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Under Pressure from the Empirical Data:

Does Externalism Rest on a Mistaken Psychological Theory?

by

Bryan Miller

Under the Direction of Andrea Scarantino and Eddy Nahmias

Abstract

The tradition of semantic externalism that follows Kripke (1972) and Putnam (1975) is built on the assumption that the folk have essentialist commitments about natural kinds. Externalists commonly take the body of empirical data concerning psychological essentialism as support for this claim. However, recent empirical findings (Malt, 1994; Kalish, 2002) call the psychological theory of essentialism into question. This thesis examines the relevance of these findings to both essentialism and semantic externalism. I argue that these findings suggest that these theories fail to reflect folk beliefs about natural kinds and folk natural kind term usage. This leads me to propose an alternative thesis-- the Ambiguity Thesis-- that is better able to accommodate the existing body of empirical data.

INDEX WORDS: Semantic Externalism, Psychological Essentialism, Ambiguity, Philosophy of Language, Experimental Philosophy

UNDER PRESSURE FROM THE EMPIRICAL DATA:

DOES EXTERNALISM REST ON A MISTAKEN PSYCHOLOGICAL THEORY?

by

Bryan Miller

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Master of Arts

In the College of Arts and Sciences

Georgia State University

2007

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Electronic Version Approved:

Office of Graduate Studies
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August 2007

Acknowledgments

I would like to thank Trevor Kvaran, Eddy Nahmias, Sebastian Rand, and Andrea Scarantino for extensive and insightful comments on earlier drafts of this thesis. Their comments, critiques and suggestions have undoubtedly helped to make this a better work. It goes without saying, however, that any mistakes that remain belong solely to me. In particular, I would like to thank Andrea Scarantino for the incredible amount of time and effort that he devoted to guiding this thesis. Based on the time he spent reading and commenting on drafts, if he did nothing else besides this for the year that my thesis was in preparation, I think he would still have managed to earn his salary. I am very grateful for the Brains and Behavior program at Georgia State University which provided me with two years of excellent funding as well as an atmosphere conducive to studying philosophy at the intersection of the cognitive sciences. As always, I want to express my gratitude for all of the support that I have received from my family and friends while engaged in my continuing obsessive philosophical endeavors. And finally, I would like to thank the Philosophy 1010 instructors, Katy Kramer, and Jason Outlaw, for helping me collect data for the experimental section of this thesis.

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1. Introduction

Since Saul Kripke's "Naming and Necessity" (1972) and Hilary Putnam's "The Meaning of 'Meaning'" (1975), semantic externalism has enjoyed a dominant role in the philosophy of language. One of the key assumptions of both Kripke's and Putnam's work is that "unknown internal structural properties," or kind-specific essences, determine the reference of ordinary language users', a.k.a the folk's, natural kind terms (Abbott, 1997; Putnam, 1975; Kripke, 1972).[1] This assumption commits externalism to the thesis that the folk attribute essences to natural kinds.[2] Externalists generally take this thesis to be empirically supported by the experimental literature on psychological essentialism.[3]

In this paper, I offer a criticism of externalism by discussing empirical evidence that undermines the essentialist commitments that externalism is built upon. This strategy situates the present work within the experimental philosophy movement. Experimental philosophy, broadly speaking, is the research program that puts philosophical claims on trial by either (1) designing and running experiments that test such claims, or (2) mining existing empirical data that have a bearing on these claims. Here, I mainly focus on existing empirical data in order to build my case against essentialism, and by extension, externalism. However, in keeping with the customs of experimental philosophy, I will also present the results of an experiment meant to explore how the reference of the folk's natural kind terms is determined.

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[1] Hereafter, I use 'externalism' to refer to the tradition of semantic externalism that follows Kripke (1972) and Putnam (1975). Following Boghossian (1998), I understand a term's reference as the property that the term refers to and a term's extension to be the set of things that possess the relevant property (1998).

[2] Externalism is not, however, committed to the metaphysical existence of such essences.

[3] Hereafter, 'essentialism' will be used as shorthand for 'psychological essentialism.'

It should be noted that not all variants of externalism are built upon essentialist commitments (see e.g. Liu, 2001; Burge, 1979, 1982), nor do all variants hold that externalism by itself provides a complete descriptive semantic theory of natural kind terms (Bilgrami, 1992; Fodor, 1998; Recanati, 1993). Here, I confine my criticism of externalism to the influential tradition following Kripke (1972) and Putnam (1975) that holds that externalism is built upon essentialist commitments and should be considered a complete descriptive semantic theory of natural kind terms.

I begin by outlining the research program of experimental philosophy to clarify the role that empirical data can play in philosophical debates (section 2). I then explain the connection between externalism and essentialism (section 3). This is followed by a presentation of the relevant empirical evidence that puts pressure on essentialism (section 4). I argue that these data suggest that both essentialism and externalism fail to reflect folk natural kind beliefs and folk natural kind term usage. Insofar as these theories are mistaken, the possibility arises that other psychological and semantic theories can better explain the data in the relevant domains of investigation. This leads me to introduce an alternative thesis-- the Ambiguity Thesis-- that is capable of accommodating the mass of conflicting evidence (section 5). I close by recounting some new data from my own ongoing study meant to test the predictions of the Ambiguity Thesis (section 6).

2. Preliminaries: Experimental Philosophy and Natural Kinds

In this section, I explore the role that empirical data may play in philosophical debates that involve appeals to intuitions. To do this, I discuss the burgeoning experimental philosophy research program. Furthermore, in order to curtail some misunderstandings that might arise due to the wide-ranging existent literature on natural kinds and natural kind terms, I make some general remarks about natural kinds and natural kind terms as they are used in this thesis.

2.1. Empirical Data and Experimental Philosophy

At the beginning of the twentieth century, Anglo-American philosophy took a decidedly analytic turn which culminated in the view that philosophical investigation *just* is a matter of conceptual analysis. Appeal to intuitions has become part and parcel of the strategy employed by philosophers involved in conceptual analysis. Joshua Knobe describes the role of intuitions in philosophy as follows:

> Typically, the philosopher presents a hypothetical situation and then makes a claim of the form: 'In this case, we would surely say…' This claim about people's [folk] intuitions then forms part of an argument for some more general theory about the nature of our concepts or our use of language. (Knobe, Forthcoming)

Importantly, the claims that these philosophers make about folk intuitions are fallible empirical claims. It either is, or is not the case that the folk share the particular intuition that the philosopher claims is "surely" shared by all. As Nahmias et al. (2006) have pointed out, to the extent that widely shared intuitions are taken to either strengthen or weaken an argument, it

becomes an important and relevant question whether or not such intuitions are in fact widely shared.

Experimental philosophers recognize that these appeals to folk intuitions are empirical claims subject to empirical verification. These philosophers seek to "put claims about intuitions to the test, [by] using experimental methods to figure out what people really think about particular hypothetical cases" (Knobe, Forthcoming). To date, philosophers involved in this new experimental research program have tested folk intuitions about issues in the philosophy of mind (e.g., Prinz and Knobe, Forthcoming), free will and moral responsibility (e.g., Nahmias et al., 2006; Nichols and Knobe, Forthcoming), epistemology (e.g., Nichols, Weinberg, and Stich, 2001), the theory of action (e.g., Nadelhoffer, 2004), and the philosophy of language (e.g., Machery et al., 2004) in an attempt to shed light on philosophical debates that hinge on supposed folk intuitions.

One of the earliest and most interesting pieces of experimental philosophy is that of Machery et al. (2004). This paper tests Kripke's (1972) claim that his intuitions concerning the reference of proper names would be widely shared by probing the intuitions of both western and east-Asian students about the Godel/Schmidt case. In the Godel/Schmidt case, Kripke supposes that

> …Godel was not in fact the author of [Godel's] theorem. A man called 'Schmidt' (…) actually did the work in question. His friend Godel somehow got hold of the manuscript and it was thereafter attributed to Godel. On the [descriptivist] view in question, then, when our ordinary man uses the name 'Godel', he really means to refer to Schmidt, because Schmidt is the unique person satisfying the description 'the man who discovered the incompleteness of arithmetic'. (…) But it seems we are not. We simply are not. (Kripke, 1972, 83)

In the end, Kripke claims that something must be wrong with the descriptivist theory of reference, since almost everyone who reads this scenario, he assumes, would agree that 'Godel' does not refer to Schmidt. The findings of Machery et al. (2004) call Kripke's claim about folk intuitions and proper name usage into question. Almost all of the western students involved in the study shared Kripke's intuition, namely that 'Godel' does not refer to Schmidt. The majority of East Asian students, however, said that 'Godel' does refer to Schmidt. These results suggest that the intuitions upon which Kripke's referential theory of proper names is built may not be as universal as he once thought, as well as raising the possibility that intuitions vary cross-culturally.

The current paper follows in the footsteps of Machery et al. (2004) by applying the methodology of experimental philosophy to the philosophy of language. It does so by empirically probing Kripke's (1972) and Putnam's (1970; 1975) supposedly representative intuitions about the nature of natural kinds and the reference of natural kind terms. Importantly, this thesis is not focused on the folk concepts of 'reference' or 'natural kind.' This would be a rather misguided endeavor since these are theoretical terms which do not enjoy widespread vernacular usage. Instead, the current work examines folk intuitions about particular hypothetical cases as a means of exploring what determines the reference of folk natural kind terms.

2.2. Natural kinds and Natural Kind Terms

Since this paper is primarily concerned with natural kind term usage, it is important to be clear about what natural kinds are. This is necessary in order to determine which terms are relevant to our investigation. Proceeding without a clear understanding of which terms are

natural kind terms would be like using 'Jhidefru' and Derku' to test Kripke's claims about the reference of proper names without knowing whether the terms 'Jhidefru' and 'Derku' refer to objects or people. In order for a term to be useful in testing Kripke's (1972) claims about the reference of proper names, we must first know what counts as a proper name. Similarly, to test Kripke's and Putnam's claims about the reference of natural kind terms, we must first know what counts as a natural kind.

Simply put, a natural kind term is a term that refers to a natural kind. Following standard philosophical usage, I define a natural kind as an entity that is both naturally occurring and explanatorily important.[4] A virtue of this definition is that it is loose enough to accommodate the numerous accounts of natural kinds on offer (e.g., Richard Boyd's (1989) Homeostatic Property Cluster account, Kripke's (1972) and Putnam's (1975) Essential Property account) while simultaneously constraining membership in the class NATURAL KIND to a specific, non-trivial type of entity. It is an important constraint on the class of entities referred to as natural kinds that they be naturally occurring in order to explain why some (i.e., tiger, mountain), but not all (i.e., microscope and particle accelerator), explanatorily important entities might be considered natural kinds.[5] It is also an important constraint that this class of entities is explanatorily important in the sense that they can be embedded in theories in order to explain why some naturally occurring entities might not be

[4] Gross (2006). Gross suggests a similar description of natural kinds in order to clarify the class of entities that is being discussed without presupposing anything about the nature of the entities that belong to this class. The value of this strategy lies in its recognition that the nature of the class NATURAL KIND is a matter of scientific investigation and, therefore, any claims about the nature of the class cannot be part of the definition.

[5] However, I do recognize that certain “natural kinds" might be able to be "created" in non-natural settings. The important point is that the kind itself must be believed, by the folk, to be naturally occurring even if some members of the kind are non-naturally occurring- i.e., gold created in laboratories or cloned animals. Further, I use the modal 'could' to make clear that I intend to refer to all entities that are naturally occurring and could, in principle, be embedded in a theory, and not just those naturally occurring entities that happen to be embedded in current theories.

considered natural kinds. According to this definition of 'natural kind,' entities as diverse as mountains (naturally occurring entities that are theoretically important for geology), wind (a naturally occurring entity that is theoretically important for physics and ecology), tiger (a naturally occurring entity that is theoretically important for biology) and gold (a naturally occurring entity that is theoretically important for chemistry) could be considered natural kinds. Other entities such as 'things weighing more than 25 kilos' or 'white things', however, would not be candidate natural kinds because they are not explanatorily important entities within the sciences. The main strength of this definition is that it manages to delineate and track the class of entities that both Putnam (1970; 1975) and Kripke (1972) refer to as "natural kinds" without imposing any unnecessary constraints on the class. Putnam (1970, 130), in fact, presents a very similar description of natural kinds when he raises the possibility that natural kind terms might simply be the terms that are meant to refer to the entities that play a theoretical role in the sciences. However, he stops short of claiming that this definition correctly delineates the class of natural kinds.

Importantly, it is not part of the definition of 'natural kind' that natural kinds possess kind-specific essences. It is true that both Kripke (1972) and Putnam (1970; 1975) claim that natural kinds do possess essences, but neither introduces this claim as a constraint on what counts as a natural kind because it is not supposed to be *analytic* that natural kinds possess kind-specific essences (Putnam, 1975).[6] For instance, Putnam notes that natural kinds are those "class[es] of things we regard as of explanatory importance; classes whose normal distinguishing characteristics are 'held together' or even explained by deep-lying mechanisms"

[6] see Schwartz (1980). He notes that for Kripke (1972) and Putnam (1970; 1975) the possession of essences is not analytic of natural kinds and that their position allows no incorrigible analytic definition to be associated with the term 'natural kind.'

(1970; 139); but he is not claiming that it is part of the definition (i.e., that it is analytic) of 'natural kind' that natural kinds are "'held together' or even explained by deep lying mechanisms" (1970, 141). Rather, he is making an empirical claim about natural kinds that is supposedly derived from, and supported by, the way that the folk use natural kind terms. I will now turn my attention to the connections between externalism and essentialism.

3. Externalism and Essentialism

In this section I illustrate the connections between externalism as a philosophical theory of reference and essentialism as a folk-psychological theory. In doing so, I will explain the relevant commitments of essentialism in order to prime the reader for the empirical work that comprises the third section. First, however, I will provide some background on the philosophical issues and debates that gave rise to the externalist program, currently the most popular semantic theory.

3.1. The Heyday of Internalism: Descriptions and Reference

Externalism has not always enjoyed widespread support in the philosophical community. Prior to Kripke's and Putnam's work, most theorists (e.g., Frege, 1892; Russell, 1919; Carnap, 1947) subscribed to some form of internalist semantics. The common thread among the various internalist theories was the claim that linguistic terms are associated with mental representations (sometimes referred to as concepts) that determine their reference.[7] According to semantic internalism, the meaning of a term just is the mental representation associated with the term. Hence, if two terms are associated with the same mental representation, then these terms are synonyms (i.e., they share the same meaning). Furthermore, for the internalist, understanding the meaning of a word is "just a matter of

[7] The role of mental representations as concepts varies somewhat since some internalists (i.e., Frege, 1892) take concepts to be abstract entities that do not exist in any particular person's head. These "public" concepts are, nonetheless, "in the head" since understanding a term supposedly involves the psychological state of "grasping" a concept.

being in a certain psychological state" (Putnam, 1975, 218). This is why internalism is said to hold that meanings are entirely in the head (Putnam, 1975).

For most internalists, the proposed mental representations were assumed to be descriptions. As a result, the internalist program came to be associated with the descriptivist theory of reference which holds that the mental representation associated with a term is a description that determines the reference of the term. It should be noted that internalism carries no commitment to the reference-fixing description being composed of any particular type of properties. That is to say, the description may consist of a set of necessary and sufficient properties, or it might only include a set of statistically relevant properties. A toy example may prove useful in illustrating the connection between internalism and the descriptivist theory of reference. Consider the term 'dog'. According to internalism, the term is associated with a mental representation- the DOG concept- that is a description such as "four legs, furry, slobbers, friendly, large canines etc". The term 'dog', internalism argues, refers to whatever items are picked out by the description. From this point on I will follow the common practice of treating internalism and descriptivism as though they stand and fall together.[8]

[8] It should be noted that internalism has far-reaching consequences in the philosophical literature, especially in the literature concerning mental content. These consequences follow from the intimate connections between the philosophy of language and the philosophy of mind. Insofar as mental representations (concepts) are taken to be the meaning of the lexical terms they are associated with, and mental representations are taken to be mental states that are the constituents of cognition, any semantic theory is *ipso facto* a theory about mental content. Because of internalism's semantic commitments, it is also committed to mental representation as the individuating factor of mental content. That is to say, mental states are individuated in terms of the mental representations that they are constituted of. Though much of what is said in this thesis might be relevant to the debate concerning internalist and externalist theories of mental content, time demands that I leave these issues to the side.

3.2. The Rise of Externalism: Realism and Externalism

While Kripke's (1972) work concerning modal logic is mostly responsible for his externalist commitments, Putnam's (1970; 1973; 1975) externalist leanings are borne out of his early endorsement of scientific realism. Because this paper is concerned with externalism as a semantic theory, I will primarily focus on Putnam's work since it most clearly illustrates the philosophical motivations for externalism as a theory of semantics. When necessary, I will cite Kripke's work in order to illustrate that it shares many of the externalist commitments that I will argue are problematic.

In the late 1960's and early 1970's Putnam began to realize that despite the fact that scientific progress involves constantly changing theories, there is "one element" of science that generally does not change, and that element is the reference of the terms associated with the entities of scientific inquiry (1973; 1975, ix). Putnam never explicitly identifies these entities of scientific inquiry as natural kinds but his remark that natural kinds might be defined as "a class which is the extension of a term P which plays such-and-such a methodological role in some well-confirmed theory" suggests that the relevant entities and the terms that refer to these entities are, in fact, natural kinds and natural kind terms, respectively (1970, 141). This notion of natural kinds is in line with the one that I presuppose in this thesis, namely, that natural kinds are naturally occurring, explanatorily important entities (section 2.2). Putnam's realization concerning the reference of natural kind terms cemented his early commitment to realism and set the stage for his work on externalism by revealing a conflict between semantic internalism and scientific realism. The conflict becomes apparent when the realist who accepts internalism attempts to explain how the reference of a natural kind term remains constant when the description associated with the term changes. The conflict arises because,

according to internalism, any change in the theory surrounding such a term will inevitably lead to a change in the mental representation (description) associated with the term. If the mental representation (description) associated with the term changes, then the reference will also change since the mental representation determines the reference. This change in reference, however, is exactly what realism wishes to resist. Realist intuitions, at least Putnam believes, appear to be inconsistent with internalist semantics.

Putnam suggests that his realist leanings enjoy the folk's sympathies (1973; 1975, 237). If he is correct, then there are grounds to suppose that internalism is mistaken insofar as it claims to be a descriptive semantic theory.[9] To understand why Putnam thinks his realist intuitions are widely shared, we need only consider his discussion of how people discuss scientific progress. Consider his toy example about the electron, a natural kind entity (1973; 1988). Noting that Niels Bohr modified his 1910 description of the electron in 1940, Putnam claims that most people assume that the term 'electron' was used to talk about (refer to) the same object in 1910 and 1940. Supposedly, almost no one would assume that the object referred to by the term 'electron' in 1940 was any different from the object Bohr referred to with the term 'electron' in 1910 even though the people living during these times might have believed different things about the object referred to by the term. Putnam believes that this fact about how people discuss scientific progress reveals a belief that the reference of certain types of terms (viz. natural kind terms) remains constant even when the description associated with the term changes. If internalism were correct, so goes the argument, then people would

[9] It is, of course, possible that the inconsistencies that arise from adhering to realism and internalism do not really present a problem to the extent that people are willing to, and actually do, have conflicting and inconsistent beliefs. I recognize this possibility, but will, for the sake of argument, assume that people strive for more consistency that this possibility allows.

assume that Bohr's term 'electron' referred to radically different objects in 1910 and 1940. They would not believe, as Putnam claims that we (the folk) do, that the only difference involved some mistaken beliefs that were revised (1988, 12-13).

Another reason to think that internalism might be mistaken falls out of the work of Keith Donellan (1966). Donellan was one of the first to note that terms, especially names, might be used attributively as well as referentially. When a name is used attributively it refers to whomever fits the description associated with the name; when a name is used referentially it is used to refer to some definite individual whether or not that person fits the description associated with the name. Contra internalism, Donellan's work on the referential use of terms illustrates that we can, and sometimes do, intend a term to refer even when the mental representation (description) we have associated with the term does not pick out the intended referent. This early work of Donellan set the stage for Kripke and Putnam to explain how terms can refer in spite of the (possibly incorrect) associated descriptions by discussing the world's contribution to meaning.

Both Kripke's and Putnam's externalist projects traded the descriptivist theory of reference for the causal/historical theory of reference for natural kind terms and proper names. In this paper, I will only concern myself with natural kind terms. According to the causal/historical theory of reference, a natural kind term is intended to refer regardless of the mental representation that is associated with the term as long as the speaker of the term is properly linked via a causal chain to the original baptizing ceremony in which the entity was first labeled with the given term. One of the payoffs of the move to the causal/historical theory of reference is that it can account for how a description associated with a natural kind term can change, while the reference of the term is held constant. This is possible, we are

told, because the referent of the term is taken to be the hidden micro-structural property (the essence) of the entity. It is only because these "essences" are believed to determine reference that the world is said to contribute to the meaning of natural kind terms.[10]

3.3. Folk-Connections: Essences and Reference

What makes externalism especially appealing, Putnam and Kripke think, is that it tracks the manner in which the folk use natural kind terms. In "Is Semantics Possible?", Putnam notes that the use of a natural kind term to label an entity indicates a belief in an "'essential nature' which the [labeled] thing shares with other members of the natural kind" (1970, 140). As he puts it, "the use of natural kind words reflects an important fact about our relation to the world: we know that there are kinds of things with common hidden structure" (1975, 244). Folk beliefs in kind-specific essences, we are told, determine what natural kind terms refer to (Putnam, 1975). Responding to a possible critique of the "empirical facts concerning speakers intentions," Putnam notes that the speakers' (i.e., the folk's) "intention is never to 'make the name [natural kind term] synonymous with the description'. Rather, 'we use the name [natural kind term] rigidly' to refer to whatever things share the nature that things satisfying the description normally possess" (1975, 238). And, assuming that he understands how the folk use natural kind terms, Putnam notes that "the extension [i.e., the set of things referred to] of the term 'water' as they (the speakers in question [i.e., the folk]) use it is in fact H20" (Putnam, 1975, 269). Finally, the "division of linguistic labor" that falls out of an actual division of real labor supposedly provides further support for essentialist commitments among the folk. The willingness among the folk to defer to experts in matters

[10] Again, some externalists (i.e., Burge) would disagree.

concerning the hidden nature of these entities suggests that the folk do have beliefs about "hidden structural properties" (i.e., essences) that are the domain of specialized investigation (Putnam, 1975; 1988).

Kripke's essentialist commitments plaque his 1973 work. Much like Putnam's early realist leanings concerning essences, Kripke also believes that natural kinds have "necessary properties" (essences) that are subject to empirical investigation (1973, 322-323). Furthermore, like Putnam, he holds that "essential properties" and "internal structures" are the important features that determine whether ordinary language users will concede that a natural kind term applies to an entity (1973, 314). Throughout his 1972 work, Kripke repeatedly offers his intuitions about possible scenarios involving natural kinds and proper natural kind term usage while simultaneously suggesting that the folk share his intuitions. I will describe two of these scenarios, one about gold, the other about tigers.

Kripke remarks that "there might be a substance which has all the identifying marks we commonly attributed to identify the substance of gold in the first place, but which is not the same kind of thing, which is not the same substance. We would say of such a thing that though it has all the appearances we initially used to identify gold, it is not gold" (Kripke, 1973, 316). Supposedly, the folk would not identify this substance as 'gold' because it is not the right kind of substance (it does not have the right internal structure). In another passage, Kripke supposes that

> … we discover an animal which, though having all external appearances of a tiger as described here, has an internal structure completely different from that of a tiger… Let's say they were in fact very peculiar looking reptiles. Do we then conclude on the basis of the description that some tigers are reptiles? We don't. We would rather conclude that these animals, though they have the external marks by which we originally identified tigers, are not in fact tigers,

> because they are not of the same species as the species which we called 'the species of tigers'. (Kripke, 1973, 317)

Again, Kripke assumes that the folk would share his hesitancy to use the natural kind term 'tiger' to refer to these newly discovered tiger-looking entities.

The above quotes make explicit that the tradition of semantic externalism that follows Kripke (1972) and Putnam (1975) is built upon the assumption that the folk have essentialist commitments. This assumption ties the success of externalism to the success of essentialism as a psychological theory of folk beliefs. Both friends and foes of externalism recognize this connection. For instance, the philosopher Barbara Abbott has characterized and defended externalism as an "essentialist semantics" (1997, 311; 1999). Remarking on Kripke's and Putnam's externalism insofar as it is committed to essences as a defining feature of proper natural kind term usage, Georges Rey notes that "they have quite explicitly claimed that there are properties that, for example, gold must necessarily have [or we must believe it has] in order for us to properly call it 'gold'" (Rey, 1983). Charles Kalish, a leading voice in psychological debates concerning concept structure and natural kinds, has likewise noted that externalist semantics is a viable theory to the extent that concepts are supposed to "capture or identify substances" in the world that possess underlying structures (essences) (2002, 14). Understanding why externalism might be characterized as such requires an exploration of the psychological theory of essentialism.

3.4. The Essentialist Foundation

In broad terms, essentialism is the thesis that the folk construct a theoretical, though perhaps pre-scientific, view of the world in which certain entities are *believed* to possess

essences (Gelman, 1994; 2003). These beliefs are generally not explicit; rather, they reflect "non-conscious, intuitive assumptions" (Gelman, 2003, 7) that the essence of an entity determines its identity and is causally responsible for a number of its observable features (Gelman, 2003). Since essences are believed to be responsible for conferring identity on an entity, it follows that kind-specific essences are believed to be the necessary and sufficient condition of kind-membership. Essentialism, however, does not require that the folk actually know, or have a theory about, a given entity's essence. What it requires is that people believe that some entities possess essences (Rips, 2001; Gelman, 2003; Pothos & Hahn, 2000). When knowledge about the actual essence is lacking, the essence is represented as a kind-specific "essence placeholder" that acts as a promissory note that there is in fact some kind-specific essence even if it is not yet known (Strevens, 2000).

According to essentialism, folk-beliefs about essences are confined to a specific domain of entities. This domain is generally limited to those entities that the folk believe to be natural kinds in the sense that these entities are believed to be "real (not fabricated by humans), discovered (not invented), and rooted in nature" (Gelman, 2003, 7). Natural kinds such as water, gold, and tiger are paradigmatic instances of the types of entities that the folk consider natural kinds. It should be noted that the folk most likely would not refer to the entities of this domain as natural kinds since 'natural kind' is a theoretical term. Rather, the idea is simply that folk essentialist beliefs are confined to a specific class of entities that are best described as natural kinds.

Essentialism postulates that the folk believe that the terms associated with natural kinds reflect the structure of the world since these terms are only used to refer to entities that are assumed to possess the correct kind-specific essence (Gelman, 2003; Malt, 2003). This

claim implies that whenever the folk use the natural kind term 'X', they only intend it to refer provided the entity labeled 'X' possesses the essence that is associated with the natural kind X (Ahn, 1998; Strevens, 2000). For example, the term 'tiger' is only meant to apply to entities that possess the tiger essence. Summed up, the commitments of essentialism are the following:

1. People believe that natural kind entities possess essences even if they do not know what such essences are;
2. These essences are believed to be the necessary and sufficient condition of kind-membership; and
3. Kind-specific essences determine what the natural kind terms refer to, if anything. The folk only intend natural kind terms to refer to the entities that are believed to possess the appropriate kind-specific essence even when it is not known what this essence is.

There is a good deal of experimental evidence that is taken to support essentialism. Most notable are what are known as "transformation task experiments" (Rips, 1989; Keil, 1989). In these experiments, participants are presented with images such as that of a dog in conjunction with a description explaining that the dog was either given a costume that made it look like a sheep, or injected with a serum that made it grow curly fur, make "baah" sounds, and take on the appearance of a sheep. Participants are then shown a second picture of the animal in full sheep dress and asked if it is a dog or a sheep. For the serum task, more than 75% of children age 7 and older respond that the animal is a dog and almost all children from age 4 on respond that the animal in the costume task is a dog. Essentialism holds that the best explanation of these responses is that the folk believe that the animal possesses a kind-specific

essence which is a necessary and sufficient condition of kind-membership.[11] Now that we have an understanding of the commitments of essentialism and externalism, let us turn our attention to another body of empirical data that appears to contradict essentialism.

[11] There is a variant of essentialism, statistical essentialism (henceforth, SE), that holds that people only believe that essences are statistically correlated with kind-membership. On this account, something can be a member of kind X without possessing the essence associated with kind X. Since this position holds that the essence is not believed to be an essential property of the kind in question, it is unclear in what sense SE is an essentialist position. It is, after all, a key feature of essentialism that the essence is *believed* to be a necessary and sufficient property of the kind in question. Furthermore, SE does not seem to require that the folk only intend their natural kind term's to refer to entities that possess the correct kind-specific essence. As a result, SE does not seem sufficient to underwrite semantic externalism.

4. Evidence against Essentialism

While there is considerable empirical evidence that appears to support the essentialist thesis (Keil, 1989; Gelman & Wellman, 1991), other empirical data appear to be inconsistent with it. In this section, I describe two empirical studies that are relevant to essentialism as a psychological theory and, by extension, externalism as a semantic theory. I begin by focusing on a relatively new experiment by Charles Kalish (2002) which suggests that the folk are not always committed to the view that natural kinds possess necessary and sufficient conditions of kind-membership captured by essences. A further finding of this study suggests that the folk tend to characterize most sub-types of natural kinds (i.e., biological taxonomic kinds such as tiger or fish, biological non-taxonomic kinds such as cell or egg, or non-biological taxonomic kinds such as mountain or star) in a similar manner. This finding presents a problem for those theorists that would attempt to salvage essentialism by arguing that the essentialist thesis only applies to a specific sub-type of natural kinds. Kalish's results, if empirically sound, raise a problem for essentialism as commonly understood. After exploring these new data, I turn to a classic study by Barbara Malt (1994) that suggests that essentialism, and consequently externalism, fail to reflect the way that the folk use natural kind terms.

4.1. Kalish's Study

Kalish notes that essentialism holds that natural kind categories have two features: they are thought to be subject to absolute membership and they are thought to be objective matters of fact (2002, 349). Kalish's experiment tries to determine whether people do, in fact,

believe that natural kinds have these two features. In the experiment, participants were presented with a list of 46 categories of three different types:

- Eight clearly well-defined categories (e.g., prime [number], father, sum)
- Three clearly fuzzy categories (e.g., friendship, gift, red)
- Forty natural kind categories which consisted of 15 non-biological natural kind items (e.g., air, star, oil, rock), 5 biological non-taxonomic natural kind items (e.g., cell, wood, egg), and 20 biological taxonomic natural kind items (e.g., tree, horse, sheep, potato).

Importantly, all 40 of the natural kind items are accommodated by the stipulated definition of 'natural kind' (see section 2.2). Items from three different natural kind sub-types (biological taxonomic kinds, biological non-taxonomic kinds, and non-biological taxonomic kinds) were used in order to test whether certain types of natural kinds might be characterized in a manner more consistent with essentialism than others.

The participants were then presented with a set of scenarios, on the following model: "Two biologists (i.e., the field) disagree about whether an animal (i.e., the item) is a horse (i.e., the category)." The experts in the field (here, biologists), the generic label of the item (here, animal) and the category or kind (here, horse) differed for each particular item. The participants were then asked to answer three questions about each particular scenario by scoring from 1-20 "how correct" they thought each of the following statements were, when the blanks were filled in with the relevant category terms:

1. "There is a continuum from pure ideal instance to imperfect partial instance. Some things may be truly intermediate between ____ (fill in the blank with each category term) and not _____."
2. "Even a ____ that is strange or unusual is still 100% ____. People may be confused or have a hard time telling, but there are no partial _____."
3. "Is the exact distinction between imperfect ____ and non-_____ a convention or matter of fact? Is the boundary something that experts decide or is it something that they discover?" (Kalish, 2002, 342).

The first question was meant to test for graded membership (i.e., borderline instances) within each category, the second question for absolute membership, and the third question for whether participants took the categories to be objective matters of fact. The participants were told that a high score (20) indicated definite "yes" to the question while a lower score (1) indicated definite "no". The well-defined categories and fuzzy categories functioned as control "kinds" to test whether the participants understood the questions.[12] The range was meant to allow for variability in how strongly they felt the question deserved a 'yes' or a 'no'. Higher scores for natural kind categories indicate answers more consistent with essentialism, i.e., (a) absolute conditions of membership, (b) no graded membership and (c) being a discoverable matter of fact.

The scores were averaged across participants and category type (i.e., well-defined, fuzzy and the three sub-types of natural kinds) and the results were as follows:
participants rated the well-defined categories as very unlikely to have graded membership (17 out of 20), the most likely to have absolute membership (18 out of 20), and the most likely to be discoverable matters of fact (15 out of 20) (Kalish, 2002).[13] Fuzzy categories, on the other hand, were scored as being subject to graded membership (3.5 out of 20), as lacking absolute conditions of membership (4 out of 20) and as being established by convention (4 out of 20). This indicates that the participants understood that some kinds have necessary and sufficient conditions of membership, while others lack these conditions. The really interesting data are

[12] Well-defined items functioned as a control because they indicate whether people understand that some categories (kinds) have necessary and sufficient conditions of membership. If none of the subjects ranked the well-defined items as subject to absolute membership, it would indicate that the subject population was mis-representative since they did not believe that any of the items had necessary and sufficient conditions of membership. Fuzzy categories were the other control "kind" because they tested whether the participants understood that not all kinds have necessary and sufficient conditions of membership.
[13] The numbers in parentheses (e.g., (17 out of 20)) are mean scores.

that the three types of natural kind categories received partial scores with respect to absolute membership (12 out of 20), graded membership (12 out of 20) and being discoverable matters of fact (12.5 out of 20). On average, participants exhibited *less* essentialist commitment for the natural kind categories than well-defined categories, but *more* essentialist commitment for natural kind categories than the fuzzy categories (see Figure 1 from Kalish, 2002).

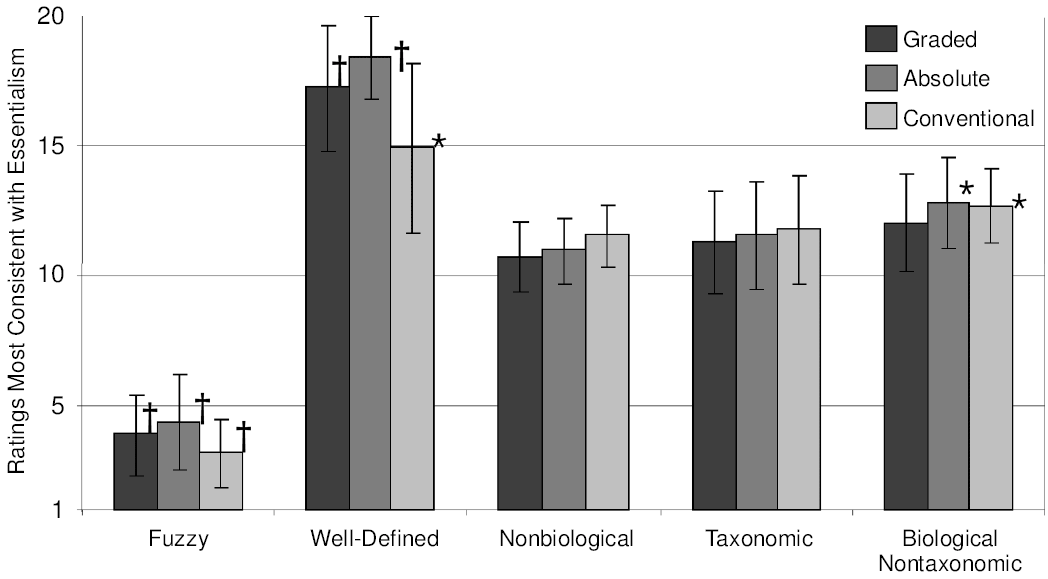

Figure 1. Mean ratings of graded and absolute category structure and conventionality in Experiment 1. Higher scores indicate responses more consistent with essentialism. All measures ranged from 1 to 20. *Different from chance (10.5) at $p < .05$. †Different from chance at $p < .01$. Error bars represent 95% confidence intervals.

Another particularly interesting finding is that there was no significant difference in the degree of essentialist characterization among the three different sub-types of natural kinds (i.e., biological taxonomic kinds, biological non-taxonomic kinds, or non-biological taxonomic kinds). Within each sub-type, some entities were characterized in a manner consistent with essentialism, while others were not. These results, in conjunction with the data concerning the folk characterization of these natural kind items, suggest that natural kind

categories lie on a continuum of "conditions of membership" between the well-defined categories and the fuzzy categories (Kalish, 2002; see figure 2).

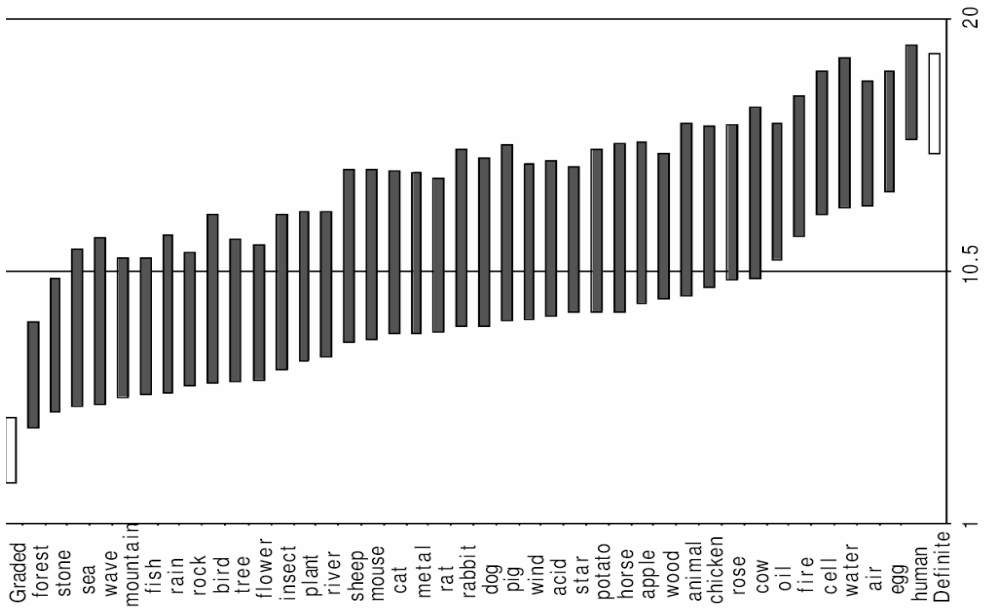

Figure 2. Continuum of "conditions of membership" (Kalish, 2002)

The data also suggests that the particular sub-type of a natural kind (i.e., biological taxonomic, non-biological taxonomic, biological non-taxonomic) is not predictive of where the entity lies on the continuum. I will return to the notion of a continuum of "conditions of membership" when I introduce the Ambiguity Thesis in section 5.

When the scores were analyzed separately for each participant, a wide degree of variability was found. Eight out of the19 participants rated at least 26 of the 40 natural kind categories in a manner suggestive of partial essentialist commitments (i.e., scores higher than 10.5 for each of the three measures of gradedness, absoluteness, and conventionality). The other 11 participants rated less than 26 of the 40 natural kind categories in a manner

consistent with essentialist commitments (i.e., 10.5 or higher). The average scores for each natural kind category were also individually analyzed and were found to vary by category. Some natural kind categories, such as water and human, were consistently rated by all of the participants in an essentialist manner (i.e., scores higher than 10.5 out of 20), while others, such as mouse and fish, were consistently rated in a manner inconsistent with essentialism (scores lower than 10.5 out of 20). These variations in judgment suggest that the conditions of membership that the folk believe natural kind categories are subject to may be much less straightforward and uniform than has been assumed.

4.1.1. Discussion

Remarking on the role of intuitions and hypothetical scenarios in analytic philosophy, Frank Jackson notes that people's judgments about "possible cases" reveal something about their endogenous theoretical commitments (Jackson, 1998, 37-41). Insofar as the scenarios presented by Kalish qualify as "possible cases", the participants' judgments reveal that they did not believe that the natural kind categories possessed an essence functioning as a necessary and sufficient condition of kind-membership. Essentialism predicts that the natural kind categories would be scored similarly to the well-defined categories on the absolute and graded membership measures, since both allegedly have necessary and sufficient conditions of membership. However, the participants only judged the natural kind categories 12.0 out of 20 for absolute and graded membership, whereas they judged the well-defined categories as 18 out of 20 for absolute membership and 17 out of 20 for graded membership. Furthermore, none of the sub-types (e.g., biological taxonomic kinds, non-biological taxonomic kinds, biological non-taxonomic kinds) of natural kinds were characterized more consistently with

essentialism than any of the other sub-types (see figure 1). Rather, within each sub-type, some items were characterized in an essentialist manner while others were not suggesting that the folk are not especially essentialist about any particular sub-type of natural kind. These judgments are hard to reconcile with the essentialist claim that the folk believe that natural kinds are objective categories that have necessary and sufficient conditions of kind-membership represented as essences.[14]

Hence, Kalish's (2002) findings present a prima facie problem for essentialism. I will now consider, and respond to, a number of essentialist attempts to attack the relevance of the data. I will then present other experimental evidence (Malt, 1994) that corroborates the general conclusion I draw from Kalish's data. Finally, I will introduce the Ambiguity Thesis as an alternative description of folk natural kind beliefs and folk natural kind term usage.

[14] Kalish ran two other experiments testing essentialist commitments. Space does not allow a complete discussion, but I will briefly review the design and findings of these experiments. In all experiments, high scores indicate judgments consistent with essentialism. Experiment 2 presented a scenario in which two linguistic communities disagreed as to whether two items belonged to the same kind. The participants were asked questions concerning whether something could be a partial member of a kind and whether the item's kind-membership status was a matter of fact or convention. The scores for the natural kinds were lower than those of the well-defined categories, but higher than the fuzzy categories, though the range between the natural kind categories and the well-defined categories was smaller than in the first experiment . These scores are inconsistent with essentialist predictions.

Experiment 3 tested whether essentialism is only exhibited when natural kinds are juxtaposed to artifacts kinds (e.g., furniture, car, etc.). A scenario such as the following was presented: "A committee of expert biologists was considering a plant that seemed to be halfway between a marigold and a dandelion." Participants were then told that the experts were empowered to determine the plants identity and then asked how the experts ought to proceed: 1) legislate and set a rule, or 2) investigate scientifically. Scores showed that the participants were more willing to say that the experts should continue investigation in order to determine the identity of natural kind items than either artifact or nominal kinds (see table 3). Another scenario was presented in which one group of experts has made the choice to identify the object in a manner inconsistent with another group of experts. The participants were then asked whether one of the groups must be wrong (diversity question). For all categories, the scores were only partially committed (10 out of 20) to saying that one group's classification must be wrong.

4.1.2. Objections and Replies

The first objection may be that the non-essentialist responses were driven by the atypical situations presented in the experimental scenarios, thereby deflating the claim that the responses are representative of folk natural kind beliefs. The use of items whose category membership was disputable even by experts may have led the participants to judge the items in a non-essentialist manner. If this is correct, then the charge might be that the findings do not reveal anything about the participants' natural kind beliefs; rather, they are artifacts of the experiment's design.

It should be noted, however, that most experiments meant to test the essentialist thesis generally involve atypical instances (Pothos & Hahn, 2000) because atypical instances provide a crucial test for the essentialist claim that "when ontological knowledge and theoretical beliefs are available, and when they conflict with shape [i.e., perceptual features], children often sort and name on the basis of these other factors" (Gelman & Hirschfield, 1999). This claim illustrates that essentialism holds essences as the final arbiter when judging natural kind category membership. Atypical instances test such claims by forcing the participants to rely on the hypothesized essence as a means of categorization. In Kalish's (2002) study, this was made possible by revealing nothing about the entities except for the fact that it was a matter of dispute whether it was a member of the kind. Essentialism predicts that under such conditions, judgments would be made consistently with the essentialist predictions (i.e., subjection to absolute conditions of membership).

The second objection argues that my interpretation of the Kalish findings is suspect because it contradicts the interpretation of earlier studies that followed a similar design and produced similar results such as that of Diesendruck and Gelman (1999). Here participants

were given questionnaires meant to probe either how certain they were that the items were members of a particular kind, or how typical of each kind they thought each item was. While many of the typical natural kind instances were rated as absolute category members, a significant number of atypical natural kind instances were also categorized as partial category members. These findings present a problem for the essentialist position. If the essence is always treated as a necessary and sufficient condition of membership, as essentialism suggests, then typicality should have played no role in category membership judgments.

To explain these findings, Diesendruck and Gelman argue that the participants lack of knowledge about whether the atypical instances possessed the essence is likely responsible for the partial category membership ratings (1999). If the participants did not have enough information about either the instance or the category in question, then they may have rated the instance as a partial member in order to err on the side of caution as a result of insufficient knowledge about the instances. The idea implicit in this explanation is that if the participants had had more knowledge about the atypical instances, then they would have judged them in a manner consistent with essentialism. While this explanation seems a likely candidate for the Diesendruck and Gelman (1999) findings, it appears incompatible with the Kalish study. Kalish (2002) controls for the possibly confounding knowledge factor by posing the questions in such a manner that essentialist judgments would not require the participants to have any knowledge of the kind in question. In order to determine if the object X either clearly is or is not a member of the kind P, nothing about Xs or Ps needs to be known. Since Kalish framed the study questions in this manner, it seems unlikely that the "knowledge factor" could have influenced the results.

The third objection hinges on an alleged failure to recognize the difference between causal and sortal essentialism. Causal essentialism is a thesis about the folk's belief in a "substance, power, quality, process, relationship or entity that causes other category-typical properties to emerge and be sustained and confers identity" (Gelman & Hirschfield, 1999, 406). Sortal essentialism, by contrast, is understood as the "knowledge of a 'set of defining characteristics that all and only members of a category have'" (Gelman & Hirschfield, 1999, 405). Supposedly, causal essentialism does not entail that kind-specific essences function as the necessary and sufficient conditions of kind-membership. Sortal essentialism, on the other hand, holds that such essences are represented as necessary and sufficient conditions of kind-membership. Some theorists may hold that the Kalish data do not threaten the causal variety of essentialism (Gelman & Hirschfield, 1999, 408).

There are reasons to question this interpretation of essentialism. The causal essentialist's rejection of sortal essentialism gains its ground by arguing that essentialism is merely a theory about folk belief systems. But, insofar as this form of essentialism holds that the folk believe that the "causal essence" confers identity, it appears committed to the idea that that the folk believe that the causal essence is a necessary and sufficient condition of kind-membership (Rips, 2001). As Rips notes, "what reason could there be for affirming that people believe natural [kind] categories have essences while denying that they believe that terms for natural categories are associated with [the] necessary and sufficient properties?"

(2001, 839). Unless better reasons can be given for assuming that causal essentialism does not entail sortal essentialism, it seems premature to assume that the two can be separated.[15]

The fourth, and possibly the most powerful objection, argues that some of the items that Kalish presented as natural kinds are not actually natural kinds, so we should not expect responses consistent with essentialism. The questionable items are not natural kinds, the objection argues, because they do not track the notion of natural kinds as they are used in the sciences.[16] This criticism seems plausible when we consider that items such as mountain, wind, fish, tree, and cell are not what most theorists would generally consider to be paradigmatic natural kinds. If this objection withstands scrutiny, then we ought to be skeptical of drawing any conclusions about folk natural kind beliefs and folk natural kind term usage from Kalish's data since the natural kind status of some of the items is under question.

The objection, however, does not withstand scrutiny. Recall that psychological essentialism holds that the folk *believe* that certain entities are natural kinds and that the terms associated with these kinds, natural kind terms, are only intended to refer to the entities that are *believed* to possess the appropriate kind-specific essences. Any data suggesting that the folk intend what they *believe* to be natural kind terms to refer to entities that they do not *believe* possess the appropriate kind-specific essences is problematic for essentialism. Whether or not "folk natural kinds" actually are natural kinds is orthogonal to the question at

[15] Another reason to be suspicious of attempts to separate causal essentialism from sortal essentialism issues from the role that sortal essentialism plays in supporting the essentialist thesis. Most of the evidence in support of essentialism is derived from categorization experiments. These experiments are, by the essentialist's definition, experiments designed to test "sortal essentialism" (Gelman & Hirschfield, 1999).

[16] This objection is primarily meant to illustrate that some of Kalish's natural kinds (i.e., 'tree') are not even natural kinds according to the stipulated definition of natural kinds that is presupposed in this thesis (see section 2.2). My response to the objection attempts to explain the inclusion of something like tree as a natural kind by arguing that the "categories" picked out by the stipulated definition may differ for the folk and theorists because of the types of theories and explanations that these entities might be embedded in.

hand, namely, whether the folk only intend what they *believe* to be natural kind terms to refer to what they *believe* to possess the appropriate kind-specific essence.

In any case, it is almost certain that some, if not many, of the entities that the folk believe are natural kinds are not actual natural kinds (i.e., natural kinds as they are understood by theorists) (Gelman, 2002; Kalish, 2002) (see section 2.2). One possible reason that many entities that the folk believe to be natural kinds are probably not actual natural kinds follows from divergences between folk and scientific theories. If folk-theories differ from scientific theories, then the entities that the folk believe are naturally occurring and explanatorily important will likely differ from those that scientists believe to be naturally occurring and explanatorily important. For example, if the folk believe that the class of entities picked out by the vernacular term 'tree' is an explanatorily important class of entities, then they are likely to believe that trees are a natural kind and treat 'tree' as a natural kind term. This follows even though scientists may not believe that the class of entities picked out by the vernacular term 'tree' is a natural kind. Since Kalish's study is primarily interested in the folk's essentialist commitments about natural kinds it is not especially important whether scientists would concur with the entities that the folk consider to be natural kinds. What is important, however, is that the items that Kalish presents are considered by the folk to be natural kinds in the sense of being naturally occurring explanatorily important entities.

The fact that Kalish's natural kind items track basic level categories suggests that the folk would believe that the items that he presents are natural kinds (not in the metaphysical sense, but in the sense that they take these items to be naturally occurring and explanatorily important). The idea of basic level categories, first championed by Amos Tversky (1977) and Eleanor Rosch (1978), holds that there is a privileged level of abstraction that focuses on the

perceptual and functional properties of objects that people tend to rely on when forming categories. The theory emerges from two general principles concerning the human cognitive apparatus and the structure of the world. The first principle (principle 1) holds that organisms wish to gain as much information as possible while "conserving finite resources [time as well as energy] as much as possible" (Rosch, 290). The second principle (principle 2) notes that the world of objects is structured such that certain properties of objects in the world tend to co-occur. For instance, the property of "having wings" tends to co-occur more often with the property "having feathers" than with the property "having fur". These two principles taken together lead to the idea that "information-rich bundles of perceptual and functional attributes form natural discontinuities" and the most "basic cuts in categorization are made at these discontinuities"(Rosch, 1978, 192).

The category CAT, for instance, is considered to be a basic level category because the attributes associated with the category CAT are abstract enough that they tend to co-occur in all cats (four legs, furry, meows, sharp claws) but constrained enough that they do not generally co-occur in other animals (other animals may possess some of the attributes associated with the category 'cat', but almost no other animal possesses all of the attributes together). As a result, if something possesses the cluster of properties associated with the category CAT, it is very probable that the entity is, in fact, a cat. This follows from the fact that most of the properties associated with the category CAT are highly cue-valid, high cue validity being a common feature of basic level categories. A cluster of properties is said to be highly cue-valid, Tversky notes, when the probability that a normal category member will have all of the properties associated with a category nears 1 (1977). If folk natural kind

categories do indeed tend to track basic level categories as Rosch suggests (1978), then it seems probable that the items from Kalish's study do track folk natural kinds.

Another reason to think that people generally class things in terms of basic level categories issues from the fact that this type of taxonomy allows the most pay-off for the least amount of cognitive effort (i.e., principle 1). Categories more abstract than the basic level tend to support fewer interesting and productive inductive generalizations, while more discriminating categories would require more cognitive effort while providing no greater payoff. A change in the cost/benefit of categorization level, however, could, and does, lead to different basic levels of categorization. An interesting example of such a phenomenon realized are the expert fishers who tend to have different, more discriminating basic level categories of fish. Nonetheless, *ceteris paribus*, the folk tend to share basic level categories, and empirical studies have shown that these categories are quite consistent with those that Kalish presents (Rosch, 1978). These studies seem to suggest that basic level categories of naturally occurring objects, much like those used in Kalish (2002), most likely track the folk's natural kind categories. I will return to the role of basic level categories and natural kinds in section 5.1. Barring further unforeseen objections, Kalish's (2002) study suggests that essentialism fails to reflect folk natural kind beliefs.

4.2. Malt's Study

The Kalish (2002) findings do not exhaust the arsenal of empirical evidence against essentialism. Barbara Malt's (1994) study contributes as well. Malt suggests that essentialism does not adequately describe the folk's usage of natural kind terms since it fails to reflect how the reference of some of these terms is determined. In her experiment, participants were

given a list of liquids and asked to categorize them as either ‘water,’ or 'non-water'. Another group of participants was then asked to estimate the H_2O content of each item. The liquids that were chosen included things such as cleaning fluid, tea, swamp water, sweat, tap water, cola, etc. The hypothesis was that if the essentialist thesis is correct and the folk are essentialists about water (in the sense that they believe that the essence of water is H_2O) then there ought to be a correlation between people's use of the term 'water' (i.e., categorization of a liquid as ‘water’) and the H_2O content of the liquids. Interestingly, the participants' use of the term 'water' did not exhibit this correlation. Many instances that were believed to have low H_2O content were categorized as ‘water,’ while instances believed to have very high H_2O content were categorized as 'non-water.' These results are difficult to reconcile with the essentialist claim that the folk only use the natural kind term 'water' to refer to H_2O, or H_2O with some impurities (Putnam, 1975, 269). This in turn suggests that the essence (i.e., H_2O) associated with the term 'water' does not always determine what the term 'water' refers to.

Barbara Abbott (1997, 1999) has presented objections to the non-essentialist interpretations of the Malt findings. One of her most plausible arguments holds that the high H_2O content liquids that were not called 'water' would nonetheless be recognized by the folk as instances of ‘water.’ She maintains that the study only shows that certain high H_2O content liquids are *usually* not called 'water.' This fact, she believes, is a result of the standards of precision that are called into play during a term's usage (1997, 317). The reason that Sprite, for example, was not called 'water,' she claims, has to do with the relatively low standards of precision that the participants of Malt's study employed when categorizing the liquids. She suggests that were we to demand a more precise response concerning Sprite's membership in the category 'water,' the folk would indeed agree that Sprite is 'water.' But as

Bloom (Forthcoming) and Streven's (2000) point out, it is not clear at all whether ordinary speakers would behave as predicted by Abbott. To simply assume that they would is to beg the question.

Abbott also objects that the non-essentialist categorizations may be the result of the ordinary vagueness that accompanies natural kind terms like 'water' (1997, 316-317). On this reading, some of the liquids were not classified as 'water' because the term 'water' is a vague term that does not have a clearly determined reference. If, however, natural kind terms are vague in the manner just described, then this presents a problem for essentialism. Recall that essentialism holds that natural kind terms are only intended to refer to entities that possess the appropriate kind-specific essence. This, in turn, requires that natural kind terms have clearly determined references and, therefore, are not subject to vagueness even if the users of the term are ignorant of the precise description of the essence. Abbott's argument that the Malt data can be explained by vagueness only succeeds at the cost of undermining her claim that essences determine the reference of natural kind terms. Insofar as it escapes the allegations of its objectors, Malt's (2002) study presents a problem for essentialism.

5. The Ambiguity Thesis

The previously discussed findings call two fundamental essentialist commitments into question: first, that the folk are committed to natural kinds having necessary and sufficient conditions of kind-membership (Kalish, 2002) and second, that the intended reference of the folk's natural kind terms is determined by kind-specific essences (Malt, 1994). After considering the existing body of data in its entirety, essentialism appears to rest on questionable empirical foundations. Externalism, insofar as it presupposes essentialist commitments, inherits this shaky foundation rendering its status as a description of the ordinary language usage of natural kind terms problematic. The problematic nature of both essentialism and externalism raises the possibility that other psychological and semantic theories better reflect folk natural kind beliefs and folk natural kind term usage. I will now sketch an alternative thesis, the Ambiguity Thesis, which I take to offer a better description of folk natural kind beliefs and folk natural kind term usage. It is not, by any means, a completely novel theory since it builds upon pre-existing theories. The Ambiguity Thesis is comprised of two sub-theses:

> Ambiguity Sub-Thesis 1 (AST_1): the overarching category NATURAL KIND is ambiguous since different natural kinds may have different conditions of membership.
>
> Ambiguity Sub-Thesis 2 (AST_2): natural kind terms are ambiguous in that they have multiple senses and need not refer only to entities that possess the appropriate kind-specific essence.

AST_1 primarily deals with folk-biological beliefs concerning natural kinds; AST_2 offers a better performing descriptive theory of natural kind terms that is based on folk natural kind term usage. I will discuss these sub-theses in order.

5.1. Ambiguity Sub-Thesis 1

In contrast to the essentialist claim that the condition of membership for the overarching category NATURAL KIND is the possession of an essence, the first sub-thesis holds that this overarching category is ambiguous since individual natural kinds are believed to have different conditions of kind-membership. This thesis enjoys empirical support from the Kalish (2002) findings, which are presented as a continuum of "conditions of kind-membership" (see figure 2).

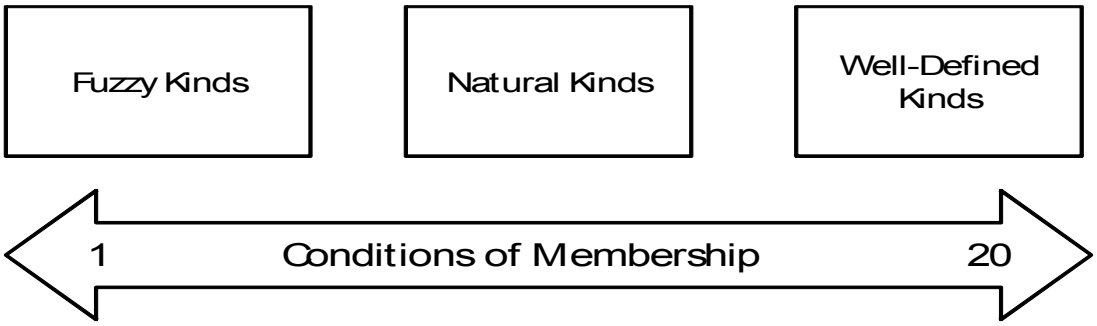

Figure 3. Chart of Kalish (2002) findings

Note that the natural kind categories occupy an intermediate place on the continuum, between the well-defined categories representing clear necessary and sufficient conditions of membership on one end, and the fuzzy categories representing a clear lack of necessary and

sufficient conditions of membership on the other end. The intermediary position of the natural kind categories illustrates the participants' reluctance to score the natural kinds as clearly having necessary and sufficient conditions of kind-membership.

When we consider the score of each individual natural kind category (e.g., MOUSE, WATER, FISH), it becomes apparent that not all of these categories are believed to have the same conditions of kind-membership (see figure 2). Water, for instance, occupies a place close to the well-defined categories, suggesting that most of the participants believed that the natural kind WATER had relatively clear-cut conditions of kind-membership. Mouse, on the other hand, occupies a place at the lower end of the continuum near the fuzzy kinds, suggesting that participants did not believe that the natural kind MOUSE had clear-cut conditions of kind-membership. The large degree of variation exhibited by the natural kind categories on this measure suggests that the overarching category NATURAL KIND does not constitute a homogenous class of entities; rather, it is a heterogeneous class composed of a variety of categories that are believed to have different conditions of kind-membership (Kalish, 2002). On the one hand, these findings challenge the claims of some philosophers and psychologists that natural kinds constitute a homogenous class that is characterized by a singular condition of kind-membership (i.e., essences) (Kripke, 1972; Putnam, 1975; Abbott, 1997). On the other hand, the data support those accounts of natural kinds that argue that the class NATURAL KIND is a heterogenous class composed of a group of entities that do not share a singular condition of kind-membership (e.g., Boyd, 1989; Dupre, 2002; Malt, 2003; Kalish, 2002).

It is also worth noting that the items from the three sub-types of natural kinds-- biological taxonomic, non-biological taxonomic and biological non-taxonomic-- are equally dispersed on the continuum. This suggests that there is no specific sub-type of natural kind

that is more strongly essentialized than any other. Insofar as the participants hold that all of the natural kind items presented by Kalish (2002) are, in fact, "naturally occurring explanatorily important entities," then it appears that possession of kind-specific essences that represent the necessary and sufficient conditions of kind-membership is not believed to be a requisite feature of natural kinds. This suggests two things: (1) that the folk are not essentialists, and (2) contrary to the claims of Kripke (1972) and Putnam (1970; 1975), the most precise definition that can be derived from folk natural kind term usage is the stipulated definition of natural kinds: "naturally occurring explanatorily important entities."

The ambiguity of the overarching category NATURAL KIND is further suggested by the participants' judgments that membership in a natural kind category is only partially an objective matter of fact (Kalish, 2002). This, in turn, implies that individual conventional rules are believed to determine, at least partially, the conditions of kind-membership for natural kind categories. Ambiguity ensues because different conventions may lead to different types of conditions of kind-membership. Interestingly, individual analysis of the participants' scores revealed that the characterization of the natural kind categories varied by participant (Kalish, 2002, 343). This finding suggests that the participants did rely on different criteria when determining their judgments about the conditions of membership. To the extent that individual beliefs about conditions of membership may vary, the overarching category NATURAL KIND appears ambiguous.

The first hypothesis suggests that folk beliefs about natural kinds are best described as a set of beliefs that may vary by person and by natural kind category. Most importantly, the first hypothesis holds that the conditions of membership for natural kinds may vary on these two dimensions. For instance, some people may believe that some natural kind categories

possess essences (e.g., WATER), while other natural kind categories do not (e.g., MOUSE). The data suggesting that many natural kind categories (i.e., categories consisting of naturally occurring, explanatorily important entities) fail to share an objective condition of membership (in this case, classical essences) further suggests that the overarching category NATURAL KIND is ambiguous.[17]

In addition to the Kalish (2002) data, there are other reasons to suppose that the first hypothesis of the Ambiguity Thesis might be on the right track. As already noted, Rosch's theoretical and empirical work on basic level categories suggests that the common thread found within folk natural kinds is the high number of co-occurring perceptual properties associated with each natural kind category (1978). Natural kind categories that track basic level categories predict natural kind groupings that cluster around a large number of perceptual cues. In many cases, folk natural kinds seem to track just this type of feature (Kalish, 2002; Rosch, 1978). Quine (1969) provides similar theoretical reasons, mainly in the form of a theory of cognitive development, to think that a cluster of cue valid perceptual features may provide initial grounds to group entities into categories (natural kinds). Once these categories have been formed, they might remain intact as "natural kind" categories even when theoretical insight is gained so long as the perceptually based categories do not conflict with theoretical beliefs. The take home message of both Quine and Rosch seems to be that the folk have a tendency to group natural kinds according to criteria other than a belief in essences. If this is true, then even when further beliefs have been attributed to the categories,

[17] I use 'classical essence' in order to distinguish the use of essence used here (viz. a necessary and sufficient property) from other uses of 'essence' which are not committed to essences being necessary and sufficient properties (e.g., Boyd's homeostatic property cluster account of natural kinds).

the more basic reasons for grouping may still play a role in folk beliefs about these natural kind categories, and, in turn, influence natural kind term usage.

5.2. Ambiguity Sub-Thesis 2

The second sub-thesis holds that natural kind terms are not used solely to refer to entities that are believed to possess the appropriate kind-specific essence. This thesis appears to be supported by the Malt (1994) study. Here, the categorization of many low H_2O content liquids (e.g., swamp water) as 'water' and many high H_2O content liquids (e.g., Sprite) as 'non-water' seems incompatible with the essentialist claim that natural kind terms (e.g., 'water') only refer to natural kind entities that possess the appropriate kind-specific essences (e.g., H_2O). The fact that the liquids that were categorized as 'water' tended to fit a description that is often associated with the term 'water,' whereas the liquids categorized as 'non-water' did not fit this description, suggests instead that a stereotypical description of water determined what the term referred to. Transformation task studies, on the other hand, suggest that the reference of natural kind terms is sometimes determined by an unobservable property, (i.e., a kind-specific essence).[18]

AST_2 seeks to explain these findings by positing that many, if not all, natural kind terms are ambiguous in that one natural kind term may have more than one sense, and as a result, more than one extension associated with it.[19] As Bloom notes, natural kind terms may

[18] However, some doubt that essences need to be posited in order to explain these findings (see Strevens, 2000; 2001).

[19] It should be noted that while this sub-thesis is presented by Bloom (forthcoming), I develop the idea in a manner that might be inconsistent with Bloom's line of thought. I do not intend that he should be understood as committed to my claims. Also, see Schwartz (1980) who proposes 'hybrid natural kind terms' that have a description that is associated with the natural kind term.

be similar to terms such as 'window' (forthcoming, 306). In one sense, a window is a structure made of glass and metal or wood. In another sense, a window is the hole in the side of a house that these structures generally fill. The ambiguous nature of a term such as 'window' results from a single term being used to refer to two different extensions that are determined in different ways (i.e., the extension consisting of the structures and the extension consisting of the "holes" in the sides of houses and buildings).

The empirical evidence concerning the folk's usage of natural kind terms suggests that these terms have both a natural sense and a stereotype sense (Malt, 1994; Keil, 1989; Bloom, forthcoming). AST_2 proposes that the natural sense of a natural kind term is only used to refer to entities that are believed to possess the appropriate kind-specific essence, while the stereotype sense of the term is used to refer to entities that share certain stereotypical features that are associated with the natural kind. I will now discuss the two senses of natural kind terms in more detail.

The reference of the natural sense of a natural kind term is determined by a belief in an important shared structure, or kind-specific essence. For 'water' this might be H_2O; for 'tiger' it might be a specific genome.[20] Regardless of the specific characteristics ascribed to the "essence," the natural sense of a natural kind term is only used to refer to entities that are believed to possess the appropriate kind-specific essence. Because the reference of the natural sense of a natural kind term is determined by a kind-specific essence, in the event that an entity is not believed to possess said essence, the natural sense of the term would not be used to refer. So, for instance, AST_2 holds that the natural sense of the natural kind term 'tiger' is only used to refer to entities that are believed to possess the "tiger" essence. As should be

clear, the "natural sense" proposed by the Ambiguity Thesis tracks the essentialist/externalist account of natural kind terms. The Ambiguity Thesis differs, however, in that it recognizes that such an account fails to offer a complete descriptive account of folk natural kind term usage.

The reference of the stereotype sense of a natural kind term, on the other hand, is determined by the description that is associated with the entities commonly named by the term.[21] The stereotype sense is used to refer to entities that share a similar description with the entities that are normally referred to by the term (Bloom, forthcoming, 301). For 'water,' this would be a description such as "the stuff that fills lakes, is drinkable, is clear, dissolves salt, is tasteless, etc." A liquid (e.g., the 'water' on Putnam's twin-earth) that fits this description might intentionally be called 'water' even though it is not believed to possess the kind-specific water essence. Additionally, stuffed tigers may be intentionally referred to as 'tigers,' not because people presuppose that they bear a tiger essence, but because they fit a certain description that is associated with the class of entities normally referred to by the term 'tiger.' The intentional labeling of stuffed figures as 'tigers' brings to the surface another aspect of AST_2. In addition to being used to refer to entities that are not believed to possess the appropriate kind-specific essence, some natural kind terms may even be used to refer to entities that are not natural kinds (i.e., naturally occurring, explanatorily important entities).

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[20] I say that the essence associated with 'water' "might" be H_20 because it might be that some people believe that water does have an essence, but H_20 is not the essence.

[21] I use 'stereotype sense' in order to suggest that the 'stereotype' that Putnam (1970; 1975) claims is associated with a natural kind manages to determine the reference of one sense of the term that is associated with the natural kind as well as describing the "paradigmatic members of the kind."

In any case, the class of entities referred to by the stereotype sense of a natural kind term generally extends beyond the class of entities referred to by the natural sense of the term.[22]

The idea of multiple senses introduces a host of theoretical questions, perhaps the most important of which has to do with the manner in which the various senses of natural kind terms are disambiguated. What is it that allows a listener to know which sense of a natural kind term, the stereotype sense or the natural sense, is being employed so that the listener can track the correct extension? One response, the one that I think is on the right track, holds that the context in which a term is uttered plays the role of disambiguating the sense of the ambiguous natural kind term.[23]

On this reading, AST_2 holds that elements of the context in which a natural kind term is used play a role in disambiguating the sense of the natural kind term for listeners by clarifying what the term refers to. By making the reference clear, the sense of the term is made clear for the listener. This is all made possible because context "clues the listener in" to the intended sense of the term. For instance, if I say "The tiger is very big" the context in which I utter this will help to disambiguate which sense of 'tiger' I intend (i.e., the stereotype sense or the natural sense). If I say this while visiting the zoo, then context disambiguates the

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[22] Importantly, the Ambiguity Thesis does not claim that possession of the appropriate kind-specific essence is either a necessary or a sufficient condition of membership in a natural kind, even though it does hold that the essence is a necessary and sufficient condition for the reference of the natural sense of a natural kind term. So, according to the Ambiguity thesis, it is possible that an entity (e.g., an animal) that is not believed to possess the appropriate kind-specific essence (e.g., tiger essence) could still be labeled with a natural kind term (e.g., 'tiger') and considered to be a member of a specific natural kind (e.g., the natural kind TIGER). The entity (e.g., animal) could be considered a member of the natural kind (e.g., TIGER) and the natural kind term (e.g., 'tiger') could be used to refer to the entity, but this would not be in virtue of the natural sense of the term since the animal is not believed to possess the appropriate kind-specific essence. Rather, this is possible because the Ambiguity Thesis allows that other criteria (i.e., a description) besides the possession of the appropriate kind-specific essence (e.g., tiger essence) might underwrite reference to the entity (e.g., an animal) in order to categorize it as a member of a specific natural kind (e.g., TIGER).

[23] Importantly, for the most part, sense-disambiguation is probably not a process that requires deliberate conscious attention; rather, it seems to just happen at a sub-conscious level (see Pustevosky and Boguraev, 1996; Cuyckens and Ziwada, 1997).

term in the direction of the natural sense of the term. If, however, I utter this same sentence while visiting a toy store, then the context disambiguates the term in the direction of the stereotype sense. Similarly, if an earth-speaker, calls twin-earth water 'water' even though she is aware that the stuff called 'water' on twin-earth is not H2O, then context suggests that the earth-speaker is employing the stereotype sense of the natural kind term 'water.' Note that disambiguation towards the stereotype sense indicates the term is referring to the set of entities picked out by a description, be that a perceptual or functional description, while disambiguation towards the natural sense indicates that the term is referring to the set of entities that possess the appropriate kind-specific essence.

AST_2 argues that many natural kind terms have at least two senses, one is a stereotype sense and the other is a natural sense. The two senses share some, but not total extensional overlap since the senses are related but nonetheless refer to different extensions: (1) an extension whose members fit the stereotype, and (2) an extension whose members possess the appropriate kind-specific essence.[24] It should be noted that the two senses could, theoretically speaking, share total extensional overlap if every entity that possesses the essence also fits the stereotype. So, for instance, if every liquid that is "clear, odorless, tasteless, found in lakes and streams" is H_20, then the extension of the stereotype sense of the term 'water' is the same as the extension of the natural sense of the term 'water.' I will now consider a number of potentially damaging objections to the Ambiguity Thesis.

[24] A term's extension is constituted by the set of entities that possess the relevant property that the term refers to.

5.3. Objection 1: Natural Kind Terms Are Not Ambiguous

The first objection argues that the claim of ambiguity as it is presented in the second hypothesis is methodologically weak (Abbott, 1997, 316). Abbott (1997) maintains that unlike truly ambiguous terms like 'bat,' a term used to refer to "flying mammals" as well as "sticks used to hit balls," no language possesses terms for "clear liquid that fills lakes and streams, is drinkable, etc" and "H_2O" so natural kind terms like 'water' are not really ambiguous. This, however, is a misguided and uncharitable reading of the claim, first championed by Noam Chomsky (1995) and later by Paul Bloom (forthcoming), that natural kind terms might be ambiguous. Abbott seems to imply that a requirement on ambiguous terms is that there actually are languages that differentiate the two senses and associate each sense with a particular lexical term. According to this description of ambiguity, the English term 'bat', for example, is ambiguous in virtue of the fact that there are some languages that have one word that means, more or less, "rodent-like mammal that flies" and another word that means "stick used to hit a ball." So, according to Abbott, the fact that there is no single term in German that means both "rodent like mammal that flies" and "stick used to hit a ball" is necessary evidence that 'bat' is ambiguous.[25] This is, however, a rather misguided characterization of ambiguity.

In linguistics, the class of ambiguous terms is commonly taken to comprise both homonymous terms and polysemous terms (Pustejovsky & Boguraev, 1996; Brisard et al., 1997; Gross, 2004; Dunbar, 2001).[26] A homonymous term is a term that has at least two

[25] Though, of course, the language must not be German. In German there is, in fact, one particular lexical term associated with each sense- "rodent like mammal that flies" is translated as 'die Fledermaus', while "stick used to hit a ball" is translated as 'der Schlaeger'.

[26] Homonyms and polysems are sometimes referred to as instances of contrastive ambiguity and complementary ambiguity, respectively (Pustejovsky & Boguraev, 1996)

unrelated meanings that share no relevant extensional overlap.[27] Homonymous terms can be thought of as two meanings associated with a singular phonological form. 'Bat' is a classic example of a homonymous term. A polysemous term, on the other hand, is a term that has at least two related meanings that share some, though generally not total, extensional overlap. Polysemy, like homonymy, can be couched in terms of the specific associated phonological form, such that a polysemy involves multiple related meanings that are associated with a singular phonological form. The overlap of extension found in polysemy illustrates the relatedness of the senses. A common example of a polysemous term is 'door.' The term 'door' has at least two senses, one of which refers to the space that is filled by a door, and the other that refers to the object that generally is used to fill this space. The two senses of 'door' share extensional overlap, but this overlap is not total. Doors exist that are not in these spaces (i.e., doors) and some of the spaces (i.e., doors) do not have doors filling them.

For natural kind terms, the overlap likely follows from the fact that most members of the extension of the natural sense of a natural kind term generally fall within the extension of the stereotype sense of the natural kind term. Most instances of a natural kind, after all, generally fit the stereotypical description associated with the kind. On the other hand, most entities that fall within the extension of the stereotype sense of a natural kind term also fall within the extension of the natural sense of the term. This follows from the fact that the

[27] They might, however, share some non-relevant extensional overlap just as both senses of the term 'bat' fall within the extension of 'things weighing less than 25 kg.'

descriptions associated with the stereotype sense of a natural kind term generally track the features that most members of the natural kind picked out by this term possess.[28]

Abbott's argument, quite rightly, assumes that natural kind terms are not ambiguous in the sense that they are probably not homonymous terms. But it fails to recognize the very real possibility that natural kind terms might be ambiguous in the sense that they are polysemous. Arguing that 'water' is ambiguous in the sense that it is a polysemous term does not require that some language possesses different lexical terms for the two proposed senses of 'water'-- it only requires that the two senses could have extensions that fail to overlap completely. Cognitive linguistics, after all, "allows that particular referential or conceptual differences in the uses of a word are allowed to make up different polysemous senses" (Cuyckens & Zawada, 1997, xvi). Further, if we accept that people often use terms such as 'tiger' with the intent to refer to the set of entities that share a certain description (e.g., *Tony the Tiger;* 'water' on twin-earth) as well as using the term with the intent to refer to the set of organisms that are members in the natural kind 'tiger,' then it appears that the term 'tiger' has a multiplicity of meanings.[29] If this is correct, then the term 'tiger' is ambiguous (i.e., polysemous) though it is not homonymous.

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[28] Another dimension of difference between homonymous and polysemous terms involves how the associated senses are represented in the mental lexicon. Unlike the representations of the senses of a homonymous term that are probably stored independently in the mental lexicon, the representations of the senses of polysemous terms in the mental lexicon probably largely overlap. These claims are supported by semantic priming studies though the exact implications of these findings are somewhat controversial (Brisard et al, 1997). Considering that linguists have recognized the pervasiveness of polysemy as a linguistic and cognitive phenomenon for many years and within almost all units of linguistic analysis [i.e., lexical item level, sentence level], claiming that natural kind terms are polysemous doesn't seem that radical after all (Brisard, et al, 1997; Cuyckens & Zawada, 1997).

[29] Similarly, if people are willing to use 'water' to refer to the liquid on twin-earth that looks and tastes just like water even though they know that the liquid is not H_2O (i.e., it does not possess the appropriate kind-specific essence), and they are also willing to call a liquid 'water' that does not look exactly like water but that is H_2O (i.e., it does possess the appropriate kind-specific essence), then it seems that the natural kind term 'water' has a multiplicity of meanings.

An example taken from Abbott may prove useful in illustrating how widespread and common polysemy concerning alleged natural kind terms is. According to the Ambiguity Thesis, the natural kind term 'blood' has two senses. The stereotype sense of the term has a reference that is determined by a description along the lines "red liquid that the body releases when cut, etc." The reference of the natural sense of the term 'blood' is likely determined by properties that are considered unique to the natural kind 'blood' (H_2O plus platelets, etc.). Now, consider Abbott's example of blood flowing from a faucet in a B-grade horror movie (1997, 316). Unless the directors are extremely meticulous about their special effects, it is safe to assume that the red liquid is not actually blood. Instead, it is probably some liquid that has a red dye in it. But, as Abbott asks, wouldn't we agree that the liquid oozing from the faucets in this horror movie should be called 'blood' (1997, 314)? If we do agree with Abbott, then it is most likely not because we think this red liquid shares some important property (i.e., an essence) that is unique to the other stuff we normally call 'blood.' Nor are we likely to presuppose that our use of the term 'blood' should be discharged if the stuff does not possess this important property (i.e., essence). If we do agree with Abbott, then it is most likely because the stuff (the liquid) fits the description of blood. In order to explain the intentional labeling of this liquid as 'blood' we must assume either that the people that call this liquid 'blood' think it is really blood in the natural sense, or assume that the term 'blood' has a stereotype sense whose reference is determined by a description of blood. Charity concerning people's intelligence inclines us to accept the second interpretation.

5.4. Objection 2: Externalism Can Accommodate Ambiguity

The second objection argues that the Ambiguity Thesis fails to operate as an alternative to externalism since the notion of multi-sense natural kind terms is already present in Putnam's work (1975). This claim is defended by both Barbara Abbott (1997) and Francois Recanati (2005). Here, I begin by exploring, and rejecting, Putnam's own claim that natural kind terms have multiple senses by showing that this claim is inconsistent with his project as a whole. I then turn my attention to Abbot's (1997) and Recanati's (2005) defense of Putnam and reject them one at a time.

Because of its central importance, I have included the relevant section of Putnam (1975) concerning the "other senses" of natural kind terms. He writes

> What we have analyzed so far is the predominant sense of natural kind words (or, rather, the predominant extension). But natural kind words typically possess a number of senses...
>
> Part of this can be explained on the basis of our theory. To be water, for example is to bear the relation sameL to certain things. But what is the relation sameL?
>
> x bears the relation sameL to y just in case (1) x and y are both liquids, and (2) x and y agree in important physical properties… What I want to focus on now is the notion of importance. Importance is an interest relative notion. Normally, the important properties of a liquid or solid etc are the ones that are structurally important: the ones that specify what the liquid or solid, etc. is ultimately made out of… From this point of view the characteristic of a typical bit of water is consisting of H2O. But it may or may not be important that there are impurities; thus, in one context 'water' may mean chemically pure water, while in another it may mean the stuff in Lake Michigan. And a speaker may sometimes refer to XYZ as water if one is using it as water…. Even senses that are so far out that they have to be regarded as a bit 'deviant' may bear a definite relation to the core sense. For example, I might say "did you see the lemon" meaning the plastic lemon. A less deviant case is this: we discover 'tigers' on Mars. That is, they look just like tigers, but they have a silicon-based chemistry instead of a carbon-based chemistry. (A remarkable example of parallel evolution!) Are martian 'tigers' tigers? It depends on the context. (Putnam, 1975, 239)

The first sentence cited in this passage suggests that the 'sense' of a natural kind term just is the extension associated with the term which further suggests that the problem of multiple senses is really a problem of multiple extensions associated with one natural kind term. Clearly, Putnam seems to think that his project allows that natural kind terms may have more than one extension (and more than one sense to the extent that externalism identifies the sense of a term with the term's reference). This is why he says that the Earth term 'water' could even be used to refer to XYZ under some circumstances. But, insofar as Putnam is committed to the causal/historical theory of reference, he seems committed to holding that each natural kind term only has a single extension. To see why this must be the case, consider how the lexical baptism of a natural kind term is supposed to occur according to the causal/historical theory of reference: an entity is baptized by a term, and the reference of the term is determined by the micro-structural properties (i.e., the way that that the world is) that are present in the entity at the time of the lexical baptism. Afterwards, the term only refers to entities that possess the proper micro-structural properties, since the reference of the term is determined, according to externalism, by the relevant micro-structural property. For externalism, the extension of a natural kind term is determined once and for all at the time of the lexical baptism. As a result, any natural kind term is only allowed one extension since the referent of the term is set once and for all during the baptism. Since the term's reference exhausts the meaning of the term, a natural kind term is only allowed one meaning (a single sense) since it is only allowed one reference, and, therefore, one extension. Regardless of Putnam's claim, it is not clear how he intends to deliver on the claim that externalism allows that natural kind terms have more than one sense.

Francois Recanati (2005) attempts a defense of Putnam's claim by arguing that the dimension of similarity that defines the "important property" necessary for determining reference is not stable.[30] Similarity is, he notes, contextually sensitive such that the important property of the entity (i.e., natural kind) might change depending on the context in which the term is uttered. This explains, supposedly, how 'water' can refer to chemically pure H2O at one point, and the stuff in Lake Michigan at another. So, for example, in a lab setting, context might determine that the important property for 'water' is chemically pure H2O, while during a fishing trip in Michigan, context might determine the important property of 'water' is being 80% H2O, i.e., the stuff in Lake Michigan. Further, context can even explain how the important property of 'water' is "being a liquid that is clear, etc (even if it is not H2O)" so that the term 'water' might even be used to refer to the XYZ on twin-earth (Putnam, 1975, 239).

Recanati's explanation seems consistent with Putnam's proposal, especially considering that Putnam too believes that "important" as it is used in the phrase "important property" is an "interest-relative notion" (Putnam, 1975, 239). The problem, however, with Recanati's defense and Putnam's claim that "important" is an interest-relative notion is that it flies in the face of the role of reference fixing via the lexical baptism. As I have already noted, the important property that is relevant in determining the reference of a natural kind term just is the micro-structural property (essence) that the baptized entity possesses (Kripke, 1972; Putnam, 1975; Abbott, 1997). It is only because externalism holds that reference is determined by these properties that natural kind terms enjoy their status as rigid designators and it is only because externalism holds that natural kind terms are rigid designators that

[30] Importantly, Recanati's position is what is sometimes referred to as a weak, as opposed to strong, form of externalism. His argument may be successful in supporting a weak form of externalism, but, I believe, it fails to support the stronger form that is under fire in this paper (i.e., Putnam, 1975; Kripke, 1972; Abbott, 1997).

externalism enjoys its explanatory power concerning twin-earth intuitions. Claiming that the relevant property picked out by the similarity relation can shift from context to context does allow natural kind terms to have multiple senses. It enjoys this ability, however, only by deflating the role that the world plays in determining the term's reference during the lexical baptism. Since the role that the micro-structural property (essence) plays during the lexical baptism is a central component of externalism, the cost of accepting Recanati's defense seems too heavy of a burden for the externalist to bear.

Abbott (1997) has also attempted a defense, though hers differs from Recanati's in that it does not argue that natural kind terms have multiple senses (1997, 316) to explain how 'water' might refer to chemically pure H_2O at one point and the stuff in Lake Michigan at another. Instead, she argues that this can be explained by the differing implicit standards of precision that are invoked when people use natural kind terms. This argument hinges on her claim that natural kind terms are subject to vagueness (1997, 316). Now, as I have already argued, there is simply no reason to think that natural kind terms are subject to vagueness if externalism is correct. If her argument that natural kind terms are subject to vagueness is shown to be mistaken, then the claim that implicit standards of precision explains how the reference of natural kind terms can shift seems suspect. In the end, none of the defenses of multiple senses within externalism seem to withstand scrutiny. Barring other more successful arguments for multi-sense natural kind terms within the externalist camp, the Ambiguity Thesis's claim that natural kind terms possess multiple senses, as well as the explanatory mileage that such a claim allows, appears incompatible with externalism.

5.5. Objection 3: Figurative Uses Are Compatible with Externalism

There is another objection closely related to the one just discussed that needs to be dealt with. This objection holds that many of the examples that have been used when discussing the stereotype sense of natural kind terms can be chalked up to the figurative use of these terms.[31] Figurative uses, or non-literal uses, the objection argues, are not really a problem for externalism since Kripke (1972) and Putnam (1970; 1975) are only concerned with literal uses of natural kind terms. I call this the "figurative use objection."

The figurative use objection is interesting but it fails to deal any lethal blows to the Ambiguity Thesis. It fails to do so because it only succeeds by assuming that natural kind terms have a figurative sense. The alleged figurative sense of natural kind terms is an unavoidable byproduct of the so-called "figurative use" of the terms. The introduction of a figurative sense of natural kind terms suggests that the terms have multiple senses thereby subjecting the figurative use objection to the same critiques that I have already leveled at Putnam's (1975), Abbott's (1997), and Recanati's (2006) attempted defenses of multiple senses within the externalist framework. The upshot of the figurative use objection is that it cautions us to be careful in allotting too much weight to examples that might be subject to the figurative use objection (e.g., stuffed tigers, plastic lemons, etc), while recognizing that the objection only presents a problem to the extent that externalism can handle multiple senses.

Though the figurative use objection does not seem to pass muster, because of its intuitive appeal, I want to explain why it fails to deliver any lethal blows to the Ambiguity Thesis even if it does succeed. Let us assume that the figurative use objection carries through- that non-literal or figurative uses of natural kind terms are not really a problem for

externalism. This would handle some of the examples (i.e., stuffed animals referred to by natural kind terms) that I have been discussing in order to illustrate that the Ambiguity Thesis outperforms externalism. Importantly, however, cases that can be described as instances of "figurative use" do not exhaust the Ambiguity Thesis's arsenal of support. Recall that AST_2 argues that in addition to being used to refer to entities that possess the appropriate kind-specific essence, natural kind terms are also used to refer to entities that share the stereotypical description associated with the appropriate natural kind. So, assuming that the figurative use objection might be able to explain why externalism is able to hold that plastic lemons are sometimes called 'lemons,' it cannot account for Putnam's claim that Earth speakers might sometimes knowingly use 'water' to refer to the stuff on twin-earth that is called 'water' but is not H_2O (Putnam, 1975, 239). Since there is some evidence which is not subject to the figurative use objection that suggests that people do use natural kind terms to refer to entities that are not believed to possess the appropriate kind-specific essences (see section 6; Malt, 1994), there is reason to believe that the problem of multiple senses is not just an illusory problem that can be chalked up to figurative use. Insofar as natural kind terms have multiple senses, the Ambiguity Thesis appears to outperform externalism.

5.6. Objection 4: Ambiguity Sub-theses 1 and 2 Are Inconsistent

Before closing, one final objection that might be leveled at the Ambiguity Thesis should be discussed. It argues that the first and second hypotheses are in conflict since the first holds that some natural kinds are not believed to possess essences and the second holds that the natural sense of a natural kind term refers to a kind-specific essence. This raises the

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[31] This objection is due to Sebastian Rand.

question of how the reference of the natural sense of a term can be determined by an essence if some of the folk do not believe in essences. While a full response to this objection requires more space than I have, I would like to sketch two partial responses.

Because essentialist commitments vary according to individual and/or specific natural kind categories, it could be that the extent to which a specific natural kind term has both a natural sense and a stereotype sense is a function of either the individual, the specific natural kind associated with the term, or a combination of both. For instance, if an individual does not believe that cats have a "cat essence," then that individual may have no natural sense of the natural kind term 'cat'. For this person, there may only be one sense of the term 'cat,' namely, the stereotype sense. Furthermore, as already noted in previous sections (section 3.3), it might be that certain natural kinds are less "essentialized" (i.e., they are not believed to possess kind-specific essences) than others. The terms associated with these natural kinds may not have a natural sense at all. Or, there might be certain people that tend to strongly "essentialize"- they tend to believe that all things possess a specific type of essence. These people may have a natural sense that is associated with almost all of their natural kind terms. In the end, whether, and to what extent, natural kind terms have both a stereotype sense and a natural sense may be a function of the individual as well as the specific natural kind in question. If this is correct, then AST_1 and AST_2 are not in conflict since it may simply be that some natural kind terms-- namely, those associated with natural kind that are not believed to possess essences-- do not have a natural sense.

Another possibility is that the two senses posited in AST_2 cause individuals to characterize natural kinds in a manner consistent with AST_1 (i.e., as lacking similar conditions of kind-membership). Recall that AST_2 posits that most natural kind terms have both a

natural sense and a stereotype sense. When individuals are asked to make judgments about natural kinds as Kalish's (2002) study required, information about the stereotype sense as well as the natural sense of the term might be brought to bear on the judgments. The fact that it is unlikely that the stereotype sense includes any properties that are taken to be necessary conditions of kind-membership could lead to non-essentialist characterizations of natural kinds such as those exhibited by the participants in Kalish (2002). Such non-essentialist characterizations do not require that natural kinds are not believed to possess essences; rather, they only suggest that kind-specific essences are not taken to be the only relevant information concerning natural kinds. To the extent that both stereotypical properties via a stereotypical sense as well as kind-specific essences via a natural sense may determine the reference of a natural kind term, it remains possible that many natural kinds that are not characterized in an essentialist manner may, nonetheless, have a natural sense that determines reference via a kind-specific essence. Accordingly, AST_1 and AST_2 are not necessarily inconsistent. I will now turn attention to where the Ambiguity Thesis stands philosophically.

5.7. The Philosophical Characterization of the Ambiguity Thesis

This paper began by pointing out some of the problems that both internalism and externalism face insofar as they each claim to comprise complete descriptive semantic theories of natural kind terms. While neither theory seems complete by itself, there are reasons to suppose that both internalism and externalism are valuable, and necessary, explanatory tools that should be exploited in order to devise a complete descriptive semantic theory of natural kind terms. I have attempted to make such reasons known throughout this thesis. The Ambiguity Thesis, I believe, provides a rough sketch of how such a completed theory may

look if it accepts the valuable theoretical insights of both internalism and externalism. I will now briefly explore how the Ambiguity Thesis is related to both internalism and externalism.

Externalism, insofar as it is built upon the assumption that the folk are essentialists, requires that the reference of natural kind terms is determined by kind-specific essences. Internalism, on the other hand, holds that the reference of natural kind terms, as well as most other types of lexical terms, is determined by the mental representation that is linked with the term. To the extent that these mental representations are understood to be descriptions, internalism is committed to a descriptivist theory of reference. On the contrary, externalism holds that reference is direct and need not be mediated by any mental representation so far as the speaker is causally linked to the term in the proper manner.

The ambiguous nature of most natural kind terms, a key component of the Ambiguity Thesis, suggests that both internalism and externalism are necessary in order to describe how the reference of natural kind terms is established. The stereotype sense of natural kind terms suggests that, at least sometimes, the mental representation associated with a term determines the reference of the term. This explains why and how the reference of the term 'tiger' can include stuffed animals and how an Earth speaker might knowingly use the term ‘water’ to refer to the XYZ found on twin-Earth. The natural sense of natural kind terms suggests that theoretical beliefs about underlying properties, perhaps in the form of essences, are sometimes responsible for determining the reference of the term. This aspect of the Ambiguity Thesis explains why and how the reference of natural kind terms can include entities that are not picked out by the mental representation (i.e., description) associated with the natural kind term (i.e., transformation task studies). The natural sense of these terms also explains why people might share Putnam's realist intuitions concerning theoretical entities like Bohr's

electron. In the end, the data that support the Ambiguity Thesis suggests that both internalism and externalism need to be included in a proper descriptive theory of semantics. I will now discuss some new empirical data that may prove useful in confirming some of the Ambiguity Thesis's predictions.

6. New Data, New Directions

In keeping with the aims of previous work in experimental philosophy, I will now briefly present some new data from a pilot study that might be helpful in confirming, or denying, the Ambiguity Thesis. I begin by explaining the design of the experiment and the results to date. I then turn to a discussion that explains how these data square with the Ambiguity Thesis.

6.1. Motivation and Design

It was noted earlier that there is a tendency among analytic philosophers to assume that their intuitions about "possible cases" are widespread among the folk and, therefore, that their intuitions provide *prima facie* evidence in support of the particular philosophical positions that they present (Knobe, forthcoming). Thanks to the work of experimental philosophers, we now know that many of these intuitions are not as widely shared as was once assumed. Having already looked at some existing data (i.e., Malt, 1994; Kalish, 2002) that bear on Kripke's (1972) and Putnam's (1970; 1975) externalism, I now turn to an ongoing study that is relevant to the discussion at hand.

Many of the intuitions that Kripke (1972) and Putnam (1970; 1975) suggest are widespread are intuitions about natural kind term usage in "possible cases." Because these "possible cases" (i.e., thought experiments) have been so influential in philosophical discourse concerning natural kind term usage, it may be helpful to probe folk intuitions about these "possible cases." For this reason, the present study explores folk intuitions about some of the

classic philosophical thought experiments that Kripke (1972) and Putnam (1770; 1975) invoke as evidence for externalism. Specifically, the study is designed to explore folk intuitions concerning the usage of a few specific natural kind terms (i.e., 'tiger,' 'water,' 'gold') that are quite prevalent in the philosophical literature. Since many of the possible cases mentioned in this study revolve around intuitions concerning the membership status of entities in natural kinds (i.e., human, tiger, water, gold, etc), the participants' intuitions about these cases ought to reveal their natural kind beliefs and how they use natural kind terms.

The design of the experiment consisted of a set of 25 statements that present possible scenarios, from simple one sentence statements to a paragraph describing a possible scenario such as the classic twin-earth thought experiment from Putnam (1975) (see tables below). After reading each scenario, the participants (50 GSU undergraduates) were asked to judge on a 7-point scale whether they agree or disagree with the statement they have just read.

6.2. Results

I will now briefly recount the most striking results of the study. The tables below reveal the number of responses, percentages and mean values of participant's responses for selected questions.[32] Throughout this section, I will offer speculations about what these data may tell us about how the reference of the folk's natural kind terms is determined.

[32] N= 50. For questions 24 and 25, N= 24. Sample size differs because the only data used for questions 24 and 25 are those from the participants that answered the comprehension question correctly (i.e., *Is XYZ the same stuff as H20?* "NO").

Table 1. Natural Kind Term Experiment Results I									
		Strongly Disagree	Disagree	Somewhat Disagree	I Don't Know	Somewhat Agree	Agree	Strongly Agree	Mean
1	*An animal with large teeth, orange fur and black stripes is a tiger.*	3 6%	10 20%	5 10%	1 2%	11 22%	12 24%	8 16%	4.50
2	*"Tony the Tiger" from Frosted Flakes is a tiger.*	0	0	0	3 6%	3 6%	9 18%	35 70%	6.52
6	*Tigger from Winnie-the-Pooh is a tiger.*	1 2%	3 6%	2 4%	4 8%	8 16%	13 26%	19 38%	5.60
8	*An animal with Dog DNA but that looks like a tiger and is raised by tigers is a tiger.*	12 24%	19 38%	6 12%	7 14%	6 12%	0	0	2.52
9	*Any animal with tiger DNA is a tiger.*	3 6%	1 2%	2 4%	5 10%	10 20%	17 34%	12 24%	5.34
10	*An animal with tiger DNA that is raised by a group of wolves is a tiger.*	3 6%	4 8%	1 2%	3 6%	11 22%	16 32%	12 24%	5.22

The above-data illustrates that roughly 88% of the participants agreed with statement 2 [*"'Tony the tiger' from Frosted Flakes a tiger."*] and about 80% of the participants agreed with statement 6 [*"'Winnie-the-Pooh' is a tiger."*]. These data, in conjunction with the fact that nearly 62% of the participants agreed, at least somewhat, with statement 1 [*"An animal with large teeth, orange fur and black stripes is a tiger."*], suggests that the reference of some of the participants' natural kind term 'tiger' is determined by a description. Otherwise, we would not expect such widespread agreement with questions 2 and 6. The responses to statement 9 [*"Any animal with tiger DNA is a tiger"*] suggest that many of the participants (roughly 78%) believed that the possession of "tiger" DNA is sufficient to justify the

application of the term 'tiger.' These data, along with the fact that more than 76% of the participants agreed, at least somewhat, with statement 10 [*"An animal with tiger DNA that is raised by a group of wolves is a tiger."*] suggests that the reference of the natural kind term 'tiger' is, at least some of the time, determined by a kind-specific essence.

Assuming that a kind-specific essence may be responsible for determining the reference of natural kinds terms, questions 11-14 sought to test whether there is a threshold level beyond which the essence is no longer sufficient to justify the usage of a term. Half of the participants (50%) agreed that an animal with at least 55% "tiger" DNA is still a tiger, while only 32% agreed that an animal with 95% "lion" DNA and only 5% "tiger" DNA is a tiger. These results suggest that even though it might be the case that only partial possession of a kind-specific essence is sufficient to underwrite the application of a natural kind term, there may be a threshold level beyond which the term is no longer thought to properly refer.

Table 2. Natural Kind Term Experiment Results II

For 11-14	A tiger and a lion mate. They produce four offspring, all of which look like tigers. However, the offspring have mixtures of "tiger" and "lion" DNA. The DNA components are as follows: one has 95% "tiger" DNA; one has 95% lion DNA, one has 75% "tiger" DNA and one has 55% "tiger" DNA. Answer the following questions:								
		Strongly Disagree	Disagree	Somewhat Disagree	I Don't Know	Somewhat Agree	Agree	Strongly Agree	Mean
11	*The animal with 95% tiger DNA is a tiger.*	2 4%	5 10%	5 10%	2 4%	12 24%	18 36%	6 12%	4.90
12	*The animal with 95% lion DNA is a tiger.*	5 10%	19 38%	7 14%	3 6%	12 24%	3 6%	1 2%	3.22
13	*The animal with 75% tiger DNA is a tiger.*	2 4%	6 12%	6 12%	3 6%	19 38%	13 26%	1 2%	4.48
14	*The animal with 55% tiger DNA is a tiger.*	2 4%	6 12%	9 18%	3 6%	22 44%	2 4%	1 2%	4.24

The possible-world scenarios provided some of the most interesting data (see table 3, next page). For instance, 50% of the participants disagreed with statement 22 [*"The "chimpanzee-looking" creatures [that possess 'tiger' DNA] on twin-earth are tigers."]* suggesting that the possession of "tiger" DNA alone is not sufficient to underwrite application of the term 'tiger.' This indicates that for many participants something more than, or in addition to, the "tiger" DNA (i.e., the kind-specific essence) is used to determine the reference of the natural kind term 'tiger.' This, however, conflicts with the participants' overwhelming agreement (78% agreed at least somewhat) with statement 9 [*"Any animal with "tiger" DNA is a tiger."*] Even more interesting, however, is the fact that many of the participants, around 30%, agreed at least somewhat that these chimpanzee-looking creatures were in fact tigers suggesting that the "tiger" DNA *is* sufficient to underwrite term usage.

Now, much of what has been said so far rests on the assumption that if the folk believe that tigers possess an essence, that essence is "tiger" DNA. It could, however, be the case that the folk do believe that tigers possess a "tiger" essence, but do not believe that "tiger" DNA is the essence. They may, for instance, think that the essence is something like a "tiger soul." However, it is very unlikely that the folk think that water has an essence but that the essence is not H_20. For this reason, the data from statements 24 and 25 are, perhaps, the most telling. Interestingly, less than half of the participants answered the comprehension question correctly [i.e., answered "yes" to the question *Is XYZ the same stuff as H_20?*].[33] Of those that did answer the comprehension question correctly, around 66% disagreed with statement 24 [*"XYZ is Water."*] while 25% agreed. This datum suggests that for the majority

[33] This suggests that people may have a hard time understanding possible-world scenario's that "break" natural laws (e.g., something that is not H_2O but that shares all of the superficial properties with the stuff called 'water' that is found on earth).

Table 3. Natural Kind Term Experiment Results III

For 21-25	**Imagine that sometime in the future scientists discover that there is a planet somewhere in the universe that is exactly like Earth in almost every way. We will call this planet "twin-earth". Twin-earth has plants, animals and ecosystems that are almost exactly like those found on earth. There are even people that live on twin-earth that are exactly like those on earth. Further, twin-earth humans speak a language that sounds just like English.**								
		Strongly Disagree	Disagree	Somewhat Disagree	I Don't Know	Somewhat Agree	Agree	Strongly Agree	Mean
21	One of the only differences between twin-earth and earth is that the animals called "tiger" on twin-earth have a different type of DNA than the animals called 'tigers' on earth. Other than their DNA, the animals called 'tigers' on twin-earth and earth are exactly the same- they look and act the same, they inhabit the same type of ecosystem, etc. *Twin-earth tigers are tigers.*	3 6%	19 38%	11 22%	4 8%	10 20%	3 6%	0	3.16
22	Another difference between earth and twin-earth involves the animals that are called "chimpanzees". On twin-earth there are creatures that look and act exactly like the animals found on earth that are called 'chimpanzees'. However, the "chimpanzee-looking" creatures found on twin-earth actually have DNA that is the same as that found in tigers on earth (Twin-earth chimpanzees have "tiger" DNA but they look and act like chimpanzees. *The "chimpanzee-looking" creatures on twin-earth are tigers.*	1 2%	13 26%	11 22%	10 20%	9 18%	6 12%	0	3.62
23	One other difference between twin-earth and earth involves the substance that is called 'water'. The chemical composition of the stuff on twin-earth that the twin-earthians call 'water' is not H_20- rather, it is XYZ. In every way imaginable besides its chemical composition, the stuff called 'water' on twin-earth is exactly like the stuff called 'water' on earth: it boils at 212 degrees Fahrenheit, it freezes at 32 degrees Fahrenheit, it is clear, it fills the lakes and oceans, it nourishes the growth of trees and plants, it quenches thirst, it constitutes a large portion of the human body, etc. **Comprehension Question:** *Is XYZ the same stuff as H_20?*	Yes 26 52%				No 24 48%			
24	*XYZ is water.*	0	13 54.1%	3 12.5%	2 8.33%	3 12.5%	2 8.33%	1 4.17%	
25	Scientists also discover that there is H_20 on twin-earth. But, unlike on earth, on twin-earth the H_20 is a reddish-blue color, it is extremely poisonous to ingest and it is very thick, much like motor oil is thick. *The H_20 found on twin-earth is water.*	3 12.5%	8 33.33%	2 8.33%	3 12.5%	4 16.67%	4 16.67%	0	

of participants, the reference of the natural kind term 'water' is determined by a kind-specific essence. Interestingly, however, about 54% of the participants disagreed with statement 25 [*"The H20 found on twin-earth is water."*], suggesting that for a large number of participants the reference of the natural kind term 'water' is *not* determined by a kind-specific essence.

6.3. Discussion

The above study explores folk natural kind term usage by probing folk intuitions. Externalism predicts, and actually requires, that the folk will only use natural kind terms to refer to entities that are believed to possess the relevant micro-structural property (essence). The Ambiguity Thesis, on the other hand, predicts that folk natural kind term usage will not be so clean. It predicts that people will sometimes use natural kind terms to refer to entities that they believe possesses the correct essence, but that they will also sometimes use the term to refer to an entity that they do not believe possesses the correct essence. This prediction is realized by the participants' responses to statement 2, 6, 21, 22, 24 and 25.

Furthermore, the Ambiguity Thesis predicts that folk natural kind term usage as it is revealed by the participants' intuitions concerning imagined scenarios will vary both between participants as well as within participant. The first hypothesis of the Ambiguity thesis predicts between-participant variance since different individuals may believe that different entities are explanatorily important. One possible direction for future research would involve exploring if these differences result from expertise, culture and/or education. The second hypothesis of the Ambiguity thesis predicts within-participant variance as a result of the ambiguous nature of natural kind terms (i.e., natural sense and stereotype sense). That is to say, individuals may

alternate between using the natural sense and the stereotype sense of a natural kind term when they are trying to make judgments about the entities that the term supposedly refers to. This might explain why some participants were willing to say that neither the H_2O, nor the XYZ found on twin-earth is water. The natural sense of 'water' might have led the participants to reason that the XYZ found on twin-earth is not water, while the stereotype sense might have led them to reason that the H_2O found on twin-earth is not water.

Between participant variance is suggested by the varied responses to statements 1, 2, 6, 10, 21, 22, 24, and 25. Here, some participants responded in a manner consistent with the stereotype sense of the natural kind terms, while others responded in a manner consistent with the natural sense of the natural kind terms. Within-participant variance has not yet been explored for all of the questions. However, the Ambiguity Thesis does predict widespread within-participant variance since it is committed to the claim that most natural kind terms have both a natural sense and a stereotype sense.

The data from this study are particularly interesting and relevant since they are predicted by the Ambiguity Thesis, but strongly conflict with externalist predictions. Importantly, this data should not be taken to provide conclusive evidence in support of the Ambiguity Thesis. It might, after all, turn out that most people do not believe that kind-specific DNA constitutes the essence of most natural kinds, nor do they believe that H_2O is the essence of water. If this is true, then new scenarios need to be designed that properly track what, if anything, the folk might consider to be essential to natural kinds. The data do, however, suggest that externalism has not captured the whole story about natural kind terms. Insofar as this is suggested, the possibility arises that a theory such as the Ambiguity Thesis might better capture folk natural kind beliefs and folk natural kind term usage.

6.4. Future Lines of Research

This thesis has been offered in the spirit of an introduction to the Ambiguity Thesis. I have attempted to make clear why the Ambiguity Thesis deserves to be taken seriously as a semantic and psychological theory. There are, however, many aspects of the Ambiguity Thesis that need to be filled out. Additionally, there are many interesting lines of inquiry that I have not been able to discuss which I am certain will provide much food for future thought. I would like to briefly mention two of these lines of future research that I believe may prove particularly fruitful.

The first line of research should explore the "nature" of the two senses that the Ambiguity Thesis attributes to most natural kind terms. In particular, it needs to be explored whether the two senses are best understood as aspects of a singular natural kind concept, or whether each sense should be treated as an individual concept. How this question is answered may prove useful to the science of concepts insofar as it may suggest something about the nature of concepts (i.e., whether there are different types of concepts that encode different types of information). If the two senses are found to be aspects of one concept, then the Ambiguity Thesis seems to suggest that natural kind concepts are prototype-structured concepts in which the kind-specific essence, along with a host of stereotypical features of the natural kind, are encoded as statistically relevant, non-necessary cue-valid properties. If future data suggests that the two senses are best understood to be associated with different concepts, then the Ambiguity Thesis appears to be committed to a plurality of concepts such that some concepts (i.e., the stereotype sense concept) encode statistically relevant information about the natural kind, while others (i.e., the natural sense concept) encode the necessary and sufficient property, or properties, of the natural kind.

A second line of research could involve exploring how widespread the phenomenon of ambiguity is. In particular, it might explore whether other terms, terms that are not natural kind terms, are also subject to ambiguity as it is described in the Ambiguity Thesis. For instance, it might be the case that artifact kind terms also have both a stereotype sense and a natural sense. This possibility doesn't seem too far-fetched considering that some theorists believe that many, if not most people, tend to "essentialize" artifacts (Bloom, forthcoming). In any case, pursuing the predictions and theses afforded by the Ambiguity Thesis ought to prove useful and productive for many areas of the cognitive sciences, as well as providing some much-needed reflection on the role of language as it applies to natural kind terms.

7. Conclusion

I have argued that semantic externalism presupposes psychological essentialism and that recent empirical findings (Kalish, 2002; Malt, 1994) have called the latter into question. I have shown that externalism's commitment to essentialism ties the success of the externalist thesis to the success of the essentialist thesis. The empirical evidence that I presented suggests that essentialism fails to reflect the folk's natural kind beliefs and natural kind term usage. I concluded that the tradition of externalism that follows Kripke (1972) and Putnam (1975) fails as a general semantic theory insofar as it assumes psychological essentialism. This conclusion led me to posit the Ambiguity Thesis as a possible alternative to both essentialism and externalism. The Ambiguity Thesis falls out of the realization that essentialism and externalism only capture part of the story that is to be told about folk natural kind beliefs and folk natural kind term usage. Its power lies in its ability to accommodate the existing body of empirical data by recognizing that the category 'natural kind,' as well as natural kind terms in general, is ambiguous. Additionally, I have presented data from an ongoing study that seems consistent with the predictions afforded by the Ambiguity thesis. Though these new data do not provide conclusive support in favor of the Ambiguity Thesis, my hope is that it increases the pressure on externalism and lightens the load on the Ambiguity Thesis. In the end, essentialism and externalism may prove to be valuable explanatory theories, but only if their scope is narrowed. The Ambiguity Thesis employs these theories as explanatory tools, while simultaneously recognizing their limited scope.

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