INFORMATIVE ABOUTNESS*

Peter B. M. Vranas
vranas@wisc.edu
University of Wisconsin-Madison
19 March 2016

Abstract. Pretheoretically, (*B*) "all believers are immortal" is about all believers, but (1) *B* is not about any unbeliever; similarly, (*M*) "all mortals are unbelievers" is not about any immortal, but (2) *M* is about all mortals. But *B* and *M* are logically equivalent universal generalizations, so arguably they are about exactly the same objects; by (2), they are about those mortals who are unbelievers, contradicting (1). If one responds by giving up (1), is there still a sense in which *B* treats unbelievers differently from believers? I argue that there is. *B* is *uninformative* about unbelievers but *informative* about believers, in the following sense: for any object *o*, the information that *B* provides only about *o*, namely "*o* is a believer only if *o* is immortal", is entailed (and thus rendered redundant) by "*o* is an unbeliever" but not by "*o* is a believer".

1. Introduction

Every time I have taught an introductory philosophy course, I have told my students something like the following:

> If you propose a universal generalization and someone produces a counterexample to it, a standard strategy is to retreat to a restricted generalization that avoids the counterexample. For example, if you propose the universal generalization "all swans are white" and someone notes that there are black swans in Australia, you can retreat to the restricted generalization "all *non-Australian* swans are white". The restricted generalization avoids the counterexample because (1) it is not about all swans: (2) it is only about non-Australian swans, (3) not about Australian ones.

The last sentence of the above passage used to sound platitudinous to me, but I now believe that claims (1), (2), and (3) are all false. There is a plausible argument for the conclusion that "all non-Australian swans are white" is about *all* swans—and thus is also about Australian swans, not only about non-Australian ones.

The argument is simple. It starts with the commonsensical assumption that "all swans are white or Australian"—like "all swans are white or pink"—is about all swans (no matter what else, if anything, it may *also* be about). But "all swans are white or Australian" is logically equivalent to "all non-Australian swans are white". So "all non-Australian swans are white" is also about all swans—and thus is also about Australian swans, not only about non-Australian ones.

Readers who believe that every universal generalization is about *all* objects might find the above argument trivial.[1] Other readers might try to pick holes in the argument, for example by contest-

* I am grateful to John Bengson, Alan Hájek, John Mackay, Michael Titelbaum, Russ Shafer-Landau, Alan Sidelle, some anonymous reviewers, and especially Elliott Sober for comments, and to my mother for typing the bulk of the paper. Special thanks are due to Aviv Hoffmann for extremely helpful comments.

[1] By an argument parallel to the one I gave in the text, one can reach the conclusion that every universal generalization is about all objects; for example, "all swans are white" is logically equivalent to "every object is white or not a swan", which is about all objects (Armstrong 1983: 42; Lambert & van Fraassen 1972: 88). I find this conclusion acceptable, but Hart (1981: 5-6) objects in effect that, because every proposition is logically equivalent to some universal generalization or other, the conclusion that every *universal generalization* is about all objects has the unacceptable consequence that every *proposition* is about all objects. I reply that a proposition which is logically equivalent to a universal generalization need not be about exactly the same objects as the universal generalization. For

ing either its explicit assumption that "all swans are white or Australian" is about all swans[2] or its implicit assumption that logically equivalent universal generalizations are about exactly the same objects.[3] For my part, I find the argument convincing (even if trivial), but my main goal here is not to defend its conclusion. I am more interested instead in how to move on *if* its conclusion is accepted. If "all non-Australian swans are white" is both about non-Australian swans and about Australian ones, then what can I tell my students instead of what I have been telling them?

2. My proposal

Here is my proposal. "All non-Australian swans are white" is about Australian swans because it says, about each of them, that it is a non-Australian swan only if it is white; equivalently (by elementary logic), that it is Australian or white or not a swan. But this is not to say anything *informative* about Australian swans: the information that an object is an Australian swan entails (and thus renders redundant) the information that the object is Australian or white or not a swan. (I use "information" informally, not as used in information theory; nevertheless, I take pieces of information to be propositions.) So my proposal is to tell my students that "all non-Australian swans are white" is *uninformative* about Australian swans[4] (and this is why it does not conflict with—and thus is not refuted by—the information that some Australian swans are black) but is

---

example, the proposition that the Eiffel Tower is metallic (which is not about the Parthenon) is logically equivalent to the universal generalization (which is, inter alia, about the Parthenon) that everything non-metallic is distinct from the Eiffel Tower.

[2] To object to this assumption, it is not enough to argue that "all swans are white or Australian" is about the *class* of swans (Goodman 1961: 7 n. 1; cf. Putnam 1958), or about the *concept* "swan" (Frege 1884/1980: 60), or about the *property* of being a swan (cf. Dretske 1977: 252-3; Sober 1985: 17): something may be about that class or concept or property and *also* be about all swans (i.e., about every individual swan; cf. Lamarque 2014: 262). Goodman argues that "every *x* is *P*" is not about all objects: "'about' behaves somewhat as 'choose' does. … Choosing something involves not choosing something else. … Likewise, saying so and so about an object involves not saying so and so about some other" (1961: 5). Goodman provides no reason, however, to accept this as a good analogy. Moreover, even if "all swans are white or Australian" is shown by Goodman's argument not to be about all objects, it is not shown not to be about all swans, since it does say something about every swan (namely that it is white or Australian) that it does not say about any non-swan. (On Goodman's views on "about", see: Hart 1981: 18-42; Patton 1965; Putnam & Ullian 1965; Rescher 1963; Tichý 1975: 88-90; Ullian 1962.)

[3] Some authors find this assumption hard to contest: "That logically equivalent statements should thus be about just the same things would seem a minimal condition of adequacy that any acceptable definition of aboutness must satisfy" (Goodman 1961: 12; cf. Hart 1981: 4, 8-9; Putnam 1958: 125; Tichý 1975: 88). Other authors, however, contest the assumption (Demolombe & Jones 1999: 115-6; Yablo 2014; Yourgrau 1987: 135-6; cf. Sober 1985: 15-6), and it might be argued that by making the assumption one deviates from a pretheoretic concept of aboutness. In reply, I can grant this: the concept of aboutness that I consider in this paper corresponds to *tutored* (instead of *raw*) intuitions. One might object to the assumption as follows: "all unmarried men are men", which is about men, is logically equivalent to "all even numbers are numbers", which is not about men. In the present context, however, this objection is question-begging: one might reply that "all even numbers are numbers" *is* about men, since it says, about each man, that he is an even number only if he is a number. Alternatively, one might object to the assumption by appealing to a fine-grained theory of propositions—e.g., a theory of structured propositions (King 2014; Russell 1903/1938; Salmon 1986; Soames 1987)—which holds that logically equivalent propositions may be distinct. I reply that the view that logically equivalent propositions may be distinct is compatible with the assumption that logically equivalent universal generalizations are about exactly the same objects (cf. Hoffmann 2016): distinct propositions may be about exactly the same objects.

[4] As I explain later on, this is *not* to say that "all non-Australian swans are white" is uninformative about the *class* of Australian swans (see §5).

informative about non-Australian swans.[5] But how to make precise the distinction between uninformative and informative aboutness? Start with the following definition:

> DEFINITION 1: CONDITIONAL (UN)INFORMATIVENESS. A proposition Q is *uninformative about an object o given a proposition R* exactly if the information that the conjunction of Q with R provides only about o is logically equivalent to the information that R provides only about o (otherwise, Q is *informative about o given R*).

Intuitively, a proposition is uninformative about an object given R exactly if the information that the conjunction of the proposition with R provides only about the object is already provided by R. But what exactly is the information that a proposition provides only about an object? I turn next to a clarification of this concept.

3. Information only about an object

> DEFINITION 2: INFORMATION ONLY ABOUT AN OBJECT. The *information that a proposition Q provides only about an object o* is the conjunction of all propositions that are both only about o and entailed by Q.[6]

To see how Definition 2 works, consider some examples. For a first example, let Q_1 be the proposition that Proust is a writer. Definition 2 has the (intuitively appealing) consequence that the information that Q_1 provides only about Proust amounts to Q_1 itself.[7] To see this, note first that (1) Q_1 is only about Proust (in the sense that Proust is the only *object* that Q_1 is about; I am not denying that Q_1 is also about the *property* of being a writer)[8] and is entailed by Q_1. Moreover, (2) Q_1 entails every proposition that is both only about Proust and entailed by Q_1. By (1) and (2), Q_1 is logically equivalent to the conjunction of all propositions that are both only about Proust and entailed by Q_1.[9] (Indeed: by (2), Q_1 entails the conjunction; by (1), the conjunction entails Q_1. I am talking about *logical* entailment—and *logical* necessity and possibility—throughout this paper.) One might want to say that Q_1 is *identical* to this conjunction (i.e., to the information that Q_1 provides only about Proust), and for simplicity sometimes I will speak in a way that suggests identity, but I am not making an identity claim: I am not assuming that all logically equivalent propositions are identical.

---

[5] My proposal provides an explanation of the (mistaken) intuition that "all non-Australian swans are white" is not about Australian swans: it seems not to be about Australian swans because it is *uninformative* about Australian swans. I am not claiming that this is a *full* explanation, but discussing other (partial) explanations lies beyond the scope of this paper.

[6] Since I am talking about propositions rather than sentences, I see no problem with infinite conjunctions. Other authors, by contrast, take sentences rather than propositions to be about objects (cf. Carnap 1937: 284-92; Hodges 1971: 5; Ryle 1933: 10).

[7] One might object that this consequence is intuitively unappealing because Q_1 also provides, for example, the information that Proust is a writer or a philosopher, which is only about Proust and is distinct from Q_1. I reply that in the text I am talking about the *full* (or *strongest*) information that Q_1 provides only about Proust; the proposition that Proust is a writer or a philosopher is only *partial* information that Q_1 provides only about Proust.

[8] This example might suggest that a proposition Q is only about an object o if and only if o is the only object that is a constituent of Q. Arguably, however, both parts of this suggestion fail. Against the "only if" part, one might argue that, if the tallest spy is François, then the proposition that the tallest spy is French is only about François but does not have François as a constituent (Fitch & Nelson 1997/2014). Against the "if" part, one might argue that, although the Sphinx is the only object that is a constituent of the proposition that the Sphinx is made out only of limestone, that proposition is also about every proper part of the Sphinx. I am not taking a stand on these arguments.

[9] One can similarly see that the information that the *negation* of the proposition that Proust is a writer provides only about Proust amounts to that negation itself (since that negation is also only about Proust).

For a second example, let Q_2 be the proposition that Proust is a writer and Sartre is a philosopher. Definition 2 has the (intuitively appealing) consequence that the information that Q_2 provides only about Proust amounts again to the proposition Q_1 that Proust is a writer. To see this, note first that (1) Q_1 is only about Proust and is entailed by Q_2. Moreover, (2) Q_1 entails every proposition that is both only about Proust and entailed by Q_2. (*Proof*. Suppose, for reductio, that some proposition T that is both only about Proust and entailed by Q_2 is not entailed by Q_1. Then T is false at some possible world w at which Proust is a writer and Sartre is not a philosopher. Since T is *only* about Proust, its truth value is the same at worlds that do not differ in which propositions only about Proust are true. So T is also false at some—in fact, at any—world w' at which the same propositions only about Proust are true as at w (so Proust is a writer) but Sartre is a philosopher. But then T is not entailed by Q_2, contradicting the supposition that it is.) By (1) and (2), Q_1 is logically equivalent to the conjunction of all propositions that are both only about Proust and entailed by Q_2, which is the information that Q_2 provides only about Proust. One might object that Q_2, unlike Q_1, entails that Proust shares with Sartre the property of being a writer-or-philosopher, so Q_2 provides *more* information about Proust than Q_1 does. I agree, but the extra information is not *only* about Proust, so my point stands that Q_1 and Q_2 provide logically equivalent information *only* about Proust.

For a third example, let Q_3 be the proposition that all philosophers are writers. Definition 2 has the (intuitively appealing) consequence that the information that Q_3 provides only about Proust amounts to the following proposition (call it Q'_3): Proust is a philosopher only if Proust is a writer. To see this, note first that Q_3 is the conjunction of Q'_3 with the proposition (call it Q''_3) that every philosopher distinct from Proust is a writer, and then reason as in the previous paragraph (replacing Q_2 with Q_3, Q_1 with Q'_3, and the proposition that Sartre is a philosopher with Q''_3).

Finally, for a fourth example, let Q_4 be the proposition that either Proust is a writer or Sartre is a philosopher. Intuitively, Q_4 provides *no* information *only* about Proust. Now note that any proposition that is both only about Proust and entailed by Q_4 is necessary. (*Proof*. Suppose, for reductio, that some proposition T that is both only about Proust and entailed by Q_4 is not necessary. Then T is false at some possible world w at which Proust is not a writer and Sartre is not a philosopher. Since T is *only* about Proust, its truth value is the same at worlds that do not differ in which propositions only about Proust are true. So T is also false at some—in fact, at any—world w' at which the same propositions only about Proust are true as at w but Sartre is a philosopher (so Q_4 is true). But then T is not entailed by Q_4, contradicting the supposition that it is.) It follows that, according to Definition 2, the information that Q_4 provides only about Proust is the conjunction of all necessary propositions that are only about Proust (like the proposition that Proust is a writer if Proust is a writer), and thus is necessary.[10] This consequence of Definition 2 might be considered intuitively unappealing, but I propose to accept it as true by *convention* that providing no information only about an object amounts to providing necessary information. (This convention will prove useful later on.) Similarly, I propose to accept as true by convention the following consequence of Definition 2: the information that an *impossible* proposition provides only about an object is impossible.

[10] One might object that a necessary proposition is not about any object (cf. Goodman 1961: 4; contrast Lewis 1988/1998: 140-1), so no necessary proposition is only about Proust. If so, I reply, then modify Definition 2 by specifying that, if no proposition is both only about o and entailed by Q, then the information that Q provides only about o is (for example) the necessary proposition that o exists if o exists.

The following theorem provides some results that are used in what follows. Notation: $\mathrm{Inf}_o(Q)$ is the information that Q provides only about o, and Q & R is the conjunction of Q with R.

> <u>THEOREM 1</u>. Let Q and R be any propositions, and let o be any object. (a) Q entails $\mathrm{Inf}_o(Q)$; moreover, if Q is only about o, then $\mathrm{Inf}_o(Q)$ entails (and thus is logically equivalent to) Q. (b) If Q entails R, then $\mathrm{Inf}_o(Q)$ entails $\mathrm{Inf}_o(R)$. (c) If R is only about o, then $\mathrm{Inf}_o(Q \,\&\, R)$ is logically equivalent to $R \,\&\, \mathrm{Inf}_o(Q)$.

I prove the theorem in a note.[11] To illustrate the theorem, consider again the conjunction Q_2 of the proposition Q_1 that Proust is a writer with the proposition (call it Q'_2) that Sartre is a philosopher. As an illustration of (a), Q_2 entails the information that Q_2 provides only about Proust, namely Q_1; moreover, since Q_1 is only about Proust, Q_1 is logically equivalent to the information that Q_1 provides only about Proust. As an illustration of (b), Q_2 entails Q'_2, so the information that Q_2 provides only about Proust, namely Q_1, entails the information that Q'_2 provides only about Proust, which is necessary. As an illustration of (c), Q_1 is only about Proust, so the information that Q'_2 & Q_1 (i.e., Q_2) provides only about Proust, namely Q_1, is logically equivalent to the conjunction of Q_1 with the (necessary) information that Q'_2 provides only about Proust. One can also give illustrations that do not rely on propositions that provide necessary information.

A corollary of (b) is that $\mathrm{Inf}_o(Q \,\&\, R)$ entails $\mathrm{Inf}_o(Q) \,\&\, \mathrm{Inf}_o(R)$. The converse fails, however. To see this, let Q be the proposition that Sartre is French, and let R be the proposition that Sartre is French only if Proust is a writer. Neither Q nor R provides any information only about Proust (i.e., the information that each of them provides only about Proust is necessary), and yet their conjunction provides the (non-necessary) information only about Proust that Proust is a writer.

Having clarified the concept of the information that a proposition provides only about an object (Definition 2), I return next to the concept of conditional informativeness (Definition 1).

4. Conditional informativeness

Recall that, according to Definition 1, a proposition Q is uninformative about an object o given a proposition R exactly if $\mathrm{Inf}_o(Q \,\&\, R)$ is logically equivalent to $\mathrm{Inf}_o(R)$. The following theorem shows that this definition can be considerably simplified.

---

[11] *Proof of (a)*. Since Q entails every proposition that is both only about o and entailed by Q, Q entails the conjunction of all these propositions, namely $\mathrm{Inf}_o(Q)$. Moreover, if Q is only about o, then Q is a proposition that is both only about o and entailed by Q, so Q is entailed by the conjunction of all these propositions, namely by $\mathrm{Inf}_o(Q)$. *Proof of (b)*. If Q entails R, then every proposition that is both only about o and entailed by R is also a proposition that is both only about o and entailed by Q, so the conjunction of all the latter propositions, namely $\mathrm{Inf}_o(Q)$, entails the conjunction of all the former propositions, namely $\mathrm{Inf}_o(R)$. *Proof of (c)*. Suppose that R is only about o. By (b), $\mathrm{Inf}_o(Q \,\&\, R)$ entails $\mathrm{Inf}_o(R) \,\&\, \mathrm{Inf}_o(Q)$, and thus entails $R \,\&\, \mathrm{Inf}_o(Q)$ (since, by (a), R is logically equivalent to $\mathrm{Inf}_o(R)$). Conversely, to prove that $R \,\&\, \mathrm{Inf}_o(Q)$ entails $\mathrm{Inf}_o(Q \,\&\, R)$, consider any proposition T that is both only about o and entailed by Q & R, and prove that T is also entailed by $R \,\&\, \mathrm{Inf}_o(Q)$—i.e., prove that the following proposition (call it Y) is necessary: if $R \,\&\, \mathrm{Inf}_o(Q)$ is true, then T is true. Let Z be the disjunction of Q with the negation of $\mathrm{Inf}_o(Q)$. Then $Z \,\&\, \mathrm{Inf}_o(Q)$ is logically equivalent to $Q \,\&\, \mathrm{Inf}_o(Q)$, and thus, by (a), to Q. Since Q & R entails T, $(Z \,\&\, \mathrm{Inf}_o(Q)) \,\&\, R$ entails T, so Z entails Y. Since Y is only about o (because R, $\mathrm{Inf}_o(Q)$, and T are only about o), to prove that Y is necessary it is enough to prove that any proposition that is both only about o and entailed by Z is necessary. To prove this, let X be such a proposition. Since X is entailed by Z, X is entailed by Q, and X is also entailed by the negation of $\mathrm{Inf}_o(Q)$. By contraposition, $\sim X$ (i.e., the negation of X) entails $\mathrm{Inf}_o(Q)$, so $\sim X$ entails every proposition that is both only about o and entailed by Q. But X is such a proposition; so $\sim X$ entails X, and thus X is necessary. (By the way, this proof also shows that, for any proposition Q, there is a proposition Z such that both $\mathrm{Inf}_o(Z)$ is necessary and Q is logically equivalent to $Z \,\&\, \mathrm{Inf}_o(Q)$.)

THEOREM 2. (a) Q is uninformative about o given R exactly if R entails $\text{Inf}_o(Q \,\&\, R)$. (b) If R is only about o, then Q is uninformative about o given R exactly if R entails $\text{Inf}_o(Q)$.

Proof of (a). By Theorem 1(b), $\text{Inf}_o(Q \,\&\, R)$ entails $\text{Inf}_o(R)$, so $\text{Inf}_o(Q \,\&\, R)$ is logically equivalent to $\text{Inf}_o(R)$—i.e., by Definition 1, Q is uninformative about o given R—exactly if: (1) $\text{Inf}_o(R)$ entails $\text{Inf}_o(Q \,\&\, R)$. The goal is then to prove that (1) is logically equivalent to: (2) R entails $\text{Inf}_o(Q \,\&\, R)$. By Theorem 1(a), R entails $\text{Inf}_o(R)$, so (1) entails (2). Conversely, suppose that (2) holds. To prove that (1) holds, prove that $\text{Inf}_o(R)$ entails every proposition T such that (3) T is both only about o and entailed by Q & R. To prove that $\text{Inf}_o(R)$ entails such a proposition T, it is enough to prove that T is entailed by R (since, by Definition 2, $\text{Inf}_o(R)$ entails every proposition that is both only about o and entailed by R). But T is entailed by R because, by (3), T is entailed by $\text{Inf}_o(Q \,\&\, R)$, which, by (2), is entailed by R. *Proof of (b)*. Suppose that R is only about o. Then, by Theorem 1(c), $\text{Inf}_o(Q \,\&\, R)$ is logically equivalent to $R \,\&\, \text{Inf}_o(Q)$. But then R entails $\text{Inf}_o(Q \,\&\, R)$—i.e., by (a), Q is uninformative about o given R—exactly if R entails $R \,\&\, \text{Inf}_o(Q)$; i.e., exactly if R entails $\text{Inf}_o(Q)$.

By Definition 2, R does *not* entail $\text{Inf}_o(Q \,\&\, R)$ exactly if R does *not* entail all propositions that are both only about o and entailed by Q & R. Therefore, as a corollary of Theorem 2(a), Q is *informative* about o given R exactly if some proposition that is both only about o and entailed by Q & R is not entailed by R (i.e., Q & R provides information only about o that R does not provide).

To illustrate (a), let Q_A be the proposition that Dreyfus is guilty only if Zola is mistaken, and let R_A be the proposition that both Dreyfus and Zola are guilty (so $Q_A \,\&\, R_A$ is logically equivalent to the proposition that Dreyfus is guilty, Zola is guilty, and Zola is mistaken). On the one hand, Q_A is uninformative about *Dreyfus* given R_A: R_A entails the information that $Q_A \,\&\, R_A$ provides only about Dreyfus, namely the proposition that Dreyfus is guilty. On the other hand, Q_A is informative about *Zola* given R_A: R_A does not entail the information that $Q_A \,\&\, R_A$ provides only about Zola, namely the proposition that Zola is both guilty and mistaken. Note that R_A does entail the information that Q_A (as opposed to $Q_A \,\&\, R_A$) provides only about Zola, which is necessary; but this does not suffice for Q_A to be uninformative about Zola given R_A, because R_A is not *only* about Zola.

To illustrate (b), consider again the proposition Q_3 that all philosophers are writers. Q_3 is informative about Camus given that Camus is a philosopher, but is uninformative about Camus given that Camus is a writer: the information that Q_3 provides only about Camus, namely the proposition that Camus is a philosopher only if Camus is a writer, is not entailed by the proposition that Camus is a philosopher, but is entailed by the proposition that Camus is a writer.[12]

It is important to note that, according to Definition 1, Q is uninformative about o given R exactly if Q & R provides no information *only* about o that is not already provided by R, and thus even if Q & R does provide *relational* information about (but not *only* about) o that is not already pro-

[12] Although, as I said, I am talking about *logical* necessity and entailment throughout this paper, it is worth noting that different kinds of necessity and entailment correspond to different kinds of informativeness. For example, the proposition that Bucephalus is not a philosopher entails both *logically* and *metaphysically* the proposition that Bucephalus is a philosopher only if Bucephalus is a writer, so say that the proposition Q_3 that all philosophers are writers is both logically and metaphysically uninformative about Bucephalus given that Bucephalus is not a philosopher. By contrast, if it is metaphysically but not logically necessary that no horse is a philosopher, then the proposition that Bucephalus is a horse entails metaphysically but arguably not logically the proposition that Bucephalus is a philosopher only if Bucephalus is a writer; if so, say that Q_3 is metaphysically uninformative but logically informative about Bucephalus given that Bucephalus is a horse.

vided by R. For example, the proposition (Q_B) that Camus admires Zola provides no information *only* about Camus,[13] and thus is uninformative about Camus given the proposition (R_B) that Camus is French—although, in an *alternative* sense, Q_B is informative about Camus given R_B, since Q_B & R_B provides relational information about Camus that is not already provided by R_B. One night ask, then, why I am not focusing on this alternative sense of conditional informativeness. Because, I reply, this alternative sense is trivial. Indeed, in this alternative sense, a contingent proposition that has nothing to do with Camus, for example the proposition (Q_C) that cadmium is blue, is informative about Camus given R_B: Q_C & R_B provides relational information about Camus, for example the proposition that Camus shares with cadmium the property of being French-or-blue, that is not already provided by R_B.

5. Conditional informative aboutness

Given the above definitions, here is how I propose to make precise the distinction between uninformative and informative aboutness:

> DEFINITION 3: CONDITIONAL (UN)INFORMATIVE ABOUTNESS. A proposition Q is *(un)informative about objects given that they exemplify a property P* exactly if, for any object o, Q is (un)informative about o given that o exemplifies P.

For example, let V be the proposition that all non-Australian swans are white. On the one hand, V is uninformative about objects given that they exemplify the property of being an Australian swan (or, more succinctly, *V is uninformative about Australian swans*): for any object o, the proposition that o is a non-Australian swan only if it is white (which is the information that V provides only about o) is entailed by the proposition that o is an Australian swan (i.e., the proposition that o exemplifies the property of being an Australian swan).[14] On the other hand, V is informative about objects given that they exemplify the property of being a swan (or, more succinctly, *V is informative about swans*): for any object o, the proposition that o is a non-Australian swan only if it is white is not entailed by the proposition that o is a swan. One can similarly see that V is uninformative about non-swans and uninformative about white objects, but is informative about non-Australian swans, informative about non-white objects, and informative about elephants. (One might find the result that V is informative about elephants intuitively unappealing; I respond to this objection at the end of the paper.)

The above example shows that (1) a proposition may be informative about objects given that they exemplify a property P but uninformative about objects given that they exemplify a property that entails P: V is informative about swans but uninformative about Australian swans. By contrast, (2) if a proposition Q is informative about objects given that they exemplify a property that entails P, then Q is also informative about objects given that they exemplify P. (For exam-

[13] One might object that Q_B does provide *only* about Camus the information that Camus exemplifies the property of admiring Zola: Q_B does not provide this information about Zola or about anyone else. I reply that the information that Camus exemplifies the property of admiring Zola is about both Camus and Zola, and thus is not only about Camus. My claim that Q_B provides no information only about Camus is *not* the claim that there is no property that Q_B attributes only to Camus; it is instead the claim that no non-necessary proposition entailed by Q_B is only about Camus. Compare: the proposition that Camus and Zola are both French does provide information (which is) only about Camus, namely the proposition that Camus is French, although it does not attribute the property of being French *only* to Camus.

[14] I take both the proposition that o is an Australian swan and the proposition that o exemplifies the property of being an Australian swan to be the singular proposition with respect to o that it is an Australian swan (see Cartwright 1997: 73-6).

ple, since *V* is informative about non-Australian swans, it is also informative about swans.) This is because, if *Q* is informative about *o* given that *o* exemplifies a property *P′* that entails *P*, then *Q* is also informative about *o* given that *o* exemplifies *P*. (*Proof*. If the information that *Q* provides only about *o* is not entailed by the proposition that (3) *o* exemplifies *P′*, then it is not entailed either by the proposition that (4) *o* exemplifies *P*, given that—because *P′* entails *P*—(3) entails (4). I am talking here only about properties *P* and *P′* such that propositions (3) and (4) are only about *o*.)

The above two consequences (namely (1) and (2) in the previous paragraph) of Definition 3 might be considered objectionable. One might argue that, contrary to these consequences, (1′) a proposition that is informative about (all) swans must also be informative about Australian swans, and (2′) a proposition that is informative about non-Australian swans need not be informative about (all) swans. In reply, I attribute the intuition that (1′) and (2′) are true to a conflation of conditional informative aboutness with *unconditional* informative aboutness, defined as follows: a proposition *Q* is *unconditionally informative about objects that exemplify a property P* exactly if, for any object *o* that exemplifies *P*, *Q* is *unconditionally informative* about *o* (in the sense that the information that *Q* provides only about *o* is not necessary).[15] One can see that, if "informative about" is understood as "unconditionally informative about" in my formulations of (1′) and (2′), then these formulations express true propositions. There is a catch, however. The proposition *V* that all non-Australian swans are white is unconditionally informative about *all* objects: for any object *o*, the information that *V* provides only about *o*, namely the proposition that *o* is a non-Australian swan only if it is white, is not necessary. But then, for *any* property *P*, *V* is unconditionally informative about objects that exemplify *P*: *V* is unconditionally informative about swans, about non-swans, about white objects, about non-white objects, and so on. So unconditional informative aboutness is trivial; this is why I understand (for example) "*V* is informative about swans" not as "*V* is *unconditionally* informative about swans", but as "*V* is informative about objects *given* that they are swans". Conditional informative aboutness does not vindicate (1′) or (2′), but it does yield the desired result that *V* is informative about non-Australian swans but uninformative about Australian swans.

Instead of saying that *Q* is informative about objects given that they exemplify *P*, one might propose saying that *Q* is informative about the *class* (or *set*) of objects that exemplify *P*. This proposal, however, faces the following problem. If it just so happens that all and only philosophers are wise, then the class C_1 of objects that exemplify the property P_1 of being a philosopher is

[15] One can prove that this definition of unconditional informativeness has the desirable consequence that *Q* is unconditionally uninformative about *o* exactly if *Q* is (conditionally) uninformative about *o* given some (equivalently, any) *necessary* proposition *R*; equivalently, given any proposition *R* that is only about *o*. By contrast, if *Q* is unconditionally uninformative about *o*, *Q* may still be (conditionally) informative about *o* given a non-necessary proposition *R* that is not only about *o.* To see this, go back to the last example I gave in §3: the proposition that Sartre is French is unconditionally uninformative about Proust, but is (conditionally) informative about Proust given the proposition that Sartre is French only if Proust is a writer. One might object in two ways to my definition of unconditional informativeness. (1) One might argue that the proposition that π is a transcendental number is unconditionally informative about π although the information that it provides only about π is necessary. I reply that this proposition is metaphysically (and maybe also conceptually) but not *logically* necessary; as I said, I am talking about logical necessity throughout this paper. (2) One might argue that the proposition that everything distinct from Socrates is material is unconditionally informative about Socrates—since it *raises the probability* that Socrates is also material—although the information that it provides only about Socrates (namely the proposition that Socrates is distinct from Socrates only if Socrates is material) is necessary (given that, necessarily, Socrates is not distinct from Socrates). I reply that in this paper I consider only *deductive* (not *inductive*) informativeness.

identical to the class C_2 of objects that exemplify the property P_2 of being wise, but on the above proposal one would say that the proposition that all philosophers are wise is informative about C_1 but uninformative about C_2: for any object *o*, the proposition that *o* is a philosopher only if *o* is wise is not entailed by the proposition that *o* exemplifies P_1 (i.e., *o* is a philosopher) but is entailed by the proposition that *o* exemplifies P_2 (i.e., *o* is wise).

To say that a proposition is *not* informative about objects given that they exemplify a property is not to say that the proposition is *un*informative about objects given that they exemplify the property: a proposition may be neither informative nor uninformative about objects given that they exemplify a property. For example, consider again the proposition Q_1 that Proust is a writer. On the one hand, (1) for any object *o* distinct from Proust, Q_1 is uninformative about *o* given that *o* is a philosopher: the information that Q_1 provides only about *o* is necessary. On the other hand, (2) Q_1 is informative about Proust given that Proust is a philosopher: the information that Q_1 provides only about Proust, namely Q_1 itself, is not entailed by the proposition that Proust is a philosopher. By (1), Q_1 is not informative about philosophers; by (2), Q_1 is not uninformative about philosophers either. Since there is only one object *o* (namely Proust) such that Q_1 is informative about *o* given that *o* is a philosopher, one might want to say that Q_1 is *slightly* informative about philosophers; however, I do not define *degrees* of informative aboutness in this paper.

It is important to note that my account of informative aboutness does not take into consideration information that *relates* different objects, like the proposition that Camus admires Zola (see the last paragraph of §4). As a consequence, the proposition (for example) that all philosophers admire Zola is not informative about philosophers: for any object *o* distinct from Zola, that proposition provides no information *only* about *o* (since the proposition that *o* is a philosopher only if *o* admires Zola is about both *o* and Zola, and thus is not only about *o*). One might say, then, that I am proposing an account of *non-relational* informative aboutness (although this would be slightly misleading, since my account does take into consideration information that relates an object only to itself). One might ask why I am not focusing instead on *relational* informative aboutness, defined in terms of the information that a proposition *Q* provides *about*—instead of *only* about—an object *o* (defined, in turn, as the conjunction of all propositions that are both about *o* and entailed by *Q*). Because, I reply, relational uninformative aboutness is trivial. Indeed, in this alternative sense of informative aboutness, the proposition *V* that all non-Australian swans are white is informative about swans, about non-swans, about white objects, about non-white objects, and so on: for any object *o*, the information that *V* provides about (as opposed to *only* about) *o* is *V* itself, and this information is not entailed by the proposition that *o* is a swan, or by the proposition that *o* is not a swan, and so on.

One might argue that my account faces a similar problem on a smaller scale: as I noted earlier, my account yields the (intuitively unappealing) result that *V* is informative about elephants. In reply, I propose that the intuition that *V* is uninformative about elephants relies on the *background information* that no elephants are swans. Relative to this background information, *V* is uninformative about elephants, in the following sense: for any object *o*, *V* is uninformative about *o* given the conjunction of this background information with the proposition that *o* is an elephant (since this conjunction entails that *o* is not a swan, which in turn entails that *o* is a non-Australian swan only if it is white). This motivates the following definition of informative aboutness *relativized* to background information:

> DEFINITION 4: RELATIVIZED CONDITIONAL (UN)INFORMATIVE ABOUTNESS. *Relative* to a proposition ("background information") *B*, a proposition *Q* is *(un)informative about objects given*

that they exemplify a property P exactly if, for any object *o*, *Q* is (un)informative about *o* given the conjunction of *B* with the proposition that *o* exemplifies *P*.

I propose, then, that the result that *V* is informative about elephants is strictly speaking correct, but is intuitively unappealing because intuitions track informative aboutness relativized to typical background information; relative to such background information, which includes the proposition that no elephants are swans, *V* is indeed uninformative about elephants.

REFERENCES

Armstrong, David M. (1983). *What is a law of nature?* New York: Cambridge University Press.

Carnap, Rudolf (1937). *The logical syntax of language.* London: Routledge & Kegan Paul.

Cartwright, Richard L. (1997). On singular propositions. In A. Kazmi (Ed.), *Meaning and reference. Canadian Journal of Philosophy, Supplementary Volume 23* (pp. 67-83). Calgary, Alberta, Canada: University of Calgary Press.

Demolombe, Robert, & Jones, Andrew I. J. (1999). On sentences of the kind "Sentence '*P*' is about topic '*T*'". In H. J. Ohlbach & U. Reyle (Eds), *Logic, language and reasoning: Essays in honor of Dov Gabbay* (pp. 115-133). Dordrecht: Kluwer.

Dretske, Fred I. (1977). Laws of nature. *Philosophy of Science, 44,* 248-268.

Fitch, Greg, & Nelson, Michael (2014). Singular propositions. In E. N. Zalta (Ed.), *Stanford encyclopedia of philosophy* (Fall 2014 ed.). URL = <http://plato.stanford.edu/archives/fall2014/entries/propositions-singular>. (Originally published 1997.)

Frege, Gottlob (1980). *The foundations of arithmetic: A logico-mathematical inquiry into the concept of number* (2nd rev. ed., J. L. Austin, Trans.). Evanston, IL: Northwestern University Press. (Original work published 1884.)

Goodman, Nelson (1961). About. *Mind, 70,* 1-24.

Hart, Allan M. (1981). *Aboutness: A logico-philosophical analysis.* Doctoral dissertation, Michigan State University.

Hodges, Michael (1971). On 'being about'. *Mind, 80,* 1-16.

Hoffmann, Aviv (2016). About propositions and their component facts: An essay in pointillist metaphysics. Unpublished.

King, Jeffrey C. (2014). Structured propositions. In E. N. Zalta (Ed.), *Stanford encyclopedia of philosophy* (Spring 2014 ed.). URL = <http://plato.stanford.edu/archives/spr2014/entries/propositions-structured>.

Lamarque, Peter (2014). About. *Journal of Literary Theory, 8,* 257-269.

Lambert, Karel, & van Fraassen, Bas C. (1972). *Derivation and counterexample: An introduction to philosophical logic*. Encino, CA: Dickenson Publishing Company.

Lewis, David (1998). Statements partly about observation. In D. Lewis, *Papers in philosophical logic* (pp. 125-155). New York: Cambridge University Press. (Originally published 1988.)

Patton, Thomas E. (1965). Some comments on 'about'. *The Journal of Philosophy, 62,* 311-325.

Putnam, Hilary (1958). Formalization of the concept "about". *Philosophy of Science, 25,* 125-130.

Putnam, Hilary, & Ullian, J. S. (1965). More about 'about'. *The Journal of Philosophy, 62,* 305-310.

Rescher, Nicholas (1963). A note on 'about'. *Mind, 72,* 268-270.

Russell, Bertrand (1938). *The principles of mathematics* (2nd ed.). New York: W. W. Norton. (Originally published 1903.)

Ryle, Gilbert (1933). 'About'. *Analysis, 1,* 10-12.

Salmon, Nathan (1986). *Frege's puzzle*. Cambridge, MA: MIT Press.

Soames, Scott (1987). Direct reference, propositional attitudes, and semantic content. *Philosophical Topics, 15* (1), 47-87.

Sober, Elliott (1985). Constructive empiricism and the problem of aboutness. *The British Journal for the Philosophy of Science, 36*, 11-18.

Tichý, Pavel (1975). What do we talk about? *Philosophy of Science, 42*, 80-93.

Ullian, J. S. (1962). Corollary to Goodman's explication of 'about'. *Mind, 71,* 545.

Yablo, Stephen (2014). *Aboutness*. Princeton, NJ: Princeton University Press.

Yourgrau, Palle (1987). Frege on truth and reference. *Notre Dame Journal of Formal Logic, 28,* 132-138.