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A Biopsychological Foundation for Linguistics

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A thesis submitted in partial fulfillment of the requirements for the degree in Doctor of Philosophy

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A BIOPSYCHOLOGICAL FOUNDATION FOR LINGUISTICS

(Thesis format: Monograph)

by

Jonathan J. Life

Graduate Program in Philosophy

A thesis submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy

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Abstract:

In this dissertation, I defend the view that natural languages are concrete biopsychological phenomena to be studied empirically. In Section One, I begin with an historical explanation. Some analytic philosophers, I argue, misapply formal logic as an analysis of natural language, when it was in fact originally developed as an alternative to natural language, employed for scientific purposes. Abstract, quasi-mathematical philosophies of language, I argue, are partially a result of this misunderstanding. I respond to Jerrold Katz' argument that a proper understanding of analytic truth requires this quasi-mathematical philosophy of language through a model-theoretical analysis of analytic truth in modal and intuitionist logics.

In Section Two, I offer a positive argument for a biopsychological philosophy of language. While Chomsky and others have emphasized the metaphysical basis of natural languages in psychological representations, I further contribute to understanding by emphasizing the basis of natural language in psychological representations *of* relevant properties of a specifically constrained biological implementation base. I defend this ontological perspective through a thorough engagement with the subfield of linguistic phonology and its important relations to physiological articulation and perception, along with an analysis of crucial interface relations among phonology, morphology and syntax.

In the final section, I engage with the objections to this biopsychological philosophy of language stemming from concerns related to linguistic normativity and communication. If natural language is based metaphysically in the biopsychological representations of individuals, there are apparent paradoxes in the notion of public

rules for language use, and in the notion of shared content for the purpose of communication. Drawing on David Forrest Wallace's *pragmatic* conception of linguistic prescription, together with analogies from anti-realist metaethical systems, I defend the intelligibility of public linguistics norms without the need for abstract ontological commitment. Drawing on Ray Jackendoff's internalist semantic and metasemantic analyses, together with Bertrand Russell's analogy argument on other minds, I also defend intelligibility of linguistic communication equally without need for abstract ontological commitment.

Key words: Philosophy, Linguistics, Philosophy of Language, Philosophy of Linguistics, Cognitive Science, History of Analytic Philosophy, Philosophical Logic, Nonclassical Logic, Analytic Truth, Phonetics, Phonology, Linguistic Interfaces, Linguistic Norms, Sociolinguistics, Communication, Natural Language Semantics

To my parents, Patricia & Richard Life

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Section 1: A Response to the Case for Linguistic Platonism

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A Biopsychological Foundation for Linguistics

Jonathan Life

Introduction

This thesis addresses the metaphysics and epistemology of scientific linguistics. Natural languages, I argue, are concrete biopsychological phenomena to be studied empirically, rather than abstract quasi-mathematical phenomena to be studied through pure reason. I begin with an historical explanation. Some analytic philosophers, I argue, misapply formal logic as an analysis of natural language, when it was in fact originally developed as an alternative to natural language, employed for scientific purposes. Abstract, quasi-mathematical philosophies of language, I argue, are partially a result of this misunderstanding. I respond to Jerrold Katz' argument that a proper understanding of analytic truth requires this quasi-mathematical philosophy of language through a model-theoretical analysis of analytic truth in modal and intuitionist logics. This response contributes both to our understanding of the ontology of natural languages and to our understanding of the logic of analytic truth.

I then proceed to offer a positive argument for a concrete ontology of natural languages rooted in both biology and psychology. While Chomsky and others have emphasized the metaphysical basis of natural languages in psychological representations, I further contribute to understanding by emphasizing, not merely the basis of natural language in psychological representations as such, but in psychological representations *of* relevant properties of a specifically constrained biological

implementation base. This ontological perspective I defend through a thorough engagement with the subfield of linguistic phonology and its important relations to physiological articulation and perception, along with an analysis of crucial interface relations among phonology, morphology and syntax. The emphasis on phonology and its interfaces sheds new light on a debate that has historically been focused almost exclusively on the syntax and semantics of natural language.

Lastly, I engage with the objections to this biopsychological philosophy of language stemming from concerns related to linguistic normativity and communication. If natural language is based metaphysically in the biopsychological representations of individuals, there are apparent paradoxes in the notion of public rules for language use, and in the notion of shared content for the purpose of communication. Drawing on David Forrest Wallace's *pragmatic* conception of linguistic prescription, together with analogies from anti-realist metaethical systems, I defend the intelligibility of public linguistics norms without the need for abstract ontological commitment. Drawing on Ray Jackendoff's internalist semantic and metasemantic analyses, together with Bertrand Russell's analogy argument for other minds, I also defend the intelligibility of linguistic communication equally without need for abstract ontological commitment.

This dissertation is best categorized as a thesis in the philosophy of scientific linguistics, rather than in traditional philosophy of language. The conclusion most directly defended is that natural languages *as objects of study in scientific linguistics* are concrete bio-psychological phenomena. In personal correspondence, Henry Jackman has wisely pointed out to me that the claim that natural languages *as objects of study in scientific linguistics* are concrete bio-psychological phenomena and the claim that natural languages *as objects of study in traditional philosophy of language* are concrete

bio-psychological phenomena are not unobjectionably equivalent in implications. In particular, the *methodological* implications for linguistics do not unobjectionably imply *methodological* implications for traditional philosophy of language. I grant that the equivalence of natural language as studied in linguistics and natural language as studied in philosophy of language is not as thoroughly defended in this dissertation as could be desired. Perhaps the question of this equivalence may be a topic of future research.

Linguistic Naturalism in the Chomskyan Paradigm

The core tenet of the Chomskyan philosophy of language and linguistics is that language is a part of the natural world. According to this perspective, human language is a result of a language faculty in the human mind, ultimately the human brain. The representation and implementation of language, on this perspective, thus cannot be logically separated from language itself. This language faculty contains an internal system that generates phonetic, formal and semantic representations. These representations, together with the generative system itself, compose an internal language. This resultant internal language is called an 'I-language', and I-languages are taken to be the foundation of all human language. The theory of a particular language is its grammar, while that which all languages share at their biological core is called "Universal Grammar" or "UG", "a theory of the initial state S_0 of the relevant component of the language faculty" (Minimalist Program, 167).

While Chomskyan linguists often talk (some think inconsistently) about common sense public languages such as French, Wolof, Swahili, etc., according to their paradigm,

analysis of these languages is not the ultimate goal of their science. The ultimate goal of their science is to understand the internalized languages of individuals and the core biological principles that all of these internalized languages ultimately share. When Chomskyans talk about internalized languages and the biological principles they follow, ultimately, they really are talking about the languages particular to individuals.

Chomsky understands language as a system of internal representations in human minds, ultimately in human brains. The brain, according to Chomsky, has a modular component used specifically for language. The study of this human language faculty can be understood as the study of the initial state of this modular component of the mind. It is the language faculty in this initial state that interacts with the input to language learning, (whatever exactly that is), so as to produce words, phrases and sentences. The language faculty takes the input to language learning and from it *generates* what we would more commonly call a person's language. The faculty is also called a 'generative grammar', from which comes the name of the discipline of generative linguistics.

There are (at least) two senses of the term 'language' that emerge from this picture that must be sharply distinguished. Chomsky uses the term 'language' to refer to the generative grammar itself, but it is also, of course, often used to describe the output of the generative grammar. Recognizing these distinct senses of 'language' allows us to see that Chomsky's claims that, for example, "Peter's language 'generates' the expressions of his language" are not circular. It is the 'language' in the sense of the grammar that generates the 'language' in the sense of a set of sentences (New Horizons, 5).

Further systematic ambiguity can be found in Chomsky's use of the term 'grammar.' While, on the one hand, Chomsky considers one's grammar to be the state of the language faculty that combines with language learning input to produce grammatical expressions, on the other, 'grammar' is also used as a term for the scientific description of the language faculty put forward by the theoretical linguist.

This ambiguity is complicated by Chomsky's use of person-level mental terms such as 'knowledge' and 'theory' to describe the mental representation of the language faculty itself. He writes, for instance, that one's generative grammar is one's "theory of his language." Chomsky exegesis aside, this person-level terminology I think should be read as metaphorical. The grammar is simply the system of representations that combine with language learning input to determine complexes of instructions for articulation, perception and the systematic organization of thought – viz. the performance systems [New Horizons, 5].

It is important to note from this that the outputs of the generative grammar are also psychological representations. These complexes of instructions for articulation, perception and thought are linguistic expressions of a given person's psychological idiolect. What this means becomes clear, hopefully, over the course of this thesis. It should be noted that, taking common sense into consideration, there are thus actually (at least) *three* relevant senses of the term 'language.' There is the distinction between the initial state of the language faculty and its output when combined with the input to language learning. There is also, however, the distinction between the conception of the output of a generative grammar as mental representations of performance system instruction complexes, and the common-sense conception of language as something

abstractly public, rather than psychological at all. The conclusion that this common-sense public conception of language is not a relevant object of study for scientific linguistics is a core philosophical consequence of the Chomskyan Paradigm.

I am following Chomsky in thinking language is based in a system of mental representations. I also, however, take things a step further, by emphasizing the sense in which language is based in contingent physiological human constraints, which influence the system of mental representations and thus the expressions of language. In the next section, I discuss the alternative that I am rejecting to this Chomsky-inspired theory.

Linguistic Platonism and Katz' Necessity Argument

Jerrold Katz offers one of the primary alternatives to the Chomsky-inspired psychological philosophy of language. Katz is a Linguistic Platonist in that he considers the objects of the science of linguistics to be abstract in the way that Mathematical Platonists consider the objects of the science of mathematics to be abstract. This is to say that, for Katz, linguistic phrases and sentences do not exist in physical space or time, nor, more centrally relevant, do they exist in any way relative to the mental states or events of individual minds. In short, "sentences are taken to be abstract and objective" rather than concrete and subjective, or - more specifically relevant - rather than biological and psychological (Platonist Grammar, 173-4).

Katz primary argument for Linguistic Platonism has been coined "The Necessity Argument" (Soames 1991). Katz' idea is that since analytic truths are logically

necessary, and since they depend on natural languages to exist, natural languages themselves must be necessarily existent objects, a notion which only Linguistic Platonism can possibly make sense of.

The Chomskyan psychological philosophy of language, Katz thinks, makes it impossible to account for the logical necessity of analytic truths. By treating generative grammars as systems of psychological principles, and analytic truths as outcomes of such systems, the necessity of analytic truths, Katz argues, must reduce to a merely nomological, psychological relation. For Chomskyans, he insists, the analytic sentences whose truth consists in their logical impossibility of being false are degraded to having their truth consist in merely what humans cannot conceive. This is a fallacy, he thinks, in that it conflates the notion of “true no matter what” with the notion of “merely what human beings are psychologically or biologically forced to conceive to be true no matter what.” He considers this to be an unacceptably relativist conclusion, and thus grounds to adopt Linguistic Platonism so as to avoid it (Platonist Grammar, 199-200). Chapter two of this thesis presents a thorough response to this argument.

Philosophy of language historically originated as an extension from philosophy of mathematics. As a result, many philosophers have come to study language very abstractly, and many concrete aspects, particularly phonological ones, have been ignored. This brings about an incomplete perspective in philosophy of language. In this thesis, I thoroughly engage with concrete aspects of empirical linguistics in the effort to fill the holes of this incomplete perspective. The next section gives a brief introduction to phonetics and phonology and discussion of their relevance.

The Relevance of Phonetics and Phonology

While phonetics can be seen as the study of the sounds of language at their most concrete level, phonology can be seen as studying the grammatical relations that govern these linguistic sounds, both in respect to being linguistic, but also in respect to being sounds. Phonology is like syntax in respect to being specifically linguistic in its categories and principles, but like phonetics in respect to its categories and principle specifically relating to the articulation and perception of sounds. If we define the properties IL: inherently linguistic, in the sense of existing relative to a language or representation of a language and ISR: inherently sound-related, in the sense of existing relative to sounds or their articulation or perception, then we can say that Syntax has IL but not ISR, phonology has both IL and ISR, and acoustic and articulatory phonetics have ISR but not IL. Much more is said about phonetics and phonology when we come to my positive argument in chapter three.

Bromberger and Halle write:

Though many philosophers of language have views on empirical linguistics, few, if any, have given serious attention to phonology. Recent anthologies and books on the philosophy of language either don't mention phonology at all, or at best perfunctorily restate crude and out-dated notions on the subject. This is somewhat surprising since the facts that phonology studies are critical to the individuation of expressions and to their character as objects of speech perception or outputs of speech production [209].

For anyone interested in ontological issues about natural language, one would think phonology would be an area of relevant interest. It is the facts studied in phonology, after all, that form the substantive basis of natural languages as they are both spoken and perceived in actual use. As Bromberger and Halle continue:

But for these facts (of phonology), there would be [be] no syntax or semantics of natural languages besides sign languages¹ (also neglected by philosophers), and philosophers deliberating about such languages would have to be silent [209].

It is a phonological substance, that is, on which the structures of syntax and semantics apply. In this quote, Bromberger and Halle thus point out the need for a philosophical analysis of the science of phonology itself. Phonology itself is a philosophically significant subject, worthy of the same type of consideration that philosophers have given linguistic semantics. Bromberger and Halle are also pointing out the importance of phonology to the proper understanding of the philosophy of language in general. It is this aspect of the relation between phonology and the philosophy of language that I emphasize. Rather than philosophically analyzing the science of phonology itself, I will be using the scientific insights that have been developed in phonology to flesh out a new and more complete perspective on a particular area in philosophy of language: the ontological status of languages themselves. Because the history of philosophy of language has neglected to take account of phonology, the subfield has inadvertently led to an inappropriately abstract view of

¹ Actually, it is now understood that sign languages also have phonologies, or something analogous. Analogous grammatical systems related to production and perception apply to sign languages, just in a different physical medium. This is discussed in chapter two, which expands much more significantly on the phonetic-phonology interface and its philosophical consequences.

what natural languages are. The use of phonological evidence in the analysis of the ontological status of languages themselves is an original and much needed contribution that this thesis provides.

From analysis of the practice of linguists I argue that natural languages are not logically independent of their psychological representation or biological implementation. It may have seemed from our pre-scientific intuitions that natural languages should be independent in the way that Platonism holds them to be. But pre-scientific intuitions can only be a starting point for trying to understand the world. When we move from pre-scientific intuitions to actual scientific understanding we should not be surprised to find that we did not start with as clear an understanding of what we were theorizing about as we thought we did.

Outline of Thesis Sections

Section 1: A Response to the Case for Linguistic Platonism.

Section One offers responses to arguments for an abstract quasi-mathematical philosophy of language. The philosophical issues regarding the relation of natural language and formal logic are addressed here.

Chapter 1: The Historical Context of the Debate on the Ontology of Language

This chapter discusses the historical context of the philosophy of language. Platonist philosophers of language such as Lewis, Soames and Katz have advanced their

arguments for an abstract understanding of natural languages in the context of the 'analytic tradition' established by Frege and Russell, who developed their logical philosophy for the purpose of analyzing mathematics. Applying this same logical philosophy to the analysis of natural language is a mistake.

Chapter 2: Linguistic Naturalism and the Logic of Analytic Truth

This chapter specifically addresses Katz' argument for Linguistic Platonism based on the logical necessity characteristic of analytic truth (Katz, 1981, 1984). In a different philosophical context, Kripke observes that "it would be wrong to identify the language people would have, given that a certain situation obtained, with the language that we use to describe how circumstances would have been in that situation" (Vacuous Names, 57). This same observation is applicable to the analysis of analytic truth. Kripke semantics for intuitionist and modal logics are employed to rigorously flesh out an analysis of necessary analytic truth in natural languages that is consistent with the contingency of the existence of those natural languages themselves.

Section 2: A Case for a Biopsychological Account

This section offers my positive argument for the biopsychological philosophy of language that I defend. The primary engagement with empirical linguistics and my philosophical conclusions related to linguistics itself are developed here.

Chapter 3: The Biopsychology of Phonetics & Phonology

The chapter explores the biology of speech articulation and perception and its relation to natural language phonology. Phonology is both grounded in speech biology yet, at the same time, an abstraction from it. The building blocks and principles of phonology are abstracted from speech biology by the medium of psychological representation. Phonology is thus logically dependent on both human biology and psychology.

Chapter 4: The Dependence Relations of Formal and Phonological Grammar

This chapter discusses the interfaces among phonology, morphology and syntax in natural languages. It also discusses the applicability of the same scientific frameworks to both phonological and formal levels of linguistic representation. The technical and theoretical relations among formal and phonological grammatical components justify the hypothesis of a biopsychological foundation for all of core theoretical linguistics.

Section 3: Responses to Objections to the Biopsychological Account

This section offers my responses to objections to the biopsychological philosophy of language developed in the previous section. The philosophical issues regarding the apparent conflict between our scientific understanding of natural language and our everyday understanding of natural language are addressed here.

Chapters 5 & 6: The Objections from Linguistic Norms and Communication

These final chapters address the common-sense objections to a biopsychological understanding of natural languages. Some traditional notions of shared public languages are problematic for various reasons, both logical and social. It is argued, however, that a modest pragmatic analysis of linguistic norms is defensible, and can illuminate the nature of communication without abandoning the biopsychological theory defended in this thesis. An attempt is made to flesh out Jackendoff's notion of the "tuning" of semantic representations for the purposes of communication (Jackendoff, 2002).

Section 1: A Response to the Case for Linguistic Platonism

Chapter 1: The Historical Context of the Debate on the Ontology of Language

This first chapter will set the historical context for my general argument. The empirical backing for my general argument in this thesis will come principally from phonology, an area of linguistics that has been almost entirely ignored by philosophers of language. This ignorance, I argue, is a result of the contingent history of philosophy of language starting as a logical discipline gradually growing and separating from the philosophy of mathematics. Frege and Russell, the great logicians generally regarded as having created the discipline of philosophy of language, in fact were not primarily interested in natural language. Frege not only saw the laws of truth as independent of psychology, he also saw them as independent of natural language, as can be seen in his famous article 'Thought'. Russell, in turn, stated explicitly in a response to Strawson

that his logical theory of descriptions was never intended as an analysis of natural language. Yet it is in the context of the 'analytic tradition' established by Frege and Russell that Platonist philosophers of language such as Lewis, Soames and Katz have advanced their arguments. Understanding this historical context can help to explain why concrete facts about language, such as phonological facts, have not been a focus of analysis, and thus why misguided arguments for Linguistic Platonism have seemed more persuasive than they actually are. By making a clear distinction between philosophical logical theory and inquiry into the actual facts of natural language, somewhat surprisingly, I first introduce the idea that Kripkean modal logic may be applied to empirical linguistic data to provide a thorough new argument in defence of the Chomskyan view that natural linguistic phenomena are biopsychological in nature.

According to the Chomskyan view, as we have discussed, the foundation of language is psychological in the sense that it is rooted in the minds, and ultimately the brains, of particular humans. Contrary (perhaps) to common sense, languages are not abstract objects that are shared in any literal sense by linguistic communities. This does not mean that talking about public languages as things that are shared among communities is nonsense. But it does mean that the appropriateness of such talk is merely practical. When it comes to scientifically understanding the core principles of natural language, 'English', 'Arabic', 'German', etc., are not primary, according to Chomskians, and, indeed, are actually rather metaphysically suspect. This (perhaps) anti-common-sense perspective on language, though standard in linguistics and typical to scientific inquiry in general, has seemed suspect to philosophers of language such as

Lewis, Soames and Katz. This chapter will propose an historical explanation of this reaction and will begin to outline the aspects of my logical response.

One of the primary alternatives to the Chomskyan paradigm is that of Linguistic Platonism. The clearest description of Linguistic Platonism comes from Katz. He writes:

Grammars are theories of the structure of sentences, conceived of as abstract objects in the way that Platonists in the philosophy of mathematics conceive of numbers. Sentences, on this view, are not taken to be located here or there in physical space like sound waves or deposits of ink, and they are not taken to occur either at one time or another or in one subjectivity or another in the manner of mental events and states. Rather, sentences are taken to be abstract and objective [Platonist Grammar, 173-4]

Here Katz fleshes out the metaphysics of the view that languages are abstract objects. It means that they do not exist in space or time. It means that they are not particular to the minds or brains of individuals. As I will show in this chapter, this understanding of language comes naturally to philosophers following in a certain 'analytic tradition' of philosophical analysis. As I will show throughout this thesis, there is significant evidence from linguistics that gives strong reason to reject this Platonist viewpoint in favor of a biopsychological alternative.

From Mathematics to Language 1: Frege, Anti-Psychologism and Propositions

The first major philosopher of language in modern times was Frege. Frege argued against psychologism in philosophy of logic and math. His famous paper

'Thought' was an extension of this argument. It is a great irony that the logical philosophy pioneered by Frege and Russell, the primary purpose of which was to abstract philosophy from natural language, has come to be misleadingly referred to as 'The Philosophy of Language'.

What does 'abstract from natural language' mean? The most obvious example is the notion of a proposition as an abstract, non-linguistic bearer of truth or falsity. This notion was fleshed out in Frege's 'Thought'. The idea of a proposition makes truth independent of language. Yes, philosophers following in the 'analytic tradition' from Frege still have to use language of some kind or other. But the goal can be seen as getting to those language-independent propositions as directly as possible, which means trying to abstract from the contingencies of natural language as much as possible.

Frege wrote:

People may very well interpret the expression 'law of thought' by analogy with 'law of nature' and then have in mind general features of thinking as a mental occurrence. A law of thought in this sense would be a psychological law. And so they might come to believe that logic deals with the mental process of thinking and with the psychological laws in accordance with which this takes place. That would be misunderstanding the task of logic [*Frege Reader*, 325].

What gets called Fregean 'philosophy of language' was initially a philosophy of logic. The discipline of 'philosophy of language' understood as covering the philosophy of logic and the philosophy of linguistics, is an imaginary discipline. There is the study of natural languages and there is the study of logic, and they have no intrinsic connection to each other. Or so I will argue.

For Frege, a sentence itself was “a series of sounds”, and it was not sentences themselves, but rather “the sense of sentences” that were primarily true or false (*Frege Reader*, 327). Senses of sentences that are true or false were Fregean “thoughts”. Thoughts for Frege, were abstract objects. He was a Platonist about thoughts. He held them to be neither in time nor space, nor, more surprisingly in the minds of particular persons. He wrote:

Is a thought an idea? If other people can assent to the thought I express in the Pythagorean theorem just as I do, then it does not belong to the content of my consciousness, I am not its owner; yet I can, nevertheless, acknowledge it as true. However, if what is taken to be the content of the Pythagorean theorem by me and by somebody else is not the same thought at all, we should not really say 'the Pythagorean theorem', but 'my Pythagorean theorem', 'his Pythagorean theorem', and these would be different [*Frege Reader*, 336].

Though this perspective on thoughts will tie into objections to bio-psychological theories of languages for reasons relating to communication, Frege’s primary concern was not with linguistic communication. His main point related to the nature of scientific truth as such. He continued:

If every thought requires an owner and belongs to the contents of his consciousness, then the thought has this owner alone; and there is no science common to many on which many could work... if someone takes thoughts to be ideas, what he then accepts as true is, on his view, the content of his consciousness, and does not properly concern other people at all [*Frege Reader*, 336].

Frege concluded that:

Thoughts are neither things in the external world nor ideas... A third realm must be recognized [*Frege Reader*, 336-7].

Frege did not consider that thoughts might be psychological *types* rather than psychological tokens. This oversight will be relevant in chapter six when I address the objection to a biopsychological theory of language stemming from concerns relating to communication. Psychological types are independently motivated since generalization is necessary for scientific and folk psychology to be possible. In chapter six I will use Ray Jackendoff's meta-semantic insights to explain how the use of psychological types can dissolve paradoxes related to communication without involving commitment to them as distinct objects.

It is important to recognize that Frege's Platonism about thoughts was not a perspective on the nature of language. His view was not just that if thoughts were psychological states they would be impossible to communicate. Rather, it was that the idea of sharing thoughts would not even make any logical sense. Propositions, which Frege called 'thoughts' were logically required for science, he thought, not merely for the purpose of communication or even understanding, but in order for there to be objective truths at all. Thoughts were required for facts. The view that Fregean thoughts, or propositions, exist was not a position in the philosophy of language, but a metaphysical realist perspective on the nature of truth as such, independent of natural language.

The extended title of Frege's famous logical work 'Begriffsschrift' ('Concept Script,') was 'a formula language of pure thought modelled on that of arithmetic'. The project of developing a logical language for the purposes of science was motivated largely by the belief that actual natural language did not relate to Fregean thoughts as

directly as mathematical languages, and thus that new ones should be artificially developed. It was because natural language did not relate to thoughts with sufficient directness that logical ones were created. This fact is demonstrated clearly in comments from Russell.

From Mathematics to Language 2: Russell, Logical Analysis, and Rational Reconstruction

Russell's theory of descriptions was a logical theory developed, in particular, for the analysis of mathematics. His response to Strawson on this topic showed his commitment to a rational reconstructionist philosophy. The tradition that comes from Frege and Russell thus emphasized both Platonism and rational reconstruction, the former stemming from Frege, the latter from Russell. But rational reconstruction, like Platonism, was never actually intended as a way of analyzing natural language itself.

Responding to Strawson's objection to his theory of descriptions, Russell wrote: [There is] a fundamental divergence between myself and many philosophers with whom Mr. Strawson appears to be in general agreement. They are persuaded that common speech is good enough not only for daily life, but also for philosophy. I, on the contrary, am persuaded that common speech is full of vagueness and inaccuracy, and that any attempt to be precise and accurate requires modification of common speech both as regards vocabulary and as regards syntax... For technical purposes, technical languages differing from those of daily life are indispensable [Mr. Strawson, 387].

In constructing logical analysis for the purpose of philosophy, Russell was not attempting to simultaneously analyze natural language itself. He was rather dismissing natural language, reasonably, as not suited to certain scientific purposes and developing new logical languages that can serve these purposes better. He was looking not to explain the workings of natural language as something that could represent truth objectively, but rather to replace natural languages with languages that worked more closely with the laws of objective truth itself (Mr. Strawson, 387).

He wrote explicitly:

For my part, I find it more convenient to define the word 'false' so that every significant sentence is either true or false. This is a purely verbal question... I have no wish to claim the support of common usage [Mr. Strawson, 388-9].

And continued, referring to “sentences of the form ‘All A is B’”:

Traditionally, such sentences are supposed to imply that there are A's, but it is much more convenient in mathematical logic to drop this implication and to consider that 'All A is B' is true if there are no A's. This is wholly and solely a question of convenience. For some purposes the one convention is more convenient, and for others, the other. We shall prefer the one convention or the other according to the purpose we have in view. I agree, however, with Mr. Strawson's statement (P. 52) that ordinary language has no exact logic [Mr. Strawson, 389].

The ‘analytic tradition’ in philosophy can be seen as having started with two principle views advocated by Frege and (at least early) Russell. First was the view that scientific truth, particularly mathematical truth, was objective. This, as I have shown, is demonstrated in Frege’s philosophy regarding thoughts. Second was the view that

natural language was insufficiently precise for properly representing these objective truths of science, and particularly mathematics, and that artificial logical languages should be devised to better suit the purpose. This, as I have shown, is demonstrated in Russell's remarks regarding his own logical theory of descriptions. In its origin, 'analytic philosophy' was not concerned with the analysis of language over the analysis of reality. Quite the contrary: it wanted natural language out of the way so it could get to reality more directly.

One can support a Frege-Russell inspired rational reconstruction of language for the purpose of more directly representing scientific truths while also supporting a different, entirely separate project inquiring into the actual facts of language itself. This ties into issues related to instrumentalism. Languages are themselves objects about which there are truths to be understood. It may be useful for some purposes to rationally reconstruct natural language into a logical system, but this is irrelevant to the science of linguistics. The science of linguistics is concerned with discovering the actual facts of actual language. Though now called the 'philosophy of language', this early work by Frege and Russell was, for the most part, not concerned with understanding the truths about language, but with getting outside of natural language to the extent possible so as to more clearly understand other truths such as those of mathematics. This was a perfectly legitimate pursuit, but should not be confused with the likewise legitimate pursuit of trying to understand the facts of language itself.

Lewis and Soames on Natural Languages' Logical Independence

The progression of philosophy, like any discipline, is complicated because it results from a combination of historical and logical factors. Platonist philosophers of languages such as Lewis and Soames of course put forward arguments for their position, but there is a sense in which these arguments are misapplications of the Frege-Russell analysis of logic to natural language.

Lewis writes:

I am ready enough to believe in internally represented grammars. But I am much less certain that there are internally represented grammars than I am that languages are used by populations. I think it makes sense to say that languages might be used by populations even if there were no internally represented grammars. I can tentatively agree that L is used by P if and only if everyone in P possesses an internal representation of a grammar for L, if that is offered as a scientific hypothesis. But I cannot accept it as any sort of analysis of 'L is used by P', since the analysandum clearly could be true although the analysans was false [Languages, 22].

The Logical Independence Argument can be fleshed out as follows:

Premise 1: It is a logical possibility that there exist creatures who speak the same language L (where 'L' stands for any natural language) while differing in their psychological representation and biological implementation of L.

Premise 2: If it is a logical possibility that there exist creatures who speak the same language L while differing in their psychological representation and biological implementation of L, then L (thus any natural language) cannot be logically dependent on its psychological representation or biological implementation.

Conclusion: Natural languages are logically independent of their psychological representation and biological implementation. (They are abstract objects.)

Lewis' argument assumes that one is looking for something like a conceptual analysis. Instead, I argue, the project is to identify an entity that corresponds to the non-descriptive pre-theoretical term, and investigate its nature. Through the application of Kripkean logic to linguistic data, it can be demonstrated that the essential nature of language should be understood empirically, rather than purely analytically².

Lewis makes a distinction between “languages” and “language” according to which “languages... [are] functions from strings of sounds or of marks to sets of possible worlds, semantic systems discussed in complete abstraction from human affairs... [while] language... [is] a form of rational, convention-governed human social activity (Languages, 7).

Languages, in other words, are abstract, while language is more concrete. Accordingly, Lewis thinks a division of labour should be applied to the study of languages and language. He writes:

I distinguish two topics: first, the description of possible languages or grammars as abstract semantic systems whereby symbols are associated with aspects of the world; and second, the description of the psychological and sociological facts whereby a particular one of these abstract semantic systems is the one used by a person or population [Semantics, 19].

² For instance, the point is not to analyze the everyday notion ‘star’ and the “descriptive meaning” people associate with it – that might result in Venus being one, and the Sun not being one. The point is to find out what ‘star’ stands for, and then to figure out the essence of that thing. Thanks to Robert Stainton (personal correspondence) for this example.

Lewis identifies linguistics with the former of these topics, the study of languages, and, because of his analytic argument against the essential relevance of mentally represented grammars, takes linguistics to be a logical discipline independent of the empirical facts which may relate to the latter of these topics, the study of language.

Soames makes a similar argument regarding the conceptual independence of linguistics from psychology and biology. While Soames' Platonism is less severe than that of Katz in that he allows that some sort of empirical methodology may go into the study of natural languages, he still holds that languages as abstract objects are to be understood independently of their psychological representation and biological implementation.

Soames writes:

Linguistic theories are conceptually distinct and empirically divergent from psychological theories of language acquisition and language competence... these two kinds of theories are conceptually distinct [in that]... they are concerned with different domains, make different claims, and are established by different means... they are empirically divergent [in that]... the formal structures utilized by optimal linguistic theories are not likely to be isomorphic to the internal representation posited by theories in cognitive psychology [Linguistics, 155].

Soames makes two distinct claims regarding the anti-psychologist status of linguistics. First, like Lewis, that there is a perfectly coherent conception of the analysis of language as something considered in abstraction from bio-psychological factors such as acquisition and use. Second he thinks this non-bio-psychological understanding of

linguistic analysis to be an accurate reflection of what practicing linguists actually do [Linguistics, 157].

The idea that a complete linguistic analysis is possible independent of bio-psychological considerations and the further idea that such analysis is what practicing linguists actually do both demonstrate a failure to take account of all relevant subfields of linguistics. As this thesis will show, when the work of practicing phonology is taken into account, the conceptual independence argument falls apart.

Despite Soames' claim that he has accounted for scientific linguistic practice, his argument is clearly in the tradition of the analytic philosophy that was never intended by Frege and Russell to actually analyze natural language. The crux of Soames' argument relates to the notion of objective truth, something, as we have seen, which may not be essentially related to natural language. Soames writes:

If linguists' grammars were simply psychological theories, then claims about truth conditions would themselves be psychological. Since these claims are not purely) psychological, it follows that grammars are not wholly psychological in nature" [Linguistics, 163].

But if Frege and Russell were correct, the laws of truth may not relate directly to natural language. The principles of natural languages need not match up directly and coherently with the laws of truth. The application of the Fregean logic that abstracted truth from psychology also abstracted it from language. It thus is inappropriate to apply this same Fregean logic to make anti-psychologist claims about language itself.

Ultimately, in chapter six, I will flesh out an account according to which reference and truth are in fact psychological phenomena, but this analysis is not required to rebut

Soames argument. The epistemic possibility that Frege was correct about the natural language-independence of the laws of truth suffices for rebuttal.

Katz on Necessity and Analytic Truth

Jerrold Katz writes:

A theory of natural language ought not rule out the possibility of accounting for necessary truths... which owe their necessity to the language. But this is exactly what conceptualist theories of natural language do in treating grammars as theories of psychological principles and in treating linguistic theory as a theory of the innate basis for internalizing such principles. Conceptualist theories are limited to accounting for necessary truths... as nothing more than consequences of principles that human beings, by virtue of their psychological or biological make-up, cannot take to be false. Such necessary truths come out on the conceptualist's account as merely what human beings are psychologically or biologically forced to conceive to be true no matter what. But this is a far cry from what is true no matter what" (Platonist Grammar, 199-200).

The Necessity Argument, in turn, can be fleshed out as follows:

Premise 1: Analytic truths are necessary and owe their necessity to natural languages.

Premise 2: Truths dependent on contingent objects discovered a posteriori cannot be necessary truths.

Premise 3: Truths dependent on psychology and biology are truths dependent on contingent objects discovered a posteriori.

Conclusion 1: Analytic truths cannot be truths dependent on psychology or biology.

Final Conclusion: Natural languages cannot be psychological or biological in nature.

Katz's argument for linguistic Platonism is also based on a direct analogy with logic and mathematics. He writes:

No one confuses psychological theories of how people make inferences with logical theories of implication, or psychological theories of how people perform arithmetical calculations with mathematical theories of numbers. Yet, in the exactly parallel case of linguistics, conceptualists³ do not make the distinction, conflating a psychological theory of how people speak and understand speech with a theory of the language itself [Platonist Grammar, 193].

Katz's case in the philosophy of language and linguistics is based on a direct analogy with the philosophy of logic and mathematics. But this analogy only has any plausibility in relation to some areas of semantics. In other areas of linguistics no one would ever make a claim that the relevant facts were necessary truths. Thus, the only force of Katz's analogy from logic and mathematics lies in what I have called 'the necessity argument' from analytic truth.

Katz writes:

Clearly... Chomsky's rationalism could not account for necessary truth...

Chomsky's psychologism actually denies the possibility of genuine necessary truth in natural languages. Given Chomsky's treatment of grammars as theories of the psychological makeup of speakers, the strongest notion of compulsion that is possible on Chomsky's conception of language is a notion of the natural or biological limits humans work under in evaluating the truth of their beliefs. The

³ 'Conceptualist' is the term Katz uses for a philosopher who considers the content of linguistics to be mental.

grammatical principles underlying analytic truth, on Chomsky's view, only express laws of human mental or neural processes, and hence, can only determine what human beings have, on the basis of the nature of their linguistic capacities, to conceive of as true no matter what. Nothing can follow about what is true no matter what [Language, 5-6].

Again, the analogy with Fregean reasoning about math and logic is clear. It is not, in this case, however, a good analogy. It is only in respect to the particular case of analytic truths in semantics that the analogy can be fleshed out. No one would ever try to make a similar analogy from math and logic to phonology. Further, even in the case of analytic truths in semantics, Katz's argument from necessity does not hold up.

This section will be further fleshed out in the next chapter. Kripkean model theory for modal logic will play a key role in my response to Katz's analytic-truth argument for linguistic Platonism. In short, Katz assumes that all necessary truths are necessarily necessary. In fact, however, as Kripkean model theory can show, since something can be necessary in all logically accessible worlds, without being necessary (or even true) in some logically inaccessible worlds, the notion of a truth being necessary without being necessarily necessary is perfectly coherent. Since we can only judge necessary truths from a world in which our own language exists (the actual world), for all logically accessible worlds, the analytic truths of our language will be true. This is to say that these analytic truths, for us, are logically necessary.

We can model a world where our own language does not exist, indeed where no languages exist. And we can logically represent that, from this world, the analytic truths of our own language do not hold. But the possibility of representing this model is perfectly consistent with also representing that, from our world, the analytic truths of

our language are logically necessary. Thus, the existence of languages themselves need not be necessary for their truths to be. Again, this argument will be fleshed out in much greater detail in the next chapter.

To Come in this Thesis

In this thesis, I will examine whether certain given aspects of language are logically independent of biology and psychology. In determining that they are not, I will also be demonstrating the ability of biology and psychology, together with philosophical reflection, to discover necessary truths by Kripkean means. I will address, in turn, the biological and psychological nature of linguistically basic units (phonemes), general phonological linguistic principles (in markedness theory), and general formal linguistic principles (drawing on facts at the phonology-morphology and morphology-syntax interfaces). I think the examples I will analyze provide a concrete means of bridging a conceptual divide between the philosophy of natural languages and the sciences of biology and psychology.

In the preface to *Naming and Necessity*, Kripke writes:

Of course this work grew out of earlier formal work in the model theory of modal logic. It was clear from $(x) \Box (x=x)$ and Leibniz's law that identity is an 'internal' relation: $(x)(y) (x=y \rightarrow \Box x=y)$. (What pairs (x, y) could be counter-examples? Not pairs of distinct objects, for then the antecedent is false; nor any pair of an object and itself, for then the consequent is true.)...In speaking of rigid designators, we are speaking of a possibility that certainly exists in a formal

modal language. Logically, we as yet are committed to no thesis about the status of what we ordinarily call 'names' in natural language. We must distinguish three distinct theses: (i) that identical objects are necessarily identical; (ii) that true identity statements between rigid designators are necessary; (iii) that identity statements between what we call 'names' in actual language are necessary. (i) and (ii) are (self-evident) theses of philosophical logic independent of natural language." [3-4]

For now, we may simply remain agnostic about Kripke's theory of names interpreted as a theory of names in natural language as, at a general level, it is consistent with a bio-psychological understanding of what languages are. (Or, at least, it is not yet obvious that it is not so consistent with such understanding). We may, in other words, simply ignore his theory of names as interpreted in relation to natural language and use his logical insights to help structure a robust argument against linguistic Platonism as a theory of what languages are. In chapter six I will show how Jackendoffian semantic theory allows a reinterpretation of Kripke's logical theory that produces a related theory of natural language names that is consistent with the general perspective of this thesis.

Necessary self-identity does not need to be understood as a referential semantic fact of natural language. It may be understood as an objective mind-independent relation, or it may just be understood as a result of the way we think about objects, when thinking in a certain logical (and arguably useful) way. Even if necessary self-identity is not a property of objects independent of how we think of them, however, it is still unclear we could think of them as not necessarily self-identical. The modal realism/anti-realism question is thus largely irrelevant for our purposes.

Regardless of whether he himself sees it this way, Kripke's philosophy can be seen in the Frege-Russell tradition as simply a rational reconstruction of language, useful for certain purposes. It is better, for certain purposes, not to view it as a philosophy of natural language strictly speaking, but as an abstraction from natural language, ultimately, I will argue in Chapter 6, as an idealization from aligning reference frames.

In this light, Kripke's philosophy can be seen as following in the original analytic philosophical tradition of Frege and Russell. Since this tradition is actually based on an attempt to abstract philosophy from the vagueness and contingency of natural language, rather than an attempt to accurately represent its structure, Kripke's logical analysis can be viewed as a useful logical abstraction without thinking of it as an accurate description of the specific workings of natural language semantics. Again, as I will show in Chapter Six, Kripke's account as a logical abstraction can be fleshed out as an idealization made practical when the reference frames of different individuals sufficiently line up.

Kripkean logical analysis allows a clear response to the logical independence argument for linguistic Platonism. What I call 'Kripkean empiricism' is an application of his analysis to empirical data, in this case linguistic data. The conceptual independence argument assumes that the essential nature of something must be understood in advance. It moves from the fact that we can imagine a language existing without its particular representation and implementation to a conclusion that it is metaphysically distinct from its representation and implementation. This, however, is a conflation between metaphysical and epistemic possibility. It is true that linguists could be wrong about what languages are. But this is entirely different from claiming that languages

somehow could be something they are not. This latter claim, as Kripke shows, is illogical.

When it comes to objective truth, ultimately there may be some sort of conceptual independence between logic and psychology/biology. But this in itself does not say anything about natural language. Ultimately, I will argue that there is empirical support that language is metaphysically connected with the psychological/biological side, rather than the logical side. First, however, the next chapter will present a thorough response to Katz' argument for Platonism from analytic necessity.

Chapter 2: Linguistic Naturalism and the Logic of Analytic Truth

The Necessity Argument for Linguistic Platonism

According to Linguistic Platonism, languages and their grammars are abstract objects. This philosophy is based on an analogy with Mathematical Platonism in the philosophy of mathematics, according to which mathematical objects are equivalently abstract. Languages are taken to be abstract in the sense that they do not have spatial locations, temporal locations or a subjective basis in the mental states of individuals. Languages are considered to be logically independent of all physical and psychological reality. More than that, as with mathematics, they are immaterial and objective. Furthermore, according to Katz, it follows from this that “[languages] are entities whose structure we discover by intuition and reason, not by perception and induction” (Platonist Grammar, 173-4).

For Katz, linguistics should be conceived as a rational science analogous to mathematics. Both his definition of Linguistic Platonism and his argument for it are rooted in an analogy between linguistics, on the one hand, and logic and mathematics, on the other. Theorists, he notes, do not conflate logical theories of implication with the actual psychology of people making inferences. Nor do they conflate mathematical theories of numbers with the actual psychology of people making arithmetical calculations. Katz sees this as inconsistent with the “exactly parallel case of linguistics, related to which “conceptualist” theorists regularly identify the psychology of language with the theory of language itself (Platonist Grammar, 193).

Katz' argument against what he calls "conceptualism" is directed mainly at Chomsky and his followers, but it can apply as an objection to any philosophy of language according to which natural languages are contingent objects ultimately logically grounded in the spatiotemporal world. Any philosophy of language according to which natural languages are contingent objects ultimately logically grounded in the spatiotemporal⁴ world I will here refer to as 'Linguistic Naturalism'. The biopsychological theory of natural languages I will develop in the third and fourth chapters is a form of Linguistic Naturalism. Linguistic Naturalism is the antithesis of Linguistic Platonism and *vice versa*.

Katz' argument is fleshed out in relation to the necessity of analytic truth. As Katz sees it, there is a strong analogy between the necessity of analytic truths in natural languages and the necessity of mathematical truths. It is partly because of the necessity of analytic truths that Katz thinks Linguistic Naturalism is an insufficient philosophy with which to fully understand natural languages. In identifying grammatical principles as logically dependent on their psychological representation and biological implementation, he argues, Naturalists cannot understand any of the consequences of such principles as necessary truths. Since, for the Naturalist, the existence of the grammatical principles themselves is logically contingent, any semantic consequences of these principles, Katz argues, must be contingent as well. This, he continues, leaves analytically true sentences, not as sentences that cannot possibly be false, but merely as sentences that we cannot possibly believe to be false. Katz thinks this conclusion to be unacceptable. "What human beings are psychologically or biologically forced to

⁴ Or, for those who think it distinct from the physical, the psychological world.

conceive to be true no matter what," he writes, "is a far cry from what *is* true no matter what" (Platonist Grammar, 199-200).

By its very nature, Katz thinks, Linguistic Naturalism makes genuine necessary truth in natural language into a logical impossibility. On a Naturalist conception, the closest thing to necessary truth that can arise, he argues, is believability relative to the biological limits of the human mind. Thus, as he sees it, analytic truth is reduced to merely what humans are under compulsion to *think* is true, entirely independent of what actually *is* true. "The grammatical principles underlying analytic truth," he continues, "only express laws of human mental or neural processes, and hence, can only determine what human beings have, on the basis of the nature of their linguistic capacities, to conceive of as true no matter what... [but] nothing can follow about what *is* true no matter what" (*Language*, 5-6).

Since Katz considers logical analytical structure to contain "the most important facts" about natural language, he thus thinks Linguistic Naturalism inadequate as a philosophical framework for the foundations of linguistics. How humans are genetically programmed to represent language, he sees as clearly logically irrelevant to anything that could be necessarily true, in the strong sense he cares about. "Real necessary truth," he writes, cannot be "relativized to what is humanly conceivable, even as genetically determined" because what is humanly conceivable and what is genetically determined are themselves all matters of entirely *contingent* fact (*Language*, 94).

To sum it up, Katz believes (1) that analytic truths are logically, not just nomologically, necessary, (2) that (some) analytic truths are logically determined by natural languages, and (3) that something necessary in this sense cannot be logically determined by something concrete and contingent. Thus he thinks natural languages

themselves cannot be concrete and contingent, which amounts to them being abstract and necessary, as his Platonism defines them.

One could object to Premise 1, arguing, in Quinean fashion, that the analytic-synthetic distinction is illusory⁵. One could also object to Premise 2, and argue that analytic truths are logically independent of any natural language⁶. My strategy in this chapter, however, will be to reject Premise 3.

As Kripke has written, “It would be wrong to identify the language people *would have*, given that a certain situation obtained, with the language that *we use to describe how circumstances would have been* in that situation” (Vacuous Names, 57). This insight of Kripke’s, combined with his insights on *a posteriori* necessity (Kripke 1980) will be used below to explain how the necessity of analytic truths can be genuine, while also essentially related to the contingent existence of natural languages.

On the Language we have for the Worlds we don’t

To understand the fallacy in Katz’ necessity argument it is important to understand some of the insights on related matters put forward by Kripke. In various places, Kripke addresses the apparent philosophical dilemmas that arise from negative existential statements considered in modal logical ‘possible world’ contexts. The statement ‘Moses does not exist’ is true of many possible worlds in which Moses does not (and never did) exist. Yet in such worlds, no one would be able to make the

⁵ The well-known position of (Quine, 1951).

⁶ Something like this approach is considered by Soames in ‘The Necessity Argument’ (Soames, 1991). I would accept the solution entirely, except for the fact it seems to require commitment to senses as abstract objects, a view with which I am uncomfortable.

statement 'Moses does not exist' to the same effect because the term 'Moses' would not have the same content^{7 8}. The paradox of this situation, however, is merely apparent. As Kripke writes in 'Vacuous Names and Fictional Entities':

Since we can refer to Moses, we can describe a counterfactual situation in which Moses wouldn't have existed. It matters not at all that in that situation people would not have been able to say, 'Moses does not exist', at least using 'Moses' the way we are using it here. Indeed, I can describe a counterfactual situation in which I would not have existed, even though if that were the case I wouldn't be around to say it. It would be wrong to identify the language people *would have*, given that a certain situation obtained, with the language that *we use to describe how circumstances would have been* in that situation [57].

In other words, whatever possible world we are describing, we are describing it *from* the actual world containing our actual language. Since, in the actual world, the man Moses existed and thus the name 'Moses' has the content that it has, the content of 'Moses' is extendible to situations in which Moses did not exist. What matters for cross-world semantics is not what people in other possible worlds can say, it is what *we* can say *about* those possible worlds.

Kripke makes the same point in *Reference and Existence*:

⁷ Some other person may have the name 'Moses,' but applied to this person, the utterance 'Moses does not exist' would not have the same content.

⁸ In Jackendoff's internalist semantics, which will become central in chapter 6, the sense in which 'Moses' must have different content in a world where he does not exist can be fleshed out in respect to the cognitive valuations 'external' and 'imaginary' (Jackendoff, 318). In our world the semantic content of 'Moses' has the valuation *external*, while in a world where he never existed it must have the valuation *imaginary*, leading to differences in the semantic nature of the statement it can be used to make.

One should not identify what people would have been able to say in hypothetical circumstances, if they had obtained, or what they would have said had the circumstances obtained, with what we can say of these circumstances, perhaps knowing that they don't obtain. And it is the latter which is the case here. We do have the name 'Moses', and it is part of our language whether it would have been part of our language in other circumstances or not [30].

The point being, once again, that the content of a term as it applies in other possible worlds is determined in the actual world. We always speak *with* our own language, even when we are speaking *about* possible scenarios in which we *would be* speaking with a different language. It is true that for inhabitants of a world in which Moses never existed, the statement 'Moses does not exist' could not arise in the same way. This does not imply, however, that we should describe this world as one in which the statement 'Moses does not exist' is neither true nor false. After all, we are describing it as a world in which Moses does not exist to even set up the example!

The analogy between Kripke's insight regarding negative existential statements considered in modal contexts and the matter of the equivalent extension of analytic statements considered in modal contexts is fairly straightforward. In considering the extensions of the contents of the names of our language to other possible scenarios we ignore the language of the inhabitants of these possible scenarios. *In precisely parallel fashion we must ignore equivalent linguistic variation in considering the extensions of analytic truths in cross-world contexts.*

Let us assume that the stock analytic truth 'bachelors are unmarried men' is indeed analytically true. The particular example is, after all, irrelevant. There are clearly possible scenarios in which the sounds uttered in 'bachelors,' 'unmarried' and 'men'

would have related to different content than they in fact have⁹. There are even more possible scenarios in which these terms, and their contents¹⁰ never would have existed. But this should not lead us into the profound confusion that such possible scenarios, due simply to their linguistic variation from actual reality, would be worlds in which it is false, or neither true nor false that all bachelors are unmarried men. As with 'Moses', we speak of the extension of 'bachelors' and 'unmarried men' to other worlds *from our world with our language* even when we are speaking *about* their extensions in other worlds with other languages.

Another way of framing this point, again following from Kripkean insight (Kripke 1980), is in relation to an understanding of *a posteriori* necessity. The meaning of 'bachelor', in many English idiolects, is identical to the meaning of 'unmarried man'. Likewise, to presume another stock example, water, the substance, is identical to H₂O. Further, in so far as water and H₂O are identical, they are *necessarily* identical. If it is true in the actual world, as we believe, that water is H₂O, then it is necessarily true. Yet surely it is inappropriate to move from the perfectly reasonable proposition that water is necessarily H₂O to the bizarre proposition that water is a necessary entity that must exist in every possible world! Rather, the necessity of the identity of water and H₂O is simply taken to imply that water is H₂O *in every possible scenario in which it exists*.

In this respect, identities between the semantic contents of different terms are logically analogous to other identities. To say that all bachelors are unmarried men is to

⁹ It is obvious that the sounds /ba-cha-lur/ and /mehn/ could have different content. It's not obvious that the terms could, if terms are partly individuated on the basis of what they mean. (One sometimes says not that there is one word 'bark' but rather that several words are pronounced /bahrk/. Thinking about it this way, no word 'bark' can mean something different than it does.)

¹⁰ See chapter six for defence of psychologism about content.

say that in every world in which the content of 'bachelors' (in appropriate English idiolects) exists, it is identical to the content of 'unmarried men' (in appropriate English idiolects). There are countless possible scenarios in which Moses, water, and the content of 'bachelor' (in appropriate English idiolects) do not exist. This is perfectly consistent with the contingency of Moses, the necessary identity of water with H₂O, and the analyticity of 'all bachelors are unmarried men.' To think otherwise is to confuse the language we have with the languages of the worlds we are describing.

Relative Logical Modality

An upshot of these considerations is that, contrary to Katz' apparent assumption, not all types of logical necessity are true in all possible worlds. Just because analytic truths in natural languages are relative to certain biopsychological facts does not imply that the necessity of these truths reduces to mere contingent fact. Relative logical necessity is a perfectly coherent notion.

Priest offers the following example:

Given how things are now, it is possible for me to be in New York in a week's time, 26 January. Given how things will be in six days and twenty-three hours, it will no longer be possible. (I am writing in Brisbane.) Or, even if one countenances the possibility of some futuristic and exceptionally fast form of travel, assuming that I do not leave Brisbane in the next eight days, it will then be impossible for me to be in New York on 26 January. Hence, certain states of affairs are possible relative to some situations (worlds), but not others [*Non-classical*, 21]

When we ask what is possible, in many contexts, we are asking what is possible *given certain actual facts*. The question ‘is it possible that Priest will be in New York on January 26th?’ can be asked in different senses. It can be asked with the implicit assumption of knowledge that he is in Brisbane on January 25th, or with any other implicit knowledge assumption that happens to be relevant. In logic class the question could be posed more abstractly. Even then, however, implicit assumptions regarding the existence of Priest and New York and the sensible application of the notions of days and months of the year would be unavoidable. Could Priest be in New York on January 26th in a world where the Earth had an entirely different orbital relation to the Sun? One could likely create an artificial language to deal with this question, but in natural language such worlds are simply not within its cross-world extension of consideration.

Some will object that though relative logical necessity exists, ‘metaphysical’ necessity cannot be relative logical necessity, but must be absolute logical necessity. This objection basically comes down to stomping one’s foot and *defining* the type of identity in question so that it has to be the way one says it is. All I can say to this objection is that the notion of ‘metaphysical’ necessity so defined has no obvious philosophical value. As I will show, analyticity in natural languages can be logically defined using entirely clear logical systems that already exist. Further, this can be done without relying on the notions of conceivability or psychological law as logically relevant. Requiring the relevant logical necessity be ‘metaphysical’ where ‘metaphysical’ is defined as absolute, does not contribute to clarity or precision or to explanation in general. It amounts to banging on the table and demanding that one logical system be used for explanation rather than another. If analyticity in natural language can be given a clear logical explanation without relying on conceivability or

psychological law, then those who still demand a separate type of ‘metaphysical necessity,’ admittedly, cannot be answered, but I see this as unproblematic.

The relativity of the modality of analyticity in natural language is not exactly analogous to Priest’s above example. As I will go on to show, there is a plurality of types of relative logical modalities.

A given modal logic can be semantically represented by a triple $\langle W, R, a \rangle$, in which W is a non-empty set, interpreted as a set of possible scenarios or worlds, and R is an *accessibility relation* defined among a , interpreted as the actual world, and the other members of W ¹¹. R is binary in the sense that, for any u and v in W , either uRv or not- uRv . This is to say, that either v is accessible from u or it is not. “Intuitively,” Priest writes, “ R is a relation of relative possibility, so that uRv means that, relative to u , situation v is possible” (*Non-classical*, 21).

If statement A is true at *some* world accessible from a world w , we can say that A is *possibly* the case from w . Likewise, if statement A is true at *every* world accessible from a world w , we can say that A is *necessarily* the case from w (*Non-classical*, 22).

Speaking from the actual world, there is no accessible world in which it is not true that all bachelors are unmarried men. Thus the sentence ‘all bachelors are unmarried men’ (in appropriate English idiolects) is a necessary truth. As I will explain, this necessary logical truth holds *about* all accessible possible worlds despite the fact that there are some accessible possible worlds *from which* no statement of it could arise to be either true or false. Understanding this in detail requires an exposition of different modal logics and their philosophical roles.

¹¹ Interpreted as the other possible worlds.

Modal Logics

Different modal logics are determined by different definitions of the accessibility relation R among possible worlds. There are three primary logical properties by which R is most commonly defined for modal logics. R is *reflexive* in so far as, for all x in W , xRx . In other words, R is reflexive if every world is accessible from itself. R is *symmetrical* in so far as, for all x and y in W , (if xRy then yRx). In other words, R is symmetrical if, if one world is accessible from another, then the other is accessible from it. Lastly, R is *transitive* in so far as, for all x, y and z in W , (if $(xRy$ and $yRz)$ then xRz). In other words, R is transitive if, from every world, every world that is accessible from an accessible world is accessible. The modal logic $K\rho\sigma\tau$ is defined as that in which R is all of reflexive, represented by ' ρ ' (rho), symmetrical, represented by ' σ ' (sigma), and transitive, represented by ' τ ' (tau). The definitions for the modal logics $K\rho$, $K\sigma$, $K\tau$, $K\rho\sigma$, $K\rho\tau$, etc. are relevantly analogous (*Non-classical*, 38-9).

As it turns out the logic $K\rho\sigma\tau$ is equivalent to the logic $K\nu$, for which R is defined by ' ν ' (upsilon) as simply universal. In other words, in $K\nu$, by definition, every world is accessible from every other world. And, since it is provable¹² that the set of theorems in $K\rho\sigma\tau$ is identical to the set of theorems in $K\nu$, it follows that the accessibility relation in $K\rho\sigma\tau$ is also universal. Both of these logics are thus referred to indifferently as ' $S5$ ' (*Non-classical*, 47-8).

As Priest writes of the question, 'which modal logic is correct?' there is "no single answer... since there are many different notions of necessity (and, correlatively,

¹² For proof see *Non-classical*, 53-4.

possibility and impossibility)... logical, metaphysical, physical, epistemic, [...] and moral" (*Non-classical*, 48-9).

Formally fleshed out, Katz' implicit assumption in the necessity argument can be understood as the assumption that S5 is the correct modal logic for necessities owing to natural language. S5 may be the best modal logic to apply for many logical purposes, but the Kripke-inspired considerations put forward in this chapter should lead us to reject it in the analysis of natural linguistic analytic truth.

In considering the semantics of analytic truth in natural language, there is no reason to consider the actual world, or any other possible world to be inaccessible from itself. Thus, we can straightforwardly assume that the correct logic for natural language semantics of analytic truth will have a reflexive accessibility relation. That is: for all x in W , xRx .

Likewise, if a given analytic truth A applies from our world a to a possible world x and applies from x to a possible world y , we have no reason to deny that, from our world a , A applies in y . Thus, we can also straightforwardly assume that the correct accessibility relation will be transitive. That is: for all x, y and z in W , (if (xRy and yRz) then xRz).

Formally speaking, the logical property that the accessibility relation on the necessity of analytic truths in natural language seems it should *not* have is symmetry. From our world a in which the sentence S 'bachelors are unmarried men' exists, S is true in a given world b in which there exist no sentences. But it is false that *from b* , considered as actual, S is true in a , considered as non-actual; *from b , S does not arise to be true or false anywhere*. That is: it is *not* the case that (for all x and y in W , (if xRy then yRx)).

If we define possible worlds for the science of linguistics relative to their sets of natural linguistic sentences¹³, we can say that a world y is accessible from a world x precisely when y contains no sentences not contained in x . That is: xRy iff_{df} (y (sentence-wise) $\subseteq x$)¹⁴. y is accessible from x when y is a (not necessarily proper) sentencewise-subset of x . For the purpose of natural language semantics, worlds containing sentences that do not actually exist may be ignored just as worlds without Priest or New York or appropriate Earth-Sun relations are ignored in the analysis of ‘is it possible that Priest be in New York on January 26th.’ These worlds for us are linguistically inaccessible because the analysis of their non-actual sentences does not arise without the arising of the sentences themselves¹⁵. Empirically, we cannot access them. The containment definition provided allows the relation of logical accessibility to mirror the relation of empirical accessibility.

Defining possible worlds for linguistics relative to sentence sets actually offers a much more straightforward relative modal-logical analysis for natural-language semantics than is obvious in the Priest-in-New-York example. By this understanding of W for natural-language semantics, the formal properties of R fall out appropriately:

R is reflexive in that no world contains sentences it does not itself contain. That is: (for all x in W , xRx) iff_{df} (for no x : not- $(x(\text{sentence-wise}) \subseteq x)$)¹⁶.

R is transitive in that if a world z contains no sentences that a world y does not contain, while y contains no sentences that a world x does not contain, it follows that z

¹³ Or semantically truth-evaluable sub-sentential forms, if such there are.

¹⁴ Where ‘sentence-wise’ inclusion relates the sentences of the worlds rather than all of their objects, since it is only the linguistic objects with which we are concerned in the particular science of linguistics

¹⁵ Similarly to the otherworldly phonologies I will discuss in chapter 3.

¹⁶ See footnote 14.

contains no sentences that x does not contain. That is: (for all x, y and z in W , (if (xRy and yRz) then xRz)) iff_{df} (If ($z(\text{sentence-wise}) \subseteq y$ & $y(\text{sentence-wise}) \subseteq x$), then $z(\text{sentence-wise}) \subseteq x$)¹⁷.

Lastly R is *not* symmetrical in that a world y may not contain sentences not contained in a world x while x does contain sentences not contained in y . That is: not-(for all x and y in W , if xRy then yRx) iff_{df} not-(if ($y(\text{sentence-wise}) \subseteq x$), then $x(\text{sentence-wise}) \subseteq y$)¹⁸.

On this understanding the modal logic for natural language semantics should be $K\varrho\tau$, or one similar. Importantly, my fleshing out the $K\varrho\tau$ accessibility relations in no way depends on conceivability or other nomological notions. They are fleshed out using only the concept of a sentence and purely logical inclusion relations, neither of which the Platonist has any grounds with which to take issue. As noted the logical inclusion relations mirror empirical relations, but this is irrelevant to their logical character and function in the logical description of semantics.

Where such a logical system is applied to natural languages, all actual analytic sentences will come out as necessarily true. Even when considering sentences *as if* other possible worlds were actual, our relevant definitions on $\langle W, R, a \rangle$ will make every analytic sentence in that world considerable as actual also come out as necessarily true from that world. The only difference from Katz' analysis, is that, following Kripke, sentences that do not exist in a given world will not be considerable as actual from that world, just as non-existent sentences are not considerable as actual from the actual world.

¹⁷ See footnote 14.

¹⁸ See footnote 14.

As I will show in the coming section, this conclusion is consistent with a proposal that the best analogy between philosophy of language and philosophy of mathematics relates the foundations of linguistics not to Mathematical Platonism, as Katz defends, but rather to Mathematical Intuitionism¹⁹.

Possible Worlds and Linguistic Intuitionism

Platonism is not the only metaphysical position in the foundations of mathematics. Contrary to Platonists, Intuitionists argue that mathematical truth is a mind-dependent phenomenon. To be clear, this chapter does not seek to take any philosophical position whatsoever in the philosophy of mathematics. Since Katz draws a parallel with the philosophy of mathematics in the definition and defense of his Linguistic Platonism, I am simply relating my own counterargument to the context of his framework.

As Priest writes, for the Mathematical Intuitionist, “the meaning of a [mathematical] sentence is to be given, not by the conditions under which it is true [in the classical sense], where truth is conceived as a relationship with some external reality, but by the conditions under which it is proved, its *proof conditions* – where a proof is a (mental) construction of a certain kind” (*Non-classical*, 100). This philosophical position is fleshed out in relation to a unique logic, intuitionist logic, defined in relation to mental constructions of mathematical proofs.

¹⁹ Chomsky makes the same analogy at one point (*Government and Binding*, 16), without fleshing out the logical details.

In classical logic: ' $A \wedge B$ '²⁰ is defined as true when 'A' is true and 'B' is true; ' $A \vee B$ ' is defined as true when 'A' is true or 'B' is true; ' $\sim A$ ' is defined as true when 'A' is not true; and ' $A \rightarrow B$ ' is defined as true when, if A is true then B is true.

Similarly but importantly distinct, in intuitionist logic: ' $A \wedge B$ ' is defined as proven when A is proven and B is proven; ' $A \vee B$ ' is defined as proven when A is proven or B is proven; ' $\neg A$ ' is defined as proven when there exists a proof that there is no proof of A; and ' $A \rightarrow B$ ' is defined as proven when there exists a construction that, provided any proof of A, may be applied to provide a proof of B (*Non-classical*, 100).

As it turns out, intuitionist logic may be semantically analyzed as a modal logic. Intuitionist logic is determined by a definition of the standard modal logical triple $\langle W, R, a \rangle$, wherein R is reflexive and transitive, but not symmetrical (analogously to the modal logic $K_{\rho\tau}$), together with a *heredity condition* according to which, for every possible world in the set of possible worlds, if a simple statement (and, as it turns out, thus any statement²¹) P is true at a world w, and a world w' is accessible from w, then P is also true at w' (*Non-classical*, 101). That is: for all P in all w & w', (If ((P in w) & wRw'), then P in w').

²⁰ Particular letters here may be taken as sentence variables.

²¹ "The proof is by induction on the construction of formulas. Suppose that the result holds for A and B. We show that it holds for $\neg A$, $A \wedge B$, $A \vee B$, and $A \rightarrow B$. For \neg : we prove the contrapositive. Suppose that wRw', and $\neg A$ is false at w'. Then for some w'' such that w'Rw'', A is true at w''. But then wRw'', by transitivity. Hence, $\neg A$ is false at w. For $A \wedge B$: suppose that $A \wedge B$ is true at w, and that wRw'. Then A and B are true at w. By induction hypothesis, A and B are true at w'. Hence, $A \wedge B$ is true at w'. For $A \vee B$: the argument is similar. For $A \rightarrow B$: we again prove the counterpositive. Suppose that wRw' and $A \rightarrow B$ is false at w'. then for some w'' such that w'Rw'', A is true and B is false at w''. But by transitivity, wRw''. Hence $A \rightarrow B$ is false at w" (*Non-classical*, 102).

Priest offers the following elucidation:

think of a world as a state of information at a certain time; intuitively, the things that hold at it are those things which are proved at this time. uRv is thought of as meaning that v is a possible extension of u , obtained by finding some number (possibly zero) of further proofs. Given this understanding, R is clearly reflexive and transitive. (For τ : any extension of an extension is an extension.) And the heredity condition is also intuitively correct. If something is proved, it stays proved, whatever else we prove." (*Non-classical*, 102)

On a modal interpretation, the heredity condition states that all proven statements are necessarily proven. The relevant sense of necessity is reflexive in that a statement is proven in every scenario in which it is proven. It is transitive in that, from the scenario in which it is proven, it is proven in every scenario accessible from an accessible scenario in which it is proven. The relevant sense of necessity is *not* symmetrical, however, in that a statement can perfectly well be proven in one scenario, and thus, by the necessity of proof, extend from that scenario to all accessible scenarios, while it *would not be* proven *were* certain of those alternative scenarios in fact the case and thus, *from those certain alternative scenarios*, it would be neither true nor false of the actual scenario, considered as non-actual, that it is proven.

Regardless of whether the Mathematical Intuitionist is correct or pragmatic to apply intuitionist logic to the foundation of mathematics, it appears this logic has a useful application in the analysis of natural linguistic analytic truth. Addition of the heredity condition to the modal logic $K\wp\tau$ seems to define the logical difference between the general realm of natural linguistic truths in general and the specific realm of analytic truths.

The sole modal semantic difference between $K\Box\tau$ and intuitionist logic, as we have seen, is the heredity condition. And the modal semantic interpretation of the heredity condition, as we have also seen, amounts to the relevant notion of the necessity of proofs. Since analytic sentences, like mathematical sentences, and unlike other natural language sentences considered from a purely linguistic perspective, are necessary, the application of the heredity condition to $K\Box\tau$ seems thus to individuate the natural language semantics of analytic truth from natural language semantics in general.

For the natural language semantics of analytic truth, we may apply intuitionist logic by saying that the sentences that hold in a scenario are those sentences that are true purely in virtue of their mental representation, the sentences that hold regardless of mind-independent fact.

This move may seem to submit to the Platonist the need for a role to be played by conceivability or otherwise merely nomological necessity, but it does not. Granting that analytic truth is grounded in psychological representation does not commit one to saying that the type of necessity that determines it is psychological. Semantic contents under different descriptions are logically identical, when identical at all, in the same way as water and H_2O . The identified objects we are talking about happen to be psychological, but the relations of identity we are applying to them are not. There is no way of changing the psychological or other natural laws that would make a given mental representation non-self-identical. Since analytic truths consist in the identity of mental representations under different descriptions, though in this sense they are psychological in their substance, they are *not* psychologically determined. To say a

sentence is true purely in virtue of mental representation is thus an appropriately logical, rather than nomological statement.

The relevant accessibility relations for analytic truth are as follows:

R is reflexive in that every sentence true purely in virtue of mental representation in a possible world is true purely in virtue of mental representation in that possible world. That is: if (MRT)S in w , then (MRT)S in w ²².

R is transitive in that, from a given world w , there is no possible world w'' not containing more sentences than a possible world w' not containing more sentences than w in which something true purely in virtue of mental representation in w is not true. That is: if ((MRT)S in w & (w'' (sentence-wise) \subseteq w' & w' (sentence-wise) \subseteq w)), then (MRT)S in w'' ²³.

R is *not* symmetric in that, from a given world w , purely in virtue of mental representation in w , a sentence S may be true in a world w' not containing sentences not contained in w , while S does not exist in w' , and thus, from w' , is neither true nor false in w (or anywhere else). That is: not-if (if ((MRT)S in w , then (if (w' (sentence-wise) \subseteq w), then (MRT)S in w'))), then (MRT)S in w' .

Lastly, the heredity condition holds in that once something has been made true purely in virtue of mental representation it remains true purely in virtue of mental representation whatever else may become true purely in virtue of mental representation^{24 25}. That is: If (((MRT)P in w) & wRw'), then (MRT)P in w' .

²² where 'MRT' notates truth in virtue of mental representation is the appropriately logical sense described.

²³ See footnotes 32 & 40.

²⁴ Unlike synthetic truths, which may become false with changes in the world.

²⁵ This is relative to idiolects considered synchronically rather than diachronically.

As Heyting wrote of Intuitionism in the foundations of mathematics: we do not attribute an existence independent of our thought, i.e., a transcendental existence, to the integers or to any other mathematical objects. Even though it might be true that every thought refers to an object conceived to exist independently of it, we can nevertheless let this remain an open question. In any event, such an object need not be completely independent of human thought. Even if they should be independent of individual acts of thought. Their existence is guaranteed only insofar as they can be determined by thought. They have properties only insofar as these can be discerned in them by thought. But this possibility of knowledge is revealed to us only by the act of knowing itself. Faith in transcendental existence, unsupported by concepts, must be rejected as a means of mathematics proof" (Intuitionist, 42).

As Heyting sees the mind-dependence of mathematical facts, the Linguistic Naturalist sees the mind-dependence of linguistic facts. If one is to evaluate the philosophical foundation of linguistics by drawing an analogy with the philosophical foundation for mathematics, one must conclude that it is Mathematical Intuitionism, rather than Mathematical Platonism, as Katz wrongly proposes, with which the philosopher of language should identify.

Again, some will object that the constructed logical necessity of mathematical intuitionism is not 'deep' enough to count as 'metaphysical' necessity. Again however, I believe this objection to be empty. The necessity of analytic sentences in natural language can be explained, not only by natural scientific means, but also by logical means. While analytic truths do have their substance in psychological representation, the necessity that determines them is not itself psychological, or otherwise nomological.

It is the logical relation of self-identity that is determined in the same way for mental objects as for any other ontological variety. No further explanation, I hold, can be reasonably demanded by the Platonist.

Section 2: A Case for a Biopsychological Account

Chapter 3: The Biopsychology of Phonetics and Phonology

The Biology of Language

This chapter addresses phonetics, phonology, and the relation between the two. It demonstrates that phonological units and phonological grammars are both essentially rooted in human biopsychology.

Philosophers typically think of words as pairings of sounds with meanings. This can make words seem apsychological. But the correlate of a meaning is not really a sound, but rather something that only a biopsychological perspective can describe. There are two biopsychological projects, neither of which is exactly about sounds. There is the articulation of sound patterns in speech and the perception of sound patterns in speech. Some philosophers of language have emphasized the importance of the actual human brain for philosophy of language. In this chapter, I want to emphasize the essential importance of things like the exceptional agilities of our tongue, vocal chords, etc.

Phonetics and Speech Science

A complete understanding of human language requires an understanding of the biology of articulation and perception. To understand why speech sounds develop as

they do and why human systems of speech sounds have the particular structures that they have, we must understand the science of speech (Leiberman and Blumstein, 2).

In the physiology of speech production, some anatomical elements have a specific functional role and some do not. Articulatory Phonetics seeks to understand the elements that play the specific, speech-related functional roles. Traditionally, the physiology of speech production is categorized into three anatomical subcomponents: the subglottal component, the larynx and the supralaryngeal vocal tract. In turn, the subglottal component of speech anatomy consists of the lungs and the respiratory muscles that control them. The larynx is a muscle that moves the vocal chords together or apart so as to close or open the airway from the lungs up towards the supralaryngeal area. Finally, the supralaryngeal vocal tract consists of further airways in the nose, the mouth and the connection from the throat to the mouth called the “pharynx.” The speech-specific actions of articulatory phonetics are called “gestures” (Leiberman and Blumstein, 3-4).

The functionally relevant components of speech anatomy are “matched” with functionally relevant components of perceptual physiology in a way that composes a complete functional system. This is to say that the sounds we have gestures to produce are the same sounds we have a perceptual apparatus to interpret. Further, it is by the same mentally represented categories that both articulation and perception of human speech are made possible. The nature of these categories will be illuminated gradually over the course of this chapter (Leiberman and Blumstein, 14).

In phonetics and speech science we are interested in anatomical gestures, perceptions and acoustic patterns that are related to language. But this language-specificity is relative to our interests, whereas in phonology, in theory, the natural

categories are inherently language-specific due to their role in the language faculty. In cases where we are taking in air for a non-linguistic reason, the relevant anatomical laws are the same, whereas phonological laws are linguistic by their very nature; they have no non-linguistic instances.

The larynx in the throat is set to openings of particular size, varying from a completely closed to a minimally obstructed airway. It holds certain openings relative to the production of certain speech sounds. For example, it holds wider during the production of a [h] than during a [f]. The principle function of the larynx relative to speech is to generate a series of air puffs by vibrating the throat. In articulatory terms this is called “phonation”, in phonological terms the matched representation is called “voicing” (Leiberman and Blumstein, 97-8).

While phonation and voicing have an equivalent physiological basis, logically, they can be understood as distinct. Phonation is an anatomical gesture, whereas voicing is a phonological feature. Features, unlike gestures, are inherently linguistic by theoretical definition. We can say that all voicing is phonation but not that all phonation is voicing, since non-linguistic phonation is not voicing, but all voicing is inherently linguistic. These definitions are helpful for explanatory purposes. Analogous remarks apply to the gestures of the supralaryngeal vocal tract where the majority of the phonological categories for production and perception of speech are biologically grounded (Leiberman and Blumstein, 115).

Depending on speaker and context, non-identical patterns of articulation may be used to produce equivalent speech sounds, even within the same dialect. Evidence appears to point towards “acoustic invariance” as opposed to “motor invariance” as the

fundamental language-specific phonetic categories²⁶. As Lieberman and Blumstein write, “speech production appears to involve the speaker’s planning his articulatory maneuvers to achieve supralaryngeal vocal tract shapes that yield particular acoustic goals” (Lieberman and Blumstein, 128-9).

If the acoustic invariance account is correct, the principles by which phonological features relate to articulation must be somewhat abstract and defined in relation to articulatory physiology in an irreducibly functional manner related to our perceptual systems. However, this does not change the fact that phonological categories are grounded, ultimately, in physiology. The functional abstractness of the physiological grounding of phonological features demonstrates why they require articulatory gestures to exist, but cannot be strictly identical to them. It also demonstrates, as will be discussed later on in the chapter, the role psychological representation must play in the categorization of gesture classes into features. As Lieberman and Blumstein continue, “speakers have some sort of mental representation²⁷ of the supralaryngeal vocal tract shape that they normally use to produce a particular speech sound in a given phonetic context” (Lieberman and Blumstein, 129).

An analogous theory could offer a functional psychological grounding of sign language phonological features in relation to light patterns, rather than acoustic ones. Given the possibility of a functional analogy between the groundings of spoken and signed phonological features, even on the acoustic invariance perspective, the metaphysical grounding of features remains articulatory. In other words, sound is not directly essential to features, whereas articulation is. Sound, rather, is indirectly

²⁶ Though either theory would align with the philosophy of this thesis.

²⁷ Presumably a modular sort.

essential in that it is an essential consequence of certain articulations. The sense in which the articulatory grounding of features is functional does not mean they can be abstracted from a biologically constrained class of implantation bases. Features are very much rooted in the general nature of human physiology. If the human production system had been radically different, human languages would have been too. Sign-language phonology will be discussed further later in this chapter.

Psychological representation provides a physiologically grounded mapping between articulation and perception. An understanding of this mapping demonstrates that even acoustic invariance relative to features is actually a partially illusory abstraction. It is the categorical nature of perception that allows continuously varying gesture sets to be categorized relative to features. Phonetic communication between speakers-listeners essentially works by a speaker encoding phonological feature segments into acoustic patterns and a listener decoding those patterns back into phonological representations. This intricate phonological encoding and decoding system creates the illusion of invariance between gestures and acoustic patterns that are in fact distinct. As an example, the [d] sound in [di] ('dee') is acoustically distinct from the [d] sound in [du] ('doo'), but "human listeners 'hear' an identical initial [d] segment in both of these signals because they, in effect, 'decode' the acoustic pattern using prior 'knowledge' of the articulatory gestures and anatomical apparatus that is involved in the production" (Leiberman and Blumstein, 147).

The set of categories used for instructions that function to produce an acoustic pattern is the same set as that used to perceive it. This category set is a phonological feature. The specific biological implementations of the human articulatory and perceptual systems are thus fundamental to the very nature of phonological features.

This fundamental grounding is organized through a mapping between articulation and perception that is connected via psychological representation. As I will eventually flesh out thoroughly, this is why the grounding of phonology must be not only inherently biological, but also inherently psychological as well.

It is the same speech sounds that the human vocal tract is adapted to produce that human neural property detectors are adapted to perceive. As Lieberman and Blumstein write, “there seems to be a ‘match’ between the sounds that humans can make and the sounds that they are specially adapted to readily perceive (Lieberman, 1970, 1973, 1975, 1984; Stevens, 1972b)” suggesting that “physiological constraints on both the human vocal tract and the auditory system provide a limiting condition on the particular shape of language” (149, 185).

The human auditory system has biological constraints analogous to those of the human articulatory system. From birth, humans are equipped to interpret speech-sound continua via strict on-or-off categories. The biological contingencies of the human articulatory system together with the categorical restraints of the human auditory system provide the fundamental explanation for why there is a specific, limited range of possible basic human speech sounds (Lieberman and Blumstein, 186-7).

As an example to demonstrate the categorical nature of human speech perception, consider the sounds [b] and [p]. In the articulation of these two sounds, the classes of gestures functioning in the supralaryngeal vocal tract are equivalent in equivalent contexts, e.g. in ‘bat’ and ‘pat’. The functional articulatory difference between these two sounds consists in the *degree* of opening of the laryngeal muscles in the throat. In the [b] in ‘bat’ the larynx begins in a relatively closed, phonating position. In

the [p] in 'pat' the larynx begins relatively open and closes as the lips do, phonation beginning on the vowel sound (Leiberman and Blumstein, 196).

Of course, the articulatory system itself is anatomically continuous. The difference between 'bat' and 'pat' is perceived relative to the continuum of possible phonation-delay periods from the starting of articulation. As it happens, articulations with a delay before phonation shorter than 25 milliseconds are perceived as [b] while otherwise equivalent articulations with a delay before phonation longer than 25 milliseconds are perceived as [p]. Yet phonation delays in the same context shorter or longer than 30 milliseconds or 35 milliseconds make no perceptual difference. Clearly, the 25 milliseconds distinction has no logical priority over phonation delay distinctions at other duration points. We happen to make a discrimination at the particular point in the potential duration continuum that we make, this is a fact about our biology, not of logic. It is the specific, biological nature of the human auditory apparatus that structures the basic sounds of human speech (Leiberman and Blumstein, 197).

Equivalent millisecond variation ranges are not perceived. Which ones are perceived is simply a contingency of the human perceptual system. As Leiberman and Blumstein write, "voicing thus appears to be inherently structured in terms of this perceptual constraint as well as the articulatory constraints of the speech-producing apparatus" and, of course, this applies to other phonological features as well (Leiberman and Blumstein, 197).

We now have a general understanding of how the science of speech production and perception relates to the grounding of the basic sound units of language. So far we have been talking about the implementation of the sound systems of language at a very low level of abstraction. We will now begin to speak about these systems at a higher

level of abstraction, specifically, at their inherently linguistic level. At their inherently linguistic level, speech sounds are represented as phonemes. The nature of phonemes is to be understood through an understanding of the underlying nature of features.

Features

[set], [bet], [let], [net] each correspond to different words in English because /s/, /b/, /l/ and /n/ are different phonemes in English (Durand, 7-8). It is in the sense that there is no linguistic change without a phoneme change that the phoneme is the basic linguistic unit. But this is not to say that a phoneme cannot be analyzed. As Durand writes:

A typical French [e] (as in [mer] 'sea') involves at the same time an egressive airstream, vibrations of the vocal folds, a raised velum shutting off the nasal cavity, a specific tongue position on anterior-posterior axis (i.e. front²⁸) and the closed-open axis (i.e. mid-low) and a lip gesture (spread lips). But all these components are independent of one another. The lips could have been rounded resulting instead in an [oe] sound as in 'moeurs' [moer(s)] 'habits', the tongue could have been retracted (cf 'mort' [mor] 'death'), the velum could have been lowered giving the sound a nasal quality (cf 'main' [me~]) 'hand') and so on (15).

In other words, a phoneme is not simply a sound. It is a set of instructions for articulation matched with a mapped set of instruction for perception based on the same fundamental categories. The different phonologically significant aspects of articulation determine what are called phonological features. According to linguistic theory, a

²⁸ Front being the tongue position within the axis, not the axis itself.

phoneme is a set of features. In so far as a phoneme is a set of features, it cannot be something other than a set of features, since, as Kripke's insight demonstrated in the previous chapter, this would be a modal contradiction. Features are logically dependent on articulatory and perceptual phonetics. Thus, phonemes are logically dependent on articulatory and perceptual phonetics, which is to say that the basic linguistically significant units are logically dependent on their biological implementation. The set of possible features is determined universally by the nature of biological constraints of human anatomy. In theory, fundamental laws relating to natural classes of possible phonemes should apply cross-linguistically at some level of abstraction.

Gestures and features are importantly distinct. Gestures are purely physiological. Features are psychological representations of the ways ranges of gestures function to produce acoustic categories defined relative to perception. Not every language needs to make every possible phonological distinction, but every language can use only possible phonological distinctions, and what the possible phonological distinctions are is determined by the biology of articulation and perception.

Sign Language

Etymologically, it could be argued that 'sign language phonology' is a contradiction in terms. Scientifically, however, underlying categories and principles of signed languages have been shown to be relevantly analogous to those of spoken language phonologies to such an extent that semantic concern about the term has become irrelevant. This is because, as noted earlier, the directly essential metaphysical grounding of the categories of phonology is not acoustic, but physiological.

The only relevant disanalogy between articulatory gestures of spoken and signed languages is that the latter happen to be decoded via a visual rather than an auditory modality²⁹. As in spoken languages, in signed languages the semantically lexical items are not holistic gestures but, rather, sets of anatomically-grounded, recombinable, non-semantically significant primitives determined by a finite inventory of categories functioning as instructions for articulation and perception. The phonological features of signed languages have constraints on their recombination analogous to those of spoken languages and, again analogous to spoken languages, “features of handshape, location, and movement can recombine to form minimal pairs of signs,” thus distinguishing particular phonemes relative to the role they play in distinguishing different words (Sandler, 1).

This shows that the sense in which spoken language phonology is related to actual acoustic sounds is in fact indirect. The physiological production of components of signed languages is a different type of articulation, and their visual rather than auditory decoding is, of course, a different kind of perception. The truth is that all phonological systems are essentially related to articulation and perception, and, since the articulations and perceptions essentially related to the phonologies of spoken languages are in turn essentially related to sounds, the phonologies of spoken languages are, in some sense, indirectly essentially related to sounds. But the philosophical point remains the same that all phonological systems are essentially related to some implementation in some articulatory anatomy and some perceptual modality. The representation and use of the phonological system of a language is thus very much dependent on concrete biological matters.

²⁹ Lip reading presents an interesting potential connection.

An organism radically different from us biologically, may not be able to use our languages despite being sufficiently intelligent, and vice versa with us and the language of such an organism. In theory (perhaps) we could come to understand the meanings of a language of an organism biologically very different from us. But this would be different from representing that language linguistically; its principles would not be intuitive to us and we would represent them using general-purpose memory, rather than the language faculty. We could never be a native speaker, but could only represent the alien language as we might represent the biology of how birds fly.

Dolphin Communication Systems

Consider, as a possible real-world example, dolphin communication systems. Dolphins produce two broad types of sounds: “pure-tone whistles and broad-band clicks”. The clicks in turn come in two subtypes: “echolocation signals and burst pulse sounds.” (Dooling and Hulse, 296)

To what extent dolphin communication systems should be considered actual languages is a matter of debate. However, if dolphins do have languages, the phonologies of these languages will likely be very different from those of human languages. In this case, though we could come to learn the dolphins’ languages using general-purpose memory, due to their physiological differences from us, we could not represent the dolphins’ languages as languages. We could never be native dolphin-language speakers, even if taught from birth.

It would not be contradictory to imagine languages with phonologies based in articulatory and perceptual systems that do not actually exist³⁰. Presumably, in some sense, the possibilities are infinite. According to Platonism non-actualized languages are just as legitimate objects of study as actualized ones, since all possible languages exist as abstract objects in the same way, regardless of whether or not organisms or populations use them. But the features and principles of possible languages with otherworldly phonologies are impossible for linguists to study. Arguably, they are as impossible to study as otherworldly colors, as they simply have no cognitive grounding for us.

The concrete empirical facts of language are essential to the science of linguistics. Even if we do have the imaginative ability to conceive of non-actual phonologies, this is no more relevant to foundations of linguistics than our imaginative ability to conceive of non-actual animals is relevant to the foundations of biology. In some sense, there are possible worlds with very different biological facts. But no one moves from this premise to the conclusion that biology is an abstract discipline analogous to mathematics. Since the facts of phonology are grounded in contingent reality analogously to biology, imaginative possibilities should also not lead to the conclusion of Linguistic Platonism.

³⁰ Though, as argued in chapter two, I believe this is irrelevant to the logic of the science of linguistics.

The Phonetics-phonology Interface

Having discussed some varied actual and possible implementation bases of phonologies, let us return to the matter of the nature of the direct relation of phonology to phonetics.

There are three ways in which phonology is grounded in phonetics: definition, explanation and implementation. Phonological features are defined in respect to contingencies of human physiology. It is the biological constraints of human physiology that explain phonological patterns. And, lastly, it is human physiology that implements phonological representations (Kingston, 401).

The explanation of phonological patterns is very complex, as such patterns are always the result of various, often competing biological constraints. As we will see later in this chapter, communicative and anatomical constraints are in a delicate balance in the determining of the phonological principles of languages. The problem of understanding the implementation of phonological representation is analogously complicated. As Kingston explains, “the problem of implementing phonological representations cannot be solved by simply reversing the solution to defining their constituents and working down from the phonology to a pronunciation or percept,” because “the phonetic implementation also determines what kind of phonological representation is possible in the first place” (Kingston, 402).

Definition

Phoneticians and phonologists have long worked hard to understand the correct phonetic definitions of phonological features. “Landmarks in this effort,” Kingston sites, “are the acoustic-auditory definitions in Preliminaries to Speech Analysis (Jakobson, Fant, & Halle 1952), the articulatory alternatives in Chapter 7 of the Sound Pattern of English (Chomsky & Halle 1968), and most recently, the combined acoustic and articulatory definitions in The Sounds of the World’s Languages (Ladefoged & Maddieson 1996), and Acoustic Phonetics (Stevens 1998)” (Kingston, 402).

As noted previously, the phonetic grounding of phonological features has a certain level of functional abstractness. Features are realized differently depending on contexts, aspects of speaking style, etc. There have been two general approaches to understanding the relevant level of abstraction appropriate to categorizing the phonetic invariance of phonological features: Articulatory Phonology and Auditorism. Each of these approaches abstract from the specific articulatory and acoustic details of utterances, but each does so differently. Articulatory Phonology defines phonetic invariance of phonological features relative to the speaker’s mental representation of her articulatory plan for the utterance, whereas Auditorism defines phonetic invariance of phonological features relative to the auditory effects of the acoustic waves produced. These approaches each offer a different means of defining phonetic invariance of phonological features “by moving to a description of the utterance with many fewer dimensions than are necessary to describe its articulatory or acoustic realization” (Kingston, 402-3). At the linguistic level, less is represented than may be represented at

other levels related to actually performing articulation. Linguistic principles do not require representation of all the articulatory information.

Either of these approaches is consistent with the functional grounding of phonological features relative to human biological constraints that we have previously described. Evidence, as it happens, at this point leans toward Auditorism. Scientific results, Kingston writes, “suggest that the invariants from which distinctive features emerge are the auditorily similar effects of covarying acoustic properties and not motor equivalences of different combinations of articulations” (Kingston, 406)³¹.

This provides one fleshing out of how phonological categories can be based in biology. The appropriately similar articulations are those that produce sounds that are perceived as the same. That the fundamental level of categorization relates to perception does not mean that the mental representations of plans for utterances do not exist. It merely means that these mental representations of plans for utterances must be understood as having those plans fundamentally defined relative to the way those utterances are represented as being perceivable. But, as we have previously discussed, the categories by which humans perceive and individuate speech sounds map onto the same categories they use to produce them in a manner composing a complete functional biological system. This is to say that we are wired up to perceive the same sounds we are wired up to articulate, and that both the articulatory wires and the perceptual wires make use of the same information, functioning in harmony. Perceptual phonetics may define phonological features, but since the mental representations of articulation and perception are essentially interrelated in this way,

³¹ Auditorism clearly fits well with the acoustic invariance account of speech production previously discussed.

articulation still has a metaphysical relation to phonological features. Indirectly, the objective nature of articulation, as well as perception, thus determines the grounding of phonology.

Explanation

Natural language phonemes cluster into natural classes that relate in principles that determine phonological patterns. The biological and psychological properties of speaking and listening offer phonetic explanations of these phonological patterns. As examples, consider “stops”, the natural phoneme classes in which the airflow of the vocal tract is blocked, and “fricatives,” the consonants in which air is pushed through two articulators close together. Stops include phonemes such as /p/, /t/ and /k/, and fricatives include phonemes such as /m/, /n/, /ŋ/ (‘ng’) and /l/. Ultimately, all natural classes of phonemes are defined relative to the features that they have in common. Phonological principles relating phonemes are thus ultimately reducible to principles relating feature classes, since phonemes themselves are nothing over and above classes of features. Kingston notes that “stops intrude between nasals or laterals and following fricatives in many American English speakers’ pronunciations of words such as warm[p]th, prin[t]ce, leng[k]th, and el[t]se because voicing ceases and, in the case of the nasal-fricative sequences, the soft palate rises before the oral articulators move to the fricative configuration (Ohala 1971, 1974, 1981)”. This is an example of how the contingent nature of human anatomy can ultimately explain phonological patterns. We will delve deeper into the role human biological constraints play in determining phonological principles later in this chapter (Kingston, 406).

As we have previously discussed, articulatory and perceptual biological factors ultimately explain why there is a finite set of possible human speech sounds. In fact, human articulatory and perceptual constraints also seem to provide part of an explanation for why human languages have the specific actual sounds that they have. As Kingston writes, “languages have the oral, nasal, and reduced vowels they do because vowels must be dispersed perceptually in the vowel space, certain vowel qualities are more salient than others, and a long vowel duration makes it possible for a listener to hear nasalization while a short duration prevents the speaker from reaching a low target”. Phonetic factors will form a part of any eventual complete explanation of the specific contents of the phoneme segment inventories of human languages. (Kingston, 407).

Implementation

A fundamental difference between phonetic reality³² and its phonological representation is that the former is inherently continuous whereas the latter fundamentally consists in relation to strict categories. The categorical nature of phonology, as we have discussed, is determined by the categorical nature of human speech perception in that the categories determining phonological principles are defined by functional contingencies of perceptual phonetics. The continuous-categorical distinction is often put forward as the fundamental distinction between phonetic and phonological phenomena. This is the case, for example in Keating (1988c),

³² Both articulatory and acoustic.

Pierrehumbert (1990), Cohn (1993a), Zsiga (1995), Holst & Nolan (1995), and Nolan, Holst, & Kuhnert (1996) (Kingston, 430).

The puzzle of understanding exactly how phonology is phonetically implemented is analogous to the challenge of explaining phonological patterns in phonetic terms. Human biological constraints determine not only the manner in which phonological representations are realized but also some of the properties of these representations themselves. The phonetic implementation of phonology also relates to the phonetic definition of phonological features in that “properties of the phonological representation emerge out of its implementation in much the same way that the distinctive features emerge out of the solution to the variability problem”. Thus, the three main topics in the study of the phonetics-phonology interface all ultimately interrelate themselves. The complete system of human phonology is grounded in a thorough and harmonious manner in the contingent restraints of human biology (Kingston, 432). Ultimately, phonology consists in a mental representation of phonetics³³.

Optimality and Markedness

One might agree that the basic units of language are not logically independent of biology and psychology, but claim still that the general principles are logically independent. A strong case can be made that this is false. In optimality theory, a given

³³ In personal correspondence Chris Viger offered me the analogy to think of the relation of phonological representations to phonetic implementations as we think of the relation between our color representations to light. Perhaps this serves as a helpful heuristic.

grammatical output is, by definition, the optimal output given a ranked set of “markedness constraints and faithfulness constraints” (Kager, 9). Markedness constraints optimize ease of articulation and perception while faithfulness constraints optimize one-to-one correspondences between forms and meanings. In other words, faithfulness constraints “protect the lexical items of a language against the ‘eroding’ powers of the markedness constraints” (Kager, 10). The constraints most interesting for our purposes are markedness constraints.

Unmarked values are preferred in all languages and primary in all grammars, while marked values are avoided when possible in all languages and used by grammars only for the purposes of contrast. Formal and lexical contrasts are required for contrasts in meaning. This, again, is the role served by faithfulness constraints.

Markedness constraints affect all levels of phonological representation. At the phoneme level it can be observed that, while the unrounded front vowels /i/ and /e/ exist in all languages, rounded front vowels such as /y/ and /ø/ exist only in some languages, and again, merely for the purposes of certain contrasts. [-round] is thus unmarked in front vowels while [+round] is marked in front vowels. Analogous markedness values also apply at the level of syllables, with CV³⁴ and V syllables being unmarked and CVC and VC syllables existing only in some languages and only for contrastive means (Kager, 2-3).

The important fact about markedness constraints, for present purposes, is that “what is ‘marked’ and ‘unmarked’ for some structural distinction is not an arbitrary formal choice, but rooted in the articulatory and perceptual systems” (Kager, 3). As Kager continues:

³⁴ ‘C’ for ‘consonant’, ‘V’ for ‘vowel:’ so ‘a’ is V, ‘ba’ is CV, and ‘bad’ is CVC, etc.

An exclusively typology-based definition of universality runs the risk of circularity: certain properties are posited as 'unmarked' simply because they occur in sound systems with greater frequency than other 'marked' properties... phonological markedness constraints should be phonetically grounded in some property of articulation or perception. That is, phonetic evidence from production or perception should support a cross linguistic preference for a segment (or feature value) to others in certain contexts (11).

Since markedness must be rooted in the biology of articulation and perception, and since the general phonological principles of natural languages' grammars are based on markedness constraints (together with faithfulness constraints), it follows that the general phonological principles of natural language are themselves rooted in biology. These general phonological principles consist in psychological representations of the physiological system in which they are implemented. The information carried is dependent on the receiver, even when the receiver is one's self. 'Unmarked' is not a functional characterization that is multiply realizable. It isn't like jewelry or transportation. Instead, 'unmarked', like 'cerebral cortex', refers to a biological kind. As a result, what is actually unmarked is essential to natural language. General principles of natural languages are essentially biological and psychological and cannot be logically independent of their representation and implementation, as Platonism requires them to be. Not merely phonological units, but also phonological grammar is rooted in contingent human biopsychological constraints. It is not just that the units the principles relate are biopsychological. The very principles themselves are determined in the biopsychological implementation. It is because the implementation has the structure that it has that phonological principles have the structure that they have.

Allophony in I-language

As we have discussed, not all aspects of phonetic reality are essential to the nature of their phonological representation. As an example, Isac and Reiss note that phonological grammar “treats plain and aspirated [t], flap, and glottal stop as equivalence classes that are themselves realizations of a more abstract equivalence class called a phoneme” (Isac and Reiss, 112). In this example, we see that whether a [t] is phonetically aspirated is phonologically irrelevant. Thus, standard French and Quebecois pronunciations of the informal second-person singular pronoun ‘tu,’ for example, are phonologically equivalent. Both phonetically not aspirated and phonetically aspirated [t]s are represented phonologically as a /t/. When it comes to determining phonological principles, whether a [t] is aspirated is an irrelevant distinction. Two classes of speech sounds produced relative to the same phoneme that are not represented as phonologically distinct or relevant to phonological principles are called two “allophones”. Phonetically aspirated and not aspirated [t] classes are allophones of the phonological /t/ (Isac and Reiss, 112).

As Isac and Reiss note, the phenomenon of allophones demonstrate the “construction of experience” that is intrinsic to phonological representations in that two sounds that, in reality, are acoustically and articulatorily different, are perceived as the same. This point matches well with the fundamental perceptual definition of phonological features put forward earlier. Analogously, as noted earlier, sounds that are phonetically different can also be perceived as phonologically the same. E.g. 30-35 milliseconds phonation delays on [p]s in ‘pat’ are all phonologically perceived as

identical /p/s³⁵. These examples demonstrate the essential role inherently psychological representation of human biology plays in the fundamental nature of human language (Isac and Reiss, 113).

The Role of the Psychological

As the above already suggests, saying that phonological facts are logically dependent on phonetic ones, again, is not to say that they are identical. As Durand writes:

Componential aspect of speech production does, of course, provide support for distinctive features but it should not lead us into thinking that every parameter of speech production is phonologically relevant... it is crucial to establish a fundamental distinction between phonological and phonetic features (Durand, 15).

Every pronunciation of the word 'set' is slightly different, phonetically speaking. But they are all the same, phonologically speaking, in a sense in which a pronunciation of 'bet' is different. Since the articulatory system is continuous, there is strictly an infinite range of possible phonetic variation, allowing for arbitrary, non-linguistic individuation criteria. Since the categories on which phonology is based are discrete, phonemes cannot be strictly identified with regions of articulatory space. Rather, in saying that phonemes are sets of features, what is meant is that phonemes are sets of instructions to be executed in continuous articulatory space producing acoustic patterns categorized discretely relative to human perception. The basic linguistically

³⁵ See end of section on Phonetics and Speech Science.

significant units are thus logically dependent both on the biological as well as on the psychological. The identity of a phoneme consists in a set of instructional relations from the mind to the articulatory system that determines the production of sounds categorized relative to their perceptibility by the human auditory system. Since phonemes are scientific objects, they may be designated according to their essential structure. They are thus not merely contingently, but necessarily biopsychological.

Tonal Stability

The role of psychology in phonology may be made clearer by a consideration of tonal languages. The language Bakwiri has high and low tones on given phonemes that create linguistically significant contrasts beyond those determined by standard phonological features. In what follows, an upward-facing accent will be used to note a rising tone and a downward-facing accent to note a falling tone. When Bakwiri speakers are asked to transpose³⁶ the syllables of certain classes of disyllabic words they systematically respond by swapping the phoneme sequence of each syllable while leaving the tones in their original phonological segment. For example, upon being asked to transpose the syllables of 'kwéli' ('falling') they consistently produce 'líkwè.' This "tonal stability" can only be explained by considering the tonal system and the phoneme system to be represented on separate phonological "tiers" (Durand, 244).

In other words, a phoneme and its tone must be distinct, since phonological operations may be applied to them separately. But since a tone, at the level of articulation, cannot exist independently of a phoneme, its identity must be partly

³⁶ In English this is changing the word 'baby,' /bebi/ to /bibe/, 'beebay'.

determined psychologically. It is *only* in representation that a tone is isolated in the way required for the transposition results attained to be possible. Again we have a scenario in which the categories of instructions for articulations must be more specific than the mere general properties of articulations themselves. The basic linguistically significant units are logically dependent on both the biological and the psychological.

Empirical inquiry into the grounding of the basic linguistically significant units leads us to the a posteriori discovery of their essential features. In every possible world in which the phonemes and tones of our world exist, those phonemes and tones are logically dependent on the same biological and psychological grounding that individuates them.

Conclusion

The view here defended - that psychological representation of biological phenomena is the foundation of human language - is often termed "mentalism" (or "psychologism," which I prefer). As Bromberger and Halle write, "if the mentalist view is correct, then one should expect systematic connections [between phonology and phonetics]: after all, articulatory types represent ways in which phonological intentions are executed, and acoustical types represent information on the basis of which these intentions can be recognized" (142).

In other words, the essential psychological nature of phonological representation does not take away from the concrete phonetic grounding of these psychological representations. Human phonology is a system of psychological representations that are representations of concrete biological realities. The

phonological principles that determine phonological patterns are psychological principles that are themselves also partly determined by fundamental human biological constraints. This chapter has demonstrated the essential grounding of phonology in both human psychology and human biology. It has been a defence of the biopsychological framework for scientific linguistics as an alternative to the Platonist framework according to which both biology and psychology are irrelevant to the study of language itself.

Chapter 4: The Dependence Relations of Formal and Phonological Grammar

One might retort to the previous chapter by claiming that linguistics should simply ignore phonology. One might try to defend the idea that, despite appearances, phonology is somehow not actually a proper part of the science of language. A Platonist could claim that only the formal aspects of language should be considered essential to linguistics, where 'formal' means 'medium-independent', the aspects of language that are the same whether spoken or written (or signed or whatever). Since languages are abstract, anything related to articulation or perception by nature is inessential, so the objection would go.

The response to this objection is that phonology has to be considered part of linguistics because the formal aspects of language, it turns out, cannot be properly explained independently of their phonological aspects. Morphology³⁷ and phonology, as optimality theory demonstrates, are essentially co-dependent. Aspects of syntax, in turn, are dependent on morphology. Thus, aspects of all of formal grammar require explanation partially at the level of phonological grammar, and thus ultimately at a biopsychological level.

³⁷ Morphology is the formal grammar for constructing words from minimal meaning units called 'morphemes,' whereas syntax is the formal grammar for constructing phrases and sentences from words.

General Harmony

In this chapter, I will be putting forward some technical arguments for the interrelatedness of formal and phonological grammar. These technical arguments will do the main work to rebut Platonism regarding morphology and syntax, but they will also be made within a context based on general harmony. General consideration of harmony leads one to note that it would be strange if phonological units and structural principles were biopsychological while morphology and syntax were Platonic. The observation of correlations at the syntax-phonology interface makes this evident.

Consider the sentence 'John likes blueberries'. The syntactic concept of force, or emphasis, notated 'f', allows for multiple formal representations of this sentence. For example, the sentence can be represented as '[f JOHN] likes blueberries', such as when it is used as a response to the question 'who likes blueberries?', or as 'John likes [f BLUEBERRIES]', such as when it is used to answer the question 'what does John like?', etc. In these representations, f is a syntactic constituent. In the everyday writing of the sentences there is no representation of f, but phonologically there is. The constituent of the sentence paired with syntactic force, in Standard English, will always be the same constituent paired with phonological stress, that is, the constituent emphasized vocally. When it comes to force and stress, in Standard English, syntax and phonology are 'mapped' in a way determining consistent correlations. Not all stress is accompanied by force³⁸, but all force is accompanied by stress (Truckenbrodt, 442-3).

³⁸ One can phonologically stress a syllable of a word, for example, without syntactically emphasizing it. E.g. in the word 'emphasis,' the syllable 'em' is phonologically stressed, but typically in no way logically emphasized.

Thus, there are law-like relations between formal and phonetic representations at the level of sentence syntax. These relations are facts about idiolects with generalizations, facts and generalizations that Platonist Linguistics must necessarily leave out if it is to ignore phonology. Specifically, there is a law-like relation between syntactic f and phonological stress generalizable over Standard English idiolects, a sentence-level linguistic phenomenon that Platonist linguistics must leave out³⁹.

Such correlations do not provide a strong case against Platonism for formal grammar, but they intuitively open the door for a biopsychological account. Though such correlations do not demonstrate dependency, it would be somewhat surprising if syntax and phonology turned out to have no ontological connection to each other. As I will now show, other aspects of formal grammar are directly dependent on aspects of phonological grammar. Thus, the intuitive sense that one gets from consideration of general harmony can be fleshed out into a rigorous technical case for the biopsychological grounding of all linguistics.

The Phonology-morphology Interface

Again, one might grant based on the previous chapter that there are general principles of linguistic sound structure that could not be logically independent of biology and psychology, but claim still that the general formal principles must be logically independent. In other words, one might claim that the principles of language that apply to it regardless of whether it is spoken or written (or signed or whatever)

³⁹ This may also be a case where phonology ultimately connects up with semantics.

must be logically independent of representation and implementation. Once again a strong case can be made that this objection fails.

As it turns out “morphological and phonological properties of an output form are mutually dependent” (Kager, 25). Even when abstracted from actual articulation, the general formal principles that apply to complex word formation remain logically dependent on psychological representations of markedness constraints.

Reduplication

A clear illustration of the dependency of morphology on phonological markedness constraints can be seen in the phenomenon of reduplication as pluralisation.

Reduplication can be either total or partial:

Total reduplication: Indonesian: ‘woman’ = ‘wanita’; ‘women’ = ‘wanita-wanita’ (Kager, 195)

Partial reduplication: the Australian language, Yidin: ‘initiated man’ = ‘mulari’; ‘initiated men’ = ‘mula-mula.ri’ (Kager, 196)

In the case of partial reduplication, “reduplicants tend to have unmarked phonological structures, as compared to the phonotactic⁴⁰ options generally allowed in the language” (Kager, 196). A reduplicant, as Kager writes:

is, by nature, a phenomenon which is dependent in its identity upon another morpheme. Since the reduplicant is not burdened with lexical contrasts, its

⁴⁰ Phonotactics is, essentially, the syntax that applies at a phonological level of representation.

phonological form naturally drifts towards the unmarked... any language, given the chance, will develop unmarked structures in contexts where the influence of faithfulness is absent... [this brings about an] 'emergence of the unmarked'... [which is a] major argument... that languages are subject to universal markedness constraints (Kager, 198).

Thus even in written language (or any other medium in which the formal level of natural language may be abstracted from its primary articulatory form), the brute human biology of natural language plays a role in the general principles that apply to it. Phonological constraints directly impact morphological structure. The latter thus cannot be fully understood without the former. There is no way to abstract a correct understanding of the principles of natural languages as logically independent of their psychological representation and biological implementation. Even formal principles are rooted in the nature of the human articulatory system and its discrete representation in the form of feature instructions and markedness constraints. Since the phonologically determined structural principles of morphology can be designated as essential features of morphological representation, it follows that the nature of natural language morphology is not merely contingently, but essentially biopsychological.

Haplology

In contemporary linguistics it is well established that phonological markedness constraints have a strong effect on inflectional morphemes. There is a phenomenon resulting from this called "morphological haplology" (Stemberger, 1981) or "the repeated morph constraint" (Menn and MacWhinney 1984). Haplology consists in the

deletion of an affix in a context where the other rules of the grammar would determine it to be directly adjacent to a phonologically equivalent affix. An example of this can be seen in the English possessive plural 'dogs'. Haplology aside, the rules of the grammar would determine two -s affixes resulting in 'dogs's', but the second -s is consistently absent (Bernhardt and Stemberger, 590).

Again we have an effect from phonology that is carried up to formal grammar. The effect of haplology is not medium-specific. It affects written English equivalently to spoken English. Just as one says [dagz] rather than [dagzz], so one writes 'dogs' rather than 'dogs's'. The Platonist cannot escape the effects of phonology in her theory of linguistics by claiming to only consider formal grammar as genuine linguistics⁴¹.

Affix Position

Yet further examples come from consideration of affix position. Most familiar affixes are either morphemes added to the start of words, called 'prefixes', or to the end of words, called 'suffixes'. There exist languages with affixes positioned differently, however, and their consideration provides various examples for the case at hand, since there is evidence to support that "when affixes occur anywhere other than the edge of a word, phonological pressures are always responsible" and that "the influence can be quite important, to the extent that phonological well-formedness can determine morpheme position" (Ussishkin, 457).

⁴¹ Importantly, the rule relates to /z/ represented as a plural morpheme, not merely phonologically represented. This explains why 'Chris's' remains an acceptable output.

According to General Alignment theory (GA) all affixes are prefixes or suffixes by nature, which deviate from word-edge position strictly due to phonological requirements. More specifically, there is a morphological alignment constraint that requires every affix to be placed at one end of a word or the other, but there are also phonological well-formedness constraints that cause deviation from this morphological constraint due to the phonological constraint's higher ranking in the grammar (Ussishkin, 460). Below are some examples to demonstrate.

Variable-direction Affixes

In Afar, the verbal system determines variable-direction affixes for person marking. The affixes marking person, in Afar, vary in location as a result of phonological constraints. The verbal affix, 't', marking second-person forms, for example, occurs at the end of stems beginning in consonants and the start of stems beginning in vowels. Examples are as follows: "[consonant-initial stems] nak-t-e – 'drink milk'; haj-t-e – 'put'; sug-t-e – 'had'; kal-t-e – 'prevent'... [vowel-initial stems] t-eh-e – 'give'; t-ibbid-e – 'seize'; t-okm-e – 'eat'; t-usuul-e – 'laugh'" (Ussishkin, 460).

The position of t is phonologically based in that the stem-initial phoneme, to which the affix is added, is determined by its phonological property. Optimality theory offers a straightforward explanation:

A right edge-oriented alignment constraint on the person marker (capturing its suffixal nature) is dominated by ONSET, a constraint requiring syllables to have

onsets⁴². Since consonant-initial stems have an onset, the alignment constraint exerts its effect on the position of the person marker. However, vowel-initial stems surface with the person marker at the left edge, resulting in a more harmonic output from the point of view of syllable structure, to which alignment is subordinated (Ussishkin, 460).

In other words, in the grammar of Afar, the phonological constraint demanding syllables to have onsets outranks the morphological constraint demanding affixes to be placed at the end of stems. Since onsets must be consonants, and since the phonological onset constraint in Afar outranks the relevant morphological constraint, in vowel initial stems the affix *t* ends up stem-initial.

Again, of course, this example is medium-transcendent. Though the grammatical cause is a phonological one, the morphological result exists at the formal as well as phonological level of representation.

Infixes

An infix results when phonological constraints force a morpheme to occur away from either stem edge. A somewhat comical example comes from English expletive infixation, "where the expletive prefixes to a stressed syllable... [e.g.] Ari-fuckin-zona, cali-fuckin-fornia... Minne-fuckin-sota" (Ussishkin, 461).

Here, morpheme position is determined by a specific phonological factor, namely, the location of phonological stress. The morphological component 'fuckin' consistently occurs directly prior to the stressed syllable in the word, e.g. 'zo' of

⁴² Onsets are consonantal phonemes starting a syllable. In 'dog' /d/ is the onset.

'Arizona,' 'for' of 'California,' and 'so' of 'Minnesota'. Yet again this example shows results that are independent of medium. While phonological stress is not represented in standard writing, the morphology of the word transfers over. This does not require that orthography be linguistically represented.⁴³ The point is that the formal linguistic reality *that is present in spoken and written utterances* is determined partially by the structural nature of its spoken form. Phonological grammar determines formal grammatical facts.

Interfixes

An interfix occurs when phonological constraints cause a morpheme to split apart within a word. The morphology of interfixes is called “‘nonconcatenative morphology’, where the segmental content of an affix may be distributed within a stem” (Ussishkin, 463).

Modern Hebrew offers an example of nonconcatenative morphology. In Hebrew, constraints on syllable structure and word size “impose a set of restrictions on the optimal phonological shape of words that results in interfixational phenomena, without explicit recourse to interfixes as a special class of morpheme” (Ussishkin, 464).

Abstractly speaking, there is a passive-making affix in Hebrew 'ua'. 'Dubar', 'it was spoken' is derived from 'diber', 'he spoke' in a way determined by phonological constraints. The constraint COMPLEXONSET requires syllables not to have multiple onset consonants. The constraint ONSET, however, requires that syllables have onsets of one form or another. Thus COMPLEXONSET rules 'out .dbrua.' and .dbu.ra.' as

⁴³ It may or may not be.

passive forms and ONSET rules out 'du.abr' and 'ud.bar.' as possible passive forms. The remaining result is 'dubar' (Ussishkin, 470).

This is yet another example of phonological causes having medium-independent consequences for formal linguistic properties. All the examples provided thus far have been morphological, but this already provides argument for the biopsychological grounding of syntax as well, since the nodes of a syntactic tree are themselves the output of morphology.

As we will see, however, there is even stronger reason to take all of formal grammar to be grounded biopsychologically. In the next section I will address the morphology-syntax interface. By demonstrating the interdependence of morphology and syntax, given the already-established interdependence of morphology and phonology (and of phonology and biopsychology), one can ultimately defend the grounding of syntax, too, in biopsychology.

The Morphology-syntax Interface

It has now been demonstrated that morphology is dependent on phonology. If it can also be demonstrated that syntax is dependent on morphology, then, in an indirect sense, it can be inferred that syntax is not independent either. It is the role of this section to demonstrate the dependence of syntax on morphology. The same phonological-determination of morphological structure must indirectly be ontologically essential to syntactic structure.

Case in Australian Languages

In many languages, morphological words can play the same functional role as syntactic phrases. Morphology and syntax offer alternative means for encoding the same formal linguistic relations. In fact, in “nonconfigurational” languages “inflectional morphology takes on much of the functional load of phrase structure in more configurational languages like English, determining grammatical functions and constituency relations” (Nordlinger, 2).

Australian languages offer a clear demonstration of the contingency and variability of distinctions between morphological and syntactic representations and relations. This is due to their surprisingly extensive case system. Many Australian languages have free constituent order in simple clauses and the only marker for grammatical relations is provided by case morphology. The sentence ‘the dog saw the boy’ in the Non-Pama-Nyungan language, Wambaya, for example, may be grammatically represented with any constituent order provided that the auxiliary *gin-a* occurs in second position. Thus “*Ngajbi gin-a alaji janyi-ni... alaji gin-a ngajbi janyi-ni... alaji gin-a janyi-ni ngajbi... ngajbi-ni gin-a janyi-ni alaji... janyi-ni gin-a alaji ngajbi... [and] janyi-ni gin-a ngajbi alaji*” are all semantically equivalent (Nordlinger, 2-3).

In Wambaya and many other Australian languages main clauses have no syntactic indicators of grammatical function. Which words play the roles of “Subject, Object and other grammatical functions is specified solely from the morphology; usually from the case morphology,” which demonstrates that there is no essential rule regarding which parts of formal grammar are part of syntax and which are parts of morphology (Nordlinger, 3).

Even the seemingly quintessentially syntactic process of iterative embedding can be done morphologically in Wambaya and similar languages. This is done via case stacking where the iteration of case suffixes on a single word mark successively embedded formal linguistic relations. As Nordlinger writes:

It is clear that case marking in these languages has a fundamental role in determining the syntactic relations. In fact, these relations need not be expressed in phrase structure at all, but are constructed directly from the case morphology; in these languages the morphology builds the syntax, expressing the same types of relationships encoded in the phrase structure in languages like English (Nordlinger, 4-5).

In other words, in translating Wambaya into English, one must use syntax to represent the formal linguistic relations that Wambaya represents morphologically. In saying that “morphology builds syntax” in Wambaya and similar languages one should be careful to disambiguate two senses of “syntax.” We may say that a formal linguistic relation is syntactic when it is represented by sentence structure in the metalanguage of our linguistic analysis, here English, or we may say that a formal linguistic relation is syntactic when it is represented by sentence structure in the object language that the linguistic analysis is about, here Wambaya.

Note that the above distinction makes a difference in the analysis of the morphology-syntax relation in Wambaya. If we take a metalanguage definition of syntax, then it is true that morphology builds syntax in a straightforward way: the morphological principles of Wambaya bring about syntactic relations. This shows the dependency of syntax on morphology and thus, through the chain of syllogisms of this thesis, ultimately on biopsychological phenomena.

If one takes an object language definition of syntax, we can say something even stronger. In this case we can say that there is no categorical distinction between morphology and syntax at all. The very same grammatical relations may be represented morphologically in one language and syntactically in another. The difference relates only to our theoretical system for analyzing these languages. This is a more radical interpretation, though nothing, it seems, but an English-style language bias could really count against it. Regardless, the weaker metalanguage interpretation is sufficient for the argument of this chapter.

Back to General Harmony

In addition to these technical arguments for the dependency of formal grammar on phonological grammar, a further theoretical case can be made by appeal to the successful application of the same theoretical framework for both phonological and formal grammar. If the same principles of optimality theory that make sense of phonological data also make sense of syntactic data, this suggests that phonological and formal grammar are essentially interdependent in a mutual ontological network. That is, it gives reason to think that, if phonological grammar is biopsychological, formal grammar is likely biopsychological as well. It is the role of this section to demonstrate the useful and correct applicability of optimality theory to syntactic data.

OT Syntax

Though thus far in this thesis I have addressed optimality theory as it relates to phonological phenomena, the framework is actually applicable as a theory of natural language grammar in general. In fleshing this out it will be worth highlighting and reiterating some basic points. In brief, optimality theory could be defined, in relation to linguistics, as a hierarchical ranking of constraints that grammar works to violate minimally in producing linguistic outputs. This is a very general idea and thus is not inherently restricted to phonology (Kager, 341).

One thing it is crucial to highlight about OT is the sense in which it is empirically divergent from predecessor frameworks based on the notion of parametric settings. In parametric frameworks a given rule could be “switched off” in a given language such that it did not at all apply in that language. In OT, contrarily, constraints are never switched off, but rather are merely “dominated” by higher ranked constraints within the grammar of a given language. The notions of off-switching and dominating are conceptually similar but empirically divergent in important ways. As Kager writes:

It is predicted [by OT] that the effects of some constraints may show up even in a language in which it is dominated. Given the chance, even a dominated constraint will make its presence felt, and ‘break into activity’. The canonical example of such situations... are cases of ‘the emergence of the unmarked’. In contrast, a parameter, once it has been ‘switched off’, can never thereafter leave its mark on the grammatical patterns of the language (Kager, 342).

In other words, if constraint A were to be dominated by constraint B, then, though in any linguistic context where B applies, A would be irrelevant, in any context

where B and all other constraints out ranking A were to happen not to be relevant, A would apply. Contrarily, however, if, assuming a parametric framework, rule A' were switched off in the grammar of a given language, then A' would simply never apply in that language. Kager offers the following illustrative example:

Consider a language which selects the value 'negative' for the parameter 'onsets are obligatory' ... On a parametric view it is predicted that such a language lacks processes... to bring about syllables with onsets, rather than onset-less syllables⁴⁴. Yet we know... that this prediction is simply false. In OT the (correct) prediction is made that the relevant constraint ONSET may continue to be active in a phonology even when the language allows for onset-less syllables. (Onset-less syllables show that Onset is dominated by faithfulness constraints, obscuring its effects in most contexts.) There is a subtle yet robust difference between parametric theory and OT in this respect (Kager, 342).

This is to say that in languages with grammars in which the syllables-must-have-onsets constraint is dominated by constraints a, b,... q, the processes of the language which would force an onset will not apply where a or b... or q apply, but will apply where none of a or b... or q apply. The grounds for testing OT against parametric frameworks are thus empirically straightforward. And as Kager shows, there is also strong evidence for the limited applicability of dominated constraints in the realm of syntax, analogously to the realm of phonology (Kager, 342).

Kager gives the example of 'do-support,' which will be explained below. He cites Chomsky 1957 and 1991 as showing that "do-support is possible only when it is

⁴⁴ That is, to bring about onsets for the sake of having onsets.

necessary” and shows that optimality theory can make straightforward sense of this general principle (Kager, 358).

‘Do’ is obligatory as a single auxiliary verb only in simple interrogative sentences and is unpermitted in positive declarative sentences, or in sentences with additional auxiliary verbs. In other words, ‘do’, in past form, is obligatory in ‘what did Mary say?’. One cannot instead ask ‘what Mary said?’ with the same meaning. Alternatively, however, in similar linguistic contexts with additional auxiliary verbs such as ‘what will Mary say?’, do forms are unpermitted. One cannot say ‘what does Mary will say?’ or ‘what will Mary do say?’ (Kager, 358-9).

Similarly, in a positive declarative sentence, one must say ‘Mary said much,’ not ‘Mary did say much.’ Auxiliary do forms are also ruled out in declarative sentences already containing an auxiliary verb. One must say ‘Mary will say much’ rather than ‘Mary does will say much’ or ‘Mary will do say much.’ Indeed, auxiliary do forms cannot even co-occur with themselves. One must say ‘what did Mary say?’ not ‘what did Mary do say?’ As Kager summarizes, “no more occurrences of do-support take place than are strictly necessary... The auxiliary do is possible only when it is necessary” (Kager, 359-60).

An optimality theoretic explanation of this phenomenon is made by reference to the constraints OB-HD (Obligatory Heads) and FULL-INT (Full Interpretation). OB-HD requires each syntactic projection to generate a syntactic head, that is, a constituent that determines the syntactic type of the generated phrase. In a verbal projection, for example, a verb must be generated as head (Kager, 349).

FULL-INT, in turn, requires that lexical conceptual structure be parsed, meaning it functions to eliminate any semantically empty lexical items such as the forms of do in

English that are at issue. The verb 'do', used as an auxiliary, is semantically empty. Thus sentences such as 'what did Mary say?' violate FULL-INT (Kager, 352).

The reason this occurs, however, is because, in the grammar of Standard English OB-HD ranks more highly than FULL-INT. Did is generated in 'what did Mary say?' so that the Verb Phrase 'what did' can be headed by a verb as OB-HD demands. When auxiliary verbs with semantic content such as 'can', 'will', or 'may' are available to satisfy the OB-HD constraints of verbal projections, 'do' will be ruled out of entry to the projection by the FULL-INT constraint. But where no verbal auxiliary with semantic content is applicable, the grammar will ignore FULL-INT in order to use 'do' to satisfy OB-HD (Kager, 363).^{45 46}

This shows that the same theoretical framework that explains phonological phenomena can also be used to explain syntactic phenomena. Considered out of context, it is of course logically possible that this is a sheer coincidence, but together with the technical arguments I have provided regarding the dependency of aspects of formal grammar on aspects of phonological grammar, I think it fits a further component into a strong case against Platonism for formal grammar. I have here strengthened the case from general harmony to show not just that linguistic theory in general should

⁴⁵ Actually there is some slight complication on this matter, but further use of the OT framework can explain it. As Kager notes "what said Mary?" ... satisfies OB-HD... [and] avoids do-support. Then why should it be ruled out? The answer resides in the undominated constraint NO-LEX-MVT that... blocks head-movement of a lexical verb out of VP... When movement of the lexical verb to the head position of CP is blocked, while this head position must be filled by some verb, then there is nothing better than to insert a form of 'do'. English thus prefers violations of FULL-INT to violations of NO-LEX-MVT" (Kager, 367-8).

⁴⁶ Another apparent counter example comes in cases of stress 'do' such as 'Rob *does* like beer.' In such cases, however, *do* does carry semantic weight. 'Rob *does* like beer' (or '*do* *does* carry semantic weight') differs from 'Rob likes beer' in a way semantically analogous to 'Rob likes beer, actually,' the 'does' or 'actually' implying this fact about Rob was not previously known, acknowledged or accepted.

apply to both phonological and formal grammar, but that the same theoretical framework should apply to both. This provides further reason to think phonological and formal grammar of equivalent ontological status.

Instrumentalism

One might grant the factual dependence of formal grammar on phonological grammar yet still claim that the former should be studied independently for practical reasons. This type of instrumentalist objection can be retorted by returning to a point from the first chapter of this thesis: an instrumentalist project may have some utility - perhaps for example, for the metatheory of certain sciences or what have you - but linguistic science is concerned with the actual facts of language.

The case for instrumentalism in the philosophy of linguistics is given a particularly precise form in Stich's paper 'Grammar, Psychology and Indeterminacy.' In this paper, Stich states explicitly that linguistics should not be concerned with discovering which among the possible 'dags' (descriptively adequate grammars) for an individual's language that individual actually internalizes⁴⁷. Rather, he proposes one consider "the multiplicity of dags as a practical problem for the working linguist" (Stich, 138).

Stich's motivation for linguistic instrumentalism is his recognition of the methodological challenge rooted in the task of determining an evaluation measure (or set of measures) to figure out which of the many possible grammars that would

⁴⁷ He in fact remains agnostic as to whether any grammar is actually internally represented at all (Stich, Grammar, Psychology and Indeterminacy, 138).

generate a given language, L in fact does generate L, biologically speaking.

Basically, he thinks instrumentalism is a requirement to make linguistics tractable. He

writes:

Since we [instrumentalists] are making no claim that the selected grammar is 'actually internalized' we need not be concerned that there may be several such evaluation measures [for choosing a grammar compatible with the linguistic data]. Our project is the highly nontrivial project of producing a model that takes pld [primary linguistic data] as input and yields an appropriate dag [descriptively adequate grammar] as output. Any evaluation measure that does the trick will be suitable." [139-140]

Stich is not wrong that figuring out which grammar a person actually represents to generate her language is difficult. Indeed, it is extremely difficult. It is not, however, beyond the realm of empirical investigation. The grounding of various aspects of grammar in markedness theory, for example, provides an observation basis for understanding phonological and morphological grammatical principles. This is an observation basis that would not have been available prior to the development of optimality theory. And there is no theoretical limit on the further, surprising possibilities for empirical testability of grammars that may come with future advancements in linguistic science.

At a more fundamental level, one should object to the very idea of a rejection of realism in a given science that is based on the practical methodological difficulties of the field. Stich goes on to admit the linguistics that results from his instrumentalist framework is not really a science of language.

If our account of the grammarian's activity is accurate, then it is perhaps misleading to describe him as constructing a theory of the language of his subjects. Rather he is building a description of the facts of acceptability and linguistic intuition [Stich, 144].

Like Russell's project of regimenting natural language for the technical purposes of analyzing science, Stich's proposal to regiment the study of phenomena related to language such that its scope is restricted to "facts of acceptability and linguistic intuition" may serve some purpose (though it is less clear in the latter case just which purpose it would serve).

The parallel between Stich's proposal and Russell's can be seen by remembering what Russell said in response to Strawson's attack on his logical theory of descriptions. For Russell, logical analysis of language:

is wholly and solely a question of convenience. For some purposes the one convention is more convenient, and for others, the other. We shall prefer the one convention or the other according to the purpose we have in view [Mr. Strawson, 389].

This, as discussed in the first chapter, is a perfectly acceptable instrumentalist project, entirely consistent with the also-perfectly-acceptable project of inquiring into the actual facts of natural language. The exact same thing can be said of Stich's proposal: it is legitimate in its own right, but irrelevant to the ontological status of natural languages.

In a similar way, there may be many circumstances when it is perfectly legitimate to talk about morphology and syntax without talking about phonology or the biopsychological grounding of grammar in general. But when the subject of discussion

is the actual ontological nature of the grammatical systems underlying the formal patterns of human languages, this subject matter must be recognized as essentially biopsychological. Platonism relating both to phonological grammar and to formal grammar must be rejected.

Section 3: Responses to Objections to the Biopsychological Account

Chapter 5: The Objection from Linguistic Norms

The Scientific and Manifest Images of Language

Thus far, this thesis has been concerned with the scientific understanding of language, as something physiological and cognitive, and essentially, therefore, as something sub-personal. What remains to be considered is how this scientific understanding of language fits together with our everyday, commonsense understanding of language, according to which language is used for communication between persons, and follows or fails to follow certain essentially normative constraints.

The scientific view of the world poses a theoretical threat to our common-sense understanding of our place in it as persons. As Sellars writes in 'Philosophy and the Scientific Image of Man':

Does the manifest image of man-in-the-world survive the attempt to unite this image in one field of intellectual vision with man as conceived in terms of the postulated objects of scientific theory? The bite to this question lies, we have seen, in the fact that man is that being which conceives of itself in terms of the manifest image. To the extent that the manifest does not survive in the synoptic view, to that extent man himself would not survive [18].

Something similar could be said regarding the manifest image of human language. The image of language as *normative* (as opposed to merely descriptive), *personal* (as opposed to merely sub-personal), *social* (as opposed to merely individual), and *serving communication* (as opposed to merely serving thought) would be lost if not shown consistent, somehow, with its scientific counterpart.

Because the use of language is important to the commonsense understanding of human beings as persons, consideration of Sellars' analysis of the scientific and manifest images of human beings is relevant to the apparent conflicts between the scientific and manifest images of language.

Humans appear in different ways to different sciences. We have images in social science, psychology, physiology, biochemistry, and all the way down to physics, in which we appear as "a swirl of physical particles, forces, and fields" (Sellars, 'Philosophy and the Scientific Image of Man', 20). "The" scientific image of humans is an idealization of the bringing together of these various special images. All of them, and thus "the" scientific image itself, Sellars writes "are to be contrasted with man as he appears to himself in sophisticated common sense, the manifest image which even today contains most of what he knows about himself at the properly human level" (20).

Though, historically, the scientific image of human beings and of the world in general grows out of a basis in their manifest image, once generated and developed, the scientific image presents itself as a rival, conflicting with the theory and ontology of the manifest image. Though the scientific image of the world stems from the manifest image as an historical basis, it also views the manifest image itself as an object in the world and, from the lens of the scientific image, this manifest image is at best a pragmatically useful approximation of ultimate scientific reality (Sellars, 20).

The conflict of the scientific and manifest images of human beings, Sellars notes, leave us with a seemingly inescapable trilemma. We are apparently forced to choose between: "(a) a dualism in which men as scientific objects are contrasted with the 'minds' which are the source and principle of their existence as persons; (b) abandoning the reality of persons as well as manifest physical objects in favor of the exclusive reality of scientific objects; (c) returning once and for all to the thesis of the merely 'calculational' or 'auxiliary' status of theoretical frameworks and to the affirmation of the primacy of the manifest image" (38-9).

To accept (a) means resorting to an outdated, Cartesian conception of the human mind, at best rendering the scientific image incomplete, and at worst leaving our fundamental conception of personhood a mere epiphenomenon. To accept (b) is simply to eliminate our fundamental conception of personhood altogether. And to accept (c) is to rob the scientific enterprise of its claim to legitimately pursuing truth. None of these options seem at all satisfactory.

In considering the scientific and manifest images of language we face a version of the same trilemma. We are confronted with the apparent need to choose among: (a*) a dualism in which both the scientific and manifest versions of language somehow co-exist, leaving either science's version of language incomplete or common sense's version of language a bizarre epiphenomenon; (b*) abandoning the reality of commonsense public language altogether, as some linguists claim to do, professionally, if not sincerely; or (c*) giving up on the claim that the science of linguistics is a legitimate pursuit of truth. Once again, none of these options seem at all satisfactory.

Sellars' proposed solution involves seeing "the conceptual framework of persons... [as] not something that needs to be reconciled with the scientific image, but

rather something to be joined to it” (40). Sellars avoids the dualism of option (a) by defining the manifest image of humans as a normative image, rather than a descriptive one. “To recognize a featherless biped or dolphin or Martian as a person,” he writes, “requires that one think thoughts of the form, 'We (one) shall do (or abstain from doing) actions of kind A in circumstances of kind C'” (Sellars, 39-40). His idea is that thinking of objects as persons in this way is not to classify or explain them descriptively, as science does, but rather to judge them by community norms.

The solution to the apparent conflict between the scientific and manifest images of human language will be developed along similar lines. In the present chapter I will defend the biopsychological theory of language against concerns relating to linguistic normativity. Then in the final chapter I will defend it against concerns relating to linguistic communication. Ultimately these two solutions go hand in hand as solutions to the general predicament relating the scientific and manifest images of language. This chapter also relates to a common sense, Moorean objection to my biopsychological frame, which runs, roughly: ‘but we *know* there are commonsense public languages!’ Ultimately, this objection will be dealt with by the end of the coming two chapters as well.

Linguistic Normativity

Steven Pinker writes:

Imagine that you are watching a nature documentary. The video shows the usual gorgeous footage of animals in their natural habitats. But the voiceover reports some troubling facts. Dolphins do not execute their swimming strokes properly. White-crowned sparrows carelessly debase their calls. Chickadee’s nests are

incorrectly constructed, pandas hold bamboo in the wrong paw, the song of the humpback whale contains several well-known errors, and the monkeys' cries have been in a state of chaos and degeneration for hundreds of years [382].

This, to say the least, would be a very strange nature documentary. The voiceover, as Pinker describes it, can be seen as viewing animals the way Sellars views human beings: *normatively*, through the lens of the manifest image. Pinker actually intended this example as a *reductio* of the notion of prescriptive grammar, but it need not be taken this way quite so straightforwardly. While this is not how we normally view non-human animals – excepts pets, perhaps – it lends support to Sellars' view to consider that we seemingly *could* view them this way without contradicting, deflating, or needing to add to the theory or ontology of our scientific understanding of animals, which is provided in the more mainstream nature documentaries. Likewise, I will argue, is the case with language.

Scientific linguists understand human languages as animals are understood by mainstream scientific voiceovers in nature documentaries. The 'grammatical' constructions of people's languages are simply whatever constructions their language faculties represent in appropriate ways; grammar is a matter of fact, not a matter of correctness. Yet, in everyday life, people are understood – at certain times, or in many cases in general – as speaking ungrammatically, even when there isn't a performance error. The language faculty, as scientifically understood, generates, via its grammar, many sentences that when judged by common sense seem ungrammatical. Clearly, then, there are two separate understandings of "grammatical" that need to be sorted out (Pinker, 383).

Grammaticality, as understood by the linguistic scientist, is a descriptive notion, describing the rules by which people actually speak. Grammaticality, as understood by the layperson, is a normative notion, prescribing how, according to a particular individual or group, people *should* speak. The prescriptive rules of the layperson, Pinker writes, “have no more to do with human language than the criteria for judging cats at a cat show have to do with mammalian biology” (Pinker, 383-4). Just as feline zoologists may ignore the prescriptive norms of cat shows, so linguists may ignore prescriptive grammar.

With this analysis of the dual meaning of ‘grammar’ kept in mind, let us return to the Sellarsian trilemma in respect to the scientific and manifest images of language. We apparently must choose between: (a*) a dualism in which both the scientific and manifest versions of language somehow co-exist; (b*) abandoning the reality of commonsense public language altogether; (c*) giving up on the claim that the biopsychological science of linguistics is a legitimate pursuit of truth.

Many linguists seems to adopt (b*), while Platonist philosophers of language can be interpreted as adopting either (a*) or (c*). The normativity-based common-sense objection to the biopsychological philosophy of language is interpretable as a (c*) version of Platonism, albeit less upfront about its ontological commitments.

Speaking of Black English Vernacular, John Simon writes:

‘I be,’ ‘you be,’ ‘he be,’ etc... may indeed be comprehensible, but they go against all accepted classical and modern grammars and are the product not of a language with roots in history but of ignorance of how language works [Pinker, 398-9]

Though perfectly understandable and communicable, non-standard varieties of languages are viewed, according to Simon and (often implicitly racist) common sense, as *wrong*. Though “roots in history” suggests an ontological basis somewhat more terrestrial than Katz’ Platonism, Simon’s view is Platonist in the sense of viewing languages as distinct from their biopsychological representation. Languages, from this perspective, are abstract objects in that they are independent of their users, and many people are incorrect in how they use them.

Problems with Common-sense Prescriptivism

According to common-sense prescriptivism, the standard variants of natural languages that are spoken by elites and taught in universities are the factually correct variants of these languages. Those who speak alternative variants are incorrect about the facts of their own languages. This perspective is both wrong and dangerous.

William Labov was a pioneer in the study of the connection between dialect and education in the 60s and 70s. He writes:

I would argue that linguistic research applies to a good many of the questions facing contemporary society: how to reverse educational failure in the inner cities; how to resolve conflicts and paradoxes that center around bilingual education; how to implement the responsibility of the law to communicate to the public [Linguistic Science, 166].

While it is the facts of language with which linguistics is concerned, there are cases where these facts can be used to implement important social changes. Here I will be focusing on the topic of educational failure in inner cities, how this failure was a

consequence of common-sense prescriptivism, and how this fact can be used as an empirical case indicating that common-sense prescriptivism is both wrong and dangerous.

At the time of his writing, significant government funding in the US was going towards research into understanding the educational problems facing children in poor, inner-city schools. Educational psychologists were trying to understand what disadvantages the children in these schools were having that were causing their low academic performances, on average, relative to children from richer areas. A theory widely believed and implemented for sizable intervention programs was that children from poor, inner city areas had a “cultural deficit” resulting from an “impoverished environment” in their years growing up prior to schooling (Nonstandard, 179).

A core component of this “cultural deficit” was thought to be a verbal deficit resultant from a lack of exposure to correct, conceptually sophisticated language use. Rather alarmingly, this verbal and cultural deficit theory was applied in particular to African-American children. As Labov describes the view, “Negro children from the ghetto area receive little verbal stimulation, are said to hear very little well-formed language, and as a result are impoverished in their means of verbal expression: they cannot speak complete sentences, do not know the names of common objects, cannot form concepts or convey logical thoughts” (Nonstandard, 179). In brief, the view was that because the adults these children were surrounded by growing up did not speak proper English, the children had a deprived basis from which to learn sophisticated conceptual thought.

The verbal deprivation theory applied to African-American children in poor, inner-city schools was entirely false. Not only was it false, it was harmful. As Labov

writes, “the myth of verbal deprivation is particularly dangerous, because it diverts attention from real defects of our educational system to imaginary defects of the child” (Nonstandard, 180). This is a case that illustrates that the misunderstanding of facts of language can have real social implications, such as racial unfairness and/or injustice.

As Labov’s work demonstrated, the verbal deprivation theory applied to African-American children in the 60s and 70s was based on an implicit assumption that middle-class, predominantly white variants of English determined the facts of English as such, and that those who did not use these variants were failing to grasp the facts of their own language. “Before we impose middle-class verbal style upon children from other cultural groups,” Labov wrote, “we should find out how much of this is useful for the main work of analyzing and generalizing, and how much is merely stylistic – or even dysfunctional” (Nonstandard, 192). If a bias towards a given variant of English is not based on its superior utility, but merely on tradition or power structures, then this bias is a prejudice, especially when certain discounted variants are predominantly the variants of certain racial minorities.

In Bereiter, 1966, the AAV (African-American Vernacular) forms “they mine” and “me got juice” are characterized as examples of language failing to serve as a possible medium for logical thought, examples of merely “a series of badly connected words” (Bereiter, 1966, pp. 113 ff.). In the case of “they mine”, Labov shows, Bereiter confuses logicity with explicitness. “We know that there are many languages of the world which do not have a present copula, and which conjoin subject and predicate complement with a verb,” writes Labov. “Russian, Hungarian, and Arabic may be foreign,” he continues, “but they are not by that same token illogical” (Nonstandard, 202). When standard variants of other natural languages share a syntactic property with a non-

standard variant of English, it is inconsistent to reject the legitimacy of the property in the non-standard variant of English while accepting it in standard variants of other natural languages.

Furthermore, Labov continues, “the deletion of the ‘is’ or ‘are’ in nonstandard Negro English is not the result of erratic or illogical behaviour: it follows the same regular rules as Standard English contraction.” (Nonstandard, 203). In other words, AAV allows a zero form of the verb ‘to be’ when and only when AAV standard white English allows a contracted form. ‘They mine’ in AAV is equivalent to ‘they’re mine’ in Standard English; it is not equivalent to ‘they are mine’. Likewise, where Standard English does not allow contraction, AAV does not allow a zero form. “Just as one cannot say ‘that’s what they’re’ in Standard English, ‘that’s what they’ is equally impossible in the vernacular we are considering” (Nonstandard, 203). At an abstract level, Standard English and AAV employ the same syntactic principle. One cannot deny the legitimacy of the principle in one case, while rejecting it in the other. Since racial identity is connected to these variants of English, prejudice not based on linguistic utility is especially problematic.

The mistaken theoretical bias of the verbal deprivation theory led to a fundamental misunderstanding of the educational psychology of children in poor, inner-city schools. The consequences of this failure are significant since they relate to issues of fairness and racial equality. As Labov writes about the usual view:

When the everyday language of Negro children is stigmatized as ‘not a language at all’ and ‘not possessing the means for logical thought’, the effect of such a labeling is repeated many times during each day of the school year. Every time

that a child uses a form of NNE⁴⁸ without the copula or with negative concord, he will be labeling himself for the teacher's benefit as 'illogical', as a 'nonconceptual thinker'" (Nonstandard, 206).

None of this is to claim that the verbal deprivation theory had explicitly racist motivations. It was a scientific theory that turned out to be false. However, once it is recognized that it was implicit bias rather than logic that led psychologists to assume the superiority of Standard English, it is necessary for protection of racial equality that African American variants of English be recognized as fundamental to the unique educational challenges faced by African American children in poor, inner-city schools.

Surely no psychologist would ever claim that Russian, Hungarian, and Arabic children who had difficulty in English-speaking schools must be mentally challenged in respect to their verbal capabilities. Yet misinterpretation of AAV as simply failed standard, white English led Jensen 1968 to conclude, "almost half of lower-class Negro children are mentally retarded" (Jensen 1968, 167) (Nonstandard, 211). Evidently, this is both a false and extremely dangerous conclusion. The consequences of diagnosing normal, healthy children as "retarded" are obviously very negative.

As Hoffman and Walker (2010) write, "ethnolinguistic variation in a multilingual, multiethnic community has less to do with imperfect acquisition of the majority language and more to do with the way in which speakers actively construct and express ethnic identity" (59). The recognition of the legitimacy of nonstandard variants of natural languages is a necessity for the promotion of racial equality in a society.

In 'Objectivity and Commitment in Linguistic Science', Labov discusses the specifics of the failures of the educational psychology of the time and the consequences

⁴⁸ 'Non-standard Negro English'

of these failures for issues of racial equality. One example comes from a test called “the Wepman test” used to determine children’s ability to discriminate sounds. The Wepman test would present children with minimal pairs from Standard English to evaluate their ability to differentiate basic linguistic sounds. A major problem with this test was that it included some pairings that, while differentiated in Standard English, were phonologically equivalent in AAV. Such Examples included {pin, pen}, {sheaf, sheath}, {clothe, clove}. As discussed in this thesis, phonological representation makes categorical divisions across continuous acoustically varying signals. Thus, one person can produce the vowel sound in ‘pen’ representing it as distinct from that in ‘pin’ and another can hear the very same sound as identical to that in ‘pin’. There is no right or wrong regarding whether the phonological representation attached to the meanings of ‘pin’ and ‘pen’ are equivalent or divergent. Standard English and AAV simply make different phonological distinctions. A demonstrated inability to recognize the differences between the phonology of Standard English and the Phonology of AAV led to “consequent misreporting of the hearing abilities of normal black children” (168-9).

Again, the educational psychology in the 60s and 70s was not explicitly motivated by racism. However, a failure to recognize the existence of non-standard variants of English had consequences harmful for racial equality. As Labov writes, “the verbal deprivation of black children was so great that they were [seen as] best treated as if they had no language at all” (Linguistic Science, 185). Bereiter and Engelmann 1966 claimed that African American children spoke merely a “restricted code” and possessed no verbal medium in which the learning of concepts could be possible. As Labov describes Bereiter and Engelmann’s view “the only logical answer to the question, “Where is the squirrel?” is [to say] “The squirrel is in the tree,” and... children

who answered [by saying] "'on the tree" did not show the capacity for logical thought" (Labov 1969a; Baratz & Baratz 1969) (Linguistic Science, 185).

The arbitrariness of the preference for 'in' over 'on' in this example can be seen by considering that, in Standard English, one describes people as 'on the bus' more commonly than 'in a bus', which is surely at least as logical as saying a squirrel is 'on the tree'. Thus, if AAV is inherently illogical, then Standard English is as well.

While the educational psychology of the 60s and 70s was not explicitly motivated by racism, when the data available were combined with a failure to recognize AAV as a legitimate language, the inevitable consequence was in fact racist. As Labov cites:

Arthur Jensen argued in the Harvard Educational Review of 1969 that compensatory education had failed even though vast sums had been spent on it; that there were sharp limits on what could be done to improve the school performance of lower-class black children, since most of them were genetically incapable of forming concepts freely; that the only solutions to the educational problems of the inner city were to train black children for lower-skilled jobs by associational methods, and to limit their numbers in the population (Linguistic Science, 185).

It cannot be emphasized enough that this is an unacceptable consequence. When a writer of status and authority claims that African Americans are cognitively inferior and that whites should "limit their numbers in the population", something has gone horribly wrong.

Linguistic science indeed has the power to do social good. It is through the work of Labov and others on the linguistics of AAV and other non-standard variants of

English that the problems with the educational psychology of the 60s and 70s that led to racist conclusions were brought to light.⁴⁹

Labov's work was foundational for many future studies inquiring into the structures of non-standard variants of natural languages. As Robert Bayley writes:

It is now beyond dispute that much of the linguistic variation that was previously thought to be random is indeed systematic, and that eloquence, logic, and clarity of expression are not the particular properties of standard languages. Moreover, although public attitudes have been slow to change, work on socially stigmatized varieties, particularly the varieties used by ethnic minorities and members of the working class, has served as important evidence to combat popular misperceptions of such varieties as being illogical and their speakers as incapable of mastering national or regional standard varieties. On the contrary, sociolinguistic analysis has revealed beyond any doubt that these varieties are orderly, complex, and complete linguistic systems. (102)

A Pragmatic Alternative

Rejecting common-sense prescriptivism need not mean giving up on any form of natural linguistic prescription. The problem with common-sense prescriptivism that led to racist consequences was the assumption that linguistic prescriptions were grounded

⁴⁹ Indeed, these problems were brought to light, not just in science, but also in a court of law. Labov himself testified in a trial in which a school board in Ann Arbor, Michigan was required to submit to the trial judge within thirty days "a plan defining the exact steps to be taken to help the teachers to identify children speaking Black English, and... to use that knowledge in teaching such students how to read Standard English" (Linguistic Science, 193).

in linguistic *facts* in the realist sense. The alternative, which I will label ‘pragmatic prescriptivism’, takes linguistic prescription to be grounded in linguistic *utility*: what best serves one’s linguistic purposes relative to a context and (fuzzy⁵⁰) linguistic community. Unlike common-sense prescriptivism, pragmatic prescriptivism is consistent both with approved schools of thought in sociolinguistics and with racial equality.

David Forrest’s Wallace’s philosophically-under-valued essay, ‘Authority and American Usage’ is essentially a defence of pragmatic prescriptivism. When it comes to “the issues surrounding ‘correctness’ in contemporary American usage,” Wallace writes, “the fundamental questions they involve are ones whose answers have to be literally worked out instead of merely found” (72).

The answers to questions regarding best linguistic usage cannot be “merely found” because prescriptions are not grounded in facts in the realist sense. These answers have to be “literally worked out” in the sense that *our* determination of what will best serve a particular linguistic goal relative to a particular context and (fuzzy) linguistic community, is a process of creation, rather than discovery. Strictly speaking, linguistic prescriptions are better or worse for their purposes, rather than true or false in a realist sense.

While we tend to treat dictionaries as an authoritative guide to the facts of language, this way of thinking is only a heuristic one. Dictionary writers have linguistic expertise, but they do not have God-like powers; they are perfectly capable of making inappropriate judgment calls. To see this one need only recognize that not every

⁵⁰ The linguistic community is ‘fuzzy’ in the logical sense that it does not have clearly defined borders. There will always be some people for whom there is no fact of the matter as to whether they do or do not count as part of a given linguistic community.

published dictionary is identical and, in theory, that *anyone* could publish a list of any definitions whatsoever and call it a dictionary. Dictionary writers do not have linguistic authority simply by virtue of being dictionary writers. They must provide *good reasons* for their prescriptions. “Nobody elected them, after all,” Wallace points out, so “whence the authority of dictionary-makers to decide what’s OK and what isn’t?” (75).

Since answers to linguistic usage problems must be worked out rather than solved, the solutions to the problems of the dictionary writer’s authority are both complex and subtle. Essential to a dictionary-writer’s authority, Wallace argues, is the use of Ethical Appeal:

Ethical Appeal... is a complex and sophisticated ‘Trust me.’ It’s the boldest, most ambitious, and also most democratic of rhetorical Appeals because it requires the rhetor to convince us not just of his intellectual acuity or technical competence but of his basic decency and fairness and sensitivity to the audience’s own hopes and fears.” (77)

Common-sense prescriptivism has no Ethical Appeal, in this sense. The rhetoric of common-sense prescriptivism is dogmatic: ‘these are the facts and I know them’. The work of Labov and other sociolinguists has shown that many linguistic prescriptions are instruments of oppression. But prescribers with Ethical Appeal are not oppressive; they are trying to help those who want help with communicating their ideas clearly and skillfully. Within this pragmatic understanding of linguistic prescription, there is no contradiction whatsoever in the idea of a dictionary or usage manual for non-standard variants of English such as AAV. Wallace writes:

Fact: there are all sorts of cultural/geographical dialects of American English – Black English, Latino English, Rural Southern, Urban Southern, Standard Upper-

midwest, Maine Yankee, East-Texas Bayou, Boston Blue-collar, on and on. Everybody knows this. What not everyone knows – especially not certain prescriptivists – is that... these non-SWE⁵¹-type dialects have their own highly developed and internally consistent grammars, and that some of these dialects' usage norms actually make more linguistic/aesthetic sense than do their standard counterparts. Plus, of course, there are also innumerable sub- and subsubdialects (98).

When linguistic prescription is understood as pragmatic, giving or taking prescription on usage in one variant of English no more implies the denigration of other variants of English than it implies the denigration of Russian or Japanese. To think otherwise would be like thinking that being a soccer coach implied the denigration of hockey as a legitimate sport. "Correct' English usage," Wallace writes, "is, as a practical matter, a function of whom you're talking to and of how you want that person to respond – not just to your utterance but also to you" (97-8).

Even if you were a great hockey player, you could not bring your stick on a soccer field. It is for this reason, by analogy, the use of Standard English in certain contexts with certain people can abort communication and can make one seem pretentious and unlikable. "There are," Wallace writes, "– as you and I both know and yet no one in the Usage Wars ever seems to mention – situations in which faultlessly correct SWE is not the appropriate dialect" (102).

"A certain number of traditional prescriptive rules really are stupid," Wallace notes, and "people who insist on them.... are... contemptible and dangerous" (100).

Linguistic prescriptions must be put forward for *useful reasons*. The most obvious

⁵¹ Standard White English

reasons for linguistic prescriptions are those related to communication: rules against using two-way adverbs to avoid the ambiguity in examples such as “people who eat this often get sick”; rules against using other misplaced modifier types to avoid the ambiguity in “there are many reasons why lawyers lie, some better than others”; and rules regarding the proximity of relative pronouns to their modifying nouns to avoid the ambiguity in “she’s the mother of an infant daughter who works twelve hours a day” (Wallace, 93).

These examples of semantic ambiguity, however, are not the only type of justification for linguistic prescription. Strictly speaking, the goals one can try to achieve through language are unlimited. One set of reasons for linguistic prescription that is often under-recognized is a speaker’s set of goals related to expressing her own identity. As Hoffman and Walker, again, write, “ethnolinguistic variation in a multilingual, multiethnic community has less to do with imperfect acquisition of the majority language and more to do with the way in which speakers actively construct and express ethnic identity” (59).

In this sense, to think Standard English is inherently preferable to variants such as AAF, Latino English, etc. is genuinely racist, because it is to think the expression of white identity inherently preferable to the expression of identities of other racial groups. As Wallace bravely and intelligently summarizes:

The real truth, of course, is that SWE is the dialect of the American elite. That it was invented, codified, and promulgated by Privileged WASP Males and is perpetuated as ‘Standard’ by the same. That it is the shibboleth of the Establishment, and that it is an instrument of political power and class division and racial discrimination and all manner of social inequity. These are shall we

say rather delicate subjects to bring up in an English class, especially in the service of a pro-SWE argument, and extra-especially if you yourself are both a Privileged WASP Male and the teacher and thus pretty much a walking symbol of the Adult Establishment. This reviewer's opinion, though, is that both students and SWE are way better served if the teacher makes his premises explicit and his argument overt – plus it obviously helps his rhetorical credibility if the teacher presents himself as an advocate of SWE's utility rather than as some sort of prophet of its innate superiority. (107)

The political issues associated with the teaching of Standard English cannot be ignored. To what extent other variants of English should be incorporated into our education systems is a question beyond the scope of this chapter. As Labov's work showed, however, *at very least* it needs to be admitted that a learning environment with teaching conducted in Standard English puts students with non-standard native dialects at a disadvantage.

This being said, Wallace's subtle understanding of the political issues essential to the very topic of linguistic prescription demonstrates that it is possible to be a prescriptivist without being prejudiced. Whatever variant of whatever language in which one is seeking to help and educate, one must be a humble advocate of utility, not a pretentious proponent of intrinsic superiority.

When prescriptivism is grounded in utility rather than fact, in the realist sense, it is perfectly consistent with descriptivism, since descriptivism, alternatively, is grounded in fact much more straightforwardly. This point is crucial to this thesis as a whole. The public languages grounding the work of prescriptive grammarians are fundamentally different from the idiolects grounding the work of scientific linguists.

When it comes to the linguistic representation in the brain of an individual language user, there are straightforward facts of the matter. Language users simply do represent their languages in whatever way they represent it. When it comes to the language or variant of a language shared by a linguistic community, there are strictly speaking no facts of the matter, in this same sense. Instead, there are communicative and other usage problems to be solved. The role of prescriptive grammar is to *create solutions to these problems*, which it may do to continuously varying degrees of helpfulness.

Analogies with Meta-ethics

The idea that statements about linguistic norms may be meaningful without being true or false in a straightforward way can be made sense of in analogy to various views in meta-ethics. Below I discuss three possible meta-ethical analogies. What is important, for present purposes, is not to determine which particular view is the relevant analogy for meta-normativity in language, but simply to demonstrate the space of conceptual possibilities. This space of conceptual possibility is enough to show that realism about common-sense languages and nihilism about linguistic norms are not one's only options.

Blackburn's Quasi-realism:

Blackburn writes:

Projectivism is the philosophy of evaluation which says that evaluative properties are projections of our own sentiments (emotions, reactions, attitudes,

commendations). Quasi-realism is the enterprise of explaining why our discourse has the shape it does, in particular by way of treating evaluative predicates like others, if projectivism is true. It thus seeks to explain, and justify, the realistic-seeming nature of our talk of evaluations - the way we think we can be wrong about them, that there is a truth to be found, and so on (1984:180) (Miller, 52).

The meaning of evaluative language, according to projectivism, comes from within us – in our sentiments - and is projected onto the world. Quasi-realism, in turn, endeavors to explain how evaluative language can seem to be applicable to the world independent of our sentiment projections, when, in fact, our sentiment projections are inherent to its very meaningfulness. One could easily imagine a similar philosophical program applied to linguistic, rather than ethical, norms. It is interesting, in fact, that Blackburn uses the more general phrase ‘philosophy of evaluation,’ rather than ‘meta-ethics,’ suggesting that the theory could be applicable to language, not merely through analogy, but directly.

Quasi-realism about ethics seeks to explain how we can meaningfully say “it’s true that murder is wrong,” “it’s false that breaking promises is the right thing to do,” “Jones believes that murder is wrong,” etc. without being metaphysically committed to such notions as moral predicates referring to objective properties, moral judgments expressing cognitive beliefs, or moral evaluations being literally true or false (Miller, 52). Likewise, one could easily image a project to explain prescriptive grammatical language without metaphysical commitment to abstract linguistic objects.

In Meta-ethics, the central paradox that anti-realist theories face is called “the Frege-Geach problem.” The need for a projectivist philosophy to be enhanced by a

quasi-realist philosophy stems from the apparent logicity of sentences such as: “if murder is wrong, then getting little brother to murder is wrong” (Miller, 58). If moral language is not truth apt, so goes the objection, why does it seem to fit smoothly into truth-conditional constructions?

Blackburn’s solution to the Frege-Geach problem makes use of the notion of a person’s “moral sensibility.” A given person has a set of dispositions to respond with different emotive attitudes to different potential situations. This set of dispositions is identified with a person’s moral sensibility. For Blackburn to have an attitude of approval towards the sentence “if murder is wrong, then getting little brother to murder people is wrong” is to have an attitude of approval towards any moral sensibilities that combine disapproval of murder with disapproval of getting one’s little brother to murder, in respect to this combination (Miller, 59).

One could easily image a similar scheme applied to one’s linguistic sensibilities. Just as, in the moral case, we can treat approval of logical complex moral language as approval of the harmoniousness of an aspect of relevant moral sensibilities, so, in the linguistic case, we may treat approval of logically complex language about prescriptive grammar as approval of the harmoniousness of an aspect of relevant linguistic sensibilities.

Gibbard’s Norm Expressivism

Another relevant metaethical theory is Gibbard’s Norm Expressivism. Gibbard’s views about morality are based in his views about rationality. For him, to say that an

action A is rational is not to ascribe A an objective property, or to say something truth-evaluable about A, but simply to express acceptance of some system of norms permitting A. (Miller, 96).

With this analysis of rationality, Gibbard is able to construct a truth-conditional meta-language to talk about norms without having to take first-order rationality statements themselves to be truth-evaluable. He writes:

We can characterize any system N of norms by a family of basic predicates 'N-forbidden', 'N-optional', and 'N-required'. Here 'N-forbidden' simply means 'forbidden by system of norms N', and likewise for its siblings. Other predicates can be constructed from these basic ones; in particular 'N-permitted' will mean 'either N-optional or N-required' (1990: 87) (Miller, 101-2).

While the moral notions 'forbidden,' 'optional,' and 'required' are not truth evaluable, there can still be facts of the matter regarding what a given system of norms defines to be forbidden, optional, and required. "It is a purely factual matter," as Miller explains the view, "whether, for example, the system of norms constituted by the Ten Commandments forbids adultery, or permits smoking, or whatever" (Miller, 101-2).

Gibbard then defines the notion of a normative judgment J as holding at a "factual-normative world" $\langle w, n \rangle$ just in case, with the creation of the meta-judgment J' created by replacing all normative predicates with meta-predicates relating them internal to the system of norms N, J' is true at w. To make a normative judgment of J is thus to make the judgment J' that J is required relative to the system of norms N while simultaneously embracing N itself (Miller, 103).

This analysis offers a direct solution to the Frege-Geach problem. Making the statement "if lying is wrong, then getting little brother to lie is wrong" can be analyzed

as making the statement “if lying is N-wrong, then getting little brother to lie is N-wrong,” a perfectly truth-conditional one, while simultaneously embracing N (Miller, 103).

A major objection to Gibbard’s theory, Miller notes, “arises as to how Gibbard can avoid having to provide an expressivist account of rule-following, and thus treat predicates such as N-permitted and so on as normative rather than purely descriptive” (Miller, 109).

The statement “the Ten Commandments forbids adultery” seems purely descriptive, but if acceptance of the Ten Commandments consists merely in the adoption of a set of emotive dispositions, and emotive dispositions are not themselves true or false, it seems problematic just how the sentence “adultery is Ten Commandment-forbidden” could be true or false.

This problem for Gibbard, of course, is not directly relevant. In the linguistic analog case, a solution to the relevant problem is relatively straightforward. What prescriptive rule one is encouraging, one is presumably able to cognitively represent. The system of prescriptive linguistic norms one accepts can then be understood as the set both one represents and to which one has appropriate emotive dispositions. In other words, a prescriptive linguistic rule can be understood as a descriptive linguistic rule paired with a set of emotive dispositions towards it. Since one can certainly grant the truth-conditional cognitive content of statements about descriptive linguistic rules, one can thus grant the truth-conditional cognitive content of statements relating particular utterances to systems of prescriptive norms without having to judge the prescriptiveness itself to have truth-conditional cognitive content.

Best-opinion Theories

Yet another option is that ethical or linguistic prescriptive statements in some sense *are* true or false, but for human-dependent reasons.

Both metaethical theories we have addressed thus far have been non-cognitivist, meaning that they take moral sentences to be neither true nor false. The alternative to non-cognitivism, obviously, is cognitivism: the view that moral language is truth-apt. Cognitivist theories, however, can be either strong or weak. A strong cognitive theory posits the existence of objective, yet somehow-cognitively-accessible moral facts, while a weak cognitive theory rejects the idea of cognitive access or properties of this kind. Weak cognitivism thus offers another possible anti-realist understanding of moral language (Miller, 128).

A version of a weak cognitivist metaethics is Wright's best opinion theory, according to which moral truth is determined by best moral opinion. On this view, unlike Blackburn's or Gibbard's, moral judgements are true or false, "but their truth is constitutively tied to facts about human opinion" (Miller, 130).

This is yet another way that statements about linguistic prescriptions could be understood as meaningful, without the need for external metaphysical commitment. In this chapter I have not endorsed any of these particular meta-ethical accounts, nor, for that matter, their analogous application to linguistic norms. I hope, however, that I have demonstrated the wide range of possibilities that exist between Platonism about natural languages and nihilism about prescriptive linguistic norms.

Chapter 6: The Objection from Communication

The Fregean Problems of Objectivity and Communication

The most salient point regarding human language is that people in linguistic communities use it to communicate. The essence of the objection from communication to the biopsychological philosophy of language can be observed in Frege's famous work, *Thought*.

Frege notes that no two people can have an identical mental state, for mental states, by their nature, are dependent on the consciousness of their owners (Thought, 335). For this reason, Frege argues, propositional thoughts cannot be identical with mental states:

If other people can assent to the thought I express in the Pythagorean theorem just as I do, then it does not belong to the content of my consciousness, I am not its owner; yet I can, nevertheless, acknowledge it as true. However, if what is taken to be the content of the Pythagorean theorem by me and by somebody else is not the same thought at all, we should not really say 'the Pythagorean theorem', but 'my Pythagorean theorem', 'his Pythagorean theorem', and these would be different... the words 'true' and 'false', as I understand them, might also be applicable only in the realm of my consciousness, if they were not meant to apply to something of which I was not owner, but to characterize in some way the content of my consciousness. Truth would then be confined to this content and it would remain doubtful whether anything at all similar occurred in the consciousness of others (Thought, 336).

In one sense, Frege's concern with the identification of thoughts with the mental states of individuals is a concern about objectivity and rational disagreement. When I say the Pythagorean theorem is true, and someone else says it is false, but we each have our own, separate thought in mind and, indeed, *necessarily* have our own, separate thought in mind, then it would not be rational for us to disagree for there is no shared thought about which there could be an objective, mind-independent truth. This interpretation seems supported by quotes such as this:

If every thought requires an owner and belongs to the content of his consciousness, then the thought has this owner alone; and there is no science common to many on which many could work, but perhaps I have my science, a totality of thoughts whose owner I am, and another person has his... no contradiction between the two sciences would then be possible, and it would really be idle to dispute about truth (Thought, 336).

Call this the logical Fregean problem: the concern that the identification of thoughts with mental states makes the notion of objective truth impossible.

In another sense, however, one can interpret Frege's concern as a concern about the possibility of communication. If thoughts are identical to particular mental states, how can people ever possibly communicate their thoughts? Call this the pragmatic Fregean problem: the concern that the identification of thoughts with mental states makes the notion of communication impossible.

Contra Frege, the biopsychological theory of language defended in this thesis identifies the content of language, thoughts, as individual mental states. It is my aim in this chapter to present a direct solution to the pragmatic Fregean problem. I admit to

offering only a partial solution to the logical Fregean problem, though it is also a legitimate concern.

A Metaphysical Challenge

If all that fundamentally exist as meanings are the linguistic representations of particular individuals, how is communication possible at all? Though linguistic communities are fuzzy objects, there must be *some* sense in which *some* part of linguistic representation is *somehow* shared whenever two people succeed in a communicative exchange.

This metaphysical challenge is made even deeper when the biopsychological foundation of language is understood to imply, not only the inherently individual basis of one's language, but also the inherently internal nature of one's language's semantic content. As Chomsky writes, "though naturalism does not entail an internalist approach [to semantics], it does seem to leave no realistic alternative" (Internalist Perspective, 156). "Internalist" here means inside the head. As Chomsky and many of his followers conclude, the grounding of language in psychology brings with it the grounding of linguistic content.

Not everyone agrees with Chomsky that a naturalist approach to meaning leaves no realistic alternative to internalism. Dretske (1981) and Fodor (1990) have attempted to defend informational theories of meaning that are both naturalistic and externalist. If an account such as Dretske's or Fodor's were correct, then the grounding of communication would be a much simpler problem: we could share meanings because meanings are in the world and we share the world.

The problem with externalist theories, however, is that they rest on a notion of intentionality. Paying Fodor's heroic attempts the respect they deserve, it still appears the case, as Jackendoff points out, that there is no physically realizable causal connection between concepts and objects (Jackendoff, 300).

Robert Stainton has pointed out to me, in personal correspondence, there is a theoretical difference between:

- (a) A *semantic* theory such as externalism, which states that external objects and states of affairs are the semantic contents of phrases and sentences; and
- (b) A *meta-semantic* theory such as causal informational semantics, which *explains what grounds a semantic theory such as externalism.*

While Stainton is correct to make this distinction, the distinction itself is of merely logical, and not of relevant practical concern. "One cannot make naturalistic sense of intentionality" Jackendoff writes; "it suffers from precisely the same difficulty as 'grasping' language" (Jackendoff, 300). If no meta-semantic grounding for externalism is naturalistically justified, then externalism itself cannot be naturalistically justified either.

Even without considering its lack of meta-semantic grounding, externalism is flawed for internal, first-order reasons. The massive list of objects referenced easily via natural language includes: fictional and mythical characters such as Sherlock Holmes and the unicorn in Ray Jackendoff's dream last night; geographical objects such as Wyoming, the Mississippi River, and the distance between New York and Boston; social entities such as the value of Noam Chomsky's watch, the first dollar Robert Stainton ever earned, Morris Halle's Ph.D. degree, Chris Viger's reputation, General Motors, or

the score of tomorrow's Red Sox game; Auditorily perceived objects such as Mahler's Second Symphony or the words 'banana' and 'despite'; and so on (Jackendoff, 300).

The common-sense externalist theory of reference – which might be identified with the manifest image of reference – thus faces problems at both the meta-semantic and semantic levels. At the meta-semantic level “it is necessary to invoke some mystical connection from the mind to the world,” and at the semantic level “the notion of ‘objects in the world’ [in many cases] is itself suspect” (Jackendoff, 303).

Internalism escapes the ontological concerns of externalism because human concepts play a role in the nature of strange objects. Since we know ourselves to have concepts of strange objects, these concepts playing a role in the objects' themselves existence, thus significantly reduces our epistemic worry as to how they could exist.

Jackendoff thus offers to replace the common-sense, externalist theory of reference wherein “(7) phrase P of language L, uttered in context C, refers to entity E in the world (or possible worlds)” with a conceptualist, internalist theory wherein “(8) A speaker S of a language L judges phrase P, uttered in context C, to refer to entity E in [the world as conceptualized by S]” (Jackendoff, 304).

Jackendoff explains the conceptualist theory as follows:

In a conceptualist theory, reference is taken to be at its foundation dependent on a language user – just as relativistic physics takes distances and times to be dependent on an observer's inertial frame. And just as it is often convenient to revert to Newtonian dynamics when relativistic effects can be ignored, we can often take (7) as a convenient abbreviation for (8), temporarily ignoring the ‘reference frame’ – the presumption of agreement among members of a (relatively) homogeneous speech community (Jackendoff, 304).

This gives us a hint of how the problems of this chapter may be addressed. Where the semantic lexicons and conceptual schemes of various speakers are sufficiently similar, one can talk *as if* common-sense externalism were true. This is one way of interpreting the use of Kripkean rigid designation as a logical idealization, rather than a theory of natural language. It thus provides an idealization for the pursuit of scientific objectivity, offering a partial dissolution of the logical Fregean problem.

At this point, however, we yet have no way to make sense of the notion of 'sufficient similarity' at issue. Presumably two semantic reference frames are sufficiently similar when they share a sufficient number of particular semantic representations. But if the Fregean concerns about identification of thoughts with mental states are not answered, there is no sense to the notion of two particular semantic representations being the same.

Returning to our pragmatic Fregean dilemma then: if not only our words, but what we mean by our words is in our heads, in what sense can we share semantic representations, as we seem to when we seem to communicate?

One apparent option would be to take communication to be entirely determined by context, and not at all by individual semantic representations. Scholars disagree as to whether Chomsky thinks that all of semantics should be abandoned in favor of pure pragmatics, or if he merely thinks all *externalist* semantics should be abandoned. Chomsky exegesis aside, there is reason to prefer the latter, more moderate perspective. The meaning of a linguistic expression cannot be determined *entirely* by context because it must contain some semantic aspects with which the contact can relate. "If it did not," as Ray Jackendoff succinctly points out, "a hearer could in principle

know from the context what message was intended, without the speaker saying anything at all!" (Jackendoff, 280)⁵².

In other words, if there were not some purely linguistic aspect of meaning, language could never be required to convey a given meaning. Since there are meanings that are communicated that would not have been communicated if not for the use of language, some aspect of semantic representation independent of context must exist. How these representations can be shared remains the heart of the problem of linguistic communication.

The Problem of Other Meanings

Since linguistic reference is dependent on the particular psychological representation of the language user determining it, there is no literal sense in which speakers share a semantic reference in the world. Since semantics must play a role for communication to be possible, there remains a serious challenge to our understanding of communication. Jackendoff is well aware:

From the standpoint of neuropsychology, we must recognize that the neural assemblies responsible for storing and processing conceptual structures indeed are trapped in our brains. They have no direct access to the outside world.

Hence... we must explicitly deny that conceptual structures are symbols or representations of anything in the world, that they mean anything. Rather, we

⁵² Likewise, If nothing approximating a shared language played an explanatory role, with context doing it all, I could communicate as seamlessly with (what one now calls) a monolingual Urdu speaker as I do with an English speaker, given the same shared context.

want to say that they *are* meaning: they do exactly the things meaning is supposed to do, such as support inference and judgment. Language is meaningful, then, because it connects to conceptual structures (Jackendoff, 306).

This is to say that meaning is in the head. It is not to say that meaning cannot interact with the world in any way. It is to say that the relevantly *semantic* aspects of our neural anatomy are determined by relations internal to that anatomy itself, rather than by relations between that anatomy and the world. Being itself part of the world, our neural anatomy does interact with the world. Thus, there can be indirect interaction between the semantic representations of one person and another as mediated through the actions they use these representations to create and to perceive. But these actions and the world in which they are acted are not themselves the foundation of meaning; they are only forms of evidence from which meanings may be fallibly inferred.

The solution to (one aspect of) the problem of communication, I posit, is the same as the solution to the problem of other minds. The logical grounding of belief in other minds - and, I claim, in other meanings - is based on, as Russell famously demonstrated, an analogy.

To rationally defend belief in the existence of the minds of other people Russell writes:

We must appeal to something that may be vaguely called 'analogy.' The behavior of other people is in many ways analogous to our own, and we suppose that it must have analogous causes. What people say is what we should say if we had certain thoughts, and so we infer that they probably have these thoughts... they behave in ways in which we behave when we are pleased (or displeased) in circumstances in which we should be pleased (or displeased) (Analogy, 667).

Since we can observe our own mental states and the fact that these mental states bring about our production of certain actions, and since we can observe equivalent actions produced by other people, we can reason from analogy that the actions of other people are likely brought about by mental states similar to our own.

Other people's responses to stimuli resemble our own in ways that behavior of "dead' matter" does not resemble our own. "As it is clear to me that the causal laws governing my behavior have to do with 'thoughts,'" Russell writes, "it is natural to infer that the same is true of the analogous behavior of my friends" (Analogy, 667).

It is entirely commonsensical for us to believe in the minds of other people (and, probably, to not believe in the minds of inanimate material objects). It is almost impossible, in fact, to *not* attribute mental states analogous to our own behind the behaviors of other people. Russell's point, however, is not an historical one, but a logical one: "what I am discussing is the possibility of a postulate which shall establish a rational connection between this belief and data" (Analogy, 668).

The basic logic of this Russellian postulate is as follows. We observe in ourselves that actions of type A are brought about by mental states of type M. We observe in other people actions of type A, and thus presume, by something like a causal law, that they too have mental states of type M (Analogy, 668).

As an example, imagine the reaction to burning one's hand on a stove: the mental state of pain brings about the rapid removal of one's hand from the stove. Upon seeing one's friend touch the stove and produce the same physical response, one reasonably infers that one's friend has an equivalent mental state.

The case with internal semantics, I propose, is to be logically grounded by means of the same analogical reasoning. While semantic (and syntactic and phonological)

types are private, phonetic types are public, as is written language. This together with the publicity of our physical behavior gives us all the relevant resources required for sound analogical defence of the possibility of communication.

Consider the following cases:

Case 1: A friend produces the utterance 'a chair for you.' She then brings you a chair and when you sit in it, she smiles.

Case 2: A friend produces the utterance 'a chair for you.' She then brings you a chair, but when you go to sit in it, she stops you.

Case 3: A friend produces the utterance 'a chair for you.' She then brings you a small dog.

What can be reasoned about one's friend in these three cases, respectively? For intuitive reasons, let us add the stipulation that the friend is not a first language English speaker, and is thus liable to make mistakes:

In case 1, the friend seems to be doing all the things I would do if I had the internal representation that I had a chair for the other person in the room. It can thus be reasoned by analogy that my friend's internal phonological, syntactic and semantic representations of her public phonetic utterance are the same, or at least contextually 'the same enough,' as mine.

In case 2, the friend acts as I would if I had an internal representation of 'a chair,' but does not act as I would if I had an internal representation of 'for you.' It is evident from the friend's behavior that some miscommunication has occurred. If the friend then proceeded to sit in the chair herself, one might hypothesize that she had mentally mixed up the English terms 'you' and 'myself' (and, perhaps, that she was somewhat unmannerly).

In case 3, the friend seems not to have the same internal representation of 'chair' that I do, and, perhaps, has confused the English terms 'chair' and 'dog'. One could imagine checking this hypothesis by looking at the dog and then the friend and saying 'chair?'

Note that establishing belief in the internal semantic representations of others in this manner does not require that persons or chairs or dogs themselves be the meanings of these representations. All that is required is that we observe regularities in the interaction of our own internal representations and our actions in the world. Though, in the case of other minds, Russell seems to imagine the interaction between the mind and the world as deterministic, this is not a requirement for justified analogical reasoning. The relevant regularities, in either the general mental-state case or the semantic representation case, may be something like statistical generalizations, rather than deterministic laws. So long as they are relatively reliable, the practical analogies remain rational⁵³.

⁵³ Looking back on his argument from analogy in his 1959 book, *My Philosophical Development*, Russell writes:

[U]ndoubtedly, it is through experiences of my own that I am led to believe in the minds of others; and, undoubtedly, as a matter of pure logic, it would be possible for me to have these experiences even if other minds did not exist. Part of our reason for believing in other minds is derived from analogy, but part is derived from another source which has a wider application.

Suppose you compare two copies of the same book and find that they agree word for word, you cannot resist the conclusion that they have a common cause, and you can trace this common cause backward through composers and publishers to the author. You do not find it credible that the author's body went through the motions of writing the book without his having any thoughts meanwhile. Such grounds for admitting other minds are not demonstrative in the logical sense. You might have experiences in a dream which would be equally convincing while you still slept, but which you would regard as misleading when you woke. Such facts warrant a certain degree of doubtful-ness, but usually only a very small degree. In the immense majority of cases, they justify you in accepting testimony if there is no evidence to the contrary [195].

Reasonable inference relations between meaning representations and actions are weaker than content relations, and thus do not commit one to externalism. Firstly, reasonable inference from action to meaning representation, as I have noted, does not require strict causal laws, which are the minimum that would be needed to meta-semantically determine external content. Secondly, even if, as it turns out, there actually are strict causal laws from meaning representations to actions, it would remain an open question of conceptual analysis whether or not these strict causal laws should be taken to meta-semantically determine external content relations. Thus, though externalism being true would certainly bring no problems for my thesis, the fact that it probably is not true is in no way detrimental to my thesis either.

Communication in Social Context

Social interaction among individuals molds the semantics those individuals represent. In attempting to communicate individuals come to act similarly and thus, by Russellian analogy, have more and more justified belief in their shared semantic representations (Jackendoff, 281). Jackendoff writes:

I am inclined to think that human beings have a need to 'tune' their conceptualizations to those of others – to have a common understanding of the world. Since we cannot read minds, the only way we can assess our attunement

While Russell granted that the analogical argument was not deductively air tight, we continued to believe it offers reason to believe in a conclusion, *when there is no evidence to the contrary*. Since, in the case of semantic representations, we have no positive reason to think the ideas of others should be different from our own when their behaviour is as ours would be, we may assume as an inference to the best explanation that they are.

is by judging whether the behavior of others –including what they say- makes sense. To the extent that all members of a community are effective in acting on this drive, there will be a tendency for conceptual convergence, including in the use of language [330].

The desire for linguistic tuning, presumably, is a major factor in linguistic prescription, both explicit and implicit. Reciprocally, adherence to linguistic prescription, even when motivated by other personal reasons, presumably contributes to the tuning process. One seeks to communicate with the (fuzzy or specific) group with which one identifies, and thus looks to tune representations accordingly. At the same time, one wants simply to fit in and be accepted by one's (fuzzy or specific) group, and thus follows explicit and implicit linguistic prescriptions for non-semantic reasons, which continues a circular momentum of group semantic tuning. Through a combination of desire for communication and group identity, it seems reasonable to expect semantic tuning to progress reliably within a given linguistic community until there is external reason for it to digress off course, such as the influence of a (fuzzily or determinately) distinct group.

Linguistic tuning in this sense does not require an abstract mind-independent entity for two people to tune towards. Unlike like tuning a guitar with a tuner that tells the musician if the note is a perfect G, linguistic tuning is like two musicians tuning their guitars to the other guitar. In semantics there is no analog of a perfect G or A minor or what have you. If two people's semantic representations tune as two guitars tune *to each other*, independently of concern for specific perfect notes, communication between these people will become possible.

I fully grant that some primitive concepts themselves must be identical for any concepts to be similar. This is entirely consistent with the notion of reference frames being more or less similar in respect to how many primitive concepts and combinations thereof the frames share.

Kinds and Communication: a Modest Metaphysics of Public Language

Still, admittedly, I have avoided what some may see as the heart of the metaphysical issue: what can it *even mean*, in a biopsychological, semantically internalist theory of natural language, to say that two linguistic expressions and/or their semantic contents are “shared”? To the die-hard metaphysician, my answer may be disappointing. For those simply concerned with the foundation of scientific linguistics and/or the everyday understanding of communication, however, I think it should be entirely acceptable.

What is required for the possibility of communication is the possibility of two people’s linguistic representations and their contents *being of the same kind*. Regarding the conceptualization of kinds, Jackendoff writes:

Consider the possibility of a cognitive structure that has descriptive features... but lacks an indexical and a valuation. I suggest that this is just the structure we need for kinds or types... what a kind really lacks is the possibility of pointing to it: one can only point to instances of it. Omitting the indexical feature from the concept would have exactly this effect [319].

A kind itself, on this account, is not a thing independent of its instances. It is merely a commonality consisting within the instances themselves. With this

understanding of the conceptualization of kinds, we can quite consistently say that two people share the representation of a linguistic term or its content (or hopefully both) without saying that there is some entity independent of either person's representations which is the kind itself.

As Jackendoff writes:

In the present approach... [a kind term such as] 'Professor' simply has a sense without a reference. The sense of a phrase is built up compositionally, and if the composition happens to provide an indexical feature, then we get a referring phrase [322].

Kinds terms, in Jackendoff's analysis of internalist semantics, do not directly refer. Instead, their meaning simply determines their instances. Applying this system to semantic representations *themselves* allows us to completely deflate (an aspect of) the apparent metaphysical paradox of communication. By Jackendoff's explanation of kinds, we can understand the semantic representations of two people as the same kind simply in so far as we may make the same descriptions of them. Communication is possible in so far as people could possibly have semantic representations of the same kind in a given context.

Two representations, in fact, may simply be *similar* to the extent that *some* descriptions apply to both of them. Thus, *partial* communication is also possible. Two representations are similar to a degree determined by the number of descriptions that apply to them, drawn from a contextually relevant description set. One can never *know* for certain that two people's representations are identical *simpliciter*, since previously

unconsidered descriptions of them are always possible. As an ideal, however, descriptively identical representations are a non-contradictory notion⁵⁴.

Though I do not endorse this interpretation, it is arguable that this analysis commits one to an ontology of properties, say, one property per description. *However*, it certainly does *not* commit one to an ontology of specifically semantic natural kinds. There is no necessary reason that laws must range over semantic kinds, as opposed merely to neural kinds. There is also, though, no reason they must not. Whether a rigorous science of semantic communication is possible is an empirical question.

The Inter-subjectivity of Science

It may be objected that my representations and those of another, say, 'Sarah' may only be identical or similar *as (meta-) represented by me and Sarah*, but, if the act of communication under consideration is an act of communication *between me and Sarah*, then nothing more can be required. This is generalizable to whoever is involved in whatever communicative exchange.

I have thus far responded to the pragmatic Fregean problem, admittedly, much more directly than the logical Fregean problem. I admit the perspective presented here is not necessarily one consistent with the notion of perfect scientific objectivity. I offer only the partial dissolution to the logical Fregean problem by noting that, in so far as the pragmatic Fregean problem is solved, the *practice* of science remains perfectly

⁵⁴ Assuming the spatiotemporal properties of the representations to be semantically irrelevant.

coherent, if not a certain metaphysically robust *philosophy* of science. Perhaps a stronger solution to the logical Fregean problem remains possible.

Concluding Remarks on the Manifest Image

As noted, we do not *seem* to be drawing analogical inferences every time we communicate. Nor are we applying Jackendoff's explicit analysis of semantic representations, rejecting kinds as unique entities. Communication is *manifested* to us *as if* it involved direct, unmediated access to something independent of our biopsychological representations. Once the analogical foundation that logically grounds communication is brought to light, and once Jackendoff's semantic system is considered explicitly and then accepted, however, naturalistic explanation of the complex workings of what *appears* to us in this simple form can be understood as the actual foundation of human communication.

Internalist semantics, in fact, offers a framework to respond to a Moorean objection to the biopsychological philosophy of language that may be underlying the objections I have addressed. This Moorean objection, again, runs, roughly: 'but we *know* there are commonsense public languages!' The response to this objection is as follows.

Knowledge claims, presumably, presuppose reference to known objects. In this case, English, French, etc. are the known objects in question. But where reference is understood internally, presumably then knowledge must be understood internally as well. So to say we *know* that commonsense public languages exist does not contradict the thesis that language is biopsychological.

From the perspective of the scientific image, the manifest image of commonsense public languages can be understood as resulting from the idealization away from largely shared particular semantic reference frames. When this idealization is in place, we can speak *as if* commonsense public languages simply exist. This is perfectly consistent with recognizing that, when we move back to the perspective of the purely scientific image, this idealization is removed and the only languages that exist are in the minds of particular individuals.

This also addresses the objection that commonsense public languages ‘supervene’ on collections of biopsychological idiolects in a way that somehow gives rise to unique logical properties. For it is not that the commonsense public languages are an ontological *addition* to the world of biopsychological idiolects, rather, they are arising from the cognitive *subtraction* of consideration of unshared characteristics. This makes commonsense public languages things perfectly sensible to talk about, without the need to accord them any fundamental ontological status.

This understanding of the manifest image of public languages also makes sense of the notion of nonstandard dialects. Since what counts as a public language depends on how individuals mentally represent the characteristics of sets of idiolects, those sets of idiolects mentally represented in relation to *cultural identity* can be individuated in ways culturally arbitrary sets of idiolects cannot. It is my hope for future research that this understanding may be used to address the basis and ethical consequences of dialect discrimination in societies.

Conclusion

This thesis has addressed the metaphysics and epistemology of scientific linguistics. In it, I have argued for the view that natural languages are concrete biopsychological phenomena, rather than abstract quasi-mathematical phenomena. As a consequence of this linguistics should be pursued as an empirical discipline, rather than an *a priori* discipline.

Section One offered responses to arguments for an abstract quasi-mathematical philosophy of language. The philosophical issues regarding the relation of natural language and formal logic were addressed here. I began with an historical explanation for the rise of Platonism as a philosophy of language. Some analytic philosophers, I argued, have taken formal logic as a tool for the analysis of natural language. The original developers of formal logic, however, developed it rather as an alternative to natural language; it was an alternative developed for scientific purposes. Abstract, quasi-mathematical philosophies of language, I argued, are in some respects resultant from this misconstrued conception of the relation of formal logic and natural language.

I responded to Jerrold Katz' argument that a quasi-mathematical philosophy of language is required to make sense of the logical necessity of analytic truth. Through a model-theoretical analysis of analytic truth in modal and intuitionist logics I demonstrated the possibility of necessary truth being determined by contingently existing objects. This response offers benefit both to our understanding of the ontology of natural languages and to our understanding of the logic of analytic truth.

Section Two offered my positive argument for the biopsychological philosophy of language that I defend. The primary engagement with empirical linguistics and my

philosophical conclusions related to linguistics itself were developed here. I proceeded to offer a positive argument for a thoroughly biopsychological philosophy of language. I further developed our metaphysical understanding of the foundations of linguistics by emphasizing not only the basis of natural languages in psychological representations, as Chomsky has done, but even more concretely in psychological representations of relevant properties of a specifically constrained biological implementation base. I defended this ontological perspective through a thorough engagement with the subfield of linguistic phonology and its relations to physiological articulation and perception, along with an analysis of the interface relations among phonology, morphology and syntax. My emphasis on phonology and its interfaces allowed for a new light on a debate that has historically been focused almost exclusively on natural language syntax and semantics.

In Section Three I responded to objections to the biopsychological philosophy of language as developed in the previous section. The philosophical issues regarding the apparent conflict between our scientific understanding of natural language and our everyday understanding of natural language were addressed here. I responded to objections to the biopsychological philosophy of language stemming from concerns related to linguistic normativity and communication.

The metaphysical individualism of the biopsychological philosophy of language leads to apparent paradoxes relating to public rules for language use, and to communally shared content for the purpose of communication. Drawing on David Forrester Wallace's *pragmatic* conception of linguistic prescription, together with analogies from anti-realist metaethical systems, I defended the intelligibility of public linguistic norms without the need for abstract ontological commitment. Drawing on Ray

Jackendoff's internalist semantic and metasemantic analyses, together with Bertrand Russell's analogy argument for other minds, I defended the intelligibility of linguistic communication also without abstract ontological commitment.

In conclusion, this thesis has contributed to knowledge by offering a view of natural language that is satisfying both to our scientific and to our everyday understanding. This thesis has furthered understanding of the rich Chomskyan tradition of scientific linguistics, allowing for thorough empirical research in a framework with the virtue of minimal ontological commitment to mysterious abstract objects. In addition, the thesis has furthered this understanding while also defending it against charges from common sense, describing the complex but comprehensible relation of the scientific and social conceptions of natural language.

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The Sophia Prize - \$100 – (Trent University, 2009)

The Mary's Fund Scholarship Prize – \$1000 – (Trent University, 2008)

The James Creery Memorial Essay Prize – Paper Title: *Incompleteness & Computation* – \$200 (Trent University, 2008)

The Gadfly Prize for a Second Year Student – \$150 (Trent University, 2007)

Trent University National Renewable Scholarship – \$4500 (Trent University, 2005-6, 2007-09)

MARKING & TEACHING EXPERIENCE

Tutorial Leading – 2nd Year Theory of Knowledge – (University of Western Ontario, Jan.-April, 2013)

Tutorial Leader – 1st Year 'Questions of the Day' (Practical Ethics) – (University of Western Ontario, Jan.-April, 2012)

Tutorial Leader – 1st Year 'Big Ideas' in Philosophy – (University of Western Ontario, Jan. – April, 2010)

Tutorial Leader – 1st Year 'Big Ideas' in Philosophy – (University of Western Ontario, Sept. – Dec., 2010)

Marker – 2nd Year Philosophy of Law – (University of Western Ontario, Sept. – Dec., 2009)

Marker – 2nd Year Philosophy of Religion – (Trent University, Jan. – April, 2009)

Marker – 2nd Year Philosophy of Art – (Trent University, Sept. – Dec., 2008)

Marker – 1st Year Introductory Philosophy – (Trent University, Sept., 2008 – April, 2009)

OTHER ACEDMIC EMPLOYMENT

Head Editor of Humanities – Journal of Undergraduate Studies at Trent – \$1000 Honorarium - (Publication of 2009)

REFEREED CONFERENCE PRESENTATIONS

Canadian Society for the History and Philosophy of Science – Paper Title: *On Normativity & Communication in Linguistic Science* – (University of Ottawa, 2015), *Abstract Refereed*

Western Interdisciplinary Student Symposium on Language Research – Paper Title: *On Linguistic Normativity and Communication* – (University of Western Ontario, 2015), *Abstract Refereed*

Canadian Society for the History and Philosophy of Science – Paper Title: *Considering Practicing: On the Importance of Phonology for the Philosophy of Language* – (Brock University, 2014), *Abstract Refereed*

Canadian Society for the History and Philosophy of Science – Paper Title: *A Defence of a Psychological Perspective for Linguistics* – (University of Victoria, 2013), *Abstract Refereed*

University of Washington Graduate Student Conference – Paper Title: *On Libertarian Agency* – (University of Washington, Seattle, 2012), *Paper Refereed*

Atlantic Region Philosophers Association – Paper Title: *The Logicisms of Russell & Ramsey* – (University of King's College, Halifax, 2010), *Abstract Refereed*

Philosophy Society Student Symposium – Paper Title: *Sequences & Selves* – (Trent University, 2009), *Paper Refereed*

Philosophy Society Student Symposium – Paper Title: *Fatalism & the Principle of Excluded Middle* – (Trent University, 2008), *Paper Refereed*

Philosophy Society Student Symposium – Paper Title: *A Paradox in Physical Reduction* – (Trent University, 2007), *Paper Refereed*

INFORMAL TALKS

Philosophy Graduate Student Colloquium Series – *An Empirical Linguistics is the Only Possible Linguistics* – (University of Western Ontario, Fall Term 2013)

Philosophy Graduate Student Colloquium Series – *Some Preliminary Remarks on a VIBE Theory of Public Languages* – (University of Western Ontario, Fall Term, 2012)

Philosophy Graduate Student Colloquium Series – *In Defence of the Coherence of Metaphysical Libertarianism* – (University of Western Ontario, Summer Term, 2012)

Philosophy Graduate Student Colloquium Series – *Phonology and the Metaphysics of Language* – (University of Western Ontario, Winter Term, 2012)

Philosophy Graduate Student Colloquium Series – *Substitution Failures and the Theory of Truth* – (University of Western Ontario, Fall Term, 2011)

GRADUATE COURSES IN PHILOSOPHY

Consciousness – (University of Western Ontario, Winter Term, 2012)

Concepts – (University of Western Ontario, Fall Term, 2011)

The Semantics-pragmatics Boundary – (University of Western Ontario, Fall Term, 2011)

The Language of Thought – (University of Western Ontario, Winter Term, 2011)

Evolutionary Perspectives on Ethics & Epistemology – (University of Western Ontario, Winter Term, 2011)

Free Will – (University of Western Ontario, Winter Term, 2011)

Darwin's *On the Origin of Species* – (University of Western Ontario, Fall Term, 2010)

Empiricism in the Philosophy of Science – (University of Western Ontario, Fall Term, 2010)

20th Century Philosophy of Science – (University of Western Ontario, Winter Term, 2010)

Late 20th Century Analytic Philosophy – (University of Western Ontario, Winter Term, 2010)

Philosophy of Mathematics – (University of Western Ontario, Fall Term, 2009)

21st Century Philosophy of Mind – (University of Western Ontario, Fall Term, 2009)

Metaphysics: Leibniz to Kant – (University of Western Ontario, Fall Term, 2009)

GRADUATE COURSES IN LINGUISTICS

Sémantique (in Department of French Studies) – (University of Western Ontario, Winter Term, 2012)

Philosophy and Linguistics (Cross-listed in Philosophy and Linguistics) – (University of Western Ontario, Winter Term, 2010)

SECOND LANGUAGE IMMERSION PROGRAMS IN QUEBEC

Université Laval – Five Weeks Spring, 2012; Five Weeks Summer, 2013

Université du Québec à Trois-Rivières – Six Weeks Spring, 2009; Six Weeks Summer, 2011

ACADEMIC VOLUNTEER WORK

Reviewer – Papers for Conference on Philosophy of Mind, Language and Cognitive Science –
(University of Western Ontario, Winter Term, 2013)

Volunteer ‘Expert Consultant’ – UWO ‘Ask the Experts’ Sessions on Applying for Scholarships
– (University of Western Ontario, Fall Term, 2010)

Elected Student Representative of the Philosophy Department – (Trent University, 2008-9
Academic Year)