

SECOND-ORDER KNOWLEDGE

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1. Introduction

Knowledge involves belief. Belief is a propositional attitude, i.e. an attitude that a subject holds towards a proposition. If a subject S knows that P and the proposition P involves no further knowledge attribution, let us say that S possesses *first-order knowledge*. On the other hand, if S knows that P and the proposition P involves a knowledge attribution, let us say that S possesses *higher-order knowledge*. The aim of this article is to shed light on the nature of second-order knowledge, a specific kind of higher-order knowledge. It is worth noting, however, that the kinds of considerations offered here are also relevant to cases of knowledge of higher orders—if properly extended or modified.

An example of second-order knowledge is the following:

- (1) Duncan knows that he knows that $4 + 5 = 9$.

as the proposition within the scope of “knows” involves a further knowledge attribution. We will approach the task of shedding light on second-order knowledge by discussing it in relation to three issues from the epistemological literature:

1. Internalism/externalism: according to internalists about warrant, if a subject S is warranted in believing that P , then the reasons that underwrite S 's warrant are accessible to S by reflection—that is, by introspection, a priori reasoning, or memory—alone. Externalists deny this idea. (For more on internalism/externalism, see, e.g., BonJour 1992, Pryor 2001, and the articles in Kornblith 2001 and Goldberg 2007. “Warrant” here should not be taken in the sense of Plantinga 1993, i.e. as that which renders knowledge when added to true belief.)
2. KK Principle: if S knows that P , then S knows that S knows that P . We can write this formally as follows: $K_S P \rightarrow K_S K_S P$ (where “ K_S ” is read “ S knows that ...” and “...” is to be replaced by a proposition).
3. Knowledge-Transmission Principle: if S knows that R knows that P , then S knows that P (formally: $K_S K_R P \rightarrow K_S P$).

2. Internalism/externalism, monism/pluralism and second-order knowledge

Before we turn to the task of showing how the internalism/externalism distinction can be used to gain insights into the nature of second-order knowledge, a clarificatory remark is in

order. The distinction between internalism and externalism has been introduced as pertaining to *warrant*. How, then, can it be relevant to the nature of second-order *knowledge*?

The answer is this: most epistemologists take warrant to be a necessary condition on knowledge. One cannot know that *P* without also being warranted in believing that *P*. For this reason, internalists about warrant are also internalists about knowledge in an interesting sense: knowledge is subject to a substantial internalist warrant constraint. Externalists about warrant, on the other hand, maintain that there is no substantial internalist warrant constraint on knowledge. Typically they hold this view, because they hold the further view that being warranted is grounded in features of the relevant belief-forming method or process (possibly in conjunction with features of the environment) and that these features need not be reflectively accessible to the subject in order to be warrant-conferring. According to Goldman (1979), a prominent advocate of externalism, a belief—if warranted—is so because the relevant belief-forming process is reliable, meaning that it yields a good enough ratio of true to false beliefs. The warrant-giving reason—i.e. reliability—need not be reflectively accessible to the subject. It is enough that the process *is* reliable. For our present purposes, we need not dive into the intricate details of the debate between internalists and externalists. It will suffice to table three views that mark the scope of respectively internalism and externalism in rather different ways.

The first view and second view are respectively internalist and externalist warrant monism (or respectively “IW-monism” and “EW-monism”, in short). The opposition between these two views has traditionally fueled the internalism/externalism debate, the articulation of the third view—pluralism—being a more recent development. According to the IW-monist, *all* warrants are subject to an internalist accessibility constraint: warrant-underwriting reasons always have to be accessible to the warranted individual through reflection alone. According to the EW-monist, there is no such thing as internalist warrant. No warrant is such that a subject is excluded from being warranted just because the warrant-underwriting reasons fail to be reflectively accessible. (It may be that these reasons are reflectively accessible in some cases. However, this should not be run together with the internalist idea that this kind of accessibility is *required* for warrant.) EW-monism can be held on various grounds. One might think that no warrant involves any warrant-underwriting reason that has to be reflectively accessible. Alternatively, one could grant that some warrants involve reasons that have to be reflectively accessible, but maintain that these reasons never by themselves suffice for warrant. To yield warrant they have to be supplemented by reasons that are not subject to a reflective accessibility constraint—“externalist reasons”, as it were. The first incarnation of EW-monism is more radically externalist than the second, but both yield a rather strong form of externalism—one that goes beyond what externalism commits one to, as characterized above. Externalism thus characterized only commits one to saying that there are instances of warrant for which the underwriting reasons are not reflectively accessible. The third view is warrant pluralism (or “W-pluralism”, in short). According to W-pluralism, some types of warrants are subject to a reflective accessibility constraint, while others are not. The former types of warrants are thus internalist in nature, while the latter are externalist.

The three views just presented are pairwise incompatible. What we will now do is to assume the truth of each of these views in turn and see what can be said about the nature of second-order knowledge against the background of these assumptions.

Assume that IW-monism is true and consider a case of second-order knowledge—rendered formally: $K_j K_j P$. What can be said about the nature of this instance of knowledge? The assumption of IW-monism enables us to make some progress with respect to this

question: both knowledge attributions have to be understood along internalist lines. Formally, we can write this by using a superscript: $K^I_s K^I_s P$.

To get a specific point of focus let us return to the example of second-order knowledge given earlier. Duncan knows that he knows that $4 + 5 = 9$. Internalism tells us that whatever warrant-giving reasons are involved in Duncan's first-order knowledge that $4 + 5 = 9$ must be accessible via introspection, a priori reasoning, or memory. This constraint could be satisfied by Duncan's knowing that $4 + 5 = 9$ on the basis of a proof in elementary arithmetic. In that case Duncan's warrant-giving reasons—provided by the proof—are a priori accessible. He can access them by thinking alone. As for Duncan's second-order knowledge, IW-monism dictates that this too be subject to an accessibility constraint. How could this constraint be satisfied? Here is one way: Duncan might introspect and come to believe that he knows that $4 + 5 = 9$, because he reflects on the pedigree of his proof and reaches the conclusion that it is a solid one. The reasons that underwrite the warrant for his higher-order belief are the belief-contents *I know that $4 + 5 = 9$* and *I know so on the basis of a solid proof*. These contents are reflectively accessible to him, as introspective access is a species of reflective access. The general point to draw from this specific case is that an advocate of IW-monism is committed to saying that *every* case of second-order knowledge is like the one just considered by involving two internalist warrants.

Let us leave IW-monism behind and instead assume that EW-monism is true. What can be said about the nature of second-order knowledge against this assumption? We immediately get that the warrant involved in each of the knowledge attributions has to be externalist in nature. The warrant-underwriting reasons need not be accessible purely via reflection. As before, we can signal this formally by using superscripts: $K^E_s K^E_s P$.

To get a specific point of focus let us suppose that

- (2) Sven knows that he knows that there is a bottle of water on the table.

Let us see how the EW-monist can account for (2). We will do so by assuming reliabilism, i.e. the brand of externalism mentioned earlier. Furthermore, assume that Sven believes that there is a bottle of water on the table on the basis of visual perception, that he believes that he knows that there is a bottle of water on the table as a result of introspection, and that both of these belief-forming processes are reliable. This delivers the warrants involved in (2), without the satisfaction of a requirement to the effect that the warrant-underwriting feature—i.e. reliability—be reflectively accessible to Sven. This feature by itself renders Sven warranted on the reliabilist picture. What the EW-monist is committed to is the idea that all instances of second-order knowledge can be accounted for in the same manner as (2)—meaning, in particular, that both ingredient warrants must be of an externalist character. (In showing how an externalist can account for (2) we appealed to reliabilism. However, it is important to note that someone who is a reliabilist—or broader, an externalist—about visual-perceptual warrant and/or introspective warrant by no means is committed to EW-monism.)

Let us now turn to warrant pluralism, the last of the three views. According to the pluralist, some types of warranted belief involve satisfaction of the internalist accessibility constraint, while others do not (Burge (1993, 2003), Goldman (1988), and Wright (2004) are sympathetic to some version of warrant pluralism). As we have seen, the IW-monist and the EW-monist alike are committed to holding that all instances of second-order knowledge have a uniform nature. What is interesting about W-pluralism is that it leaves conceptual room for two kinds of non-uniform second-order knowledge, in addition to the uniform

kinds endorsed by IW-monism and EW-monism respectively. Using the formalism relied on so far, W-pluralism accommodates the following four possibilities:

Uniform second-order knowledge:

- $K^I_S K^I_S P$
- $K^E_S K^E_S P$

Non-uniform second-order knowledge:

- $K^I_S K^E_S P$
- $K^E_S K^I_S P$

The considerations just offered show that what stance one takes with respect to the internalism/externalism and monism/pluralism issues is relevant to the nature of second-order knowledge. On the IW-monist view, second-order knowledge is tied thoroughly to reflection. Both knowledge attributions involved in any case of second-order knowledge are subject to the requirement that the warrant-giving reasons be accessible through reflection alone. According to EW-monism, no instance of second-order knowledge has this nature. The ingredient warrants are not subject to a reflective accessibility constraint. The warrant pluralist begs to differ with both the IW-monist and the EW-monist. Some instances of second-order knowledge may have a reflective character ($K^I_S K^I_S P$), while others may have an externalist character ($K^E_S K^E_S P$). Yet other instances, may have neither of these uniform characters, but be non-uniform or mixed instead ($K^I_S K^E_S P$, or $K^E_S K^I_S P$).

3. The KK-Principle

We will now turn to perhaps the most widely discussed issue in the debate over second-order knowledge, the KK-principle. To begin with, recall the standard formulation of the principle:

$$\textit{Standard-KK} \quad K_S P \rightarrow K_S K_S P$$

This principle is not obviously true and so it requires defense. A full defense of the KK-principle will show not only why we ought to buy into it, but also that it is validated by one's preferred account of (first-order) knowledge. And already at this stage, there is some reason to believe that Standard-KK does not hold. After all, knowledge requires belief. If it turns out to be so much as possible to know a proposition yet fail to believe that one does, Standard-KK will be refuted. And this does certainly seem possible. For instance, one may fail to register that one knows some proposition—due to a lapse of attention, say—and, in consequence, fail to form the corresponding belief. For that reason, one might think that the prospects for Standard-KK are rather dim.

In view of such difficulties, some have tried to restrict the KK-principle. Perhaps the most common move here is to weaken it: if one knows that P then one is *in a position to know* that one knows that P . Or again, formally (where “ $\Diamond K_S$ ” is read as “ S is in a position to know ...” and “...” is to be replaced by a proposition)

$$\textit{Weak-KK} \quad K_S P \rightarrow \Diamond K_S K_S P$$

There are various ways of spelling out the notion of being in a position to know. Crucially, however, all of these ways maintain that being in a position to know does not require belief. This will, of course, remedy the above defect. It remains to be shown whether there is good reason to accept Weak-KK and whether it is validated by the correct first-order account of knowledge.

The answer to the question concerning the KK-principle is often viewed as reflecting the traditional divide between IW-monism and EW-monism (recall that the monism/pluralism divide is a more recent development in the debate). IW-monists tend to be more sympathetic to the KK-principle, whilst EW-monists tend to reject it (some, e.g. Williams 1991, have gone as far as cashing out the distinction between the two views in terms of their diverging stances on the KK-principle). It is not hard to see why this should be so. Consider reliabilism again. Reliabilists typically reject the KK-principle even in its weak form because they typically construe at least some of the processes that are crucial to the delivery of the first-order beliefs—such as perception, testimony etc.—not only as being different than but also as being independent from the ones that are crucial to the delivery of the second-order beliefs—such as introspection. If these processes are both separate and independent, however, it is possible that one—the first-order process, say—operates in such a way as to deliver the warrant, while no second-order process follows suit. In such a situation the subject may acquire a first-order warrant whilst not even being in a position to acquire a second-order warrant—hence the reliabilists' rejection of even Weak-KK.

Contrast this position with the one favored by the IW-monist. If as IW-monists think, the subject's (*S*'s) reasons that underwrite her warrant for *P* must be accessible to her by reflection alone, then through reflecting *S* can come to know that she has a warrant for *P*. If, as some IW-monists are also happy to grant, belief is luminous in the sense that one can know by reflection alone that one believes *P* on grounds *G* whenever one does, *S* also has a warrant that she believes that *P* and that this belief is suitably grounded in her warrant for *P*. Since in order to know *P* *S* must also have a warrant that *P* is true, she thus has a warrant (a) that she has a warrant for *P*, (b) that *P* is true, (c) that she believes *P* and (d) that her belief that *P* is grounded in her warrant for *P*. Given an IW-monist conception of knowledge according to which one knows that *P* just in case one truly believes *P* on the basis of a warrant for *P*, it follows that *S* has a warrant that she satisfies all the conditions for knowledge that *P*. In other words, she has a warrant that she knows that *P*. Thus, if *S* knows *P*, she has a warrant that she knows *P* (and, of course, it is true that *S* knows *P*). Finally, suppose that to be in a position to know that *P* is to be but a suitably based belief that *P* away from knowledge that *P*. By the present IW-monist account of knowledge that means that one is in a position to know *P* if and only if one has a warrant for *P* and *P* is true. On this account of being in a position to know, it follows that if *S* knows *P* she is in a position to know that she knows *P*. Thus we have one way in which an IW-monist conception of knowledge validates Weak-KK.

4. Objections to the KK-Principle

Gettier cases

Let us now move on to some objections to the KK-Principle. Some, including card-carrying internalists (cf. Chisholm 1986: 90), have thought that the Gettier problem not only

constitutes the demise of the kind of IW-monist conception of knowledge sketched above, but also highlights that the prospects even for a weak version of the KK-principle are dim.

One way of articulating their worry is as follows: Gettier cases show that knowledge cannot just be warranted true belief (where warrant is construed along IW-monist lines). They show that a further external condition for knowledge is required. Given that the condition is external, however, it will be impossible to come to know by reflection alone that one satisfies it. But, the thought continues, in order to be in a position to know that one knows one must, by IW-monist lights, at least have a warrant—i.e. an *internalist* warrant—that one satisfies all the conditions for first-order knowledge. So, even the IW-monist will be unable to validate Weak-KK. If even the IW-monist cannot do this, the prospects for Weak-KK may appear to be rather dim.

There are a number of ways in which this worry can be allayed. The one we would like to focus on here concerns the possibility of W-pluralism, discussed briefly above. Let it be agreed that knowledge requires a degettierisation condition in addition to internalistically warranted true belief. If we are willing to countenance warrant pluralism, we may be able to rescue Weak-KK by putting to use the idea of an externalist warrant that one has by default—call it “entitlement.” (For more on entitlement, see e.g. Burge (1993, 2003) and Wright (2004)). Suppose it can be argued that one is entitled to believe that one’s first-order beliefs are not gettierised, which seems plausible if a case can be made that there is any proposition one is entitled to believe. Suppose, furthermore, we are willing to grant warrants constituted, on the one hand, by one’s internalist warrant that one satisfies the internalist warrant, truth, belief and grounding condition for knowledge and, on the other hand, by one’s entitlement that one satisfies the degettierisation condition. Then we may be able to validate a version of the KK-principle after all. For now, at least in the default case, one does have a warrant that one possesses first-order knowledge. Again, if to be in a position to know is to be but a suitably based (and, we must now add, degettierised) belief away from knowledge, and if knowledge is degettierised, internalistically warranted and true belief, then, if one has first-order knowledge, one is also in a position to know that this is so. (Notice, however, that since the second-order warrant contains an externalist component, the second-order knowledge must be externalist in nature, i.e. the KK-principle will be of the form $K^*_s P \rightarrow \Diamond K^e_s K^*_s P$.)

What is also interesting about this line is that it is available also to the EW-monist. Just like the W-pluralist, the externalist may wish to countenance the possibility of entitlements to propositions about the satisfaction of the conditions for first-order knowledge and venture to defend an EW-monist version of the KK-principle. So, somewhat surprisingly, even if the prospects of an IW-monist version of the KK-principle are dim, EW-monists who are willing to grant that we have entitlements that the conditions for first-order knowledge are satisfied may be able to countenance a purely externalist version of the KK-principle. (McHugh Forthcoming exploits the notion of entitlement to defend a version of the KK-principle that he claims to be compatible with both internalist and externalist conceptions of knowledge.)

Children and Animal Knowledge

The second objection to the KK-principle we will discuss is as simple as it is powerful. It starts from the observation that it is plausible that small children and certain animals can have basic first-order knowledge of the world. For instance, a toddler may know of his toy

that it is red and a dog may know that his master is approaching. At the same time, children, if they are small enough, and certainly many of the relevant animals, do not possess the reflective abilities and concepts requisite to acquire the corresponding second-order knowledge. For instance, they may lack the very concept of knowledge needed to grasp the proposition that they know. Thus, small children and animals may know things but, since they may also lack the very concept of knowledge, they may not be in a position to know that they know. In consequence, the KK-principle fails (Dretske 2004: 176).

Again, there are moves to be made here for the champion of the KK-principle. Perhaps the most obvious one is to place an additional restriction on the principle to the effect that the agent can grasp the proposition that she knows (e.g. Ginet 1970, McHugh Forthcoming). One disadvantage of this move is that it seems to demote the KK-principle's status: instead of capturing a fundamental truth about *knowledge* it now captures a truth about certain kinds of *cognitive agent*, i.e. those capable of grasping propositions about first-order knowledge. Alternatively, one could insist that even small children and animals are in a position to know that they have knowledge where this means that they are but a suitably based (and degettierised) belief away from second-order knowledge. Of course, small children and animals are in no position to form a belief that they know. It remains true, however, that they are but a suitably based (and degettierised) belief away from knowing that they know. Now, it might be objected that in order to have a warrant for some proposition *P* one already must have the concepts needed to grasp *P* (Feldman 2005: 111). While this may be plausible for warrants that the subject needs to achieve, it is far from clear that this also needs to be the case for types of warrant that can be held by default. Since entitlement is just such a type of warrant, the champion of the KK-principle can avoid this objection by construing the relevant second-order warrants as entitlements. So, it seems that some version of the KK-principle may remain defensible even in the face of the objection from children and animal knowledge.

Williamson's Anti-luminosity Argument

The last objection against the KK-principle we will discuss here is due to Timothy Williamson. Williamson argues against the possibility of "luminous conditions." Roughly, a condition is luminous if and only if it is such that if and when it one is in it, one is also in a position to know that it one is in it. Alternatively, a condition *C* is luminous just in case

Luminosity For all subjects *S* and times *t*, if at *t* *S* is in *C* then at *t* *S* is in a position to know that *S* is in *C*.

The KK-principle can then be interpreted as stating that the condition of knowing a proposition is luminous.

Williamson ventures to show that conditions such that one can gradually move from times at which one is in them to times at which one isn't cannot be luminous. The crucial step in Williamson's argument is to show that in conjunction with a plausible application of the so-called "safety" condition on knowledge, according to which in order know a proposition, *P*, one must avoid false belief in *P* across relevantly similar situations, *Luminosity* yields the paradoxical result that it is impossible to move gradually from times at which one is in the allegedly luminous condition to times at which one isn't.

In order to see how the argument works, let C be any condition that admits of gradual movement in the relevant sense, S any cognitive agent with limited cognitive capacities and t_i and t_{i+1} any two adjacent instants in a series of instants that describes S 's gradual movement from times at which S is in C to times at which S is not in C . Furthermore, let the instants in the series be separated by intervals so small that, due to S 's limited cognitive capacities, S cannot distinguish between them with respect to whether S is in C . Surely, in this situation, any two adjacent instants in the series are relevantly similar to one another. Suppose at t_i S believes that she is in C . By safety, her belief counts as knowledge only if she avoids false belief at t_{i+1} . How can S achieve this? Suppose at t_{i+1} S is not in C . Of course, *ex hypothesi*, S cannot achieve avoidance of false belief at t_{i+1} through an ability to distinguish between t_i and t_{i+1} with respect to whether she is in C . The only other way in which S can achieve avoiding false belief here is if between t_i and t_{i+1} S loses her belief for some other reason, for instance, as a result of a decrease in confidence below the threshold for belief. As Williamson points out, however, in that case S 's belief at t_i is ill based—in the example just mentioned on misplaced confidence—and therefore does not qualify as knowledge. Thus, if at t_{i+1} S is not in C , at t_i S 's belief does not qualify as knowledge. Otherwise put:

Safety For any two adjacent instants, t_i and t_{i+1} , if at t_i S knows that S is in C then at t_{i+1} S is in C .

Now Williamson assumes a conception of what it takes to be in a position to know that is closely related to but slightly stronger than the one outlined above: “If one is in a position to know P , and one has done what one is in a position to do to decide whether P is true, then one does know P .” (Williamson 2000: 95) Supposing, as Williamson may in his example, that S does what she can to determine whether P is true, we get that if, at t_i S is in C , then, at t_i S knows that S is in C . By *Safety* we can derive: at t_{i+1} , S is in C . Since *Luminosity* holds for all times and *Safety* for any two adjacent instants t_i and t_{i+1} in the series, continuous application of the two principles will show that if, at any time, S is in C , at all times S is in C —contrary to the assumption that S can move gradually from times at which S is in C to times at which S isn't in C . So, conditions that admit of such gradual movement cannot be luminous.

In order to put the anti-luminosity argument to work against the KK-principle, it remains to be shown that one can move gradually from the condition of knowing a proposition to not knowing it. Fortunately, this is fairly easily done. Consider the following example: S is looking at a surface the color of which gradually changes from red to orange along the color circle. Suppose, at the outset, S believes on the basis of visual-perceptual evidence that the surface is red. Since the surface is clearly red, surely she also knows that it is red. However, as time passes, the visual perceptual evidence grounding her belief changes gradually from red to orange. The evidence grounding her belief that the surface is red thus becomes gradually weaker until it is no longer strong enough to give her knowledge that it is red. So, it is possible to gradually move from the condition of knowing a proposition—here, that the surface is red—to the condition of not knowing it. The anti-luminosity argument applies. The KK-principle fails.

Powerful as Williamson's argument may be, it does not go uncontested. There are a variety of responses to it including Neta and Rohrbaugh (2004), who deny the safety condition on knowledge, Weatherson (2004), who argues that conditions that are constituted by the subjects' believing them are luminous, and Dokic and Égré (2009), who have tried to rescue a version of the KK-principle for certain types of knowledge. For present purposes,

however, we would like to develop a response on behalf of champions of the KK-principle that is inspired by Hintikka (1970) and Malcolm's (1952). Malcolm and Hintikka respond to objections to the KK-principle by restricting the principle to what they call "a strong sense of the concept of knowledge," the sense of the concept they claim to be at issue in most of the epistemological literature. What Malcolm and Hintikka seem to be suggesting here is that the concept of knowledge is ambiguous. While this proposal may have been understandable and even attractive at the time they were writing, strong reasons against such an ambiguity thesis have since come to light (see e.g. Stanley 2005: 81). Yet, there is a way of breathing new life into this response by combining it with contextualism, a prominent view in recent epistemology. (For more on contextualism see e.g. Cohen 1988, DeRose 2009 and Lewis 1996.) According to the contextualist, the term "knows" and its cognates are context-sensitive. They express different relations in different contexts. Crucially, context determines just how strong a warrant one needs to have in order to count as "knowing." We can once again express this suggestion formally by introducing a superscript indicating the strength of warrant needed for "knowledge": $K^0_S P$, $K^1_S P$, $K^2_S P$, etc. The rule here is: the higher the numeral in the superscript, the stronger the warrant needed for "knowledge," i.e. the stronger the knowledge relation. We can now argue, and this is where the present line takes its inspiration from Malcolm and Hintikka's remarks, that the KK-principle holds in contexts in which "knows" expresses a suitably strong knowledge relation. That is to say, we get: $K^n_S P \rightarrow \Diamond K^n_S K^n_S P$ for suitably large n . If Williamson's argument is sound, it is hard to see how any being with limited cognitive capacities could ever stand in such a strong knowledge relation (except perhaps to a very limited range of propositions). However, contextualists are typically happy to grant that at least in some contexts "knows" may express such a strong relation. If so, contextualists may be able to countenance a version of the KK-principle even if Williamson's anti-luminosity argument goes through.

5. The social aspect of second-order knowledge

Above our discussion of second-order knowledge has focused on single-agent cases, i.e. cases where S knows that R knows that P , and S and R are identical. We will now drop the assumption of identity and consider multi-agent cases. The following example involving Fermat's Last Theorem is an example of multi-agent second-order knowledge:

- (3) Bob knows that Jack knows that no solution exists for the equation $a^n + b^n = c^n$ for positive integers a , b , c , and n and $n > 2$.

Cases like (3) are interesting for several reasons. One quite simple reason is that it serves to highlight the social nature that second-order knowledge sometimes has. (3) reflects the fact that we—or most of us, anyway—do not live in complete epistemic isolation. We are part of epistemic communities or groups that involve other agents with whom we interact and to whom we bear significant epistemic connections.

An example of this kind of interaction or connection is captured by the following principle of knowledge transmission:

$$(KTP) \quad K_S K_R P \rightarrow K_S P$$

KTP will strike many as plausible, at least to the extent that it is thought that we often gain knowledge by knowing that someone else knows something. Applying this idea to the Bob-Jack example, one might think that, by knowing that Jack knows Fermat's Last Theorem (i.e. the theorem in (3)), *Bob* knows the theorem too. How could this be? Well, perhaps Bob—who has no specialist knowledge about mathematics—has been told by Jack what Fermat's Last Theorem says and that he, Jack, is working on a proof of the theorem (assuming, for the sake of exposition, that he is unaware that Wiles proved it). Bob knows that Jack is an extremely talented mathematician. Over a very extended period of time Bob witnesses Jack work on the proof and eventually hears him utter, "Fermat's Last Theorem is true! I've proved it!" Let us suppose that Jack has in fact proved the theorem, and that he knows that the theorem is true on this basis. Furthermore, suppose that by observing Jack and hearing his utterance, Bob knows that Jack knows Fermat's Last Theorem. But does Bob also know the theorem? This is just another way of asking whether KTP holds in this particular case.

KTP has some prominent advocates—Hintikka (1962), just to mention one. However, even if we suppose that advocates of KTP are right in maintaining that the principle holds, it is important to avoid confusion about what the principle says. In particular, although it is natural to read KTP as saying that subject *S* knows that *P* by knowing that subject *R* does so, the specific warrant involved in *R*'s knowledge is not automatically transmitted to, or inherited by, *S*. This can be so even if *S* is fully aware of what the source of *R*'s knowledge—and warrant—is. The Bob and Jack example will serve nicely to drive this point home. Jack's knowledge—and warrant for believing—that Fermat's Last Theorem is true is based on the proof that he has constructed. Bob is fully aware of this. It should be clear, though, that this does not make Bob's warranted belief in the theorem—and his corresponding knowledge—directly proof-based. He is not capable of following the proof, for one. If anything, the warrant possessed by Bob is based on Jack's testimony (for more on testimony, cf. Burge 1993 and the articles in Lackey and Sosa 2007).

Turn now to internalism/externalism and monism/pluralism, the themes against which our discussion has been cast. Both forms of monism deliver only uniform instances of KTP. For the IW-monist all warrants are internalist, whereas the EW-monist thinks that they are all externalist. What this means in our present context is that KTP must be read uniformly on both of the monist views:

$$\begin{array}{ll} \text{KTP + IW-monism:} & K^I_S K^I_R P \rightarrow K^I_S P \\ \text{KTP + EW-monism:} & K^E_S K^E_R P \rightarrow K^E_S P \end{array}$$

KTP is a different story from a W-pluralist point of view. As earlier, one reason to find W-pluralism interesting is that it widens conceptual space. This is reflected by the different kinds of instances it leaves room for:

$$\begin{array}{lll} \text{KTP + W-pluralism:} & \text{Uniform:} & \text{Non-uniform:} \\ & K^I_S K^I_R P \rightarrow K^I_S P & K^I_S K^I_R P \rightarrow K^E_S P \\ & K^E_S K^E_R P \rightarrow K^E_S P & K^E_S K^E_R P \rightarrow K^I_S P \\ & & K^I_S K^E_R P \rightarrow K^I_S P \\ & & K^I_S K^E_R P \rightarrow K^E_S P \\ & & K^E_S K^I_R P \rightarrow K^I_S P \\ & & K^E_S K^I_R P \rightarrow K^E_S P \end{array}$$

That is, W-pluralism leaves room not only for uniform instances of KTP, but also various non-uniform ones.

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