University of Tartu

Faculty of Philosophy

Department of Philosophy

Indrek Lõbus

In Defence of Logical Omniscience

MA Thesis

Supervised by Daniel Cohnitz and Luis Estrada González

Tartu 2016

TABLE OF CONTENTS

INTRODUCTION

How could we reason deductively, if we are logically omniscient, i.e., if we always believe by default everything that logically follows from what we believe? That we *are* logically omniscient follows from Robert Stalnaker's (1984) theory of propositional attitudes, the pragmatic picture. Consequently, his theory faces the above problem – *the problem of deduction*. In this thesis, I will defend Stalnaker's response to it and, by extension, the claim that we are indeed logically omniscient.

As a solution to the problem of deduction, Stalnaker proposes two complementary theories, *the metalinguistic theory* and *the integration theory*. The account of deductive inquiry that the two theories jointly give is that we engage in deductive inquiry by integrating our linguistic dispositions into new ones in order to find out which propositions are expressed by the sentences that constitute the argument whose validity we are trying to establish. This account of deductive inquiry is not only consistent with subjects of propositional attitudes being logically omniscient but also presupposes that they are. Stalnaker's account has been widely rejected in contemporary literature. Of the many arguments presented against his account, two are most noteworthy. One of them, *the translation argument* (presented in Moore 1995, Nuffer 2009), aims to show that Stalnaker's account cannot explain how two subject who do not share a language can neveretheless acquire the same deductive information. And the other one, *the argument from logical oversight* (presented in Moore 1995, Jago 2014), aims to show that there are counter-examples to logical omniscience that Stalnaker's theory is unable to explain away. I will show that both arguments rest on a mistaken way of individuating expressions. The mistaken assumption involved in the translation argument is that two instances of one and the same sentence cannot have different typographical or phonetic features, and the mistaken assumption involved in the argument from logical oversight is that two different logical connectives cannot have the same typographical or phonetic features. Both of my responses rely on a distinction, *the sign/symbol distinction*, between two ways of individuating expressions, which can be traced back to Wittgenstein's *Tractatus*.

The purpose of defending Stalnaker's solution to the problem of deduction is not only to block the most widespread objections to the pragmatic picture but to make available a way of defending any theory of propositional attitudes that predicts logical omniscience. Such theories have been proposed, in some cases perhaps unwittingly, e.g., in Lewis 1979, Marcus

1983, Dancy 2000, Baker 2003, Travis *manuscript* (2013), and elsewhere. Although I will make use of some specific aspects of the pragmatic picture in my defence of Stalnaker's solution, it is quite likely that such aspects can be found also in many other theories with similar consequences. For this reason, the results presented here, if correct, have more general importance, showing that the prediction of logical omniscience is, at least *prima facie*, an acceptable one.

My thesis unfolds as follows. In chapter 1, I will give an overview of the prediction that we are logically omniscient as it arises in the framework of the pragmatic picture and explain what the problem of deduction consists in. After that I will explain Stalnaker's two-part solution to the problem of deduction and give an overview of the two arguments. This will be the topic of chapters 2 and 3. In chapter 4, I will introduce the sign/symbol distinction in the light of which the problems with the two arguments can be seen. I will then provide responses to both arguments in chapters 5 and 6. In the course of responding to the translation argument in chapter 5 I will also develop a slight variation of Stalnaker's metalinguistic theory that, unlike the original version, accounts for the sign/symbol distinction.

1. LOGICAL OMNISCIENCE AND THE PROBLEM OF DEDUCTION

In this chapter I will give an overview of how the prediction that we believe everything that logically follows from what we believe arises in the framework of Stalnaker's theory of propositional attitudes and explain what the problem of deduction consists in. I will start by giving an overview of the relevant details of Stalnaker's theory, the pragmatic picture. I will then explain how the pragmatic picture gives rise to the prediction and what reasons there are for accepting this prediction as correct. After that I will explain how this prediction in turn gives rise to the problem of deduction. This paves the way for the next chapter where I give an overview of Stalnaker's proposal for solving the problem of deduction. It is Stalnaker's proposal that I will ultimately defend in this thesis.

1.1. The Pragmatic Picture

The pragmatic picture stems from an observation concerning our practices of ascribing propositional attitudes. In ascribing propositional attitudes to subjects, we *rationalize* their actions. And correlatively, by treating subjects as acting rationally, we treat them as having propositional attitudes. For example, to borrow one from Stalnaker, "I explain why Sam is turning cartwheels on the front lawn by pointing out that he wants to impress Alice and believes that Alice will be impressed if he turns cartwheels on the front lawn" (Stalnaker 1976: 81). Taking this as his starting point, Stalnaker proposes that propositional attitudes "should be understood primarily in terms of the role that they play in the characterization and explanation of action" (ibid.: 4). In other words, according to Stalnaker, propositional attitudes are nothing more than states of agents[1] in the light of which actions are rational – the action rationalizing role is *constitutive* of propositional attitudes. Consequently, we should expect an account of propositional attitudes to fall out of an account of rational action.

We can think of agents as confronted with a range of actions they can perform. For an agent to do something is for her to *choose* one of the actions from that range over others. Actions have different outcomes in different circumstances. For an action to be rational, according

[1] I am avoiding the term 'mental states' here because it may already invite theory laden interpretations. Stalnaker's point, as I understand him, is that we should construct a theory of propositional attitudes around the fact that they have an action rationalizing role, and that nothing else should be assumed about them.

to Stalnaker, is, roughly, for it to be chosen on the basis of these two features. If propositional attitudes are to be things in the light of which actions can be seen as rational, they must reflect these choices of agents. And there is a natural way they could do this. To choose an action on the basis of which outcomes it has in which circumstances, the agent must have *preferences* towards the outcomes and *assumptions* concerning the circumstances that happen to obtain (see ibid.: 4). To ascribe propositional attitudes to agents just is to ascribe various preferences and assumptions to them. We can thus think of propositional attitudes as criteria for choosing actions. By having such criteria we are disposed to act in certain ways as opposed to others. Consequently, given the pragmatic picture, propostitional attitudes can be thought of as certain *dispositions we have to act*. This is one of the features of the pragmatic picture that will be relevant in the subsequent chapters. The other stems from the fact that both the outcomes and the circumstances in which actions lead to those outcomes can be thought of as alternative possible states of the world, or *possible worlds*, for short. And so, the pragmatic picture, in taking the action rationalizing role to be the constitutive role of propositional attitudes, treats propositional attitudes first and foremost as ways of relating to possible worlds.[2] In this, it contrasts with most accounts of propositional attitudes, which take propositional attitudes to be first and foremost ways of relating to propositions.[3] The pragmatic picture still treats propositional attitudes as involving propositions but only as "ways of distinguishing between the elements of the relevant range of alternative possibilities – ways that are useful for characterizing and expressing an agent's attitudes towards those possibilities" (ibid.: 4). More precisely, the idea is that propositions, in having truth values relative to possible worlds, are involved in propositional attitudes by being true relative to every possible world that the subject relates to in having the attitude in question.

To wrap up the above, the pragmatic picture suggests that we can treat propositional attitudes as dispositional states of a certain sort that determine which possible worlds subjects relate

[2] Stalnaker eventually develops the pragmatic picture into what he calls *the causal-pragmatic theory* by supplementing it with an account of how our dispositions to act could be picking out possible worlds. Although this further development is an interesting take on propositional attitudes and in fact what Stalnaker is mostly known for, it does not bear upon the subsequent chapters of this paper. For a more detailed overview of Stalnaker's theory, see Stalnaker 1984.

[3] It should be pointed out that this contrast will not disappear, if we adopt the possible worlds account of propositions. Given the latter, the proposition that ϕ is the set of all possible worlds in which $\ulcorner\phi\urcorner$ is true. Given the pragmatic picture, a propositional attitude can relate a subject to a set of possible worlds in which $\ulcorner\phi\urcorner$ is true without thereby relating her to the set of *all* possible worlds in which $\ulcorner\phi\urcorner$ is true. There is thus still a difference between propositional attitudes relating subjects to possible worlds and propositional attitudes relating subjects to propositions, thought of as sets of possible worlds.

to. Formally, we can model these dispositional states simply as sets of possible worlds. In the discussion to follow, I will concentrate on one propositional attitude in particular, namely belief. This is not because of some special features that beliefs in particular have but simply because belief happens to be the paradigm example in most of the criticism against the pragmatic picture. Following Stalnaker, I will refer to dispositional states associated with belief as *belief states*. The schema that the pragmatic picture gives us for beliefs is the following (where 'S' denotes a subject, and $[\![\phi]\!]$ is a proposition expressed by a sentence $\ulcorner\phi\urcorner$):[4]

(PP) S believes that ϕ iff $[\![\phi]\!]$ is true in every possible world in a belief state *b* of S.

One last thing worth noting about (PP) is that, in the light of it, beliefs "look like something negative" – to believe that ϕ, given (PP), is simply "to be in a belief state which lacks any possible world in which $[\![\phi]\!]$ is false" (Stalnaker 1984: 69; notation modified). In subsequent discussion, I will sometimes write '$[\![\phi]\!]$ is true in every possible world in a belief state *b*' as '*b* supports $[\![\phi]\!]$' for brevity.

1.2. Logical Omniscience

In every possible world in which the premises of a deductively valid argument are true, the conclusion is true as well. So, whenever those premises are true in every world in some belief state, the conclusion is true in every world in that belief state as well, i.e., a belief state that supports the premises of a deductively valid argument also supports its conclusion. Given this and (PP) from above, the pragmatic picture seems to predict that, in believing every premise of a deductively valid argument, one also believes its conclusion. Propositional attitudes, in other words, are predicted to be closed under logical consequence, or equivalently, subjects of propositional attitudes are predicted to be *logically omniscient*. The prediction is captured in the following schema:

(LO) If $\Gamma \vDash \phi$, then ($\forall\ulcorner\psi\urcorner \in \Gamma$, *S believes that* ψ) $\vDash$ *S believes that* ϕ.

A special instance of this prediction is that, insofar as logical truths are true and logical falsehoods false in all possible worlds, including all those that are part of any belief state,

[4] For Stalnaker's own formulation of the schema, see Stalnaker 1984: 69.

anyone who believes *anything* is automatically treated as believing every logical truth, and no-one can ever be treated as believing any logical falsehoods.

1.2.1. The Argument from Intuitions?

In the literature, (LO) is usually taken to be, to cite Jason Stanley, "shockingly at odds with common sense in the most mundane of cases" (Stanley 2010: 91), which in turn is taken to be a sufficient reason for rejecting (LO) along with (PP) that gives rise to it. Cases usually pointed out in support of this line of objection are cases where subjects seem to fail to believe various hard to prove mathematical or logical theorems.

The problem with this line of objection is that there are also cases where (LO) gives intuitively correct results. Looking at such cases also gives a better sense of what it is to be logically omniscient. For example, in believing that Alice is reading, one also believes that *someone* is reading. It seems to make no sense to say that one believes the former but not the latter. In the same way, in believing that *Sam is turning cartwheels and Alice is reading*, one also seems to believe that *Alice is reading and Sam is turning cartwheels* as well as that *Alice is reading*. Likewise, in believing that *exactly two* people are turning cartwheels, one also believes that *more than one* person is turning cartwheels as well as that *less than three* people are turning cartwheels. Intuitively, there is no additional mental states that one is required to have and no reasoning that one is required to go through in order to count as believing these further propositions. It seems to be a matter of logical entailment only. What the existence of such cases shows is that, whether we accept or reject (LO), we are going to conflict with common sense either way. Either way we would have to explain away some intuitions.[5] Consequently, reasons for or against accepting (LO) will have to concern more than just intuitions.

[5] For an account of propositional attitudes that aims to do justice to both intuitions, see Jago 2014: chs. 7–8. In short, Jago tries to achieve this by introducing a vague accessibility relation over proof stages. In the end, however, he is still forced to accept that there are cases where we fail to believe some obvious consequence of what we believe. On his account, it is just indeterminate which cases these are. As Jago himself recognizes, this too conflicts with common sense intuitions that Jago ends up explaining away by an appeal to "a rational prohibition on making such ascriptions, even when they express a true content" (ibid.: 243).

1.2.2. Support from Formal Semantics

In addition to the support that (LO) gets from considerations that support the pragmatic picture, it also has at least one theoretically desirable consequence. It justifies a result in formal semantics concerning the semantics of propositional attitude reports. Formal semantics relies on the principle of compositionality, which, roughly put, says that the semantic value of a complex expression (e.g., a declarative sentence) is determined by the semantic values of its parts and the way the parts are put together to form the complex expression. It is also assumed in formal semantics that semantic values of declarative sentences are functions from points of evaluation (e.g., from times, locations, possible worlds, etc.) to truth values. When two sentences are logically equivalent, then they share truth values at every point of evaluation. Consequently, any account of the semantic values of sentences that will fall out of formal semantics is going to treat the semantic values of logically equivalent sentences as identical.

Propositional attitude reports are declarative sentences, but they have as one of their constituents a further declarative sentence, namely the subclause. Thus, given the above assumptions made in formal semantics, ⌜S believes that ϕ⌝ and ⌜S believes that ψ⌝ have the same semantic value, whenever ⌜ϕ⌝ and ⌜ψ⌝ are logically equivalent. And, since all logical truths are logically equivalent and all logical falsehoods are logically equivalent, it follows that all sentence of the form ⌜S believes that $\top$⌝, where ⌜$\top$⌝ is a logical truth, have the same semantic value, and likewise for logical falsehoods. Since for ⌜ϕ⌝ and ⌜ψ⌝ to be logically equivalent just is for them to be logical consequences of one another, this result from formal semantics fits together naturally with (LO) and the pragmatic picture that gives rise to it. On the one hand, (LO) gets support from certain basic assumptions made in formal semantics, and on the other hand, the pragmatic picture, in entailing (LO), provides philosophical backing to the result concerning the semantics of propositional attitude reports.[6]

[6] The fact that (LO) fits so neatly with formal semantics is not an accident. Stalnaker is explicit about developing the pragmatic picture with just that consequence in mind (see Stalnaker 1984: 1).

1.2.3. The Problem of Deduction

The problem with (LO) is that it seems to conflict with the fact that people engage in deductive inquiry. Why should they do that, if they already believe all the consequences of what they believe? Moreover, since deductive inquiry often reveals inconsistencies in what we believe, it seems that while one hasn't found out that a proposition follows from things one believes, one can disbelieve that proposition. This is what Stalnaker calls *the problem of deduction*.

The problem of deduction is not simply that it would be odd for subjects of propositional attitudes to engage in deductive inquiry, given that they already believe everything that follows from what they believe. It should be *impossible* for them to do so. Given that assuming is a propositional attitude, if $\Gamma \vDash \phi$, then, in assuming the truth of the elements in Γ, one already assumes that ϕ. In other words, by jumping to the premises we are already jumping to the conclusion. There is no space for deductive inquiry. It also doesn't help to distinguish between consequences one is aware of and consequences one is not aware of. Mental states like being aware, understanding, realizing, etc. are also all propositional attitudes, and thus, the problem concerns them just as it concerns attitudes like believing and assuming. So, on the one hand, the task before us is to explain *how could deductive inquiry proceed*, given the pragmatic picture. But there is also another side to the problem. Normally, when we engage in deductive inquiry, we are not trying to find out something that follows from our assumptions, i.e., we are not after a conclusion. Rather, it seems that what we want to find out is *whether the conclusion follows* from the assumptions. In other words, when we manage to infer $\ulcorner\phi\urcorner$ from Γ, what we seem to find out is that $\Gamma \vDash \phi$. The problem is that, if $\Gamma \vDash \phi$, then $\ulcorner\Gamma \vDash \phi\urcorner$ is a logical truth. But, as I explained above, given (LO), we can only fail to believe things that can be false. But for something to be informative, it must be possible to fail to believe it. Only then could we *come* to believe it, i.e., be informed. Consequently, given the pragmatic picture, only things that can be false can be informative, i.e., "content requires contingency" (ibid.: 85). So, the other task before us is to given an account of deductive information as something *contingent*.

To conclude, as Stalnaker puts it, "[t]there are two questions posed by the problem of deduction: first, what is the nature of the information conveyed in a statement about deductive relationships? Second, how do we acquire this information?" (Stalnaker 1984: 85) I will give an overview of Stalnaker's answers to these two questions in the next chapter.

2. STALNAKER'S TWO-PART SOLUTION

In this chapter, I will give an overview of Stalnaker's solution to the problem of deduction. In response to the two questions posed by the problem of deduction, Stalnaker sketches two theories, which I will refer to as *the metalinguistic theory* and *the integration theory*, that collectively should solve the problem. The former is what Stalnaker proposes as an answer to the first question, namely what sort of information is deductive information. And the latter is what he proposes as an answer to the second question, namely how does deductive inquiry proceed. The two theories will be the main focus of the rest of this thesis.

2.1. The Metalinguistic Theory

As I explained above, given the pragmatic picture, for something to be informative, it must be contingent. This in turn created the problem of how to explain the fact that people seem to acquire information by engaging in deductive inquiry, since, on the face of it, what they find out is that the premises collectively entail the conclusion. But if the premises collectively entail the conclusion, then they do so with logical necessity.

In proposing a solution to this problem, Stalnaker relies on the above mentioned result in formal semantics. Given that beliefs are closed under logical consequence, we can accept that propositions are semantic values of declarative sentences as construed in formal semantics, i.e., we can accept that propositions are functions from points of evaluation to truth values. Propositions, thus construed, do not have grammatical structure. Picking up on this, Stalnaker writes:

> Because items of belief and doubt lack grammatical structure, while the formulations asserted and assented by an agent in expressing his beliefs and doubts have such a structure, there is an inevitable gap between propositions and their expressions. Whenever the structure of sentences is complicated, there will be a nontrivial question about the relation between sentences and the propositions they express, and so there will be room for reasonable doubt about what proposition is expressed by a given sentence. (Stalnaker 1987: 72)

In other words, since sentences expressing propositions have grammatical structure while the propositions those sentences express do not, it is always informative to find out which proposition a given sentence expresses. The underlying assumption here is that which proposition a given sentence expresses is a contingent matter.[7] Given this, Stalnaker articulates his theory – the metalinguistic theory – of the nature of deductive information.[8] He writes:

> Relative to any propositional expression one can determine two propositions: there is the proposition that is expressed . . . and there is the proposition that relates the expression to what it expresses. If sentence s expresses . . . proposition P, then the second proposition in question is the proposition that s expresses P. In cases of ignorance of necessity and equivalence, I am suggesting, it is the second proposition that is the object of doubt and investigation. (Stalnaker 1984: 84–85)

In other words, a sentence 'S', in addition to expressing $[\![S]\!]$, also encodes metalinguistic information – the information *that* 'S' *expresses* $[\![S]\!]$. Even if $[\![S]\!]$ is necessarily true, this metalinguistic proposition, namely $[\![\text{'}S\text{' expresses } [\![S]\!]]\!]$, is nevertheless contingent. According to the metalinguistic theory, sentences of the form $\ulcorner \Gamma \vDash \phi \urcorner$ as well as their natural language analogues express such metalinguistic propositions – propositions about which propositions do the elements in Γ and $\ulcorner \phi \urcorner$ express.

In explaining which propositions do sentences of the form $\ulcorner \Gamma \vDash \phi \urcorner$ express, the metalinguistic theory also gives us a tool for explaining futher phenomena involving deductive inquiry, that are just as problematic from the point of view of the pragmatic picture. On the face of it, we can find out other things that are logical truths, e.g., that $\sqrt{2}$ is an irrational number, which would mean that we can fail to believe such things as well. Likewise, it seems that, at least as long as we haven't discovered that some sentence is logically false, we can believe logical falsehoods. The metalinguistic theory can explain this as follows. If $\ulcorner \top \urcorner$ is a necessary truth, then a subject who appears to have found out that $\top$ may really have found out *that* $\ulcorner \top \urcorner$ *expresses a necessary proposition*. And if $\ulcorner \bot \urcorner$ is a necessary falsehood, then someone who appears to believe that $\bot$, may in fact believe *that* $\ulcorner \bot \urcorner$ *expresses a proposition which assigns it the value true*. One issue still remains, though. As Stalnaker himself notes (see ibid: 73–74), we can use sentences like $\ulcorner$S found out that $\top \urcorner$ and $\ulcorner$S believes that $\bot \urcorner$ to convey information about subjects sometimes. Consequently, we need an account of how such sentences can be used to attribute propositional attitudes about metalinguistic matters. I will come back to this issue in chapter 5.

[7] Although, as I will explain in chapter 5, there is an ambiguity involved here. There is a reading of this sentence on which it is true, and a reading on which it is false.

[8] Among the more recent proponents of the metalinguistic theory are John Perry (2001) and Agustin Rayo (2013).

The metalinguistic theory is also independently supported by the pragmatic picture. Stalnaker writes:

> If one looks at the kind of actions that might be explained by mathematical beliefs, and at the abilities that constitute mathematical knowledge, one finds that they are actions and abilities that essentially involve operating with some kind of notation – for example, calculating and constructing proofs. (Stalnaker 1987: 74)

In other words, the only dispositions to act that we can link to mathematical beliefs are dispositions to operate with mathematical notation.[9] Thus, if propositional attitudes are individuated in terms of dispositions to act, as the pragmatic picture suggests they are, then mathematical beliefs turn out to be beliefs about mathematical notation. We find further support for the metalinguistic theory by observing how deductive inquiry relates to deductive proofs. Deductive inquiry does, if all goes well, result in a proof. But, as emphasized by Gilbert Harman (2002), a proof tells us next to nothing about how the deductive inquiry that led to it proceeded. One may start from the conclusion and try to work one's way back to the premises. One may also consider beforehand which intermediate results would be useful as well as which inference rules might be needed in the proof. All of this is part of what it means to engage in deductive inquiry, but none of it is reflected in the proof. Relying on this observation, Harman writes:

> There is a difference between reasoning about a proof, involving the construction of a proof that must satisfy certain rules, and reasoning that proceeds temporally in the same pattern as the proof in accordance with those rules. One does not reason deductively in the sense that one reasons in the pattern of a proof. One can reason *about* a deductive proof, just as one can reason about anything else. (Harman 2002: 178, emphasis added)

In other words, to make sense of how deductive inquiry relates to proofs, we should think of it as aimed at the construction of a proofs, not as proceeding in the same pattern. Consequently, the information we acquire when we engage in deductive inquiry is information concerning how a proof can or cannot be constructed. This is information about the expressions we employ in the proof, i.e., metalinguistic information.

[9] There is a caveat, though. Stalnaker's point only concerns *pure* mathematics, belief and knowledge about mathematical objects, like numbers or functions. But there is also *applied* mathematics. When to the two apples you have already eaten you are offered two more, you decline because you know that four apples will give you a tummy ache. In this case we can attribute to you the belief that two apples plus two apples makes four apples. But your corresponding dispositions do not involve operating with mathematical notation. They involve operating with apples. For an account of how the metalinguistic theory deals with beliefs concerning applied mathematics, see Rayo 2013: ch 4.

2.2. The Integration Theory

Although the metalinguistic theory gives us an account of what we are after when we engage in deductive inquiry, it does not explain how it could be possible to accept the premises of a deductively valid argument without thereby already accepting the conclusion. The prediction that we believe by default everything that logically follows from what we believe arose due to the conception of a belief state that the pragmatic picture assumes. If the premises of a deductive argument are true in every world in a belief state, then the conclusion is true in every world in that belief state as well. This, Stalnaker points out, does not entail that whenever we believe all the premises of a deductive argument, we believe its conclusion. This is because, given the pragmatic picture, we can be in more than one belief state at once. He writes:

> A person may be disposed, in one kind of context, or with respect to one kind of action, to behave in ways that are correctly explained by one belief state, and at the same time be disposed in another kind of context or with respect to another kind of action to behave in ways that would be explained by a different belief state. This need not be a matter of shifting from one state to another or vacillating between states; the agent might, at the same time, be in two stable belief states, be in two different dispositional states which are displayed in different kinds of situations. (Stalnaker 1984: 83)

The possibility of multiple belief states is already accounted for in (PP). According to it, S believes that p just in case *at least one* of S's belief states supports $[\![p]\!]$. Given this, each and every belief state can be closed under logical consequence, and yet one can still believe all the premises of a deductive argument without believing its conclusion, insofar as the argument has more than one premise and one does not believe the premises relative to a single belief state. Likewise, one can believe the premises of a valid argument as well as the negation of its conclusion, as long as one doesn't believe all of these things relative to the same belief state. The latter is possible, even if the argument in question has only one premise. If $\phi \vDash \psi$, then a belief state that supports $[\![\phi]\!]$ also supports $[\![\psi]\!]$. And so, in believing that ϕ, one believes that ψ. But this does not exclude the possibility that one is also in another belief state that supports $[\![\sim\psi]\!]$. One would then simply believe two things that are mutually inconsistent.

The recognition that one can be in many belief states at once does not block (LO). (PP) still predicts that each individual belief is closed under logical consequence. And thus, we are still treated as believing everything that logically follows from a single thing we believe, which includes every logical truth. And it is also still predicted that it is impossible to believe logical falsehoods. But the plurality of belief states allows Stalnaker to sketch an account of how deductive inquiry can proceed. He writes:

> The information which one receives when one learns about deductive relationships does not seem to come from outside of oneself . . . . It seems to be information which, in some sense, one has had all along. What one does is to transform it into a usable form, and that, it seems plausible to suppose, is a matter of putting it together with the rest of one's information. (ibid.: 86)

Stalnaker's account – the integration theory – is that deductive inquiry proceeds via *integration* of belief states.[10] To integrate two belief states b and b' is to form a belief state that is the intersection of b and b'. This new belief state, since it is an intersection of the existing belief states, supports all the propositions supported by b and all the propositions supported by b'. Since, as all belief states, it is closed under logical consequence, the new belief state will also support all propositions that are entailed by the propositions supported by b and those supported by b' taken together. So, by integrating belief states, one comes to believe new propositions, propositions that are entailed by propositions one already believes. This, according to Stalnaker, is how deductive inquiry proceeds.

At this point it might be objected that, as I pointed out above, the plurality of belief states only explains how we can accept the premises without thereby accepting the conclusion of a *multipremised* argument, but we should also be able to reason from a single premise to a conclusion, as well as from no premises at all. This objection misses the point raised by Harman. The assumptions with which the proof starts are not the assumptions with which deductive inquiry begins. In fact, the premises of an argument whose validity we aim to prove need not be accepted at all in the course of showing the argument to be valid.

To see how deductive inquiry proceeds according to the integration theory, we need to combine it with the metalinguistic theory introduced above. Given the metalinguistic theory, the assumptions that deductive inquiry begins with are metalinguistic assumptions about the *constituent* expressions we employ in proof construction.[11] Since any argument whatsoever is composed of more than one constituent expression (apart, perhaps, from some arguments of the form ⌜$\phi \vDash \phi$⌝), we always start with more than one assumption. And these are

[10] For a more detailed version of the integration theory, see Rayo 2013, ch 4.3.

[11] It should be pointed out that Stalnaker himself does not develop the metalinguistic theory into this much detail. That deductive inquiry involves having metalinguistic beliefs about constituents of sentences is pointed out by John Perry (2001, see ch 6.6).

normally not assumptions that we make "for the sake of the argument" (although they can be, e.g., when a relevance logician reasons classically in order to demonstrate a flaw in the classical system). These are things that we genuinely believe about expressions, e.g., that writing '$\wedge$' between two sentences results in a new sentence that is true iff both of the constituent sentences are true, that we have written '$\wedge$' between the sentence 'P' and the sentence 'Q', etc. Since we can be in many belief states at once, we can believe each of these metalinguistic things relative to a different belief state.[12] By integrating the belief states we come to believe new metalinguistic things, namely those that the previous ones collectively entail – in this case, e.g., that '$P \wedge Q$' is true iff both 'P' and 'Q' are true. This is Stalnaker's two-part solution to the problem of deduction. When we try to show that $\Gamma \vDash \phi$, we start with believing things *about the atomic constituents* of $\ulcorner\phi\urcorner$ and of the elements in Γ. By integrating the belief states involved we come to believe things about their molecular constituents, since the latter follow from the former. When we have managed to integrate all of the belief states, then we have come to believe that $\Gamma \vDash \phi$.

It is worth pointing out that, in order to find out whether $\Gamma \vDash \phi$, there is no logical requirement that one believe the validity of certain inference rules. Nor should there be. As famously demonstrated by Lewis Carroll (1895), a proposition *that an inference rule is valid* does not itself play the role of the inference rule. One can accept such propositions without getting any closer to seeing that a conclusion follows. The reason, as the dialogue between the Tortoise and Achilles in Carroll's story illustrates, is that when, after accepting the premises of an argument, one also accepts *that such-and-such an inference rule is valid*, then that proposition ends up functioning as a further premise. The validity of the resulting argument must then depend on a different inference rule. An objection to Stalnaker's solution presented in Bjerring & Tang (*manuscript*) is based on a misunderstanding of this. Bjerring and Tang argue that, given Stalnaker's solution, if we know, relative to a single belief state, an inference rule and some metalinguistic proposition, then we thereby know everything that follows from that metalinguistic proposition via the inference rule. The mistake in the objection is that it makes no sense to say that a belief state supports an

[12] Mark Jago (2014) objects that it is implausible that the reason one fails to know a hard to prove mathematical truth is because one fails to recognize the semantic value of some constituent of the sentence. The objection fails because, as demonstrated above, one can recognize the semantic value of each constituent of the sentence but fail to know the logical truth because one hasn't integrated one's belief states that support the relevant metalinguistic propositions.

inference rule. A belief state can support the proposition *that the inference rule is valid*, and, as already explained, this proposition does not play the role of the inference rule.

This completes the overview of Stalnaker's proposal for a solution to the problem of deduction. In the next section I will look at objections to his proposal.

3. AGAINST THE TWO-PART SOLUTION

In this chapter, I will introduce the two main arguments against Stalnaker's two-part solution to the problem of deduction that one can find in the literature. One of them, *the translation argument*, is presented directly against the metalinguistic theory. In short, it aims to show that the metalinguistic theory cannot account for the fact that subjects who do not share a language can nevertheless share deductive information. The other, *the argument from logical oversight,* aims to show that there are cases where one believes that ϕ and fails to believe that ψ, even though $\phi \vDash \psi$. It is directed against Stalnaker's two-part solution insofar as the latter is supposed to explain away all the apparent evidence against (LO).

3.1. The Translation Argument

As explained in the previous chapter, the metalinguistic theory is the view that deductive information conveyed by a sentences of logic or mathematics is information about which proposition it expresses. The translation argument calls the metalinguistic theory into question by pointing out that it relativizes deductive information to languages. The argument was first presented by Robert Moore (1995) as follows:[13]

> Hilbert's native language was German, so it is highly unlikely that when he thought about mathematics, he thought about the truth of English sentences. Hence the truth of 'Hilbert believed that two is a square root of four' does not seem to depend on Hilbert's having any attitude at all toward the embedded sentence 'Two is a square root of four,' which is, after all, a sentence of English and not German. (Moore 1995: 97)

More recently, the same argument has been put forward by Gerhard Nuffer (2009).

> If mathematical information is information about sentences, sharing mathematical information requires having beliefs about the same sentences. Consequently, thinkers who have beliefs about sentences of their own language only and whose languages don't have any sentences in common cannot share mathematical information. But this is absurd. (Nuffer 2009: 191)

According to the metalinguistic theory, when it seems that we find out that two is a square root of four, then what we actually find out is that the sentence 'two is a square root of four'

[13] An analogous objection can be traced back to Alonzo Church (1950) who presented it against sententialism, the view that propositional attitudes are attitudes towards sentences, not propositions. Moore seems to be the first to use it directly against the metalinguistic theory.

is necessarily true. But this means that we find out something about an *English* sentence. Someone who does not speak English – but does speak, say, German – cannot find out *that* thing. She can find out something about a sentence of German. But this seems wrong. When the sentence of English and the sentence of German are translations of one another, then the two people find out the same thing, namely that two is a square root of four.

Nuffer puts the translation argument in the form of a *reductio* (see ibid.: 189–190). Take two sentences that are necessarily true translations of one another, like the following:

(A) Two is a square root of four.

(B) Zwei ist die Wurzel aus vier.

Given the metalinguistic theory, the deductive information conveyed by (A) is the proposition expressed by (C), and the deductive information conveyed by (B) is the proposition expressed by (D).

(C) 'Two is a square root of four' expresses a necessary proposition.

(D) 'Zwei ist die Wurzel aus vier' expresses a necessary proposition.

Since (C) and (D) are about different sentences, they do not express the same proposition. Therefore, (A) and (B) do not convey the same deductive information. But a sentence and its translation *do* convey the same deductive information. Otherwise, subjects who do not share a language couldn't share deductive information. Therefore, the metalinguistic theory is mistaken.

One immediate response to the translation argument might be to modify the metalinguistic theory slightly. Perhaps it was premature to say that deductive information is information about *sentences*. We may be able to indentify some other linguistic item that the English sentence and the German sentence have in common. This seems to be the road that Stalnaker considers when he says – though in passing – that …

> we might take the objects that beliefs and doubt are about to be the common structure shared by many, but not all, of the formulations which express the necessarily true proposition. This is still to take mathematical propositions to be about linguistic expressions in some sense, but they may be about relatively abstract features of expressions, features shared by sentences in different languages, and by sentences with different grammatical structures. /---/ In this kind of case, doubt about a mathematical statement would be doubt about whether the statements having a certain structure express the necessarily true proposition. (Stalnaker 1984: 74)

In other words, going back to the argument, Stalnaker's response seems to be that the deductive information conveyed by (A) is not expressed by (C) but by …

(C*) Every sentence with the same structure as 'two is a square root of four' expresses a necessary proposition.

If (B) has the same structure as (A), then (C*) also expresses the deductive information conveyed by (B), and thus, (A) and (B) would convey the same deductive information. Problem avoided. But, as Nuffer points out, a new problem arises, namely that of identifying a suitable structure that (A) and (B) share. It must be such that (C*) turns out to be both *true* and *contingent*. Nuffer considers various candidates for this structure, and finds fault in all of them (see Nuffer 2009 for details). But we need not go through the candidates one by one in order to see why the proposal fails. *Any* candidate structure shared by (A) and (B) that will make (C*) come out true will make it come out *necessarily* true. If (C*) is to be true, the candidate structure must play a role in determining which proposition the sentence 'two is a square root of four' expresses, and it must play the same role regardless of the sentence whose structure it is. Consequently, it would be impossible for a sentence to share such a structure with 'two is a square root of four' and not express the same necessary proposition, i.e., (C*) would be necessarily true.

Another way the metalinguistic theory might be modified is considered by Moore.[14] Instead of saying that there is a single abstract linguistic entity that both the English and the German speaker have beliefs about when they believe that two is a square root of four, we might say that when the English speaker has a belief about an English sentence, the German speaker has a belief about its German *translation*. Moore rejects this proposal on the account that …

> we seem to beg the question, since the notion of translation appears to depend on the notion of sameness of meaning, and it is the difficulty of individuating meanings adequately that prompted the syntactic approach [i.e. the metalinguistic theory] in the first place. (Moore 1995: 97)

The difficulty Moore alludes to is the formal semantics result discussed in chapter 1, subsection 1.2.2. If, following formal semantics, we accept (as Stalnaker does) that the semantic values of declarative sentences are no more than functions from points of evaluation to truth values, we can no longer distinguish between the semantic values of logically equivalent sentences. 'Es gibt unendlich viele Primzahlen' ends up being as good a translation of 'two is a square root of four' as 'zwei ist die Wurzel aus vier'. Consequently,

[14] Nuffer also considers this option but only in passing in a footnote. See Nuffer 2009: fn 10. The reason Nuffer presents for rejecting the proposal is the same as that which is presented by Moore.

the metalinguistic theory, when combined with formal semantics, cannot rely on the notion of translation.[15]

3.2. The Argument from Logical Oversight

The argument from logical oversight relies on the claim that there is evidence that beliefs are not closed under logical *entailment*, that there are cases where one believes that ϕ and fails to believe that ψ, even though $\phi \vDash \psi$. As such, it aims to show that (LO) is false. As a reminder, (LO) was the thesis that we believe everything that logically follows from what we believe. As I explained in the previous chapter, it doesn't follow from this that whenever we believe each and every premise of a valid argument, we also count as believing its conclusion, since it is consistent with the pragmatic picture that we are in multiple belief states at once. But, as I also pointed out in the previous chapter, it does follow that whenever we believe each and every premise of a *single-premised* valid argument, we also count as believing its conclusion. The argument from logical oversight aims to show that this consequence of (LO) is false. For the argument from logical oversight to go through, the following premise needs to be defended:

> Oversight
> There are cases in which a subject believes that ϕ and fails to believe that ψ, even though $\phi \vDash \psi$.

Although the argument is directed against (LO), we can see it as an objection to Stalnaker's two-part solution. Any evidence in favour of Oversight is also evidence that the metalinguistic theory and the integration theory together are unable to explain away all the evidence against (LO). I will consider two instances of the argument, one from Mark Jago (2014) and another from Robert Moore (1995).

[15] Although, as Moore himself recognizes, there may be ways to make sense of translation without relying on the notion of sameness of meaning. The solution I will provide in chapter 5 could be seen as a way of pursuing this option.

3.2.1. Jago's Defence of Oversight

Jago supports Oversight with a further argument. His argument is explicitly directed against the integration theory. But, as I will show below, it ultimately amounts to a defence of Oversight. The argument relies on the empirical claim that the validity of some arguments is more difficult to determine than the validity of others. Jago's argument aims to show that the integration theory and (LO) together conflict with this.[16]

According to the integration theory, deductive inquiry proceeds via belief state integration. Picking up on this, Jago points out that a deductive move that will take us from a set of sentences $\ulcorner\phi_1\urcorner$, …, $\ulcorner\phi_n\urcorner$ to the sentence $\ulcorner\phi_1 \wedge ... \wedge \phi_n\urcorner$ is, if not a single deductive move, then at least a trivial series of moves. Let us call this move *conjoining*. By applying conjunction introduction to sentences we *conjoin the propositions* expressed by them. Combining this claim with (PP) from chapter 1, namely that to believe that ϕ is to be in a belief state that supports $[\![\phi]\!]$, Jago concludes that, if a subject S believes each of $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$ relative to some belief state or other, she can easily come to be in a single belief state that supports $[\![\phi_1 \wedge ... \wedge \phi_n]\!]$, i.e., she comes to believe that $\phi_1 \wedge ... \wedge \phi_n$. Since $\ulcorner\phi_1 \wedge ... \wedge \phi_n\urcorner$ in turn entails each of $\ulcorner\phi_1\urcorner$, …, $\ulcorner\phi_n\urcorner$, Jago concludes that S thereby comes to be in a belief state which supports each of $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$. Given this, if we accept that beliefs are closed under logical consequence, conjoining (i.e., the trivial deductive move from $\ulcorner\phi_1\urcorner$, …, $\ulcorner\phi_n\urcorner$ to $\ulcorner\phi_1 \wedge ... \wedge \phi_n\urcorner$) will result in us believing whatever the things we believe collectively entail. Consequently, it seems that we end up making the following prediction. If one already believes each of $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, then to see whether $\{\phi_1, ..., \phi_n\} \vDash \psi$, one must simply carry out a series of conjunction introductions and see whether one comes to believe that ψ as a result. This, as Jago points out, is manifestly false.

> It often happens that one does consider all the premises of a deduction at once (and perhaps even considers their conjunction) and yet cannot infer the conclusion. The information conveyed by a non-trivial valid deduction does not correspond to the move from individual premises to their conjunction, but rather in the deductive move from those premises (or their conjunction) to the conclusion. (Jago 2014: 59)

There seems to be only two ways this conclusion can be avoided. We can either i) accept Oversight and thus deny (LO), or ii) reject the claim that one can go from believing conjuncts

[16] See Jago 2014: 58–59 for his own presentation of the argument. The presentation here is slightly more detailed.

to believing their conjunctions via conjunction introduction. Although Jago directs the argument against the integration theory, rejecting the integration theory is not really an option when we already concede that (LO) is true, i.e., that beliefs are closed under logical consequence, and that one can go from believing conjuncts to believing their conjunctions via conjunction introduction.

To give Jago's argument a compact form, we can put it as follows. Assume that $\{\phi_1, \dots, \phi_n\} \vDash \psi$. Given the theorem ⌜$\{\phi_1, \dots, \phi_n\} \vDash \psi$ iff $(\phi_1 \wedge \dots \wedge \phi_n) \vDash \psi$⌝ of classical logic, it follows that $(\phi_1 \wedge \dots \wedge \phi_n) \vDash \psi$. If a subject S has conjoined propositions $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, the following obtains (where '$b \Vdash [\![\phi]\!]$' is shorthand for 'a belief state b of S supports a proposition $[\![\phi]\!]$'):

(A^*) $\quad (b_1 \Vdash [\![\phi_1]\!] \wedge \dots \wedge b_n \Vdash [\![\phi_n]\!]) \rightarrow \exists b \colon b \Vdash [\![\phi_1]\!], \dots, [\![\phi_n]\!]$

But there are cases in which S has conjoined propositions $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, each of which she believes, but S fails to believe that ψ. This is demonstrated by the fact that conjoining alone is not enough to see the validity of any argument whatsoever. Therefore, given the conjunction introduction rule and (PP), there are cases in which S believes that $(\phi_1 \wedge \dots \wedge \phi_n)$ and fails to believe that ψ, even though $(\phi_1 \wedge \dots \wedge \phi_n) \vDash \psi$. Therefore, Oversight is true.

Stalnaker has anticipated Jago's objection. Integration of belief states, he emphasizes, is not "an easy or a mechanical task" (Stalnaker 1984: 84). It would be, if believing a proposition were like assenting to a sentence, since "then it would be a simple matter of noting and remembering what one is doing to put a belief that ϕ and a belief that ψ together into a belief that $\phi \wedge \psi$" (ibid.; notation modified). This is what Jago assumes belief state integration is like. However, given the pragmatic picture, believing is not like assenting. To believe something is to have a certain disposition to act, and thus integration, since it must result in new belief states, must involve forming new dispositions (see ibid.). Although by engaging in deductive inquiry we integrate belief states, logic doesn't tell us which dispositions to act, i.e., belief states, result from which deductive moves. If ⌜ϕ⌝ and ⌜ψ⌝ are complex enough, then conjoining the propositions they express may leave us in no better position in terms of our dispositions than when we started. In such a case, the proposition $[\![\phi \wedge \psi]\!]$ would not help to characterize our belief state, and thus, given the pragmatic picture, we simply do not count as believing the proposition.

This reveals something about the argument from logical oversight. If it is to be successful, it needs to be supported by evidence concerning what a subject believes independently of which propositions characterize her belief state. Logic alone will not do that. A plausible source of such evidence, the source commonly tapped into in discussions concerning belief, is the belief ascriptions of competent speakers. Given this, we can modify Jago's argument. Instead of basing it on the assumption that the performing of certain logical operations always leads to some specific changes in one's dispositions to act, we can base it on the claim that performing certain logical operations leads one to believe the result of these logical operations, *regardless* of whether it also results in some specific changes in one's dispositions to act. Let us just assume that there is evidence for this. Jago's argument in favour of Oversight thus amounts to this.

Assume that $\{\phi_1, \ldots, \phi_n\} \vDash \psi$. Given the theorem ⌜$\{\phi_1, \ldots, \phi_n\} \vDash \psi$ iff $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$⌝ of classical logic, it follows that $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$. If a subject S has conjoined propositions $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, the following obtains:

(A) (S believes that $\phi_1 \wedge \ldots \wedge$ S believes that ϕ_n) $\rightarrow$ S believes that $(\phi_1 \wedge \ldots \wedge \phi_n)$

But there are cases in which S has conjoined propositions $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, each of which she believes, but S fails to believe that ψ. This is still demonstrated by the fact that conjoining alone is not enough to see the validity of any argument whatsoever. Therefore, there are cases in which S believes that $(\phi_1 \wedge \ldots \wedge \phi_n)$ and fails to believe that ψ, even though $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$. Therefore, Oversight is true.

To this objection the proponent of the pragmatic picture can no longer respond in the above way. Conjoining need not result in any disposition change. All that matters is that, after S has conjoined propositions she believes, she also believes the conjunction of those propositions.

3.2.2. Moore's Defence of Oversight

I will now turn to Robert Moore's defence of Oversight, which already avoids the problem that Jago's argument faced. Moore, in providing evidence in support of Oversight, invites us to imagine a building with three doors, A, B, and C, and an agent S who is in a rush to get in and who believes that, if door A is locked, then door B is not locked. As evidence for Oversight, Moore presents the following thought-experiment (see Moore 1995: 96).[17]

> *Case I*: Suppose that S tries door A first, but finds it locked. Intuitively, since she believes that, if A is locked, then B is not, she would then automatically turn to door B, believing that B is not locked.
>
> *Case II*: Now suppose that instead of going for door A first, S goes for door B first, and finds it locked. Intuitively, she would not turn to any door automatically. But she might stop to think for a moment. It seems that she would have to *infer* that therefore A is not locked. And inferring takes time. So, it is possible that S believes that, if A is locked, then B is not locked, and that B is locked, without thereby believing that A is not locked, even if for just a moment.

Moore then points out that 'if P, then $\sim Q$' and 'if Q, then $\sim P$' are contrapositives of one another (where 'P' stand for 'door A is locked' and 'Q' for 'door B is locked'), i.e., that they entail one another. If (LO) were true, then S, in believing that (if P, then $\sim Q$), should also believe that (if Q, then $\sim P$). But then S's reaction to coming to believe that P and her reaction to coming to believe that Q should not differ. As the two cases illustrate, they do differ.

Neither the metalinguistic theory nor the integration theory seems to be able to block this argument. Given Case I of the thought-experiment, the belief that (if P, then $\sim Q$) manifests itself as a disposition to act that has nothing to do with language. S is disposed to go for door B after finding A to be locked. We have thus no reason to suggest that S has a metalinguistic belief about '(if P, then $\sim Q$)'. She *may* have such a belief, but she also has a belief that is genuinely about doors and conditions under which they would be locked or not locked. Also, since the argument '(if P, then $\sim Q$) $\vDash$ (if Q, then $\sim P$)' is a single premise argument, there seems to be no belief states that S could fail to integrate, which could explain her failing to believe that (if Q, then $\sim P$). So, it appears that we have evidence for Oversight. There are cases where one believes that (if P, then $\sim Q$) without believing that (if Q, then $\sim P$), even though (if P, then $\sim Q$) $\vDash$ (if Q, then $\sim P$).

In order to bring out a similar structure in both Jago's and Moore's argument, we can formulate Moore's argument as follows. Arguments of the form ⌜(if ϕ, then $\sim\psi$) $\vDash$ (if ψ,

---

[17] The thought-experiment presented here is an adaption from Moore's original thought-experiment. Similar adaptions are made by others who have discussed the thought-experiment (see, e.g., Muskens 1991, Egré 2006).

then $\sim\phi$)⌝ are valid. As demonstrated by Case I, there are cases where conditional belief obeys the following schema:

(B) S believes that (if ϕ, then $\sim\psi$) $\rightarrow$ (S believes that ϕ $\rightarrow$ S believes that $\sim\psi$)

As demonstrated by Case II, in those cases one can believe that (if ϕ, then $\sim\psi$) without believing that (if ψ, then $\sim\phi$). Therefore, Oversight is true.

This concludes my overview of the arguments against the Stalnaker's two-part solution to the problem of deduction. The translation argument was directed against the metalinguistic theory, and the argument from logical oversight was directed against (LO). Insofar as the metalinguistic theory and the integration theory were supposed to explain away the evidence against (LO), the argument from logical oversight could also be seen as attacking Stalnaker's two-part solution. In the next chapter, I will introduce tools for responding to the arguments presented in this one.

4. THE SIGN/SYMBOL DISTINCTION

In this chapter, I will introduce a distinction between two ways of individuating expressions. This distinction, which I will refer to as *the sign/symbol distinction*, will provide the needed conceptual tools for responding to the arguments introduced in the previous chapter. The distinction can be traced back to Wittgenstein's *Tractatus* from where I also borrow some of the terminology. I will start by explaining what the two ways of individuating expressions are. After that I will sketch an account of how these two ways of individuating expressions relate to one another. Finally, I will explain how the sign/symbol distinction brings into light two fallacies that we are in the danger of committing, unless we keep track of the relation between signs and symbols.

4.1. Signs and Symbols

In our practice of speaking of expressions, there are two senses of the term 'expression' that are not always distinguished from one another. On the one hand, we speak of *the* expressions 'snow', 'Alice', 'and', 'the tallest man', etc. It is thus assumed that expressions are individuated in terms of their typographical or phonetic features. On the other hand, we classifying expressions, e.g., as proper names, adjectives, copulas, modal verbs, etc, and assume that they can be combined with some kinds of expressions and not with others. We thus take expressions also to be individuated in terms of their logical and syntactic features. We need to distinguish between these senses because expressions in the first sense and expressions in the second sense do not map onto one another. For example, take the sentence 'no can can can itself'. If we individuate expressions in the first way, then we would count three different expressions in it, one of which occurs three times. But if we individuate expressions in the second way, then we would count five. The letter combination 'can' in it occurs as three different expressions: first as a noun, then as a modal verb, and finally as a regular verb. In the *Tractatus*, Wittgenstein separates these two senses of 'expression' from one another, introducing what has come to be known in the Tractarian literature as *the* *sign/symbol distinction*.[18] Expressions in the first sense are what Wittgenstein calls *sign* and expressions in the second sense are what he calls *symbols*. I will follow him in this.

„A sign," as Wittgenstein himself defines it, „is what can be perceived of a symbol" (TLP: 3.32)[19]. Commonly, signs are either written or spoken. Hence, we can speak of them as the typographical or phonetic units of language. But generally speaking, we can think of signs simply as the perceivable patterns that are used as pieces of language. They can be anything from strings of zeros and ones (when we say things in binary code) to patterns of smoke (when we say things in smoke signals).

As said above, symbols are individuated in terms of their logical and syntactic features (henceforth I will refer to them as *logico-syntactic* features). But there are also other features, less obviously logico-syntactic, that symbols have in virtue of their logico-syntactic features. This is because logico-syntactic features set constraints on semantic values. For example, 'Alice' in 'Alice is reading' is a proper name – this is the logico-syntactic category it belongs to. But, if 'Alice' is a proper name, then it *refers to Alice*. It is a property that 'Alice' has in virtue of being a proper name. We can recognize 'Alice' as referring to Alice simply by recognizing it as a proper name. This does not mean that logico-syntactic features of a proper name determine whose name it is. An act of babtism is needed for that. Although 'Alice' refers to Alice in virtue of being a proper name, it is *left open* who or what Alice is. Similar accounts can be given of all non-logical and non-mathematical symbols, including sentences. We can think of their logico-syntactic features as determining *placeholders* for semantic values. Which type of semantic contribution a given symbol makes is determined by which placeholder the symbol has. Referring symbols have such placeholders for individuals, predicates have them for properties and relations, sentences have them for propositions.[20] In being individuated in terms of their logico-syntactic features, non-logical and non-mathematical symbols are also partly individuated in terms of having these placeholders.

What is distinctive about the symbols of logic and mathematics is that they lack such placeholders. Instead, their logico-syntactic features *fully* determine which semantic

[18] See TLP: 3.31, 3.32, and their respective sub-paragraphs.

[19] Here and elsewhere, 'TLP' stands for '*Tractatus Logico-Philosophicus*', and the number that follows is a paragraph number. I am citing from the English translation by Pears and McGuinness. For details about the edition, see bibliography.

[20] In the *Tractatus*, Wittgenstein calls these placeholders *projections* (see, e.g., TLP: 3.11–3.13 and 4.014–4.0141). For a detailed overview of the Tractarian account of projections, see, e.g., McGinn 2010.

contributions they make.[21] For something to be a *conjunction* symbol, it must be a symbol that, if placed between two sentences, results in a new sentence that is true iff both of the constituent sentences are true. This is just what it is to be a conjunction symbol. If '∨' had that feature, then it would be a conjunction symbol too. Likewise, for something to be an addition symbol, it must be a symbol that, if placed between two numerical symbols, results in a new numerical symbol that refers to the sum of the referents of the constituent numerical symbols. Similar accounts can be given for all symbols of logic and mathematics.

4.2. Logico-Syntactic Employment

When we draw the sign/symbol distinction we thereby also raise an issue concerning how they relate to one another. Signs and symbols are the results of different ways of individuating linguistic items. Why is it that when we go from individuating linguistic items as signs to individuating them as symbols we get to one set of symbols and not another? For instance, why is the first occurrence of the sign 'can' in 'no can can can itself' a noun and not the second? In other words, what needs to be explained is how do signs get to be associated with their corresponding symbols in each case.

One proposal might be that for each sign there is a set of logico-syntactic features that are simply assigned to it by the linguistic community. On this proposal, we know which logico-syntactic features a given symbol has by relying on our previous encounters with the sign. Although there are signs, like 'can', that can occur as many different symbols, these unfortunate cases are exceptional and limited. This proposal was famously shown to be wrong by Gottlob Frege. To build upon one of Frege's (1952: 175 (orig. 1892)) examples, even if the sign 'Vienna' has previously only been used as a proper name, as in 'Vienna is the capital of Austria', we can construct sentences where it is employed as, e.g., a predicative nominal, as in 'Trieste is no Vienna', or as a verb, as in 'with these resources they could Vienna this town right up'. Similar moves can be made with any other sign, regardless of its previous uses.

In the light of such cases, Frege formulated his famous Context Principle, namely "never to ask for the meaning of a word in isolation, but only in the context of a sentence" (Frege

[21] This is presumably what Wittgenstein meant by his "fundamental idea," namely that "the 'logical constants' are not representatives" (TLP: 4.0312).

1960: xxii (orig. 1884)). Frege's principle, although formulated as a principle about meaning, is first and foremost about logico-syntactic features.[22] It concerns meaning only insofar as logico-syntactic features constrain semantic contributions. The general idea is that signs acquire logico-syntactic features by being *employed in sentences*. A sign can have different logico-syntactic features, depending on where in the sentence the sign is employed. To put this in another way, a sign has logico-syntactic features in virtue of how it is arranged with respect to other signs in the formation of a sentence. If we put the signs 'Vienna', 'is', 'no', and 'Trieste' together in one way, the sign 'Vienna' gets employed as having the logico-syntactic features of a predicative nominal, and if we put them together in another way, forming 'Vienna is no Trieste', the same sign gets employed as having the logico-syntactic features of a proper name. Since symbols are individuated in terms of their logico-syntactic features, one consequence of this idea is that symbols *cannot occur outside* of sentences.[23] To adopt a more efficient way of speaking of the relations between signs and symbols, we can say that a sign can be *employed as* some particular symbol, and that a symbol, in turn, can be *written or pronounced as* some particular sign. For instance, the sign 'can' in 'no can can can itself' is employed as three different symbols. And the noun, the modal auxiliary verb, and the regular verb in 'no can can can itself' are all written as the sign 'can'.

There is one problem with the Fregean idea, namely it does not explain how sentential signs get to be employed as sentences. Whatever it is, it in turn, given the Context Principle, affects how the constituents of sentential signs are employed. For instance, given one way of employing 'I saw that gas can explode', the sign 'that' gets employed as a complementizer, given another, that same sign becomes a demonstrative. This doesn't show that Frege's account is wrong. It just means that we need to loosen its constraints. There are things external to the sentence that can also bear upon which symbol a given sign is employed as. In order to account for this, we can, instead of speaking of the employment of a sign in the context of a sentence, speak of the employment of a sign in a *logico-syntactic context*. The

[22] Although, see Finkelstein 2001 for a treatement of the Context Principle as a principle that also accounts for some changes in semantic values for which there seems to be no corresponding changes in logico-syntactic features. For a detailed overview of the connections, both historical and logical, between the sign/symbol distinction and Frege's Context Principle, see Conant 2002.

[23] Another interesting concequence of this idea, one that was extensively studied by Wittgenstein, is that symbols also cannot occur in the *wrong place* in a sentence, which in turn means that there are no illformed sentences. For example, the sign 'and' in 'Sam and Alice are and' occurs first as a connective and then as a *predicate*. The sentence has a logical structure similar to 'Sam and Alice are young'. The first sentence is meaningless not because it is illformed but because there is no property for the predicate 'and' to predicate on Sam and Alice. See also TLP: 5.4733.

logico-syntactic context involves, by definition, all and only those things that are relevant for determining which symbol a given sign is employed as. This way we will leave it open what else may play a role in determining which symbol a given sign is employed as, in addition to how that sign is placed relative to other signs in a sentence. To summarize, the view is thus that signs are employed as symbols (i.e. as having logico-syntactic features) in virtue of being employed in a specific logico-syntactic context, or simply, in virtue of their *logico-syntactic employment*.[24]

4.3. The Essential and the Accidental in Signs and Symbols

So far I have explained how signs and symbols are individuated, and have sketched an account of how we get from signs to symbols. Based on this, I will now clarify one final issue concerning both signs and symbols which will be of special relevance for the next two chapters.

As explained in the beginning of this chapter, signs are individuated in terms of their perceivable features. Consequently, it is not possible for a sign to change its perceivable features. In other words, a sign has its perceivable features necessarily. Likewise, symbols, being individuated in terms of their logico-syntactic features, cannot change their logico-syntactic features, and thus have their logico-syntactic features necessarily. But, given the above account of how signs get to be symbols, both signs and symbols also have *contingent* features. When a sign is employed as a symbol, then it – *the sign* – has logico-syntactic features. And when we change the logico-syntactic employment of the sign, we also change its logico-syntactic features. Signs thus have their logico-syntactic features contingently. And the opposite is true of symbols. A symbol can be written as one sign or another. For example, a conjunction symbol is sometimes written as ‘and’, sometimes as ‘∧’, and sometimes as ‘&’. The logico-syntactic features do not change simply because we change the sign. Symbols thus have their perceivable features contingently, i.e., for a symbol, “the sign … is arbitrary” (TLP: 3.322).

The reason this is important for the chapters to come is that it reveals two possible fallacies we need to look out for. If we are presented with two different signs, we cannot conclude

[24] The term ‘logico-syntactic employment’ is borrowed from Wittgensein. See TLP: 3.327.

from this that we are thereby presented with two different symbols because two different signs can nevertheless be employed as the same symbol. And likewise, if we are presented with two instances of the same sign, it does not mean that we are presented with two instances of the same symbol because two different symbols can be written as the same sign. In order to tell which symbols we are presented with, we need to study the logico-syntactic employment of the signs, not what the signs look like. In the remaining two chapters I will show that the translation argument involves a fallacy of the first kind and that the argument from logical oversight involves a fallacy of the second kind. And for each argument I will give an analysis of the logico-syntactic employment of the relevant signs to reveal that the conclusions of these arguments are false.

5. RESPONSE TO THE TRANSLATION ARGUMENT

In this chapter, I will respond to the translation argument by relying on the sign/symbol distinction introduced in the last chapter. I will first point out a flaw in the translation argument. After that I will modify the metalinguistic theory so that it would accommodate the sign/symbol distinction. I will call the resulting theory *a Tractarian metalinguistic theory*. I will end this chapter by showing how this new version of the metalinguistic theory bypasses the translation argument.

5.1. A flaw in the Translation Argument

The translation argument is based on the assumption that each language has its own sentences of logic and mathematics. Only then can we point out two of them, each from a different language, and say that the sentences are translations of one another. In the light of the sign/symbol distinction, this assumption becomes subject to reasonable doubt. Let us look at (A) and (B) again.

(A) Two is a square root of four.

(B) Zwei ist die Wurzel aus vier.

Given the sign/symbol distinction, we can ask which sentences are the *sentential signs* (A) and (B) employed as. The constituent signs in the sentence 'two is a square root of four' are in fact employed in a peculiar way. For instance, although the sign 'two' is employed as a subject, the complex sign 'a square root of four' – since it seems to starts with an indefinite article – would normally be treated as a predicate. Consequently, the 'is' in the sentence should be a copula, making the logical form of the whole sentence similar to the logical form of 'Alice is a philosopher'. But the mathematical formula '$2 = \sqrt{4}$' has the form of an *identity* sentence. It includes neither a predicate nor a copula. If the English sentence is to convey the same deductive information as the mathematical formula, it too must be an identity sentence. The sign 'a square root of four' in (A) must be employed as a subject, not a predicate, and the 'is' in (A) must be an identity symbol. What this means is that 'two is a square root of four' and '$2 = \sqrt{4}$' do not convey the same mathematical information because the former is a natural language sentence that has the same truth-conditions as the latter.

Rather, they convey the same mathematical information because *they are the same sentence*. We employ the signs of English *as* the symbols of mathematics. One cannot rely on the rules of English grammar and point out a grammatical flaw in ‘two is a square root of four’. But if the rules of English grammar no longer apply, then the sentence is simply not a sentence of English. The only thing English about the sentence is its appearance. The same can be said of the German ‘zwei ist die Wurzel aus vier’. They are both ways of writing down the formula ‘$2 = \sqrt{4}$’.

We can also get to this result without relying on an analysis of a specific sentence. Since symbols are individuated in terms of their logico-syntactic features, not in terms of their perceivable features, whenever we have two signs employed as having certain logico-syntactic features, we have two instances of the same symbol. If (A) and (B) are to convey the same deductive information, then, presumably, they must have the same logico-syntactic features. Consequently, they are two instances of the same sentence.

A worry that might be raised for this conclusion is that a sentence like ‘Alice found out that two is a square root of four’ then ends up being a mix of English and the language of mathematics. But this is not a problem. The language of mathematics can be seen as an extension of natural languages. A sentence like ‘Alice found out that two is a square root of four’ will then end up being a sentence of mathematically enriched English, with a subclause that is also a sentence of other mathematically enriched natural languages. And natural languages do not just share mathematical symbols. They also share logical symbols. Logical symbols, as all symbols, are individuated not in terms of what they look like but in terms of what the do. Whenever a sign in any language is combined with two sentences to form a new sentence that is true iff both of the constituent sentences are true, that sign is employed as a conjunction symbol, the same symbol as ‘$\wedge$’ is employed as in ‘$P \wedge Q$’.

On the face of it, this seems to block the translation argument. Given the metalinguistic theory, deductive information is information about which semantic value a given expression has. If the German speaker and the English speaker find out about the same sentence that it expresses a necessary proposition, then they do share deductive information. The problem, however, is that by introducing the sign/symbol distinction, we also introduce an ambiguity into the metalinguistic theory. This will be the topic of the next two sections.

5.2. Information About the Semantics of Symbols?

Given the sign/symbol distinction, we could either flesh out the metalinguistic theory as a view that deductive information is information about which semantic value a given *sign* has or a view that deductive information is information about which semantic value a given *symbol* has. I will now show that the second option fails. This leaves us with the task of fleshing out the details of the first option, which I will take up in the next section.

As explained in chapter 1, subsection 1.2.3, only contingent propositions can be informative, given the pragmatic picture. Thus, if the metalinguistic theory is to be successful in giving an account of deductive information that is compatible with the pragmatic picture, logical and mathematical truths must express necessary propositions contingently. The problem stems from the fact that logical and mathematical truths, as all sentences, have their *logico-syntactic* features necessarily, and logico-syntactic features place constraints on which propositions a given sentence can express. For instance, the sentence 'Alice is reading' cannot but express a proposition about Alice, who- or whatever that is. This is guaranteed by a logico-syntactic property of the name 'Alice', namely the property of referring to Alice. In principle, such constraints could be strict enough that the sentence always expresses one and the same proposition. In this case, the sentence, since it has its logico-syntactic properties necessarily, would also express this proposition necessarily. I will now show that this is precisely the case with logical and mathematical truths.

Take the sentence '$2 + 2 = 4$'. What makes '$+$' in it an addition symbol is that it combines with numerical symbols 'n' and 'm' to form a new numerical symbol that refers to the sum of the referents of 'n' and 'm'. And what makes '$=$' an identity symbol is that it combines with numerical symbols 'n' and 'm' to form a sentence that is true iff 'n' and 'm' refer to the same number. It gets slightly more complicated with the symbols '2' and '4' in '$2 + 2 = 4$'. Numerical symbols are normally taken to be referring symbols. As explained in the previous chapter, the logico-syntactic features of referring symbols determine placeholders for referents, but they do not determine the referents themselves. If the same is also true of numerical symbols, then the sentence '$2 + 2 = 4$' would express a necessary proposition contingently, and the metalinguistic theory would be in the clear, at least as far as mathematical equations are concerned. But this account has two problems. First, we should then not be able to figure out whether '$2 + 2 = 4$' is true on *a priori* grounds. We would also have to figure out *which* number two and *which* number four is being referred to, in order to tell whether '$2+2=4$' is true. A second, and a more pressing issue is that it *makes no sense* to ask which number two or which number four is being referred to, whereas it does make sense to ask which Alice is being referred to.[25] Consequently, it is not left open which number a given numerical symbol refers to. For '4' to refer to the number four just is for it to refer to something that is equal to the sum of two and two, and similarly for other numerical symbols. On the one hand, this accounts for the apriority of the sentence '$2+2=4$', but it also means that each constituent of the sentence '$2+2=4$' has not only its logico-syntactic features but also its semantic value necessarily. Consequently, the sentence as a whole has its semantic value necessarily as well, i.e., the sentence '$2+2=4$' expresses a necessarily proposition necessarily. This result generalizes to all logical and mathematical truths and falsehoods. If the metalinguistic theory is to give us an account of deductive information as something contingent, it cannot be the view that deductive information is about which semantic value a given symbol has.

When Stalnaker introduces the metalinguistic theory, he proposes that metalinguistic propositions like the proposition that '$2+2=4$' expresses a necessary proposition are false in possible worlds where the *linguistic facts* are different (see Stalnaker 1984: 75). But, given the above result, resorting to possible worlds where the linguistic facts are different will not help. Since the sentence '$2+2=4$' expresses a necessary proposition in virtue of its logico-syntactic features, any world in which '$2+2=4$' does not express a necessary proposition is a world in which '$2+2=4$' is employed as having different logico-syntactic features, i.e., as a different sentence. Stalnaker himself addresses this worry in a footnote, responding to it as follows:

> However utterances or sentences are identified across possible worlds, it is enough for my purposes that there be possible worlds in which some epistemic counterpart of the expression '$2+2=4$' says something different than that two plus two equals four. One can set aside the question of whether such counterpart sentence tokens (which sound and look the same as our '$2+2=4$') are really instances of the same sentence type. (Stalnaker 1984: ch 4, fn 15)

In this passage, Stalnaker recognizes that it is not the sentences (thought of as symbols) that express different propositions in different possible worlds, but rather things that "sound and look the same" as our sentences, i.e., signs. But it is not clear how these things in other worlds could be "epistemic counterparts" of our sentences. It is not clear what that means at

[25] I'm not sure why that is, but an option worth exploring is that numbers simply are placeholders that come with numerical symbols. An ontology of mathematical objects developed in this spirit is presented in Rayo 2013.

all. What is clear is that deductive information, if it is to be metalinguistic and contingent, must be about signs.

5.3. A Tractarian Metalinguistic Theory

I will now work out the details of the metalinguistic theory as a view that deductive information is information about signs. Since logico-syntactic features are contingent features of signs, the sentential sign 'two is a square root of four' expresses a necessary proposition contingently. But we cannot simply accept that deductive information is about which semantic value a given sign has. This is, first of all, because it would again give rise to the translation argument. Signs are individuated in terms of their perceivable features. Thus, the sentential signs 'two is a square root of four' and 'zwei ist die Wurzel aus vier' are not two instances of the same sign. But the proposal would also fail to respect the sign/symbol distinction in two respects. I will now show that by bringing the metalinguistic theory in line with the sign/symbol distinction we get a response to the translation argument for free.

First, given the sign/symbol distinction, speaking of sentential signs as expressing propositions is slightly misleading. As Wittgenstein puts it, …

> … [i]nstead of, 'The complex sign 'aRb' says that a stands to b in the relation R', we ought to put, '*That* 'a' stands to 'b' in a certain relation says *that* aRb.' (TLP: 3.1432)

In other words, it is a *sign being employed as a symbol*, i.e., a certain state of affairs, that has a semantic value, not the sign itself. What expresses a proposition is a collection of signs being employed as a sentence, or, which amounts to the same, it is a *sentential sign* being employed as a sentence that expresses a proposition. Thus, if deductive information is to concern signs and semantic values, it must be, at least partly, about the employment of signs as symbols. The proposal might be that the deductive information conveyed by the sentence 'two is a square root of four' is *that the sentential sign 'two is a square root of four' being employed as the sentence 'two is a square root of four' expresses a necessary proposition*. This analysis can be shortened. As I showed above, the logico-syntactic properties of logical and mathematical truths and falsehoods fully determine which propositions they express. Thus, to grasp one such sentence is to grasp also the proposition that it expresses. If one fails to see, e.g., that some mathematical truth expresses a necessary proposition, then it is because one fails to recognize some subtle details of its logico-syntactic features. But to fail to recognize the latter is just to fail to recognize which sentence the sentential sign is employed as. Consequently, the deductive information conveyed by the sentence ‘two is a square root of four’ can simply be seen as the information *that the sign ‘two is a square root of four’ can be employed as the sentence ‘two is a square root of four’*. Deductive information is thus better thought of not as information about propositions expressed but as information about logico-syntactic employment.

The other tension between the metalinguistic theory and the sign/symbol distinction stems from the fact that *signs are arbitrary*, i.e., they can be changed without changing the sentence. If a change in signs doesn’t introduce a change in the sentence, then it cannot be introducing a change in the truth-conditions of the sentence either. In chapter 2, section 2.1, I pointed out that one task before us, given the metalinguistic theory, is to explain how sentences like ⌜S found out that ⊤⌝ and ⌜S believes that ⊥⌝ (where ⌜⊤⌝ is a necessary truth and ⌜⊥⌝ a necessary falsehood) can be used to attribute propositional attitudes with metalinguistic content. However, no matter what shape such an account will ultimately take, it will be inconsistent with the above proposal about what deductive information is. Given the above proposal, the sentence ‘Alice found out that $\sim(P \wedge \sim P)$’ should be true only if Alice has found out something about the sign ‘$\sim(P \wedge \sim P)$’, and the sentence ‘Alice found out that $\sim(P \,\&\, \sim P)$’ should be true only if Alice has found out something about the sign ‘$\sim(P \,\&\, \sim P)$’. Thus, they should have different truth-conditions. But, given that a conjunction symbol can be written as ‘∧’ or as ‘&’, ‘Alice found out that $\sim(P \wedge \sim P)$’ and ‘Alice found out that $\sim(P \,\&\, \sim P)$’ are simply two ways of writing down the same sentence. Thus, they shouldn’t differ in truth-conditions. And so, we have a contradiction.

In this case, what gives rise to the problem also gives rise to its solution. If signs are arbitrary, then it does not matter which sign it is that encodes the deductive information in question. As long as it encodes it. It doesn’t matter whether Alice finds out that the sign ‘$\sim(P \wedge \sim P)$’ can be employed as the law of non-contradiction or that the sign ‘$\sim(P \,\&\, \sim P)$’ can be employed as the law of non-contradiction. What matters is that she finds out that *there is a sign* that can be employed as the law of non-contradiction. In other words, we should think of deductive information as existentially generalized over signs. What this version of the metalinguistic theory suggests is that when we engage in deductive inquiry we look for a sign that could be employed in a certain way we are interested in. If we find a sign that does the job, we can conclude that such a sign exists. The sign itself only plays an instrumental role. It can be jettisoned after the inquiry is completed.

On this proposal, the semantics of propositional attitude reports like 'Alice found out that $\sim(P \wedge \sim P)$' no longer require that the sign employed as the subclause be contributed to the truth condition. All that needs to be contributed is *that there is a sign*. In the sentence, this contribution can be indicated by the fact that the logico-syntactic features of the subclause restrict the subclause to always picking out the same proposition, i.e., by the fact that the subclause is a logical or a mathematical truth. I will leave it open what exactly such an account should look like.

To summarize, I have made a total of three modifications to Stalnaker's metalinguistic theory in the light of the sign/symbol distinction, resulting, what I will refer to as *a Tractarian metalinguistic theory*. First, I showed that if deductive information is to be metalinguistic, it must be at least partly about signs. This is what provides the needed contingency to deductive information. Second, I showed that the metalinguistic information should be thought of, first and foremost, as information about which symbol a given sign can be employed as, not as information about which semantic value a given sign has. And third, I argued that this information is not about specific signs but involves existential quantification over signs. This is, on the one hand, because otherwise we would not be able to account for the fact that propositional attitude reports with logical or mathematical truths can be used to say that subjects have acquired deductive information. On the other hand, it also makes more sense as an account of deductive information, as the specific signs are simply irrelevant in deductive inquiry. The view, in short, is the following:

> <u>A Tractarian Metalinguistic Theory</u>
> Deductive information conveyed by a sentence 'p' is that there is a sign that can be employed as the sentence 'p'.

One final worry that might be raised for this proposal is that the sentence 'there is a sign that can be employed as the sentence 'p'' is necessarily true after all. No matter what the linguistic facts are in a world, *some* collection of signs can still be employed as the sentence 'p'. This worry, however, is groundless. The existence of language is itself a contingent matter. There are possible worlds where there simply is no language and consequently no signs that could be employed as some sentence.

5.4. Response to the Translation Argument

Given the Tractarian metalinguistic theory developed in the previous section, I can now provide a response to the translation argument. As I argued in the beginning of this chapter, the translation argument rests on the mistaken assumption that each language has its own sentences of logic and mathematics. I showed that the difference between sentences like 'two is a square root of four' and 'zwei ist die Wurzel aus vier' is only a difference in signs, that they both obey the same syntax rules – the syntax rules of the language of mathematics. Consequently, they are not two different sentences that are translations of one another. They are different ways of writing down the *same* sentence, one that we can also write down as '$2 = \sqrt{4}$'.

When we combine this result with the Tractarian metalinguistic theory, we can see how the translation argument fails. Going back to the formulation of the translation argument from chapter 3, let us take again the following two (which we can now only call) ways of writing down the sentence '$2 = \sqrt{4}$':

(A) Two is a square root of four.

(B) Zwei ist die Wurzel aus vier.

Given the Tractarian metalinguistic theory, the deductive information conveyed by (A) is the proposition expressed by (C), and the deductive information conveyed by (B) is the proposition expressed by (D).

(C) There is a sign that can be employed as the sentence 'two is a square root of four'.

(D) There is a sign that can be employed as the sentence 'zwei ist die Wurzel aus vier'.

Given that 'two is a square root of four' and 'zwei ist die Wurzel aus vier' are two ways of writing down the same sentence, (C) and (D) express the same proposition. Thus, an English speaker who acquires the deductive information conveyed by (A) and a German speaker who acquires the deductive information conveyed by (B) acquire the same deductive information. No problem arises. We can go through that same reasoning for any sentence of logic or mathematics and any two languages whose signs have been used to formulate that sentence. The result will always be the same. Given the sign/symbol distinction, the Tractarian metalinguistic theory is immune to the translation argument.

6. RESPONSE TO THE ARGUMENT FROM LOGICAL OVERSIGHT

In this chapter, I will respond to the argument from logical oversight. As before, I will again rely on the sign/symbol distinction introduced in chapter 4. The argument from logical oversight relied on the following premise:

> Oversight
>
> There are cases in which a subject believes that ϕ and fails to believe that ψ, even though $\phi \vDash \psi$.

The task before a proponent of the argument was to provide support for this premise. In chapter 3, I gave an overview of Mark Jago's (2014) and Robert Moore's (1995) cases in favour of Oversight. I will begin this chapter by pointing out a common flaw in both. After that I will give a recipe for finding that same flaw in any defence of Oversight. Given this recipe, Oversight cannot be defended. And thus, the argument from logical oversight fails. I will also consider a possible worry with the recipe that I propose, showing that the worry is responded to by the integration theory introduced in chapter 2.

6.1. A Flaw in Jago's and Moore's Defences of Oversight

To recap, Jago's defence of Oversight consisted of an argument to which Stalnaker had a response. The problem with Jago's argument was the false assumption that performing certain logical operations always leads to some specific changes in one's dispositions to act. I showed how the argument could be modified so as to block Stalnaker's response. The modification consisted in substituting the assumption with the claim that performing certain logical operations leads one to believe the result of these logical operations, regardless of whether it also results in some specific changes in one's dispositions to act. The modified argument unfolded as follows:

Assume that $\phi_1, \ldots, \phi_n \vDash \psi$. Given the theorem ⌜$\phi_1, \ldots, \phi_n \vDash \psi$ iff $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$⌝ of classical logic, it follows that $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$. If a subject S has conjoined propositions $[\![\phi_1]\!], \ldots, [\![\phi_n]\!]$, the following obtains:

(A) (S believes that $\phi_1 \wedge \ldots \wedge$ S believes that ϕ_n) $\rightarrow$ S believes that $(\phi_1 \wedge \ldots \wedge \phi_n)$

But there are cases in which S has conjoined propositions $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, each of which she believes, but S fails to believe that ψ. Therefore, there are cases in which S believes that $(\phi_1 \wedge ... \wedge \phi_n)$ and fails to believe that ψ, even though $(\phi_1 \wedge ... \wedge \phi_n) \vDash \psi$.

Drawing the sign/symbol distinction brings out a potential flaw in this argument. The schema (A) is supposed to obtain only in circumstances where the subject has conjoined $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$. But when it does obtains, it captures a sufficient condition for when the subject counts as believing that $(\phi_1 \wedge ... \wedge \phi_n)$. Since, given (PP), what one believes is analysed in terms of truth at possible worlds, (A) thereby captures a sufficient condition for when ⌜$\phi_1 \wedge ... \wedge \phi_n$⌝ *is true at a possible world*.

Which symbol a given sign is employed as is determined by the logico-syntactic context into which the sign is placed. One way such a context can be generated is if something (or someone) fixed a necessary or a sufficient conditions for when some sentential sign where the sign in question occurs in would be true. For instance, suppose there is some contextual factor C, such that whenever C is present, a sufficient condition for ⌜$\phi \wedge \psi$⌝ being true is that ⌜ϕ⌝ is true. In this case, whenever C is present, the sentential sign ⌜$\phi \wedge \psi$⌝ would not be employed as a conjunction of ⌜ϕ⌝ and ⌜ψ⌝. It would be employed, e.g., as a disjunction of ⌜ϕ⌝ and ⌜ψ⌝ or as a material implication with ⌜ϕ⌝ as its consequent. And the sign '∧' in ⌜$\phi \wedge \psi$⌝ would thus be employed either as a disjunction symbol or a material implication symbol. The logico-syntactic features of the sign '∧' would be relativized to the presence or absence of C. Given (PP), the same thing happens when we posit that whenever a subject has conjoined $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, (A) is true. I will demonstrate.

Given (PP), we can specify how belief states are involved in (A) as follows (where '$b \Vdash [\![\phi]\!]$' is again to be read as 'belief state b of S supports $[\![\phi]\!]$'):

(A′) $(b_1 \Vdash [\![\phi_1]\!] \wedge ... \wedge b_n \Vdash [\![\phi_n]\!]) \rightarrow \exists b\colon b \Vdash [\![\phi_1 \wedge ... \wedge \phi_n]\!]$

Thus, from the point of view of the pragmatic picture, (A) amounts to the claim that, when S has conjoined $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$, each of which she believes, the dispositions she starts out with are enough for her to count as believing that $(\phi_1 \wedge ... \wedge \phi_n)$. Without the requirement that the belief states b_1, …, b_2 be integrated, the criteria that a subject must satisfy in order to count as believing that $(\phi_1 \wedge ... \wedge \phi_n)$ are *lower* in a context where the subject has conjoined $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$. Consequently, a belief state can support $[\![\phi_1 \wedge ... \wedge \phi_n]\!]$ without supporting any of $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$. If we unpack the supporting relation, it means that $[\![\phi_1 \wedge ... \wedge \phi_n]\!]$ can be true in every possible world in a belief state without $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$

being true in any of them. In other words, the sign '$\wedge$' in ⌜$\phi_1 \wedge \ldots \wedge \phi_n$⌝ does not obey conjunction elimination.[26] And consequently, it is not employed as a symbol for classical conjunction. The logico-syntactic features of the sign '$\wedge$' in ⌜$\phi_1 \wedge \ldots \wedge \phi_n$⌝ are relativized to whether the subject has conjoined $[\![\phi_1]\!]$, …, $[\![\phi_n]\!]$.

If we worked out what logico-syntactic features '$\wedge$' has in ⌜$\phi_1 \wedge \ldots \wedge \phi_n$⌝, given (A$'$), we would recognize it as *fusion*, the conjunction of relevance logic (see, e.g., Read 2012).[27] The fusion of ⌜ϕ_1⌝, …, ⌜ϕ_n⌝ (usually written as ⌜$\phi_1 \circ \ldots \circ \phi_n$⌝) does not entail everything that is entailed by a classical conjunction of ⌜ϕ_1⌝, …, ⌜ϕ_n⌝ (which we can keep writing as ⌜$\phi_1 \wedge \ldots \wedge \phi_n$⌝). Consequently, S can believe that $(\phi_1 \circ \ldots \circ \phi_n)$ and fail to believe that ψ, even though $(\phi_1 \wedge \ldots \wedge \phi_n) \vDash \psi$. S's belief still turns out to be closed under logical consequence because $(\phi_1 \circ \ldots \circ \phi_n) \nvDash \psi$. Thus, Jago's argument has failed to show that beliefs are not closed under logical consequence.

Moore's defence of Oversight fails for the same reason. In presenting Case I as evidence that the subject does believe a conditional, Moore insists on the following schema encoding a necessary condition for believing a conditional:

(B) S believes that (if ϕ, then $\sim\psi$) $\rightarrow$ (S believes that ϕ $\rightarrow$ S believes that $\sim\psi$)

It is not clear which contextual factor is responsible for the obtaining of (B), but, as Case I illustrates, (B) does obtain. Given (PP), we can make explicit how belief states are involved in (B). To do this, we need to determine the dispositions involved in believing that (if ϕ, then $\sim\psi$). Given Case I, in coming have a disposition that reveals her as believing that P, S also comes to have further disposition, one that reveals her as believing that $\sim Q$.[28] No belief state integration was needed for this. Given Case II, S does not acquire a disposition to act that would reveal her as believing that $\sim P$ when she comes to believe that Q. This suggests the following specification of (B):

(B$'$) $b \Vdash [\![\text{if } \phi, \text{then } \sim\psi]\!] \rightarrow (b \Vdash [\![\phi]\!] \rightarrow \exists b' \colon b' \Vdash [\![\sim\psi]\!])$

---

[26] It is perhaps worth noting that, even though conjunction elimination appears to be invalid, given (A$'$), the inference from ⌜S believes that $\phi \wedge \psi$⌝ to ⌜S believes that ϕ⌝ is still valid. Although, given (A$'$), a belief state which supports $[\![\phi \wedge \psi]\!]$ need not support $[\![\phi]\!]$, it is still true that, if one is in a belief state which supports $[\![\phi \wedge \psi]\!]$, then one is also in a belief state which supports $[\![\phi]\!]$. The belief state supporting $[\![\phi]\!]$ can simply be distinct from the belief state that supports $[\![\phi \wedge \psi]\!]$.

[27] I will spare the reader from a proof of this.

[28] The sentence letters 'P' and 'Q' still stand in for 'door A is locked' and 'door B is locked', respectively.

Given (B'), if S believes that (if P, then $\sim Q$), and comes to believe that P, she immediately also comes to believe that $\sim Q$. There is no need for her to engage in any deductive reasoning. Thus, (B') does justice to Case I. At the same time, if S believes that (if P, then $\sim Q$), and comes to believe that Q, she is not guaranteed to come to believe that $\sim P$. The assumption that $b \Vdash [\![Q]\!]$, i.e., that S believes that Q, is consistent with there being another belief state b' of S such that $b' \Vdash [\![\sim Q]\!]$, i.e., with S also believing that $\sim Q$. Thus, nothing of interest follows concerning $[\![\sim P]\!]$. And so, we can assume that $\sim\exists b'\colon b' \Vdash [\![\sim P]\!]$, i.e., that S fails to believe that $\sim P$. Thus, (B') also accounts for Case II.

The reason why Moore's defence of Oversight fails can now be seen. By accounting for Case II, (B') allows for the possibility that $[\![\text{if } \phi, \text{ then } \sim\psi]\!]$ and $[\![\psi]\!]$ are both true relative to every possible world in a belief state without $[\![\sim\phi]\!]$ being true in any of them. And so, given (B'), the sign 'if' as it is employed in $\ulcorner\text{if } \phi, \text{then } \sim\psi\urcorner$ does not obey *modus tollens*, and consequently, it does not obey contraposition either. Based on (B') we can also work out other logico-syntactic features of 'if' in $\ulcorner\text{if } \phi, \text{ then } \sim\psi\urcorner$. But for present purposes this is not needed. We can write this connective as '$\Rightarrow$'. The situation Moore describes in his thought-experiment is one where S believes that $(\phi \Rightarrow \sim\psi)$ and fails to believe that $(\psi \Rightarrow \sim\phi)$, even though $(\text{if } \phi, \text{ then } \sim\psi) \vDash (\text{if } \psi, \text{ then } \sim\phi)$. This does not show that beliefs are not closed under logical consequence because $(\phi \Rightarrow \sim\psi) \nvDash (\psi \Rightarrow \sim\phi)$.

6.2. A Recipe for Responding to the Argument from Logical Oversight

Learning from the failure of Jago's and Moore's objections, we can put together a recipe for responding to any form of the argument from logical oversight. Any such argument needs to show that there are cases where a subject believes that ϕ and fails to believe that ψ, even though $\phi \vDash \psi$. This must be supported by some evidence. Some schema is presented that captures either a sufficient condition for believing that ϕ, as in Jago's case, or a necessary condition, as in Moore's case. Following the pragmatic picture, we can then provide a dispositionalist analysis specifying how belief states are involved in this schema. As a result we will be providing either a sufficient or a necessary condition for $[\![\phi]\!]$ being true at every possible word in a belief state. Since the condition the schema encodes allows for the agent to believe that ϕ without believing that ψ, our dispositionalist analysis will always reveal that the signs employed in $\ulcorner\phi\urcorner$ and $\ulcorner\psi\urcorner$ as logical connectives are employed in such a way that $\phi \nvDash \psi$. Consequently, we will have shown that the argument did not manage to establish that the belief of the subject in question is not closed under logical consequence.

6.3. The Classical Conclusions Objection

Before we can conclude that subjects of propostional attitudes are logically omniscient, there is one objection to the above analyses that needs to be addressed. I will address it in this section. I will start by explaining the worry with the analyses I have provided of Jago's and Moore's arguments, and then provide a response, showing that the integration theory can account for this worry without difficulty.

In both Jago's and Moore's version of the argument from logical oversight, the subject can still reach the conclusion by engaging in deductive reasoning. If $\phi_1, \ldots, \phi_n \vDash \psi$, then a subject who comes to believe that $(\phi_1 \wedge \ldots \wedge \phi_n)$ by conjoining the premises of the argument can still come to believe that ψ, if she manages to derive it. Likewise, reasoning from the beliefs that (if P, then $\sim Q$) and that Q can lead the subject in Moore's thought-experiment to believe that $\sim P$. But, if in the presentations of these cases the relevant signs employed in the subclauses are employed as non-classical symbols, then wouldn't the subjects be mistaken in concluding these things? They are, after all, *classical* consequences of what the subjects believe.

It is here, I think, where the elegance of the integration theory shines out. As said above, reasoning is one way belief states can be integrated. Consequently, any desire or obligation to find out the deductive consequences of our beliefs translates into a desire or obligation to integrate belief states. So, according to the integration theory, when we want to know what follows from what we believe, we want to know what we *would* believe, if our belief states were integrated. We care about our belief states and what propositions they would support in this ideal situation. We do not care about the propositions these belief states happen to support.

Going back to Moore's thought-experiment, if we added the assumption that $\forall b' \colon b' = b$, i.e., that all the subjects belief states are integrated into one, (B$'$) entails the following:

(B$''$) $\quad b \Vdash [\![\text{if } \phi, \text{then} \sim\psi]\!] \rightarrow (b \Vdash [\![\phi]\!] \rightarrow b \Vdash [\![\sim\psi]\!])$

Given (B$''$), 'if' in ⌜if ϕ, then $\sim\psi$⌝ does obey *modus tollens* and, consequently, contraposition. The proof runs as follows. (I will write '$b \Dashv [\![\phi]\!]$' to mean that $[\![\phi]\!]$ is false in every possible world in b. It can be read as 'b supports the falsity of $[\![\phi]\!]$'.) Assume that $b \Vdash [\![\text{if } P, \text{ then } \sim Q]\!]$, i.e., that S believes that (if P, then $\sim Q$). Given (B$''$), it follows that i) $b \Vdash [\![P]\!] \rightarrow b \Vdash [\![\sim Q]\!]$. Assume further that $b \Vdash [\![Q]\!]$, i.e., that S believes that Q. Given a classical account of negation, this entails that ii) $b \Dashv [\![\sim Q]\!]$. From i and ii taken together it follows that $b \Dashv [\![P]\!]$, which, given classical negation again, entails that $b \Vdash [\![\sim P]\!]$, i.e., that S believes that $\sim P$. Thus, given (B$''$), if S believes that (if P, then $\sim Q$), and that Q, then S also believes that $\sim P$. Adding the same assumption, namely that $\forall b' \colon b' = b$, to (A$'$) in Jago's argument gives a similar result. The subject S comes to believe whatever ⌜ϕ_1⌝, …, ⌜ϕ_n⌝ collectively entail, and the sign '$\wedge$' in ⌜$\phi_1 \wedge \ldots \wedge \phi_n$⌝ turns out to be employed as a classical conjunction symbol.

This result is not specific to the cases at hand. Given the pragmatic picture, signs for logical connectives in belief context get employed as non-classical connectives because of the complexity that comes with multiple belief states. If the multiplicity gets removed due to belief state integration, the signs are again employed as classical connectives.[29] In short then, given the integration theory, signs being employed as non-classical connectives within belief context does not bear upon the possibility of deriving classical conclusions from beliefs.

A general moral to be drawn from the failure of both the argument from logical oversight and the classical conclusions objection is that we shouldn't approach a description of a case with presuppositions about which logical theory (e.g., classical, relevant, intuitionistic, etc.) captures the logical powers of the connective signs that are employed in the description. Logical connectives shape themselves after the logico-syntactic context their signs are employed in. Consequently, if we wish to find out what follows from what in a given case, it is simply of no use to consult a logical theory. All we can do is study the details of the logico-syntactic context at hand. "Logic," in other words, "takes care of itself; all we have to do is to look and see how it does it."[30]

---

[29] Unless, of course, something similar to what happens in the scope of 'believes' also happens outside it. Similar effects in how signs for logical connectives are employed may, for instance, be created by contexts. Whether this is so is beyond the scope of this paper.

[30] Wittgenstein 1961: entry 13.10.14.

CONCLUSION

In this thesis, I defended Robert Stalnaker's (1984) account of deductive inquiry that is compatible with subjects of propositional attitudes being logically omniscient. By extension, my defence was also a defence of the idea that subjects of propositional attitudes are logically omniscient.

The account Stalnaker has proposed consists of two complementary theories, one of which – the metalinguistic theory – explains what sort of information is deductive information, and the other – the integration theory – explains how deductive inquiry proceeds. Given the metalinguistic theory, deductive information conveyed by an argument is information about which propositions are expressed by the premises and the conlusion of the argument. Given the integration theory, deductive inquiry proceeds via integration of existing linguistic dispositions into new ones.

I defended Stalnaker's account against two arguments, the translation argument (in Moore 1995, Nuffer 2009) and the argument from logical oversight (in Moore 1995, Jago 2014). The former aimed to show that Stalnaker's solution fails to account for the fact that speakers who do not share a language can still share deductive information, and the latter aimed to show that there are counter-examples to the prediction of logical omniscience that Stalnaker's solution fails to explain away. In my responses to the two arguments, I made use of a distinction found in Wittgenstein's *Tractatus* between two ways of individuating expressions: either as perceivable or as logico-syntactic units of language, i.e., as signs or as symbols. I showed that the first argument involves the mistake of treating one symbol written as two differnt signs as two different symbols, and that the second argument makes the opposite mistake of treating two different symbols written as the same sign as one symbol. In the course of demonstrating this, I also developed a version of the metalinguistic theory that is in line with the sign/symbol distinction. According to the resulting theory, deductive information is not about which semantic value a given expression has but about which symbol a given sign is employed as.

BIBLIOGRAPHY

Baker, Lynne Rudder 2003. Belief Ascriptions and the Illusion of Debth. – *Facta Philosophica* 5(2):183–201.

Bjerring, Jens Christian, Weng Hong Tang *manuscript* (2011). Why Fragmentation Does Not Help Solve the Problem of Logical Omniscience; https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbnxqY2JqZXJyaW5nc3dlYnNpdGV8Z3g6NzQwMThhYWFkNWViOTUwOQ (25.04.2016).

Carroll, Lewis 1895. What the Tortoise Said to Achilles. – *Mind* 4(14): 278–280.

Church, Alonzo 1950. On Carnap's Analysis of Statements of Assertion and Belief. – *Analysis* 10(5): 97–99.

Conant, James 2002. The Method of the Tractatus. In E. H. Reck (ed.), *From Frege to Wittgenstein: Perspectives on Early Analytic Philosophy*. Oxford University Press.

Dancy, Jonathan 2000. *Practical Reality*. Oxford University Press.

Egré, Paul 2006. Logical Omniscience and Counterpart Semantics. In T. Agotnes, N. Alechina (eds.), *Proceedings of the ESSLLI 2006 Workshop on Logics for Resource Bounded Agents*.

Finkelstein, David 2001. Wittgenstein's "Plan for the Treatment of Psychological Concepts". In T. G. McCarthy, S. C. Stidd (eds.), *Wittgenstein in America*. Clarendon Press.

Frege, Gottlob 1951. On Concept and Object. Translated by P. T. Geach, Max Black – *Mind* 60(238): 168–180.

Frege, Gottlob 1960. *Foundations of Arithmetic: A Logico-Mathematical Enquiry into the Concept of Number*. Translated by J. L. Austin. Harper & Brothers.

Harman, Gilbert 2002. Internal Critique: A Logic Is Not a Theory of Reasoning and a Theory of Reasoning Is Not a Logic. In D. M. Gabbay, R. H. Johnson, H. J. Ohlbach, J. Woods (eds.), *Handbook of the Logic of Argument and Inference: The Turn Towards the Practical*. Elsevier Science.

Jago, Mark 2014. *The Impossible: An Essay on Hyperintensionality*. Oxford University Press.

Lewis, David 1979. Attitudes De Dicto and De Se. – *The Philosophical Review* 88(4): 513–543.

Marcus, Ruth Barcan 1983. Rationality and Believing the Impossible. – *The Journal of Philosophy* 80(6): 321–338.

McGinn, Marie 2010. Wittgenstein and Internal Relations. – *European Journal of Philosophy* 18(4): 495–509.

Moore, Robert C. 1995. Propositionainnl Attitudes and Russellian Propositions. In *Logic and Representation*. CSLI Publications.

Muskens, Reinhard 1991. Hyperfine-grained Meanings in Classical Logic. – *Logique et Analyse* 133: 159–176.

Nuffer, Gerhard 2009. Stalnaker on Mathematical Information. – *The Southern Journal of Philosophy* 47(2): 187–204.

Perry, John 2001. *Knowledge, Possibility, and Consciousness*. MIT Press.

Read, Stephen 2012. *Relevant Logic: A Philosophical Examination of Inference*; https://www.st-andrews.ac.uk/~slr/Relevant_Logic.pdf (02.05.2016).

Rayo, Agustin 2013. *The Construction of Logical Space*. Oxford University Press.

Stalnaker, Robert 1976. Propositions. In A. F. MacKay, D. D. Merrill (eds.), *Issues in the Philosophy of Langauge*. Yale University Press.

Stalnaker, Robert 1984. *Inquiry*. MIT Press.

Stanley, Jason 2010. "Assertion" and Intentionality. – *Philosophical Studies* 151(1): 87–113.

Travis, Charles *manuscript* (2013). What Structure Lurks in the Minds of Men; http://www2.warwick.ac.uk/fac/soc/philosophy/news/seminars/consciousness/travis_what_structure_lurks_in_the_minds_of_men.pdf (02.05.2016).

Wittgenstein, Ludwig 2001. *Tractatus Logico-Philosophicus*. Translated by D. F. Pears, B. F. McGuinness. Routledge.

Wittgenstein, Ludwig 1961. *Notebooks 1914–1916*. Translated by G. E. M. Anscombe. Edited by G. H. von Wright, G. E. M. Anscombe. Harper & Brothers.

ABSTRACT

Title: In Defence of Logical Omniscience

The most controversial consequence of Robert Stalnaker's (1984) theory of propositional attitudes is that subjects of propositional attitudes are logically omniscient. What makes this consequence problematic is that it seems to conflict with the fact that subjects of propositional attitudes are also deductive reasoners. Stalnaker's solution to this problem consists in two complementary theories. According to the metalinguistic theory, deductive information is metalinguistic, and according to the integration theory, deductive reasoning proceeds via integration of dispositions to act. In my thesis I will defend Stalnaker's solution against two arguments, namely the translation argument (Moore 1995, Nuffer 2009) and the argument from logical oversight (Moore 1995, Jago 2014). In my responses I will rely on a Tractarian distinction between signs and symbols, showing that it brings out a similar flaw in both arguments. The flaw in the first is the assumption that the same sentence cannot be written in two different languages, and the flaw in the second is the assumption that two different logical connectives cannot be written in the same way. In my response to the first of these arguments, I will also develop a variation of Stalnaker's metalinguistic theory that accounts for the sign/symbol distinction.

RESÜMEE

Pealkiri: Loogilise omnistsientsuse kaitseks

Robert Stalnakeri (1984) hoiakutetooria kõige problemaatilisem tagajärg on, et propositsiooniliste hoiakute subjektid on loogiliselt omnistsientsed. Problemaatiline on see tagajärg seetõttu, et paistab olevat konfliktis tõsiasjaga, et hoiakute subjektid on ühtlasi deduktiivsed arutlejad. Stalnakeri lahendus probleemile seisneb kahes teineteist täiendavas teoorias. Metalingvistilise teooria järgi on deduktiivne informatsioon metalingvistiline, ja integratsiooniteooria järgi toimub deduktiivne järeldamine käitumuslike dispositsioonide integreerimises. Oma teesis kaitsen Stalnakeri lahendust kahe argumendi eest, nimelt tõlkeargumendi (Moore 1995, Nuffer 2009) ja loogilise tähelepanematuse argumendi (Moore 1995, Jago 2014) eest. Oma vastustes argumentidele tuginen Wittgensteini *Traktaadist* pärinevale eristusele märkide ja sümbolite vahel, näidates, et see toob mõlemas argumendis välja sarnase vea. Esimeses neist eeldatakse ekslikult, et sama lauset ei saa kirjutada kahes erinevas keeles, ja teises, et kaht erinevat loogilist konnektorit ei saa kirjutada samal viisil. Oma vastuses esimesele neist argumentidest töötan ka välja variatsiooni Stalnakeri metalingvistilisest teooriast, mis arvestab märkide ja sümbolite vahelise eristusega.

Lihtlitsents lõputöö reprodutseerimiseks ja lõputöö üldsusele kättesaadavaks tegemiseks

Mina, Indrek Lõbus,

(sünnikuupäev: 30. aprill, 1989)

1. annan Tartu Ülikoolile tasuta loa (lihtlitsentsi) enda loodud teose

"In Defence of Logical Omniscience",

mille juhendajad on Daniel Cohniz ja Luis Estrada González,

1.1. reprodutseerimiseks säilitamise ja üldsusele kättesaadavaks tegemise eesmärgil, sealhulgas digitaalarhiivi DSpace-is lisamise eesmärgil kuni autoriõiguse kehtivuse tähtaja lõppemiseni;
1.2. üldsusele kättesaadavaks tegemiseks Tartu Ülikooli veebikeskkonna kaudu, sealhulgas digitaalarhiivi DSpace´i kaudu kuni autoriõiguse kehtivuse tähtaja lõppemiseni.

2. olen teadlik, et punktis 1 nimetatud õigused jäävad alles ka autorile.

3. kinnitan, et lihtlitsentsi andmisega ei rikuta teiste isikute intellektuaalomandi ega isikuandmete kaitse seadusest tulenevaid õigusi.

Tartus, 02. mail, 2016