Abstract. The notion of evidence is mostly taken for granted in the study of evidentials. This paper reports on the initial stage of a research program that attempts to determine what properties are necessary for a proposition to count as ‘evidence for evidentials.’ The conclusion of this initial paper is that such evidence must be knowledge, on the basis of application of skeptical arguments, which can be thought of as a test for knowledge. A consideration of Gettier cases yields the result that perspectives must also be taken into account. The argument is developed within a Bayesian framework.

1 Introduction

In recent years there has been a good deal of semantic work on evidentiality (e.g. [1–5]). Most of this work is focused on the semantic behavior of evidentials in the traditional sense—their scope behavior, or the level of meaning at which they apply. The role that evidence itself plays in the semantics of evidentials is often, surprisingly, sidelined. It would not even be an overstatement to say that the notion of evidence is mostly taken for granted in the study of evidentials. Here is one example from the early literature, the seminal paper of [6].

(1) The interpretation of EV(p) [an indirect evidential]: [6]
   a. Assertion □p in view of the speaker’s knowledge state
   b. Presupposition: Speaker has indirect evidence for p

Here the notion of indirect evidence is left as a primitive. This trend does not change in most of the subsequent literature. I would like to argue that considering more carefully the necessary concepts of evidence for the study of evidentials yields some insight into both what evidentials have in common—possible ‘evidential universals’—and even the nature of evidence itself. Further, to the extent that we take linguistic evidence seriously in philosophical analysis, the kinds of semantic or abstract objects that can play the role of the evidence needed for evidentials seems a natural place to look in order to examine the nature of evidence.

2 Knowledge and Belief

What does evidence do? The obvious answer is that it provides justification for certain beliefs. One way to think about this justification is by means of changes
in the probabilities assigned to the content of those beliefs. This was the way that [4] defined the function of evidence, in (roughly) a Bayesian manner. This paper provides an analysis of certain Japanese evidentials, of two types: inferential evidentials, and hearsay evidentials. The inferential evidentials were modeled using an operator $\triangle_{i}^{a}$, where $i$ indexes an evidence source and $a$ is an agent. Consider their definition, given here in an informal version:

(2) $\triangle_{i}^{a}\phi$ is true given a world $w$, time $s$, and probability function $\mu$ iff:

a. $\phi$ was less likely according to $a$ at some time preceding $s$ (before introduction of some piece of evidence $i$);

b. $\phi$ is still not completely certain for $a$ at $s$ (given $i$);

c. the probability of $\phi$ for $a$ never decreased between the time $a$ became aware of the evidence $i$ and $s$ as a result of the same piece of evidence $i$ (i.e., the probability of $\phi$ given $i$ is upward monotonic).

Evidence itself was modeled with a predicate $E$. This predicate also serves a complex function. Informally, it works as follows:

(3) $E_{i}^{a}\phi$ ...

a. changes the probabilities assigned to every proposition $\psi$ (excluding $\phi$ itself) in the current information state $\sigma$ by replacing them with the conditional probability of $\psi$ given $\phi$, if defined

b. replaces the modal accessibility relation with one restricted to worlds in which $\phi$ holds.

This account is meant as a treatment of what evidence does in a context; it changes the probability of other propositions that are related to it conditionally (3a), and revises the set of accessible possibilities to one containing only those possibilities that make the content of the evidence true (3b). [4] did this by revising the accessibility relation; it could also be done by revising the set of available possibilities qua set, as was done in the analysis of modality of [7].

Now an issue arises, one of the usual issues with Bayesian epistemologies. What is the notion of probability we have in mind here? We might assume it to be objective probability: the raw chance of the truth of some proposition. Such a definition would be liberal, in the sense that it allows in principle for something to be evidence that no one realizes to be evidence. In an absolute sense this is reasonable from the perspective of (for instance) philosophy of science: certainly something could be evidence for a hypothesis, but recognizing this could require inferential steps which have not yet been made. But for the analysis of evidentials—or the role of evidence in human reasoning—this result is undesirable. We do not want to allow speakers to use evidentials on the basis of propositions they have failed to recognize as evidence. We may therefore assume (with various authors working in Bayesian frameworks) that we are dealing with subjective probability.

The difference between objective and subjective probability can be roughly characterized as follows. Consider a proposition $\phi$. The objective, or classical,
probability of \( \varphi \) is, roughly, the fraction of total possible outcomes in which \( \varphi \) is true:

\[
OP(\varphi) = \frac{|\{w : \varphi(w)\}|}{|W|}
\]

The subjective probability, on the other hand, is the degree of belief in \( \varphi \) an agent \( a \) has, so

\[
SP_a(\varphi) = \frac{|\{w : w \in Dax_a \land \varphi(w)\}|}{|Dax_a|}.
\]

If we make use of subjective probabilities, it becomes possible to state interesting generalizations relating to the ‘owner’ of the probability distribution at issue; but I will sidestep this discussion until section 5, where I will touch on some aspects of it.

We now have identified evidence with changes in subjective probability. With this move a new issue arises. Subjective probabilities are merely concerned with degrees of belief. Evidence (on the McCready&Ogata/Bayesian account) induces changes of probability; that is, on the subjective picture, changes in degrees of belief. Is this really enough to say? Can we separate objects that, intuitively, are evidence from those that are not, with this picture alone?

Let us make the issue more concrete. In a (subjective) Bayesian framework, changes in belief are all that matters. Things that are evidence for \( \varphi \) are just those things which change the subjective probability of \( \varphi \). The problem is that it is not clear that everything that changes subjective probabilities is necessarily evidence. Consider the following scenario, based on one in [8]. Suppose that I have $1, enough for a scratch-off lottery ticket but not for a hot dog, which costs $1.50. I am hungry and want a hot dog. I have no reason to believe that any lottery ticket I buy will win; but as I get hungrier I begin to convince myself that the chance of winning is a fairly good one—though I may know the odds. My belief that I will win goes up and up. The outcome of this self-delusion is a rise in subjective probability. As a result, wishful thinking can count as evidence, if no more is said.

Well. Wishful thinking is not evidence in the objective sense. It may be, though, for the purposes of linguistic use: it might be enough to license evidentials. This kind of case seems at least conceptually possible. This raises a question: what is the nature of the evidence needed for use of evidentials?

This question is deep, with philosophical implications. It cannot be fully answered in this short paper. The aspect of it I will concentrate on is this one: Is the evidence relevant for evidentials knowledge or belief? Note that both have the same effect on subjective probabilities, as the example above shows, and so both are compatible with a Bayesian picture—and, indeed, subjectively indistinguishable, as Williamson shows.

What is the difference anyway? How to tell knowledge from belief? Here is a traditional answer from epistemology: knowledge is justified true belief. I can be said to know \( p \) if I believe \( p \), \( p \) is true, and I have good reason to believe \( p \). This answer looks reasonable, and many people have espoused some version of it. But it is wrong, as the epistemologists well know. [9] discovered examples in which all
the conditions above are met, but still there is no knowledge. Here is a scenario in the Gettier style. Johnny is traveling in the country when he sees what looks to him like a horse on top of a hill and hear a horse neigh. However, what he sees is a horse-shaped rock, and the neigh is just the wind whistling through that pipe over there. But there is—coincidentally—a horse standing behind the rock. Now consider this sentence:

(4) Johnny knows there is a horse on top of the hill.

This statement seems false—though the conditions listed are satisfied: Johnny believes that there is a horse on top of the hill, there is in fact a horse there, and Johnny has good reason—in fact two good reasons—to believe there is one there, at least from his own perspective.

So knowledge is not justified true belief. What is it? This is a hard question, and no one has been able to give a definitive answer since Gettier showed the incorrectness of the traditional one. For our purposes—fortunately—we need not give a full analysis of knowledge. We need only something less ambitious, which this kind of scenario does suggest: a way to distinguish belief from knowledge. Gettier scenarios show one way to eliminate knowledge: by eliminating the foundations of knowledge, we can eliminate the knowledge itself. Now let us apply a version of this strategy to the evidential case.

3 Evidence and Skepticism

The above considerations suggest a way to distinguish knowledge from belief: if one can destroy the justification for the putative piece of knowledge, yet there is no change in the (subjective) cognitive status of the object of the attitude, then it is belief. If the cognitive status of the putative knowledge changes—if it becomes uncertain or eliminated—then the putative knowledge is knowledge indeed.

The linguistically minded reader may now be wondering why we need to go to all this trouble. After all, isn’t knowledge factive, and belief not? That means that the object of knowledge is presupposed, but not so in the case of belief. If this is so, then why must we worry about justification and the foundations of knowledge? There is some initial plausibility to this objection, but it rests on a confusion. The verbs know and believe are factive and not factive respectively, but here we are not interested in knowledge or belief as it is linguistically expressed. Rather, we are interested in evidence, as the object required for the felicitous use of evidentials. This content is not explicitly expressed in language. To find out its properties, we must take a more indirect route.

The strategy, then, is to call into question the justification for the evidence. We will use the most extreme form of this general strategy: the skeptical argument. Skeptical arguments call into question the foundations of all our knowledge (for some given area). They have the following general form: one introduces possibilities which falsify all—or some relevant portion of—our putative knowledge.
and cannot be conclusively eliminated. Because we cannot eliminate them, possible flaws in the foundations of our knowledge enter our awareness. In view of these potential errors, we become uncertain about the solidity of our knowledge. As a result, our knowledge disappears. One can think of this effect in various ways, for instance as a change in the contextual standards for knowledge attribution (e.g. [10, 11]); [12] provides an overview of other possibilities; general background on epistemological stances can be found in [13]. For our purposes we need not take a stand on which of these positions is correct.

Skeptical scenarios usually look implausible to the average non-philosopher. Some traditional examples include the possibility that you might be deceived by an evil demon into believing that you are receiving certain kinds of perceptual input, such as that you are drinking a cup of coffee; that you might be a brain in a vat, with your perceptual centers stimulated by electric impulses, or in a Matrix-like situation; that you might be dreaming everything you are perceiving, or be in a catatonic state. The common characteristic to these scenarios is that, in each, the sensory data you receive is not trustworthy as a guide to what actually is. Note the similarity to the Gettier scenarios. The difference between skeptical scenarios and Gettier cases is that, in the skeptical scenarios, there is no possibility for the individual in the scenario to learn that he is in fact in such a scenario, because all of his sensory input is open to question, while in the Gettier cases, a world-internal observer could make the Gettiered individual aware of his error. To anticipate the later discussion, this distinction turns out to play a role in the use of evidentials.

We can also find scenarios that look more common-sensical, especially when we confine ourselves to scenarios that only cast doubt on certain types of knowledge or knowledge in certain domains. For instance, consider a scenario on which you fell down a moment ago and hit your head, and the resulting damage caused you to hallucinate your current state—you appear to be reading this paper, but in fact you are lying on the floor outside your office viewing an internal projection of what you had planned to do before your injury. This situation seems quite normal compared to those above, but only calls into question your knowledge of your present activities, rather than of your entire set of memories.

What all skeptical scenarios have in common is the property that—if taken seriously—they destroy knowledge. For any $p$ that one putatively knows (or for any salient $p$, for limited skeptical scenarios like the above), one may retain the belief that $p$ but this belief can no longer be conclusive. There is always a possibility of error. Such beliefs are thus no longer knowledge in the strict sense. As a result, skeptical arguments can be viewed as tests for knowledge, when used on susceptible speakers. By running a skeptical argument on someone who is willing to consider them seriously, one can test whether a particular bit of their cognitive state is knowledge or belief, in the following sense: if the skeptical argument has no effect on the cognitive status of the content of interest, that content is merely believed.

To believe something, one must assign it a degree of subjective probability higher than whatever the threshold for belief is taken to be. In general, this
threshold is contextually determined in the usual way familiar from degree predicates (cf. [14, 15] on degree predicates and [16] on belief in particular); skeptical arguments are implausible enough that they will not (barring an extremely high contextual standard) rule out belief, for they lessen degrees of subjective probability in a very minor way. Thus beliefs can survive skeptical scenarios, but knowledge cannot. We thus have a way to distinguish knowledge from belief. One application of this tool, the one I am concerned with in this paper, is in determining whether the evidence needed for evidentials consists of knowledge or whether mere belief is acceptable. I now turn to this application.

4 Applying the Test

How can one use skeptical arguments in the desired way? The idea is straightforward. First, give a speaker a piece of evidence supporting some conclusion \( \varphi \) in the intuitive sense. I here sidestep issues concerning exactly what should count as evidence for some conclusion, as it would require complex detours into questions about induction and defeasible reasoning. After providing the evidence, ask whether \( \text{Evid}(\varphi) \) is true (or assertable, depending on the language). This step ensures that the piece of evidence is the right kind to license the evidential in general.

Here is an example from Japanese. Under ordinary circumstances, the observation that the street is wet outside in the morning leads to a rise in the probability that it rained the night before. So, by the definitions above, it should count as evidence, and be sufficient to license the inferential evidential \( \text{mitai} \).

(5) (In the morning)

\[
\begin{align*}
\text{michi-ga} & \quad \text{nureteiru.} \\
\text{kinoo-no} & \quad \text{ban} \quad \text{ame-ga} \quad \text{futta} \quad \text{mitai}
\end{align*}
\]

‘The street is wet. It must_{\text{inf}} have rained last night.’

This is correct. In this case, the evidential sentence is assertable. So the sequence \( E; ES \), where \( E \) is the evidence and \( ES \) the sentence containing the evidential, is a felicitous one.

The test for knowledge comes when we introduce a skeptical scenario after the evidence. Here is an English version.

(6) The street is wet. But perhaps there is no street—perhaps you are just dreaming. (Anyway,) It rained last night–Evid_{\text{inf}}.

Now ask the speaker: Is the new sequence \( E; S; ES \) acceptable, where \( S \) is the skeptical scenario? Or, for languages where we can consider the evidentials primarily truth-conditional, is the sentence containing the evidential true in this new context? If the new sequence is acceptable, and the sentence containing the evidential is true, then the evidence required does not need to be actual knowledge: belief is sufficient. We know this because the skeptical scenario, if taken
seriously, destroys knowledge; so if the evidence must be knowledge, then the sentence with the evidential would be bad. Conversely, if the new sequence is not acceptable, or the sentence with the evidential is false, then knowledge is required.

So that is the test. What are its results? I have tried this test on a number of Japanese speakers. A few ‘skeptical’ individuals were unwilling to take the skeptical arguments seriously. Disregarding these subjects, no speaker allows sentences with evidentials after the skeptical scenario is introduced. This suggests very strongly that the evidence needed for Japanese evidentials is not belief, but knowledge. This fact in turn has implications for the nature of evidence itself, to the extent that we take linguistic intuition seriously. I will return to this issue in the conclusion.

Here is a possible objection to the test. It might be suggested that my informants are just balking at asserting anything about the world, given that I have called into question all their knowledge of it, and its very existence. This objection has some initial plausibility, but when examined closely, lacks force. It contains two subarguments. The first involves assertion: the unstated assumption is that, without full confidence, one cannot assert anything. This unstated assumption is false. To assert, knowledge is not necessary—we do not even need total belief. Belief beyond reasonable doubt is sufficient, where the level depends on context (again, see [16] or [5] for more discussion). In any case, the objection depends on the particular skeptical scenario chosen above, which did in fact call into question everything about the world. But it is easy enough to change the scenario in such a way that we limit its application to the case at hand. Here is an instance. I give only the English version for readability.

(7) The street is wet. [But you may have a brain tumor that causes all streets to look wet, even though they are not. You cannot be sure if the street is truly wet or not.] It rained-Evid_{inf}.

This new scenario only calls into question the speaker’s knowledge of street wetness. The rest of the world remains untouched. Nonetheless, speakers are reluctant to use evidentials in scenarios like these as well. I conclude that the apparent flaw in the test is only apparent, and that evidence for evidentials—in Japanese at least—must be knowledge.

5 Gettier Cases

We have seen in the previous section that the evidence needed for evidentials must be knowledge. When the evidence was called into question via the application of skeptical arguments, evidentials could no longer be used (in Japanese). A natural question to ask now is whether the same thing happens in Gettier cases. This section explores the facts in this domain.

Recall one primary difference between Gettier cases and skeptical scenarios: the Gettiered individual is Gettiered because of facts about the world, whereas the victim of a skeptical argument has his knowledge destroyed precisely because
the facts about the world became uncertain. The crucial point is that, while the justification the Gettiered individual has for his beliefs is not well-founded, this lack of justification can be apparent to other individuals in the Gettier case. Thus we see that being Gettiered is a perspective-dependent problem: only the Gettiered individual is necessarily Gettiered. In skeptical scenarios, however, there is no way to determine whether the skeptical argument is true; all individuals have an equal lack of access to the ‘actual’ situation. (In the case of skeptical scenarios limited to cases like the brain tumor scenario above, this assessment remains valid: the individual who sees the street as not wet in (7) might equally be the victim of a brain tumor of a different kind.) This discussion suggests that we may expect to find differences between felicitous uses of evidentials in the two kinds of cases.

This expectation is fulfilled. Unsurprisingly, the Gettiered individual can assert an evidential with respect to his putative knowledge:

\[(8) \text{ano oka-no ue-ni uma-ga iru mitai da} \]
\[\text{hill-Gen top-Dat horse-Nom exists EVID Cop} \]

‘There appears to be a horse on top of that hill.’ (said by the Johnny of (4))

For the outside observer the situation is a bit more complex. We can distinguish two cases.

1. The observer knows that Johnny’s warrant for belief is no good, but does not know whether there is actually a horse.
2. The observer knows both that Johnny’s warrant is no good and that there is a horse.

In both of these cases, (8) is bad. But it is bad for different reasons. In Case 1, it is bad because of clause (2a) of the definition of the inferential evidential; the outside observer has no piece of evidence—that is, no piece of knowledge, since Johnny’s putative evidence is useless—that increased the probability that there is a horse on the hill to the necessary level. In Case 2, the observer runs afoul of clause (2b); since the observer knows that there is a horse, the probability of there being a horse is 1; she is completely certain that there is a horse, and the evidential sentence cannot be used. The situation of Case 2 is not particularly relevant for the present discussion as it involves something closer to a Gricean violation, modeled in the theory of [4] as something akin to Veltman’s [17] examples with epistemic modalities:

\[(9) \# \text{It is sunny . . . It might be sunny.} \]

If we know that it is sunny, it is not helpful to assert the possibility. The evidential case is analogous.

A question immediately arises when one considers the behavior of evidentials in Gettier scenarios, concerning the distinction between assertability and truth evaluation. The issue turns on the question of whose perspective is taken, both to the (putative) evidence itself and to the evaluation of the evidential-containing
sentence. This consideration turns out to provide further evidence that eviden-
tials behave in a way analogous to epistemic modals, and, on close examination, this fact proves to have implications for recent approaches to epistemic modals that claim that their evaluation requires one to be a relativist about truth.

Consider again (8). Is this sentence assertable? By Johnny, yes; in his Get-
tiered state, he believes that he has evidence enough to make it true, so he can utter it sincerely. By a non-Gettiered observer, however, it is not assertable: in Case 1, the observer knows the putative evidence to be incorrect, so the evidential is false; in Case 2, the evidential statement is just inappropriate given the observer’s knowledge. So we see that the perspective taken matters for assertability. Now consider what happens when we evaluate the truth of (8). Here again, Johnny himself will take (8) to be true—as will anyone Gettiered along with Johnny—but the outside, omniscient observer will take it to be false. So perspective matters for truth evaluation as well.

There is a clear similarity between this case and cases involving epistemic modals. Consider the following variant of Egan’s [18] James Bond example. In this story, Bond’s archenemy is in his base talking to a henchman. They have information about Bond: that he is either in Almaty or Basel. Bond’s archenemy asks the henchman where Bond is: the henchman replies:

\[(10)\text{He might be in Almaty.}\]

Unbeknownst to the two villains, Bond has bugged the room they are standing in with a system capable of instantaneous transmission. As he stands in his room in Basel listening to the dispatch, he says to his partner (sarcastically),

\[(11)\text{I might be in Almaty}\]

after which the two share a good laugh. Intuitively, the henchman’s claim was assertable and is, according to Egan, reasonably judged as true; but Bond’s claim—despite its having the same semantic content given standard assumptions about indexicals [19]—is false, and not assertable sincerely.

Egan, among other authors [20, 21], claims that this disparity requires us to be relativists about truth, at least when it comes to epistemic modality. I would like to suggest a different conclusion. Given the similarity to the behavior of inferential evidentials in Gettier contexts, perhaps we can understand Bond’s archenemy as being in a kind of Gettiered state. Gettier contexts are usually un-
derstood simply as contexts in which one’s beliefs, though true, are not supported by one’s evidence. Their other crucial property, though, is that they cannot be distinguished from non-Gettiered contexts by internal participants, which is just to say that they exhibit to us the limits of our ability to determine the param-
ters of our own epistemic states (as Williamson might have it). Otherwise put, a Gettier context is one which lacks some property \(P\), but which is identical, from the perspective of some agent, to a context which has \(P\). This second property is one that Egan’s scenario has. The henchman’s statement appears correct to the Gettiered henchman and his boss, because to them they appear to be in a state where Bond’s being in Almaty is a possibilty; but to the external observer Bond,
it is clearly false, for he has the information necessary to distinguish between a
might-Almaty state and the actual state—he is not Gettiered.

Notice the similarity to the Gettiered evidential case of Johnny: Johnny’s
justification for there being a horse on the hill seemed to be unimpeachable
evidence to him, and would have to those in the same situation. To the external
observer, however, it was not evidence at all, and so the evidential was false. The
modal case seems identical. For the external observer—for instance, the reader of
this paper or of Egan’s—the sentence is clearly false. Still, the external observer
can easily see how the henchman and his boss were able to judge it true: because
they were Gettiered. This, I take it, is why one may find it easy to agree with
Egan that the henchman’s utterance was true, though in fact it was false: if one
considers the henchman’s perspective and the limited information available to
him, the sentence does in fact appear true. But this impression is misleading.

In the evidential case, we saw that, for Johnny, the evidential appears to
be usable in his Gettiered state. But as soon as it is pointed out to him that
he is Gettiered, the evidential becomes unusable; the putative evidence on the
basis of which it was used proved not to be evidence at all. The same would
happen for the henchman should he learn Bond’s actual location. This suggests
a possibility: that we should understand what happens in the two cases in the
same way. Two options are open at this point. We can accept the suggestion of
Egan and others that the truth of modals is relative, and conclude that the truth
of evidentials is also relative. Alternatively, we can begin with the observations
above that the truth of evidentials depends, not only on perspective via the
evidence available to the agent, but on facts about the external world: whether
the evidence is or is not knowledge. We would then conclude that the semantics
of epistemic modals also has an external aspect. This conclusion is, I think, in
line with recent suggestions of von Fintel and Gillies [22], according to whom
the semantics of epistemic must also has an evidential and hence—by the results
of section 4 of this paper—external component. The present discussion does not
conclusively indicate which option is to be preferred; but it does indicate that
the relativist solution is certainly not the only one.

6 Conclusion

This paper has shown that the evidence required for using evidentials in Japanese
must be knowledge, and cannot simply be belief. This result was obtained by
applying skeptical arguments to the putative evidence possessed by speakers for
evidential statements. Since skeptical arguments call knowledge into question,
the fact that Japanese speakers were not comfortable asserting or assenting to
the truth of evidential sentences post-skeptical argument shows that knowledge
is required. The results were generalized to Gettier contexts, which show the
perspective dependence of evidentials, and indeed of the notion of evidence itself.
This discussion was in turn argued to have implications for the semantics of
epistemic modals.
I do not know whether evidentials in all languages require the evidence they make use of to be knowledge. If I were to make a guess, I would guess that they do; but this is an empirical question. The full application of the present study thus remain to be worked out. Still, in addition to their obvious relevance for the semantics of evidentials, the Japanese results do have interesting implications for other areas of study as well. For instance, they provide support for Williamson’s [8] thesis that all evidence is knowledge, and vice versa: \( E = K \). At least in terms of linguistic usage, in Japanese, we have at minimum that \( E \rightarrow K \). The other side of the biconditional remains to be tested in natural language.

References


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