conclusion at n_0 is false.

This has the effect that logical consequence, when the relata are sentence-types, obtains relative to n-contexts.

On the other hand sentence-tokens express propositions relative to contexts. Relative to a context, a sentence-token can be said to express more than one proposition. For instance, in a context c where Yossarian has failed badly at an exam a sentence-token of

(7)   Yossarian has excellent calligraphy

used has an answer to the question of how did Yossarian do in the exam not only *literally* expresses the proposition that Yossarian has excellent calligraphy but also *really* expresses the proposition that Yossarian failed (badly?) at the exam.

Literally expressed thus contrasts with *really expressed*. The proposition literally expressed by a sentence-token is the proposition expressed at the n-context determined by the context at which the token is produced/used by the sentence-type of which the token is a token of. As for the proposition really expressed by a sentence-token, it will not always be that which the token literally expresses. The meta-semantic interpretation of two-dimensional semantics is grounded on the existence of such distinction. While what is really expressed by a sentence-token always depends on the shared presuppositions of the participants of the conversation, what is literally expressed by a sentence-token (at least sometimes) does not. For instance, while 'Hesperus is Phosphorus', qua a sentence-token of English, literally expresses, at every context, a proposition true at every circumstance of evaluation, it will really express different propositions at different contexts (some of which may not be true at every circumstance of evaluation), depending on what is common ground between the participants of the conversation at that point.

There are thus two corresponding positions on logical consequence when the relata are taken to be sentence-tokens:

Literal sentence-token consequence thesis If the relata of logical consequence are taken to be sentence-tokens with their *literal* meaning, an argument is logically valid relative to contexts $(c_0, c_1, c_2, \ldots)$ if and only if there is no circumstance of evaluation at which the propositions *literally* expressed by the premises P_1, $P_2, \ldots$ at c_1, c_2, $\ldots$ are all true, and the proposition *literally* expressed by the conclusion at c_0 is false.

Real sentence-token consequence thesis If the relata of logical consequence are taken to be sentence-tokens with their *real* meaning, an argument is logically valid relative to contexts $(c_0, c_1, c_2, \ldots)$ if and only if there is no circumstance of evaluation at which the propositions *really* expressed by the premises P_1, $P_2, \ldots$ at c_1, c_2, $\ldots$ are all true, and the proposition *really* expressed by the conclusion at c_0 is false.[4]

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[4]Note that the relativity of logical consequence according to the sentence-type consequence, literal sentence-token consequence and real sentence-token theses is relative to possibly many distinct n-contexts / contexts, not necessarily solely one. The point is perhaps easier to appreciate concerning the relation of consequence when the relata are sentence-tokens, since in this case it is easier to see that the tokens could have been used in different contexts, with consequences for the propositions that

The two puzzles revisited

Concerning argument (1) it is not clear what Gillian Russell takes its relata to be when (1)'s logical validity is a consequence of the primary relata thesis and the analyticity thesis, despite the fact that the argument is, Russell, believes, logically invalid.

When the premises are sentence-types, then (assuming the sentence-type consequence thesis) there will be n-contexts with respect to which the argument is logically valid, and n-contexts with respect to which the argument is not logically valid. If n_0 differs from n_1 just in that the speaker of n_1 is Yossarian and the addressee of n_1 is Orr, and the speaker of n_0 is Orr and the addressee of n_0 is Yossarian, then the argument is logically valid at n_0 *and* n_1. However, in all n-contexts n_0, n_1 such that the addressee of n_0 is not the speaker of n_1, the argument will be logically invalid at n_0, n_1. The relevant n-contexts n_0 and n_1 seem to be those determined, respectively, by the context where Yossarian used a sentence-token of (1)'s premise, and the context where Orr used a sentence-token of (1)'s conclusion. Relative to such n-contexts, the argument will be logically valid, under the assumption that the sentence-type consequence thesis holds).

And if the premises are sentence-tokens, then, plausibly, the argument is logically valid (relative to the contexts c_0 where Orr used the conclusion and the context c_1 where Yossarian used the premise) both under the assumption that the literal sentence-token thesis holds, and under the assumption that the real sentence-token thesis holds.

It thus seems that Gillian Russell's claim that there is no circumstance of evaluation at which the proposition expressed by (1)'s premise is true while the proposition expressed by (1)'s conclusion is false must be qualified, since sentence-types express propositions relative to n-contexts, and sentence-tokens express propositions relative to the contexts in which they are used. Assuming that the relevant contexts are the ones where Yossarian used the premise and Orr used the conclusion, and that the relevant n-contexts are such that the speaker of n_1 is the addressee of n_0 (that it is, Yossarian) – the argument is logically valid relative to those contexts and n-contexts.

Assuming the relevant contexts are the ones where Yossarian used the premise and Orr used the conclusion, and that the relevant n-contexts are the ones where the speaker of n_1 and the addressee of n_0 are one and the same individual, Yossarian, my solution to puzzle with indexicals consists in biting the bullet and accepting that, relative to those contexts, the argument is logically valid.

Still, the illusion of logical invalidity can be explained by the fact that i) the logical validity of the arguments, regardless of whether they are taken to be sentence-types or sentence-tokens, is relative to contexts and n-contexts; ii) the fact that, relative to some contexts / n-contexts, the argument is logically invalid; iii) it might not be irrational to accept the premises while rejecting the conclusion (and it might not be the case that one ought to accept the conclusion if the premise is accepted) since one might not

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get to be related (an example will be provided of an argument where the fact that the tokens were used in different contexts is important in the evaluation of logical validity). The point also applies to logical consequence when the relata are sentence-types, since what matters for logical consequence are just the propositions expressed – under the assumption that the primary relata thesis holds –, and these need not be determined with respect to the same n-context.

be aware of the contexts / n-contexts with respect to which the logical validity of the argument is being determined. As a matter of fact, if one is unaware of the context / n-context relative to which the logical validity of the argument is being determined, it would be irrational to accept the truth of the conclusion given that the truth of the premise was accepted.

Gillian Russell also is not explicit with respect to what are the relata that she is taking into consideration when formulating the puzzle with proper names. Nonetheless, she considers the possibility that the relata responsible for the logical invalidity of the argument (5) are utterances. If the relata are taken to be either sentence-types or sentence-tokens with their literal meaning the argument is logically valid. The propositions expressed by the sentence-tokens are the ones expressed by the sentence-types of which the utterances are tokens, and for every n-contexts n_1 and n_2, the proposition expressed by the sentence-type of the premise of (5) at n_1 is the same as the proposition expressed by the sentence-type of the premise of (5) at n_2; and the proposition expressed by the sentence-type of the conclusion of (5) at n_1 is the same as the proposition expressed by the sentence-type of the premise of (5) at n_2. Concerning these propositions, there are no circumstances of evaluation ev such that the proposition expressed by the premise is true at ev while the proposition expressed by the conclusion is false at ev. The argument will thus be logically valid relative to any context / n-context, since the propositions expressed are the same relative to any n-context.

If the relata of logical consequence are assumed to be sentence-tokens with their real meaning, then whether or not the argument is logically valid is something context-dependent (assuming that the real sentence-token consequence thesis holds). There are contexts such that the propositions *really* expressed by the premise and conclusion of (5) are such that there is a circumstance of evaluation ev such that the proposition really expressed by the premise is true at ev and the proposition really expressed by the conclusion is false at ev. If the common grounds of contexts c_0 and c_1 are such that it is presupposed that 'Hesperus' and 'Phosphorus' have the same reference (e.g., if it was presupposed that both 'Hesperus' and 'Phosphorus' refer to the brightest object in the morning and evening skies), and that the 'is' stands for the relation of identity, then the argument is logically valid. However, if the only thing about the semantic properties of the expression-token 'Hesperus' that was a shared presupposition in c_1 and c_2 was that the token refers to the brightest object in the evening sky, and the only thing about the expression-token 'Phosphorus' that was a shared presupposition was that the token refers to the brightest object in the morning sky, then the argument is logically invalid.

This suggests that the same strategy that was used in order to solve the puzzle with indexicals can be used to solve the puzzle with proper names. With respect to contexts where the propositions really expressed are those literally expressed, argument (5) is logically valid. Even if prima facie the contexts relevant for the puzzle with proper names have this property, the illusion of logical invalidity can be explained through the fact that the argument is taken as being logically invalid because one envisages the possibility of ignorance to 'Hesperus' and 'Phosphorus' being correferential, and in contexts where their correferentiality is ignored, the argument is not logically valid (assuming, as I do, that the literal sentence-

token thesis holds). Furthermore, in general, it is not irrational to accept the premises while rejecting the conclusion of (5) (and it is not be the case that one ought to accept the conclusion of the argument if the premise is accepted), due to the fact that at some contexts argument (5) is in fact logically invalid.

Idealized consequence

I suggest that the illusion of logical invalidity is further explained by the fact that when making judgments of logical validity / logical invalidity we may sometimes appeal to an idealized relation of consequence that has pragmatics *built into it*, a relation which serves as a surrogate of the logical consequence relation.

The appeal to this surrogate may be advisable in several situations due to the fact that it makes some idealizations concerning the conditions under which the premises and conclusion of an argument express propositions, idealizations that allow for an easier recognition of the propositions with which the premises and conclusions are to be associated with.

My suggestion is thus that we sometimes appeal to the following consequence relation as a surrogate of the logical consequence relation:

Definition (Idealized consequence (in English)). *The conclusion of an argument is an idealized consequence of its premises* in English – *premises and conclusion being sentence-types – if and only if there is no circumstance of evaluation ev such that if tokens of the sentence-types were used at any context c^* the propositions those tokens would really express at c^* are all true at ev, while if a token of the conclusion were used at c^*, the proposition that token would really express at c^* is false at ev.*

The contexts c^* alluded to in the definition are such that all of them have the same common ground c^*, which consists in the following presuppositions:

1. That the participants in the conversation know what is the language being spoken (English);

2. That the sentence-tokens of the premises and conclusion of the argument are being used in the context;

3. That the speakers fully know the meaning of the expressions of the language whose meaning is not essentially dependent on some factor external to the speaker.

The relation constitutes an idealization in at least two ways: i) the premises and conclusion of an argument (or tokens of them) are assumed to be used all at the same context; ii) the shared presuppositions of the participants in the conversation are supposed to reflect what can realistically be expected to be their common ground. This last idealization thus shows that the idea behind idealized consequence has some indeterminacy associated with it. Even though in defining idealized consequence it was stated in a determinate way what the common ground of the participants should realistically be expected to be, it is not clear that we have such determinate account of what the common ground should be.

Idealized consequence relates sentence-types, even though the propositions with which premises and conclusion are associated are determined via what would be really expressed by sentence-tokens of those

types if they were uttered at a context c^*. This is also an idealization, but again it seems to be useful from a cognitive perspective since it allows for sentence-types to be taken as relata of logical consequence without any questions concerning what are the n-contexts relative to which the propositions expressed by the sentence-types are to be determined. Some suitable modifications to idealized consequence provide a version of the relation having sentence-tokens as its relata.

In order to further motivate the idealizations, let me consider some arguments where these idealizations seem to be doing some work concerning our judgments of logical validity.

The following is an example of a seemingly logically valid argument, provided by Williamson [1997]:

(8)   Judy is dancing; Judy is singing. Therefore, someone is both dancing and singing.

As Williamson notes, despite the fact that the argument seems to be logically valid, if the relata are taken to be sentence-tokens then they may have been used at different contexts. The first premise may have been used at a context where Judy was dancing and it was presupposed that this was so, while the second premise may have been used at a context such that Judy was singing but not dancing at that context, and this was presupposed was well. In such case, if the context where the conclusion is used is, for instance, just like the one where the second premise was used – in that Judy is dancing but not singing in such context – the argument will be logically invalid according to the literal and real sentence-token consequence theses. If the relata are assumed to be sentence-types, then the argument is also logically invalid at the n-contexts determined by those contexts, assuming that the sentence-type consequence thesis holds.[5]

Something similar seems to occur with respect to the following argument:

(9)   I am dancing; I am singing. Therefore, someone is both dancing and singing.

Despite the fact that the argument is commonly taken as being logically valid, its logical validity is relative to contexts – if the relata are taken to be sentence-tokens – or to n-contexts – if the relata are taken to be sentence-types.

However, assuming the literal sentence-token consequence thesis holds, if the relata are taken to be sentence-tokens with their literal meaning, and if the context at which the first premise is being used is such that Judy is the speaker, and the context at which the second premise is being used the speaker is Yossarian, then the conclusion does not logically follow from the premises at those contexts (and the one in which the conclusion is being used). Similar considerations apply when the relata are taken to be sentence-types and also when they are taken to be sentence-tokens with their real meaning.

This points to the idea that we judge both arguments to be logically valid due to the fact that the

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[5]It is perhaps easier to see this if circumstances of evaluation are assumed not to have a time parameter, in which case 'is dancing' and 'is singing' can be assumed to be context-sensitive. Under this assumption the proposition expressed by 'Judy is dancing' at n_1 can be taken to be equal to the proposition that Judy is dancing at n_{1_t}, while the proposition expressed by 'Judy is singing' at n_2 can be taken to be equal to the proposition that Judy is singing at n_{2_t}. Since the times are different, it does not follow that someone is both dancing and singing at n_{2_t}.

premises and conclusion of an argument (or tokens of them) are assumed to be used all at the same context. This is the first of the idealizations that I have mentioned as being present in idealized consequence. Crucially, both arguments are judged to be ideally valid.

Consider now the following argument, commonly judged to be logically invalid:

(10)   I am in Amsterdam. Therefore Yossarian is in Amsterdam.

The pull towards the logical invalidity of (10) can be explained in the same way as the pull towards the logical invalidity of argument (5), and has to do with what is reasonably and realistically taken to be the common ground of the participants in the conversation in most situations.

Focusing on argument (10), Stalnaker's meta-semantic interpretation of two-dimensional semantics provides the means for determining the proposition expressed by the token of the premise of (10) at c^*. Stalnaker proposes three rules governing assertion (I will be adopting Soames's formulation in [Soames, 2006]):

1. A proposition asserted should always be true in some but not all possibilities in the context-set;

2. Any assertive utterance should express a proposition, relative to each possibility in the context set, and that proposition should have a truth-value in each possibility in the context set;

3. The same proposition should be expressed relative to each possibility in the context set.

The first rule is motivated by the fact that, if an assertion is uninformative, then it fails to perform its essential function of narrowing down the context set; and if an assertion is false at every world in the context set, it contradicts the presuppositions already established.

The thought behind the second rule is that if a proposition is neither true nor false relative to some possibility in the context set the assertion will not determine whether that possibility should remain in the context set or if it should be eliminated instead. Given assertion's essential function, this should be avoided.

Finally, the rationale for the third rule is that if the rule is violated then the participants in the conversation will be ignorant with respect to which proposition was asserted, since their context set is compatible with the fact that different propositions were asserted, and thus, once again, an assertion cannot perform its essential function.

Of present interest is the third rule. Since at c^* the participants are ignorant of the identity of the speaker, different propositions are determined relative to each of the possibilities in the context set. Relative to a possibility in the context set where the speaker is Yossarian the proposition literally expressed will be the same as the proposition that Yossarian is in Amsterdam; relative to a possibility in the context set where the speaker is Orr the proposition expressed will be the proposition that Orr is in Amsterdam; etc. Since the third rule is violated, reinterpretation is required. In such case, the proposition *really* ex-

pressed is the *diagonal proposition*, which is (roughly) equivalent to the proposition that the speaker of the token 'I am in Amsterdam' is in Amsterdam.[6]

This means that the conclusion of argument (10) is not an ideal consequence of its premise. The proposition expressed by a token of 'Yossarian is in Amsterdam' in c^* is the same as the proposition that would be literally expressed by the token, given the presuppositions in play at c^*. Since the proposition that Yossarian is in Amsterdam is not a logical consequence of the proposition that the speaker of the token 'I am in Amsterdam' is in Amsterdam, (10) is not ideally valid.

The ideal invalidity of (5) is explained in the same way that the ideal invalidity of (10). The presuppositions at play in context c^* are those that the participants in the conversation can reasonably be assumed to possess. But, given *semantic externalism* – the view that meaning is determined, in whole or in part, by factors external to the speaker – it seems that, concerning expressions whose meaning is essentially dependent on some external factor, that part of their meaning which is determined by external factors should not be presupposed to be known by the participants in a conversation. For instance, in the case of proper names and indexicals speakers are not presupposed to know their reference, despite the fact that, at least concerning indexicals, speakers are presupposed to know a component of their meaning, their character.

Argument (5) is, as expected, ideally invalid. What the proposition that the conclusion of the argument expresses is, roughly, that the object referred to by 'Hesperus' is the same as the object referred to by 'Phosphorus', while the proposition expressed by the premise is (roughly) that the object referred to by 'Hesperus' is the same as the object referred to by 'Hesperus'. Clearly, there are circumstances of evaluation at which the former proposition is false and the latter proposition is true.

It is also interesting to note that, prima facie, the sentence-type 'I am here now' is a Kaplan-truth if and only if it is an *ideal truth*, this being dependent on whether the propriety thesis holds (the proposition expressed by the token at c^* being roughly equivalent to the proposition that the speaker of 'I am here now' is in the place and time determined by the context where 'I am here now' is being used); and that the sentence-type 'actually it is raining if and only if it is raining' is, it seems, an ideal truth (the proposition being expressed by a token of the sentence-type, at c^*, being, roughly, the proposition that the token 'it is raining' with its literal meaning is true if and only if it is raining). Idealized consequence thus seems to also capture some of the intuitions behind Kaplan's thesis*. The difference is that each of these sentence-types is not an ideal truth in virtue of the fact that, for any n-context, the proposition expressed at that n-context is true at the circumstance of evaluation determined by the n-context, but in virtue of the fact that the proposition that is expressed by a token of the sentence-type at a context where only a minimal semantic knowledge is presupposed is true in every circumstance of evaluation.

Idealized consequence can thus be seen as being closely related to the rationality and formality theses, which seems to constitute a reason for why it accommodates our judgments of logical validity and inva-

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[6]This is not to say that the proposition *really* expressed is always the diagonal proposition, but only that it sometimes is.

lidity.[7] In several situations people are less than fully equipped on what concerns the semantic properties of some expressions, and thus with respect to what should be the proposition associated with a sentence. In such situations propositions are still expressed, with those propositions being more easily associated with the sentence by whoever is interested in evaluating the argument than the propositions literally expressed. If the argument is ideally invalid, then it does not seem to be irrational to accept the conclusion while not accepting the premises, for one has (prima facie) a more immediate access to the propositions associated with the sentences than to the propositions literally expressed, and (arguably) can discern that there are circumstances of evaluation where the propositions expressed by the premises are all true while the proposition expressed by the conclusion is false. Similarly, if the argument is ideally valid, then with respect to the propositions one associates with the sentences no circumstance of evaluation can be discerned at which all the propositions associated with the premises are true and the proposition associated with the conclusion is false, and thus one would be irrational to accept the truth of all of the premises while rejecting the truth of the conclusion.

Idealized consequence and logical consequence

Idealized consequence is also in agreement with the analyticity and primary relata theses. The meanings relevant for determining whether the relation holds or not are propositions, and with respect to these pragmatic consequence is defined in such way that the analyticity thesis holds. The same happens with respect to the primary relata thesis: the relation between sentence-types is inherited from the relation between the propositions with which the sentence-types are associated. What is not standard is the way in which the sentence-types are associated to propositions. Since this consequence relation also seems to be linked to the rationality and normativity theses, and to account for our judgments of logical validity / logical invalidity, one may wonder whether it should not be *equated* to logical consequence, instead of being a mere surrogate for the relation.

In what follows I will argue that this is not a plausible position to hold. To this equation it will be objected that the cognitive concerns giving rise to idealized consequence also yield some counter-intuitive results concerning the logical validity of some arguments. I do not take these counter-intuitive results as evidence that the relation is not useful some theoretical / practical purposes, but of the fact that such usefulness comes with a cost.

Diagonal propositions have, prima facie, a truth-value that is determined only at the metaphysical possible worlds belonging to the context set. Recall what was mentioned in chapter 2 about the truth of

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[7]These judgments are probably couched on theoretical commitments. As mentioned, these might be commitments to the rationality and normativity theses. It should be pointed out that these positions (at least as they were construed in chapter 1.) are perhaps objectionable on grounds similar to the ones that lead Williamson to object to the epistemic conception of analyticity. For instance, given the analyticity thesis, the argument 'Every bachelor is an unmarried man' is a logical truth. However, the philosopher McWatt of chapter 1 would not assent to the sentence – even while understanding it – due to its deviant theory about the semantic behavior of the universal quantifier as implying the existence of bachelors. Arguably, it is not the case that McWatt is not irrational in not accepting the truth of 'every bachelor is married', since his rejection of its logical truth came precisely from rational inquiry.

sentence-tokens of (11):

(11)   Stick S is one meter long.

Assume context c' is such that in it the shared presuppositions are that S refers to an object satisfying the description 'is a meter long', that English is the language being spoken and that the meanings of all the other expressions are known, the sentence-token has a true diagonal *relative to the possible worlds on the context set* (the diagonal proposition expressed by a sentence-token φ is the proposition that is true at a metaphysical possibility w if and only if the proposition expressed in w by φ is true at w).

If one extends the diagonal proposition associated with (11) to possibilities not compatible with the shared presuppositions of the participants in the conversation, the sentence will get different truth-values. Two problems arise (the latter being a special case of the former): what is the truth-value that the proposition gets at possibilities incompatible with what is presupposed; and what is the truth-value that the proposition gets at possibilities in which the sentence-token is not present.

For instance, in a world w where all presuppositions are true except that S does not satisfy the description 'is a meter long' sentence (11) turns out to be false at w. And in a different world w' where the sentence-token does not exist the sentence-token arguably has no truth-value.

To illustrate why this is problematic for the equation of logical consequence with idealized consequence, consider a sentence-token of (12):

(12)   Actually English is being spoken.

The third of the rules governing assertion proposed by Stalnaker is violated: the sentence-token expresses different propositions at different possibilities in the context set. Hence reinterpretation is required, the diagonal proposition being that which is being really expressed. But, according to idealized consequence it is being presupposed that the token is present in the context c^*, and that the participants know the meaning of the corresponding sentence-types. The effect is that (12) is true at every possibility in the context set of c^*. In such case it is advisable, one would think, to look at the truth-value of the sentence-token at other possibilities besides the ones in the context set. If (12) is not to count as an ideal truth, at least a circumstance of evaluation at which the proposition really expressed by the token is false is required (the interest in not counting (12) as an ideal truth resides in that the general impression towards the sentence-type 'Actually English is being spoken' is that it is *not* logically true).

Looking at possibilities not in the context set allows for the consideration of the truth of (12) at possible worlds where the presupposition that the expressions have the meaning they have in English is dropped. There will be possibilities with this feature such that the token (12) is false at those possibilities. This seems to be precisely what is required. However, the consideration of such possibilities is problematic for the equation of idealized consequence with logical consequence. The problem is that, in such cases, logically valid arguments such as

(13)   Actually Yossarian is a bombardier. Therefore, actually Yossarian is a bombardier or actually
         Yossarian is French

turn out not to be ideally valid. This can be appreciated by considering a possibility w just like the actual
world except that the meaning of 'or' at such possibility is the meaning of 'and' at the actual possible
world, in which case the premise is true at w while the conclusion is false at w.

   Thus, if idealized consequence is to be equated with logical consequence the truth-values at possible
worlds not in the context set of c^* of the propositions really expressed at c^* by sentence-tokens cannot be
those that would result from extending the diagonal proposition to those worlds.

   The other problem concerns possibilities where the sentence-tokens do not occur. In such possibilities
there is no proposition that is expressed by a sentence-token, in which case it seems that the diagonal
proposition should have no truth-value at that possibility. This could be seen as an advantage. Since
propositions will have no truth-values at some possible worlds anyway, the position could be adopted
that the proposition really expressed at c^* by a sentence-token is such that it has no truth-value at any
possible world not in c^*'s context set. By conjoining this option with the position that truth is the only
designated truth-value (i.e. that the relation of idealized consequence obtains if there is no circumstance
of evaluation ev such that the propositions really expressed by the sentence-tokens of the premises are
all true at ev and the proposition really expressed by the sentence-token of the conclusion is *not true* at
ev), the result would be achieved that (12) is not an ideal truth, since there are contexts at which the
proposition expressed is not true.

   The problem with this solution is that, according to it, there are no logical truths (as is easy to see),
contrary to what is generally assumed. The other option – that of having truth and absence of truth-
value (the truth-value *undefined*, if preferred) as designated, while retaining the position that diagonal
propositions possess no truth-value at possible worlds not in the context set – is also not advantageous.
For in such cases (12) is an ideal truth, despite the fact that it is not a logical truth.

   Independently of the status of (12) as a pragmatic truth, admitting the possibility that diagonal propo-
sitions are gappy when extended to possible worlds not in the context set also makes the status of the
ideal validity of the following arguments problematic:

(14)   It is actually raining. Therefore, it is raining.

(15)   It is raining. Therefore, it is actually raining.

Not prejudging whether both arguments should count as ideally valid or not, I take it that the first
argument is ideally valid if the second is, and vice-versa, since restricted to the possibilities in the context
set both arguments are ideally valid.

   Assume that truth is the only designated truth-value. In such case there are circumstances of evalua-
tion at which the proposition that it is raining is true, while the proposition that is really expressed by

the token of 'it is actually raining' is false, those at which the token does not occur. Hence, argument (15) is ideally invalid. But since i) the truth-values of the diagonal proposition expressed by 'actually it is raining' and those of the proposition expressed by 'it is raining' are the same on what concerns the possibilities in the context set, and ii) truth is the only designated value, with the consequence that at all possibilities not in the context set the proposition really expressed by 'actually it is raining' has no truth-value, it follows that argument (14) is ideally valid.

By similar reasoning it can be appreciated that the assumption that both truth and undefined are designated has the consequence that argument (15) is ideally valid, while argument (14) is not. Hence, extending the diagonal propositions in such a way that they have no truth-value at every possibility not in the context-set has the outcome that arguments (14) and (15) have different status with respect to their pragmatic validity.

The position I will be endorsing with respect to the truth-value of diagonal propositions in possibilities not in the context set follows the same idea that is defended by Stalnaker with respect to the truth-value of diagonal propositions at possibilities not containing the relevant sentence-tokens:

> As discussed in [Stalnaker, 1987], one extends propositional concepts to possible worlds not containing an utterance token in applications of the diagonalization strategy to belief attribution by considering what a token that-clause *would* have said if uttered in a certain possible world. [Stalnaker, 2006, fn. 8]

My strategy is thus that to endorse the position that, at a possibility not compatible with the common ground, the proposition that would have been expressed by a sentence-token at that possibility is that which the participants would take has having been literally expressed if the presuppositions of the context were the case at that possibility. That is, the truth-values of the proposition that is really expressed at possibilities not in the context set are inherited from the truth-values that the proposition has at possibilities in the context set.

For example, concerning the truth-value of the proposition really expressed (at c') by a token of (11) at a possibility w such that English is being spoken at w and that the meanings of all the expressions, except S, are as in the actual world, it will be the truth-value that it would get at the most similar possibility that is in the context set. This means that the proposition that is really said is true at w, since the proposition is true at every world in the context set. For the same reason, (12) gets to be an ideal truth.

The ideal truth of (12)[8] shows that ideal consequence relation cannot, after all, account for all our judgments of logical validity / logical invalidity.

Endorsing the sentence-type consequence thesis, on the other hand, explains the judgment of logical invalidity: with respect to some n-contexts, the sentence-type (12) will in fact be logically invalid, for there are possibilities at which it is not the case that English is being spoken.

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[8]Other examples of sentences ideally true but not logically true can also be provided, ones that play with what is common ground at c^* (e.g., "bachelor' means bachelor').

Furthermore, despite the fact that arguments (8) and (9) are at a first glance judged to be logically valid, one could easily be in a situation in which those arguments would lead from true premises to false conclusions, and a minimal desideratum of logical consequence is that this must not occur. Ideal consequence's idealizations make the arguments (8) and (9) ideally valid, and (12) an ideal truth. The idealizations may, at times, be cognitively useful, and when they are, one can accept their consequences: that ideal consequences, in those cases, are logical consequences. But the idealizations will not always be useful. This will be so when the interest lies in propositions expressed at different contexts, when we are interested in propositions expressed relative to one or another n-context, etc. For these reasons I take the relation to be a useful surrogate of logical consequence, but not to be equated to it.

Qua surrogate of logical consequence, ideal consequence can further explain the illusions of invalidity present in the puzzles with proper names and with indexicals, since neither argument (1) nor argument (5) are ideally valid. Hence, I take it that, once the issue is clarified, the puzzles constitute objections neither to the primary relata thesis nor to the analyticity thesis.

4.4   Semantics? Or pragmatics?

Preliminarily, let me point out that the distinction between presemantics, semantics and postsemantics seems to be required with respect to analyticity as defined by Gillian Russell. Reference determiners constitute a level of meaning, and as such they are better conceived as functions from pairs of a n-context and a n-tuple of objects (this n-tuple of objects being determined by the context of introduction) to circumstances of evaluation. The truth of reference-determiners is thus determined with respect to three different parameters, and restricting the class of possible triples to only those triples such that the circumstance of evaluation of the triple is that determined by the n-context seems to go against analyticity as sufficiency of meaning for truth, the background worry being (as in the case of Kaplan) more with postsemantic characterizations of truth of sentence-tokens relative to contexts.

This being said, and as anticipated in the beginning of the chapter, it can be appreciated that, contrary to what is the case with the pragmatic solution to the puzzles, the semantic solution to them does not allow for the beliefs in the analyticity and in the primary relata theses to be both preserved. Given the fact that the primary relata thesis is, as conjectured by Russell, prima facie appealing, I take this as constituting an advantage over the semantic solution, all things being equal.

The second objection has to do with the postulation of reference determiners as a new level of meaning. My position is that positing such level of meaning in fact constitutes an ad hoc solution, that it is a problematic level of meaning, and that the reasons why it is problematic point to the fact that a confusion is being made between semantics and meta-semantics, the worry with what the reference determiners of proper names and natural kind predicates are being of a meta-semantic nature, not one having to do with analyticity.

Indexicals and proper names are directly referential, but there seems to be a radical difference between them. Indexicals have conventionally associated a way to determine their reference, given a context. This is what the character of an indexical does. This being said, how can the reference determiner of a proper name determine its reference, given a context of introduction?

Russell's example is that of the proper names 'Hesperus' and 'Phosphorus' and she borrows the descriptions usually associated with them in order to determine their reference. But, in general, this seems not to be possible. Consider Kripke's example in *Naming an Necessity* of 'Feynman', with whom the man in the street seems to have associated no uniquely identifying description, and for whom the descriptions associated with 'Feynman' capture not only Feynman but also Gell-Mann. Given a context of introduction in the actual world, how can the reference determiner for 'Feynman' determine Feynman and not Gell-Mann?

Russell may retort that from the fact that we do not have any uniquely identifiable description associated with 'Feynman' it does not follow that his reference determiner cannot uniquely pick him. As she points out, on the one hand it is characters, not contents, that are known to speakers, and on the other hand, as she remarks, "Names and natural kind predicates ... have extensions and referents, and those have to be determined somehow" [Russell, 2010, p. 194]. Following such line of thought, Russell could reach the conclusion that there must be a reference determiner for 'Feynman', one picking him instead of Gell-Mann in a context of introduction in the actual world.

I agree that the references of names and natural kind predicates are determined somehow. But I think that this just highlights the meta-semantic nature of reference determiners. Consider again the case of the proper name 'Feynman'. Perhaps Feynman was so dubbed by his father and uncle, in a conversation between the two. For Feynman's father, 'Feynman' refers to his first son. However, for Feynman's uncle 'Feynman' is the name of his first nephew. What is the function from contexts of introduction to referents, the reference determiner, of Feynman. Well, there seem to be several different ones (here is another one: the object referred to by 'Feynman').[9]

This, as I see it, illustrates my point that the notion a reference determiner is of a meta-semantic nature. In explaining how Feynman gets to be so called, one appeals to one or another description of him, the one most useful to the interests of the conversation. Nonetheless, for semantics proper, what is required for accounting for the meaning of 'Feynman' is just its reference (or, less boldly, nothing as a reference determiner seems to be required).

Since reference determiners are entities of dubious semantic status, I take it that a solution not appealing to such entities and using theoretical resources from accepted theories already available is to be preferred. This is precisely what is achieved by the pragmatic solution, and thus I believe that it should be preferred to the semantic solution.

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[9]Gillian Russell could appeal to rigidified descriptions, such as *the actual object referred to by 'Feynman'*. Any such description would determine the same function from contexts of use to referents. The problem for this solution is, obviously, that 'Hesperus' and 'Phosphorus' get to have the same reference determiner, and thus 'Hesperus is Phosphorus' gets to be an analytic truth after all.

Chapter 5

Conclusion

This essay was mainly concerned with two problems having to do with logical consequence and the role of context in the determination of truth. The problems addressed were the logically possible cases problem and the relata problem, and of particular interest were the questions of whether the contexts as cases thesis and the context-sensitive relata thesis are true. The theoretical framework chosen to address these questions was the one provided by the two most distinguished interpretations of two-dimensional semantics, Kaplan's semantic interpretation and Stalnaker's meta-semantic interpretation.

The main aim of the essay was to argue that the context as cases thesis must be rejected. In order to do so I began by distinguishing some options for being the class of logically possible cases within both Kaplan's semantic interpretation and Stalnaker's meta-semantic interpretation. The list of plausible options was reduced to three, all of them within the semantic interpretation. Chapter 3. was dedicated to assessing whether the most distinguished position on the nature of logical consequence supporting the contexts as cases thesis – Kaplan's thesis (or Kaplan's thesis*) – was in fact a plausible view on the nature of logical consequence. It was concluded that it is not, and that the other options on what is the class of logically possible cases are also implausible.

In chapter 4. I considered the puzzles giving rise to a rejection of the primary relata thesis, and thus also bringing some initial plausibility to the contexts as cases thesis. Insofar as it was shown in that chapter that a solution to the puzzles can be provided which allows for the primary relata thesis to retain its initial plausibility, and that it fares better than a rival solution implying the rejection of the primary relata thesis, the contexts as cases thesis ought to be dismissed.[1]

Concerning the relata problem Kaplan's thesis (Kaplan's thesis*) could be seen as constituting a monist view on the problem. According to Kaplan's thesis the relata of logical consequence are sentence-

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[1]However, it should be noted that, given what was discussed concerning option 3. of chapter 2., endorsing the sentence-type consequence thesis has the outcome that, relative to a n-context n, pairs $\langle n, ev \rangle$ can be seen as constituting the class of logically possible circumstances. This seems to be of little importance though, since what matters is that propositional consequence holds between the propositions expressed (at n), and thus that at every circumstance of evaluation at which all of the premises are true, so is the conclusion.

types / pairs of sentence-types and characters, no other entities being admitted as also being logical consequence's relata. The fact that these are the relata of logical consequence according to Kaplan's thesis has the result that it is in agreement with the context-sensitive relata thesis. If Kaplan's thesis were the case then truth of the relata of logical consequence would be relative to contexts / context-related entities.

The rejection of Kaplan's thesis opens the possibility of a pluralist view on the relata of logical consequence. Such a pluralist position was adopted in the last chapter, as a natural consequence of adhering to the primary relata thesis. The outcome of this pluralism is that the relata of logical consequence may be many kinds of things, and concerning some of those their truth is, as a matter of fact, context-sensitive. Adherence to the primary relata thesis also lead naturally to the conclusion that when the relata of logical consequence are taken to be context-sensitive, the logical consequence relation will obtain relative to contexts / context-related entities. Importantly, a consequence of the primary relata thesis having to do with the logically possible cases problem is that logically possible cases are circumstances of evaluation.

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