Natural Kinds, Mind Independence, and Defeasibility

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A standard requirement on natural kinds is that they be mind independent. However, many kinds in the human and social sciences, even the natural sciences, depend on human thought. This article suggests that the mind independence requirement on natural kinds be replaced with the requirement that natural kind classifications be defeasible. The defeasibility requirement does not require that natural kinds be mind independent, so it does not exclude mind dependent scientific kinds from being natural kinds. Furthermore, the defeasibility requirement captures the idea that natural kind classifications are tools for investigating the empirical world.

1. Introduction. An underlying assumption of this article is that a proper philosophical account of natural kinds should help us understand the success of natural kind classifications in science. Like many endeavors, a study of natural kinds should study best practices, and arguably those best practices are classificatory practices in science. This idea is far from new. It is in line with numerous theories of natural kinds, from Locke (1894) to Boyd (1999). Naturalist approaches to natural kinds aim to learn from science's classificatory practices and offer a fuller understanding of those practices. However, philosophical theories of natural kinds tend not to be naturalistic enough. Consider a standard requirement that philosophers place on natural kinds, namely, that natural kinds be independent of human thought (Searle 1995; Psillos 2002; Devitt 2005; Lowe 2014; Bird and Tobin 2017). Here is how

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Bird and Tobin (2017) articulate this requirement in the introduction to their *Stanford Encyclopedia of Philosophy* entry on natural kinds: "To say a kind is *natural* is to say that it corresponds to a grouping that reflects the structure of the natural world rather than the interests and actions of human beings." As some philosophers have pointed out, this requirement is problematic because numerous successful classifications in science depend on our thoughts and actions (Magnus 2012; Franklin-Hall 2015; Khalidi 2015).

Take, for example, classifications offered by such social and human sciences as psychology, medicine, sociology, economics, cognitive science, and political science. These disciplines posit classifications that depend on the psychological states and behaviors of humans, as well as the behaviors of groups of humans. These classifications help us understand human and social phenomena and, in some cases, give us vital information for formulating health and social policy. If natural kind classifications are those classifications that help us understand and manipulate the world, then many classifications in the social and human sciences should be considered natural kind classifications even though the phenomena they classify frequently depend on our thoughts and behaviors.

Turning to biology and chemistry, a number of classifications in those disciplines classify entities that depend on us for their existence. Such kinds of entities include genetically modified organisms, artificially selected organisms, and synthetic chemicals. Classifications of such entities help us understand the world and allow us to affect the world in predicable ways. Although we cause such entities to exist, they have features that we study and further manipulate. If natural kind classifications help us understand and manipulate the world, then classifications of chemical and biological kinds that we create should be considered natural kind classifications. Once again, we have reason to resist the requirement that all natural kinds be mind independent.

What should we do about the requirement that natural kinds be independent of human thought when many scientific classifications classify entities that depend on our thoughts? I propose that we drop the requirement that natural kinds be mind independent. We should replace that condition with one that requires that natural kind classifications be defeasible. Roughly the idea is that if natural kind classifications are to help us understand and manipulate the world, then they should be vulnerable to disconfirming evidence. The notion of vulnerability here is akin to Popper's (1963) falsifiability requirement on scientific theories. Natural kind classifications should not be true a priori but should be vulnerable to possible disconfirming empirical evidence. In what follows I spell out the details of the defeasibility requirement on natural kind classifications. One thing to notice at the onset is that the defeasibility criterion for natural kind classifications is not a metaphysical requirement on natural kinds. It is a requirement concerning which classifica-

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tions to accept as natural kind classifications. Consequently, the account of natural kinds offered in this article is an epistemic one: it focuses on which natural kind classifications help science's epistemic endeavors, rather than the metaphysics of natural kinds.

The next section discusses various ways that classifications can be mind dependent. Section 3 introduces the defeasibility requirement on natural kind classifications. Section 4 suggests some ways to refine that requirement. The last section reviews two recent attempts to avoid the mind independence requirement.

2. Varieties of Mind Dependence. There are several ways a classification can be mind dependent. One way that classifications are mind dependent that I will not discuss is simply that all classifications posited by scientists depend on human thought and action. Classifications are representations we construct, so they obviously depend on us. In addition, there is the fact that we choose which phenomena to classify. Among possible classifications of the world, we choose which classifications to construct according to our interests and preferences. These sorts of mind dependence are not the sorts of dependence that promoters of the mind independence requirement worry about. They worry about classifications that are mind dependent when such dependence interferes with the objective study of natural kinds. Often that objectivity is aligned with realism. In a more metaphysically modest vein, I suggest that we should worry about mind dependent classifications when such dependence does not promote the epistemic aims of scientific classification. That is, we should worry about mind dependence when such dependence causes classifications to be useless tools for investigating the empirical world. Accordingly, let us sort the mind dependence of classifications into two categories: mind dependent classifications that help us investigate the empirical world and mind dependent classifications that do not help us investigate the empirical world.

Sociological classifications of socially caused racial kinds are examples of classifications whose categories are mind dependent, yet those classifications help us investigate the world. Root offers the following introduction to such kinds.

> Race is like marital status: no one would be married or single had we not invented matrimony; however, given that we did, we now divide ourselves along discernible boundaries, into categories like . . . "single" and "divorced" and treat each other differently depending on which of these categories we belong to. So too with race: we assign each other a race and treat each other differently depending on that race. As a result, epidemiologists can discover that rates of mortality or morbidity are different for one race than another. . . . In other words, race may be a biologically salient category

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> even though there are no biological races, and race can mark the risk of a biological condition like diabetes or heart disease even though race is not itself a biological condition but a social status. (2003, 1175)

Consider the social category Black American studied by sociologists. Numerous properties are associated with people in this category. One set of properties consists of racist beliefs held by many Americans about Black Americans, such as the belief that Black Americans have lower intelligence than White Americans or work less hard. Such beliefs affect Black Americans, for instance, where they go to school, their income levels, and their health and mortality rates. The relations between such beliefs and the lives of Black Americans are testable. A sociologist can test whether certain beliefs held by Americans are manifested in social practices and whether those practices affect Black Americans' economic, disease, and mortality rates (Root 2000; Mallon and Kelly 2012). Furthermore, those interested in social policy use sociological classifications of race to ameliorate the negative effects of racism. The category Black Americans depends on human thought and is mind dependent, but whether those thoughts affect Black Americans can be tested. That testability, I suggest, makes the classification of the social category Black American a useful tool for investigating and affecting the empirical world.

Let us turn to an example of a mind dependent classification whose mind dependence prevents it from being a tool for investigating the empirical world. Here I focus on infallibilist social kinds (Guala 2015). Membership conditions in such kinds entirely depend on how we define those kinds rather than any investigation of the world. Taylor (1971), Searle (1995), and Thomasson (2003) hold infallibilist views of social kinds. As Thomasson writes, "In the case of institutional kinds those principles we accept regarding sufficient conditions for the existence of these entities must be true" (2003, 590). Khalidi (2015) offers the social kind permanent resident as an example of an infallibilist kind. Khalidi calls such kinds 'conventional kinds'. The conditions for membership in the kind permanent resident are legislated by the appropriate governmental bodies. Khalidi suggests that a government could legislate that all permanent residents must be able to swim 100 meters. Once that rule is set down, being classified a permanent resident is linked to the ability to swim 100 meters. I want to suggest that classifications of such social kinds are poor candidates for natural kind classifications because of their infallibilist and conventional nature. For such kinds, we legislate which properties are associated with a kind rather than conduct an empirical investigation. As Khalidi (2015, 107) writes, "no sociologist would be awarded a research grant to investigate the link between being a permanent resident and being a proficient underwater swimmer." The reason this classification is not a natural kind classification is not the odd nature of the requirement placed

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on being a permanent resident but the legislative and conventional nature of how that requirement is set.

In the first example, the case of sociological classifications of race, such classifications are mind dependent, but not in a way that adversely affects their testability. In the second case, the legislated kind permanent resident, we see how mind dependence may render a classification untestable. The first classification helps us investigate the empirical world, and the second classification does not. The challenge, then, is to distinguish classifications that are mind dependent yet help us investigate the world from classifications that are mind dependent and do not help us investigate the world. The next section suggests a way to capture that distinction.

3. Defeasibility and Natural Kind Classifications. In what follows, the notion of defeasibility is borrowed from epistemology to offer an alternative to the mind independence requirement on natural kinds. In epistemology, a belief is defeasible just in case it can be undermined by evidence. The evidence that undermines a belief is called a 'defeater'. There are different types of defeaters: undercutting versus rebutting defeaters and external versus internal defeaters (Kelly 2014). For a defeasibility account of natural kind classifications, we do not need to go through all four variations of defeaters. We can simply focus on rebutting external defeaters. Here is an example of a rebutting external defeater. Suppose I believe that my name is Bert. My mom, however, tells me that I am mistaken and that my name is really Sue. She recounts how she and my dad were inspired to name me Sue by Johnny Cash's song "A Boy Named Sue." My mom's testimony is a rebutting external defeater for my belief that my name is Bert. Her testimony is rebutting in that it is evidence against my belief that my name is Bert. It is external because what she asserts is not among my preexisting beliefs.

Before applying the notion of defeater to natural kind classifications, let me mention a background assumption I will be making. The assumption is that natural kind classifications assert certain linkages among the properties of the members of a kind. For example, the category gold in the periodic table links having the atomic number 79 with conducting electricity. Similarly, the sociological category Black American links racist beliefs with the morbidity and mortality rates of Black Americans. With that background assumption in hand, let us apply the notion of defeasibility to natural kind classifications. A natural kind classification is defeasible if there could be external rebutting defeaters for the relations posited by that classification. For instance, the classification for gold is defeasible if it is possible that there is evidence indicating that entities with the atomic number 79 do not conduct electricity. Similarly, sociological classifications of race are defeasible if it is possible that there is evidence indicating that the socioeconomic conditions of people of a certain race are not linked to social discrimination. In brief, the

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defeasibility requirement on natural kind classifications asserts that a classification is a natural kind classification only if the relations it posits among the properties of the members of a kind are defeasible.

It is important to note that the defeasibility requirement does not require that actual defeaters exist. The periodic table's classification of gold is defeasible not because there are actual defeaters of the relations it posits. It is defeasible because there could be such defeaters. The 'could' here means that the existence of a defeater is an empirical possibility. It means that the relations asserted by the classification are not true a priori; that is, they are not true by definition, math, or logic. Recall the motivation for placing a defeasibility requirement on natural kind classifications, namely, the assumption that natural kind classifications are those classifications that help us investigate the world. That in turn requires that such classifications should be empirically testable. Accordingly, the relations asserted by a classification should not be true by definition and could be defeated by empirical evidence.

With the defeasibility requirement for natural kind classifications in hand, let us return to the examples of mind dependent categories discussed in section 2. As we saw, some mind dependent classifications help us investigate the empirical world, and some do not. The defeasibility requirement nicely distinguishes when a mind dependent classification is useful for investigating the empirical world and when it is not.

Recall the social category Black American posited by sociologists. Social scientists posit that category to study how racist beliefs affect Black Americans' disease and mortality rates. Whether such racist beliefs affect the lives of Black Americans can be empirically tested, and we could be wrong that such beliefs affect the lives of Black Americans. Indeed, sociologists adjust or reject a classification of this category depending on the evidence obtained. So the mind dependence of the category Black American does not impede its ability to be a useful category for investigating the empirical world. The defeasibility requirement on natural kind classifications captures the testable nature of this category. The sociologist's category Black American passes the defeasibility requirement because the links posited among racist beliefs and the lives of Black Americans are defeasible.

Let us turn to a mind dependent classification in which that mind dependence impedes the classification from being a useful tool for investigating the empirical world. Recall Khalidi's example of the category permanent resident. Membership in that category is legislated by a government. Following Khalidi's example, suppose a government legislates that all permanent residents of a country must have the ability to swim. That requirement is brought about by the legislators' decision, not by any discovery about the empirical world. As a result, that legislative decision is not open to empirical disconfirmation. The defeasibility requirement on natural kind classifications does a good job ruling out this construal of permanent resident from

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being a natural kind classification. The posited link between being a permanent resident and having the ability to swim is infallible and thus nondefeasible.

Stepping back from these examples, recall the problem we started with at the beginning of this article. Traditional accounts of kinds require that natural kinds be mind independent. However, that requirement excludes many scientific classifications in the human and natural sciences that help us understand and manipulate the world. The defeasibility account does not rule out such kinds. Furthermore, it distinguishes when a mind dependent classification is useful for investigating the empirical world and when it is not.

4. Refinements. One might have concerns with the defeasibility requirement. In fact, when I have presented the requirement to various audiences several worries have surfaced. This section of the article recounts those worries and suggests how the requirement should be refined to address them. The result is a fuller articulation of the defeasibility requirement.

One worry is that some putative natural kind classifications posit both defeasible and nondefeasible relations among the properties of the members of a kind. Consider the Canadian $100 bill. The Bank of Canada decides (legislates) that a certain configuration of plastic (Canadian bills are made of plastic not paper) should be Canadian currency. There is no empirical investigation involved in this action. At the same time, there should be certain social processes and infrastructure in place so tokens of money have monetary value (Guala 2015). For example, only the Bank of Canada should make Canadian $100 bills, otherwise such bills lose their value as Canadian money. In addition, the Canadian government should accept Canadian $100 bills as payment for Canadian taxes, thereby creating a demand for that currency. The category Canadian $100 bill, in other words, is a mixed nondefeasible and defeasible category. On the one hand, a Canadian $100 bill's being a certain configuration of plastic is a nondefeasible property since it is legislated. On the other hand, that the Canadian government takes Canadian $100 bills as form of tax payment is defeasible since we could be wrong about that—perhaps that government no longer takes cash payment.

Does a classification's attributing both defeasible and nondefeasible property relations to the members of a category make it a bad candidate for being a natural kind classification? I will suggest that such classifications are still good candidates for being natural kind classifications. Such mixed defeasible and nondefeasible classifications are important for understanding the world. For instance, economists study the empirical aspects of monetary categories, such as the popularity of Canadian $100 bills and what percentage of them is in circulation. In general, mixed defeasible and nondefeasible classifications are frequently posited by the social and human sciences, and they are used to investigate the empirical world.

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The example of money shows that the defeasibility requirement on natural kind classifications needs to be adjusted to allow mixed defeasible and nondefeasible classifications. As it stands now, the requirement says that the property relations among the members of a kind posited by a classification must be defeasible. Let us adjust that requirement so that it says that at least some of the property relations among the members posited by a classification must be defeasible. This adjustment makes sense because sometimes categories originate by our positing nondefeasible property relations among the members of a category. Then social scientists conduct empirical investigations of other properties relations among members of that category. We saw this in the case of Canadian currency. The category permanent resident could share a similar pattern. Permanent residency for a country is first legislated, but suppose later social scientists empirically investigate other properties such residents might have, such as their household income.[1] In brief, we often posit categories whose members have nondefeasible and defeasible property relations, and it is the defeasible relations that make such categories candidates for natural kinds.

Another worry is that some classifications in the history of science are defeasible and defeated. For example, the classification of phlogiston is defeasible and defeated. Yet no contemporary chemist would say that the category phlogiston is a natural kind. As it stands, the defeasibility requirement allows a classification to be a natural kind classification when there are reasons to believe that the cited category is not a natural kind. At this juncture, it should be noted that the defeasibility requirement is a necessary condition not a sufficient condition for whether a classification is a natural kind classification. So as a necessary condition, the phlogiston example is not a counterexample to the defeasibility requirement. Nevertheless, one might wonder what conditions should be added to the defeasibility requirement to attain a more sufficient condition for when a classification is a natural kind classification. One condition is that a natural kind classification should not only be defeasible but also well tested and not defeated. (I leave 'well tested' as a placeholder to be filled in by the relevant scientists and philosophers.) In other words, the degree to which we should believe that a classification is a natural kind classification should turn on how well it has been tested and not defeated. So minimally, a classification needs to be defeasible to be a natural kind clas-

1. One might worry that here I say permanent resident could be a defeasible category, whereas earlier I said it was not a defeasible category. Whether the category permanent resident is a defeasible category is time indexed. If a classification of the category posits no defeasible property relations among its members, it is a not a defeasible category and not a natural kind. But later, if defeasible property relations are posited, it can become a natural kind. The example of permanent resident shows that many categories that are not natural kinds have the potential to become natural kinds.

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sification. After that, the degree to which we should believe that a classification is a natural depends on how well it has been tested and not defeated. This seems like a reasonable further requirement on natural kind classifications. It rules out outdated classifications as natural kind classifications, such as the classification of phlogiston. Consequently, the revised defeasibility requirement on natural kind classifications should read as follows. A classification is a natural kind classification so long as at least some of the relations it posits among the properties of the members of a kind are defeasible, well tested, and not defeated.

A third worry is that the defeasibility requirement is satisfied by classifications of categories that are obviously not natural kinds. Consider the category tall person. The classification with the category tall person could posit defeasible relations. For instance, it might assert that tall people on average are worse at limbo than short people or that tall people on average are better at basketball. These assertions can be tested and defeated. Or consider the category pen. To be a pen, an object must have some weight. So there is the testable relation between being a pen and having weight. From these examples, we see that the defeasibility requirement might be too lenient in that it allows that too many classifications are natural kind classifications. It allows that the categories tall people and pen are natural kinds, but that sounds like something an account of natural kind classifications should deny.

I want to suggest that the waters here are muddier than that. If the category tall people was investigated by science, then it would be a good candidate for being a natural kind. The same goes for the category pen. For example, suppose NASA was investigating which sorts of pens should be sent into space and that requires conducting tests on the weights of various pens. In both hypothetical cases, seemingly nonnatural kind classifications are employed to investigate the empirical world. Recall a stated aim of this article: to align our philosophical conception of natural kind classifications with classifications that help us investigate the world. If categories of entities do not intuitively seem to be natural kind categories but are nevertheless used in investigating the empirical world, then we should consider them natural kind categories. Assuming that natural kind classifications are tools for investigating the world, the question should be whether a classification is used for investigating the empirical world not whether a category in a classification fits our intuitions of what is a natural kind.

In light of this last worry, one could refine the defeasibility requirement on natural kind classification as follows. A classification is a natural kind classification so long as at least some of the relations it posits among the properties of the members of a kind are defeasible, empirically investigated, well tested, and not defeated. On further reflection, one will see that the 'empirically investigated' clause is unnecessary since if a category is well tested then it is empirically investigated.

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5. Recent Attempts to Replace the Mind Independence Requirement. In this section I review two recent accounts of natural kinds that avoid the mind independence requirement on natural kinds. I also suggest that the defeasibility approach to natural kind classifications is preferable. Khalidi (2013, 2015) has written extensively on the mind independence requirement on natural kinds. He suggests that we replace it by requiring that the links among the properties of the members of a natural kind be causal rather than conventionally established. The infallibilist social kinds discussed early—kinds for which the properties of a category are legislated rather than discovered—are conventionally established and not natural kinds according to Khalidi. Given the similarity between our two approaches, one might wonder why I suggest a defeasibility requirement on natural kinds rather than adopt Khalidi's causal requirement.

Khalidi's proposal has much to recommend it, but it places too much emphasis on causality. Many epistemically fruitful kinds in science posit correlations among the properties of a kind rather than causal relations. Such kinds can be found in microbiology (Ereshefsky and Reydon 2015), astrophysics (Ruphy 2010), and quantum physics (van Fraassen 1980). So Khalidi's account leaves out significant areas of scientific classification. An account of natural kinds should be consistent with the various epistemic aims scientists have for positing categories, including the pursuit of noncausal correlative kinds. Defeasibility captures Khalidi's motivation to reject infallibilist kinds, while at the same time not ruling out scientific classifications that focus on correlation rather than causation.

Franklin-Hall (2015) also offers an account of natural kinds that avoids the mind dependence requirement. She locates natural kinds at the intersection of investigations conducted by different epistemic agents. In particular, Franklin-Hall writes "natural kinds are groupings that match those categories that well serve actual inquirers along with (what I call) 'neighboring agents'—those different somewhat from actual inquirers in their particular epistemic aims and cognitive capacities" (940). A virtue of Franklin-Hall's account is that it highlights the role intersubjectivity plays in identifying natural kinds. However, the sort of intersubjectivity that Franklin-Hall requires is too abstract and other worldly for constructing an account of natural kind classifications based on actual classificatory practice in science. The sort of intersubjectivity her account turns on employs "neighboring agents," where those neighboring agents are, as seen in the quote above, not "actual inquirers." Hers is not an account of what natural kind classifications are in actual scientific practice but an in principle account of what natural kinds should be. An aim of this article is to provide an account of natural kinds based on actual classificatory practice. Her account fails to do that. Moreover, it is a nonoperational account: how could we check that nonactual inquirers pick out the same kinds as actual inquirers? With the de-

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feasibility account, we can check whether a classification is defeasible, well tested, and not defeated.

The discussion of Franklin-Hall's account of natural kinds brings to the fore a meta-issue concerning how philosophers should study natural kinds. A common view in philosophy is that an account of natural kinds should inform us about the fundamental nature of natural kinds. Franklin-Hall's (2015) account falls into that camp, as do a number of philosophical theories of natural kinds (e.g., Lowe 2006; Hawley and Bird 2011). This article, however, does not attempt to give an account of the fundamental nature of natural kinds. Instead, it targets the question of when we should think a classification is a natural kind classification. The account offered here is agnostic about the fundamental nature of natural kinds. Furthermore, it focuses on why scientists are successful in giving natural kind classifications, where 'natural kind classifications' means those classifications that help us understand, investigate, and manipulate the empirical world.[2]

Why adopt such a practice-focused account of natural kinds rather than a metaphysical one that attempts to understand the fundamental nature of natural kinds? As mentioned at the start of this article, a study of natural kinds should study best practices, and when it comes to natural kinds those best practices are classificatory practices in science. There are at least two virtues of a practice-focused philosophical study of natural kinds. One is that it allows us to carefully scrutinize philosophical theories of natural kinds. For example, the focus on practice has revealed that natural kind essentialism is problematic in various areas of science (Dupré 1993). Another virtue of a practice-based study of natural kinds is that it focuses on studying why classificatory practices in science have been epistemically successful. This promotes a major aim of philosophy of science, namely, to understand the success of science. Needless to say, the account of natural kind classifications offered in this article subscribes to the practice turn in the philosophy of science (Soler et al. 2014; Kendig 2016). The practice turn endeavors to understand the epistemic success of scientific practices rather than offer a metaphysics of science. Similarly, the defeasibility approach to natural kind classifications aims to understand the epistemic success of classificatory practice in science rather than offer a metaphysics of science.

2. To avoid confusion, let me point out that the defeasibility requirement does not simply assert that if a category is useful for science it is a natural kind. Putative natural kinds are categories that are the subject of scientific investigation, not merely tools in scientific investigation. Pens are useful for scientists, but they are not putative natural kinds unless they are the subject of scientific investigation.

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