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Testimonial Authority and Knowledge Transmission

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ABSTRACT

Is speaker knowledge necessary or sufficient for enabling hearers to know from testimony? Here, we offer a novel argument for the answer no, based on the systematic effects of partial belief and the hearer's view prior to hearing testimony. Modelling partial belief by credence, we show that a requirement entailed by the principles of necessity and sufficiency apparent in the literature is inconsistent with Bayesian updating. Consequently, even when the other grounds of knowledge are in place, the audience correctly updating their partial belief can block the transmission of speaker knowledge, so it need not be sufficient. Nor need speaker knowledge be necessary, because the hearer correctly updating their partial belief can put them in the position to know even though no one in the speaker's chain knows. We articulate the correct principles of testimonial knowledge transmission. The first supports a shared-credit view of transmission. The second gives a novel and systematic argument for testimony sometimes being a generative (not transmissive) source of knowledge, an argument that makes Lackey's statement account of testimony otiose. Finally, on at least one account of causation, the two amended principles together show how speaker knowledge can be a cause whose effect is hearer's knowledge.

1. Introduction

Among the key insights that evolved from the final decline of Cartesian epistemology in the 20th century is that knowledge acquisition is to a large extent an essentially social phenomenon. Advocates of transmission theories argue that a core mechanism in this context is knowledge transmission: by telling others what we know, we put them in a position to share our knowledge and, if all goes well, we pass it on to them. As John Greco puts it:

> [A]ssuming that the speaker knows the thing she is telling, the hearer plausibly comes to know by means of being told. . . . In some important sense, the speaker manages to 'pass on' or 'hand down' her knowledge to the hearer. (Greco 2020, 3)

In a similar vein, Catherine Elgin characterizes testimonial knowledge transmission as follows:

> We human beings perforce rely on one another for information that we cannot get for ourselves. Testimony emerged as a way to efficiently and systematically convey such information. In the prototypical case, an informant imparts information to an audience with the aim of having it accepted. . . . The testifier not only conveys the information, she vouches for its truth. If she is to be trusted, then unless they have defeaters . . . the

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audience can come to know (or at least be justified in accepting) the information thus conveyed. (Elgin 2025, ch. 6, opening paragraph)

The idea is straightforward and relies on a powerful general argument: transmission theories of this stripe can neatly explain how knowledge expands in epistemic communities. Telling others what we know, and accepting what knowledgeable testifiers tell us, would seem to be the most natural and effective means of social knowledge distribution.

Transmission theories typically involve a sufficiency and a necessity claim. The sufficiency claim says, roughly, that when a speaker knows something and tells it to someone, the speaker thereby enables the hearer to know it as well. The necessity claim maintains that a necessary condition for enabling the hearer to know is that the speaker, or at least someone in the testimonial chain, knows what is being communicated.[1] However, despite their initial plausibility and traditional popularity, we shall argue that both the sufficiency and the necessity claims are false. Hearers will typically bring in their own prior views of the propositions under consideration, where these views will often consist in partial beliefs and full beliefs, lack of belief and belief suspension. They also ascribe different degrees of credibility to the speakers, and the speakers will themselves often hold partial beliefs concerning the propositions on which they testify. Taking these conditions seriously, we consider the relation of knowledge transmission to partial belief transmission in terms of the Bayesian updating of credences. What turns out is that traditional transmission theories are inconsistent with such updating and hence probably mistaken. Essentially, the reason for this is that, if testimonial knowledge acquisition is to ensue, the speaker's testimony must interact in suitable ways with the hearer's credences both for the proposition under consideration and the speaker's reliability. And though these conditions may be fulfilled in special cases, they are not generally satisfied.

There have been other criticisms of traditional transmission theories. The most influential one is based on counterexamples originating with Lackey (2008). Regarding necessity, for example, Lackey argues that hearers may acquire testimonial knowledge from 'selfless assertions', i.e. assertions from speakers who testify to the proposition in question despite not knowing it, because they fail to hold the relevant belief.[2] If, nevertheless, the audience justifiably considers the speaker to be trustworthy and reliable, they can acquire true and well-grounded belief through the testimony. Hence, the argument goes, testimony can be a generative—as opposed to a merely transmissive—source of knowledge. From this, Lackey and her followers draw another far-reaching conclusion: such counterexamples, they argue, show that it is the speaker's words, and not their minds, which matter for testimonial exchange; contrary to the traditional view, it is statements instead of doxastic attitudes that are 'the crucial items' or 'bearers of epistemic significance' (Lackey 2008, 39, 58). The wider significance of the argument is thus its impact not only on social epistemology narrowly construed, but also on a classic issue that reaches into the philosophy of mind and the philosophy of language. Contrary to theories of testimony or 'conversation' in a Gricean tradition, Lackey-style counterexamples seem to fuel arguments for the primacy of language over thinking.

Lackey-style counterexamples are controversial, however (see, e.g. the discussions in Audi 2013; Carter and Nickel 2014; Faulkner 2011; Goldberg 2005; Graham 2006; Kelp 2009; Tebben 2020), and though defenders have responded to criticisms, their impact is unsettled and the current state of the debate is in limbo. We shall not invoke (putative) counterexamples but instead present a systematic formal argument that supports *one* of the conclusions Lackey and her followers draw from their counterexamples, namely that traditional transmission theories are mistaken. However, instead of drawing on controversial imaginative scenarios, our argument considers the relation of knowledge transmission to partial belief transmission in terms of the Bayesian updating of credences. It shows that unrefined transmission theories are mistaken because successful transmission requires suitable interaction between speaker's and hearer's credences. Yet, since according to our argument this interaction essentially involves the speaker's doxastic attitudes, this argument does not (re) locate the epistemic significance of testimony in the speaker's words instead of their minds.

We thus provide a new and systematic explanation of the shortcomings of traditional transmission theories which nevertheless defends the idea that the primary goal of testimony and assertive communication is the exchange of knowledge and belief.

In Section 2, we reconstruct principles of necessity and sufficiency of speaker knowledge for knowledge transmission as appealed to in the literature. In Section 3 we define the Bayesian transmission of partial belief in terms of standard Bayesian updating, define how our system of partial belief represents someone as a testimonial authority and define a requirement imposed by the principles from Section 2, the Parity Requirement. In Section 4 we show that the Parity Requirement is incompatible with the Bayesian transmission of partial belief.

In Section 5 we show that speaker knowledge is not sufficient for knowledge transmission (even in the weak sense of merely putting the hearer in a position to know) because Bayesian Transmission need not result in the hearer's credence being high enough for knowledge. We then articulate the correct principle for the testimonial transmission of knowledge. Section 6 applies that principle to the debate of whether credit theories of knowledge can account for the fact that often it seems to be the speaker instead of the hearer who deserves credit for an occasion of knowledge transmission. In Section 7 we show that knowledge is not even necessary for transmission. We then articulate the correct principle for the testimonial acquisition of knowledge. In Section 8 we show that for testimony to be an original, generative source of knowledge we need not repudiate the epistemic significance of the speaker's mind and relocate it instead to their utterance.

The upshot of Sections 5 and 7 is encapsulated in our two principles, the Testimonial Transmission of Knowledge (TTOK) and the Testimonial Acquisition of Knowledge (TAK). In Section 9 we show that, on Mackie's account of causation, an implication of these two principles makes speaker knowledge sometimes a cause of hearer knowledge.

2. Knowledge Transmission

We begin with a closer look at the claim that, at least in paradigmatic cases, the testimony of a knowledgeable speaker is sufficient to put their hearer in a position to know. We have already heard Greco and Elgin on the issue. Consider also a characterization from Alan Hazlett:

> [T]o tell someone something is to offer or propose to engage in a certain kind of collective activity with her, namely the sharing of information (alternatively: the transmission of belief, the transmission of knowledge). (Hazlett 2017, 38)

Elizabeth Fricker argues in an oft-quoted paper that

> [i]n a paradigm and felicitous telling, the teller rightly takes herself to know that P, and seeks to share her knowledge with her intended audience . . . Telling is the proprietary linguistic means—often the only practicable way of achieving this, and almost always by far the easiest—of letting someone else know what one already knows oneself (Fricker 2006, 596).

This view has a venerable philosophical tradition. In his modern classic 'Other Minds', Austin explicitly puts the point in terms of authority, saying that

> we know at 'second hand' when we can cite an authority who was in a position to know (possibly himself also only at second hand)'. The statement of an authority makes me aware of something, enables me to know something, which I shouldn't otherwise have known. It is a source of knowledge (Austin 1979, 82).[3]

In his pioneering article 'The Transmission of Knowledge', Michael Welbourne endorses Austin's claim, arguing as well that 'knowledge can be transmitted down a chain of authorities' (1979, 1):

> Typically, when you ask a question in the spirit of genuine enquiry . . . it is because you want to know something and when your interlocutor answers your question he tells you, or at least he purports to tell you, what you wanted to know. Thus the dictionary correctly gives, as one definition of the verb *tell*, 'to make known'. (Welbourne 1979, 2)[4]

Alvin Goldman says that 'a questioner evinces a desire to know something she does not already know' and thus directs her interrogatories 'at authoritative informants' (Goldmann 1999, 3). Stephen Wright summarizes:

> [T]he basic idea behind transmission theories in the epistemology of testimony is that if I know that φ, I can use testimony to transmit my knowledge to you and you can thus come to acquire my knowledge that φ. (Wright 2016, 293, see also Wright 2019)

Some comments are in order. First, an official formulation should reflect that the hearer will of course not *acquire* knowledge from the speaker if the hearer knows it already. (We are not suggesting that the above-quoted authors think otherwise. Welbourne, for example, explicitly discusses this proviso.) Second, when Austin speaks of authorities who are 'in a position to know' he seems to refer, in the above passage, to speakers who do know. It will prove helpful, however, to reserve the locution 'being in a position to know' for situations in which the subject would know, were they to form an appropriate belief based on the available grounds. In this sense, knowledgeable testimony may put us in a position to know, but we may fail to acquire the knowledge, for example, if we (perhaps irrationally) refuse to accept the testimony as a sufficiently good ground for belief.

Finally, note that when the above-quoted authors speak of 'authorities' or 'authoritative informants', they refer to people who claim to enjoy epistemic rather than practical authority. Typical instances are experts, who possess substantial epistemic superiority over laypeople or novices, relative to some theoretical domain or discipline.[5] But 'epistemic authority' also has a broader or more commonplace sense—the one the above authors appear to have in mind—where it includes epistemic superiority of any degree and can be entirely local, due to merely temporary or 'thin' epistemic advantages (Watson 2023, 151). If you tell me what time it is or whether the sun is shining through your office window, then, in normal circumstances, I will rightly credit you with epistemic authority on these questions but not consider you a disciplinary expert on them.

In the analyses that follow, we include both the epistemic authority had by experts and epistemic authority in this local sense and discuss the typical case where someone who enjoys it testifies to some proposition (or set of propositions) regarding which they are, or are regarded to be, in an epistemically superior position. Call the authority attributed to such a testifier, whether due to expertise or local epistemic superiority, *testimonial authority*. We shall assume that testifying epistemic authorities are recognized as such by their audience, and follow Austin, Welbourne, Goldman and others in using the commonplace sense of authority.

The traditional sufficiency version of the knowledge transmission claim can now be formulated thus:

> KTS (*knowledge transmission sufficiency*): If a testimonial authority, S, knows p and tells p to a hearer, H, then—assuming that H does not know p already and has no undefeated defeaters for p—S's testimony puts H in a position to know p as well.

Consider next the necessity of knowledge for transmission. Here, the claim is that a necessary condition for the hearer to be put in the position to acquire testimonial knowledge is that the speaker, or at least someone in the testimonial chain, knows. Wright (2016, 301) summarizes that '[a] listener's belief that φ can amount to transmitted knowledge only if some earlier speaker in the testimonial chain knows that φ'. This formulation may not be entirely felicitous because it trivializes the point: since for conceptual reasons one can only transmit what one has, surely the listener's belief would not amount to *transmitted* knowledge if there were no knowledge in the chain. But we can summarize the view as follows:

> KTN (*knowledge transmission necessity*): If S's testimony puts H in a position to know p, then either S or someone else in the relevant testimonial chain knows p.

Both KTS and KTN, though being intuitive and having prominent adherents, have raised controversial discussions in recent years. As sketched above, however, the debate has mainly been conducted in terms of counterexamples which are themselves controversial. We shall adopt the standard view, which is assumed in these examples, that knowledge involves belief (and not mere acceptance, as, e.g. Cohen 1989 argues). Rather than attempting to add to or adjudicate that controversy we shall directly argue for the falsity of KTS and KTN on the ground that their relation to partial belief imposes a parity requirement on the transmission of partial belief. Roughly, in order to be constitutive of knowledge, both the speaker's and the addressee's partial beliefs must meet a certain threshold k. In many accounts, k is supposed to mark a point where partial belief turns into full belief. The details are controversial: Some authors argue for $k = 1$, others set it at $k \in (1/2, 1]$. However, what is important for our argument is only the weak assumption that the partial beliefs involved must meet *some* threshold to be constitutive of knowledge, whether or not one holds that knowledge requires full belief. The problem is, in any case, that the strengths of the speaker's and the addressee's partial beliefs can, and often will, come apart and hence that one of them may have knowledge and the other not. In either case, knowledge transmission does not ensue.

In the next section, we commence our argument by developing a Bayesian model of partial belief transmission. We treat testimonial input as evidence on which the hearer rationally updates their prior views of the hypothesis and explain the parity requirement.

3. Transmission of Partial Belief

Partial belief is standardly modelled in terms of credences. We start our analysis with standard Bayesian updating and the representation of someone as a testimonial authority.[6] For convenience, whenever we speak of probability, of something being likely, of the chance of something, we are speaking colloquially of our degrees of belief as the hearer and we reserve the term 'credence' for the degrees of belief of the authority as speaker.

3.1. Bayesian Updating

We are concerned with the updating of our probability in a hypothesis, h, in the light of acquired evidence, e. In standard Bayesian updating, we update our prior probability function, P, to a posterior probability function, P^*, by conditioning on the evidence:

$$P^*(h) = P(h|e) \tag{1}$$

For our purposes, the illuminating equation derived from Bayes' theorem for $P(h|e)$ is this[7]:

$$P(h|e) = \frac{1}{1 + \frac{P(e|\neg h)}{P(e|h)} \frac{P(\neg h)}{P(h)}} \tag{2}$$

The fractions on the bottom are what we need to attend to. The ratio of our prior probabilities that the hypothesis is false or true, $P(\neg h)/P(h)$, is a parameter that tells us nothing of the significance of the evidence but merely scales that significance by our current view: when less than 1 we think the hypothesis likely, when 1 we are indifferent and when greater than 1 we are doubtful.

It is the other ratio, of our prior probabilities of the evidence given the hypothesis being false or true, $P(e|\neg h)/P(e|h)$, which encodes the significance of the evidence and controls how the evidence influences our posterior probability of h. For these reasons, we will treat these ratios in their own terms as the hypothesis ratio parameter $b = P(\neg h)/P(h)$, and the evidence ratio variable $x = P(e|\neg h)/P(e|h)$[8]:

$$P(h|e) = \frac{1}{1 + bx} \tag{3}$$

By inspection, we can see that whenever our prior $P(h) = 1$, the hypothesis ratio parameter b is zero and then the conditional probability of h on e is 1 irrespective of our view of the evidence. For this reason, we will generally take the parameter to be greater than zero.

3.2. Representing Someone as a Testimonial Authority

We shall throughout take our evidence to be that a testimonial authority testifies to a certain proposition or, as we shall say, hypothesis, h.[9] We shall assume that such testimony is honest, sincere, etc., and that in some way, such as the manner in which they tell us or from other contextual factors, we also learn approximately their degree of the belief in h. For our purposes we can make the simplification that we learn a precise degree, $C(h) = q$, or learn what is sufficient to make a precise best estimate.[10]

When it comes to partial belief, what it would be for us to take someone as a testimonial authority would be for their authority to be represented in our system of partial beliefs in a certain way with certain consequences. This way we will now consider the consequences will be the subject of our analysis. It should be noted that when we consider features of authority we are not offering *analyses* of these features in terms of conditions on partial belief: rather, those conditions are offered as *what it is* for our system of partial beliefs to *represent* an authority as having those features.

In our case, the evidence e is the authority's testifying to h. So $e|h$ is the authority testifying to h when it is true, so they are right, and $e|\neg h$ is when the authority testifies to h when h is false, so they are wrong. For this reason, we will call $P(e|h)$ the chance (i.e. our prior probability) that the testifier is right in so testifying about the hypothesis and $P(e|\neg h)$ the chance that they are wrong. Although we think ours is intuitively the best, there are a couple of other routes we could have taken regarding what represents the chance the authority is right, namely taking $P(e \wedge h)$ or $P(h|e)$ rather than $P(e|h)$.

It may appear that 'the authority is right' is most naturally understood as the chance of *what* the testifier says being true, i.e. the chance of the hypothesis h being true, and therefore should be represented by $P(h|e)$. However, this is inaccurate, since the chance of the hypothesis h being true is $P(h)$, not $P(h|e)$, although it might be thought that it is conditional on e because we have mentioned the testifier.

Perhaps there is an ambiguity here, but this thought fundamentally misconstrues what we are concerned about. Here, we are concerned with our prior view *of the authority*, not our prior view of what they testify to. So our concern with representing the authority being right is a concern with how our system of partial beliefs represents our *evaluation of the testifier as an authority*, not with representing our prior view of the hypothesis. Consequently, the probability used for that representation should be about the authority testifying to h, i.e. about the evidence e, not about the hypothesis. Both $P(h)$ and $P(h|e)$ are about the hypothesis. $P(e|h)$ is about the authority's testimony. It is the probability that the authority testifies to h given that h is true and hence it is about the testifier being right and therefore represents our prior view of them being right. Similar remarks can be made about using $P(e \wedge h)$.

In general, to take someone to be an authority we must at least think them significantly more likely right than wrong. It usually requires us to think them more likely right than us—something we presuppose from hereon.[11] So the evidence ratio being significantly less than 1 represents them as an authority in our model. How much less than 1 counts as significantly less is not something we have to determine.

It is true that we might think someone an authority on h but do not expect them to testify on h. However, if we are in a context where the question of whether h has arisen (for why else have they testified to it), then our partial beliefs have already updated on that fact and the relevant prior probability function is one that is *posterior* to updating on the question arising. In this situation, it is at least arguable that for our partial beliefs to represent someone as an authority on h requires $P(e|h)$

to be significantly above 1/2. If $P(e|h)<1/2$ then we think they are more likely NOT to testify to h if h is true (because $P(e|h)+P(\neg e|h) = 1$). But that implies we think them *unreliable* or *devious* about h.

3.3. Bayesian Transmission from a Testimonial Authority

We begin by considering how to update our prior probability of receiving an authority's testimony to a proposition. As we showed above, in Bayesian updating the evidence gets into the picture as the evidence ratio $x=P(e|\neg h)/P(e|h)$, which given the above thought is the ratio of the chance of them being wrong to the chance of them being right. Since representing their authority requires $P(e|h)$ to be significantly above ½, it might be thought that a good place to start is for $P(e|h) = 1$, when the chance of them being wrong is zero and the evidence ratio $x = 0$. In that case, Bayesian updating gives us

$$P^*(h) = P(h|e) = \frac{1}{1 + b \times 0} = 1 \tag{4}$$

However, often it will not be rational to end up with this extreme credence. Testimonial authorities (at least human ones) are neither infallible nor omniscient, and most of them will not regard themselves as having such properties. For this reason, we reject representing their authority by the chance of them being right being one.

There is a nearby thought, however, which is that our system of partial beliefs represents the testifier as an authority just in case our chance of them being right is close to their implicit view of their chance of being right. For example, if the testifier's $C(h) = 3/4$, they think their chance of being right in believing the hypothesis is only 3/4.[12] Our taking the testifier to be an authority is then represented by our $P(e|h)$ being near to 3/4.

Note that we are not saying that after learning the authority's credence we adopt something close to that credence for our chance the authority is right. Rather, we are defining what it is for our prior partial belief to represent someone as a testimonial authority. For simplicity of analysis, in general, we shall take the representation of authority to be a matter of our prior $P(e|h)=q$ iff the authority's $C(h)=q$. The chance the testifier is wrong, then, is $P(e|\neg h) = 1-P(\neg e|\neg h)$. Given that we take the testifier as an authority, we presumably think they would be similarly reliable about $\neg h$, were that the case. That can reasonably be represented by taking $P(e|h)$ to be a good estimate for $P(\neg e|\neg h)$, i.e. $P(\neg e|\neg h)\approx q$.

Using this estimator is the same as when we use the sensitivity of an indicator, such as a blood test, as an estimator of its specificity. This simplification makes the cases we develop more tractable and allows us to develop our counterexamples straightforwardly. Yes, this assumption may fail, for example, when we think someone is a biased interlocutor about h. But if we think they are biased, then we think their epistemic authority on h is defective. We want to consider paradigm cases of epistemic authority, not defective cases. For at least some paradigm cases this will be a perfectly reasonable assumption and that is all we need since we use this material to give counterexamples.

This now gives us the evidence ratio

$$x \approx \frac{1 - q}{q} \tag{5}$$

So the evidence ratio for the authority is a function of the authority's credence. Now our posterior probability when we Bayesianly update on hearing the authority testify to h gives us:

$$\text{Bayesian Transmission(BT)}: P^*(h) = P(h|e) = \frac{1}{1 + bx} = \frac{1}{1 + b\frac{1-q}{q}} = \frac{q}{q + b(1 - q)} \tag{6}$$

When below we wish briefly to distinguish fallible and infallible authorities, we can still follow the same line of thought. We represent a fallible authority by their chance of being right being slightly smaller than it would be for someone we regard as an infallible authority, i.e. our $P(e|h)=q-\varepsilon$, $\varepsilon>0$ but suitably small.

Then, the evidence ratio for a fallible authority is $(1-q+\varepsilon)/(q-\varepsilon)$ which is strictly greater than $(1-q)/q$ and hence the Bayesian Transmission posterior for a fallible authority, $F^*(h)$, is strictly less than $P^*(h)$.[13]

3.4. The Parity Requirement

According to a widespread assumption, knowledge requires a certain strength of belief and thus places some sort of a requirement on partial belief, either directly, or derivatively from knowledge implying full belief and full belief requiring sufficient partial belief, or both. For example, it seems impossible for someone to have, rationally, a low credence in something they fully believe or know.[14] So we assume that knowledge requires the strength of partial belief to satisfy some threshold. There is, admittedly, controversy over the details of any such threshold.[15] Yet this is tangential to our argument: what matters in the present context is that the traditional necessity and sufficiency principles of speaker knowledge, KTS and KTN, together require a certain parity in the transmission of partial belief. This is not to say that the threshold is generally the same for all persons on all occasions; such a thesis is doubtful and there may be considerable contextual dependence. Here is not the place to address those complications, however, and in the present context we may for simplicity assume that the testimonial context is one in which testifier and recipient share the same threshold. What matters for our argument is only the moderate assumption that such contexts exist.

KTS, then, requires that the hearer's partial belief (after transmission) satisfies the threshold. KTN requires that the speaker's partial belief, or the partial belief of someone else in the testimonial chain, satisfies the threshold. For simplicity, let us consider the case where the speaker's belief meets it. Formulated in terms of credence, and taking k to be the threshold required by knowledge, KTS gives us the left-to-right and KTN gives us the right-to-left of the

> Parity Requirement (PR): A testifying authority has $C(h) \geq k$ iff their hearer's posterior probability, $P^{**}(h) \geq k$.

We do not want to introduce a confusion between this requirement and the posterior got from Bayesian updating. To ensure this distinction is kept straight we have named the posterior probability function required by PR, as implied by the traditional transmission principles, 'P^{**}' and the posterior probability function defined by Bayesian updating 'P^*'.

4. The Parity Requirement is Inconsistent with the Bayesian Transmission of Partial Belief

In certain cases, Bayesian Transmission satisfies the Parity Requirement. For example, by inspection, we can see that whenever we are indifferent, i.e. $b = 1$, or the testimonial authority is absolutely certain in either direction, i.e. $C(h) = 0$ or 1, $P^*(h) = C(h)$ and so PR will be satisfied. However, the Parity Requirement is in fact inconsistent with the Bayesian Transmission of partial belief, since in other cases the credences come apart.

Suppose $0 < k < 1$, that our hypothesis ratio is $b > 1$, i.e. that we doubt h, and that $C(h) = k$. By PR $P^{**}(h) \geq k$ but by BT $P^*(h) < k$, as follows.

$$
\begin{aligned}
&b > 1 \\
&b(1-k) > 1-k \\
&k + b(1-k) > 1 \\
&1 > \frac{1}{k+b(1-k)} \\
&k > \frac{k}{k+b(1-k)} = P^*(h)
\end{aligned}
\tag{7}
$$

Similarly, suppose $C(h)=q<k$. Then, by PR $P^{**}(h)<k$, but it is possible for $P^*(h) \geq k$ when our hypothesis ratio satisfies the first inequality below.

$$\frac{q-qk}{(1-q)k} \geq b$$

$$q \geq b(1-q)k + qk = k(q+b(1-q))$$

$$\frac{q}{q+b(1-q)} \geq k \qquad (8)$$

$$P^*(h) \geq k$$

Finally, suppose the threshold $k = 1$. In this case $P^*(h)=P^{**}(h) = 1$ as required by PR iff

$$P^*(h) = 1 = \frac{q}{q+b(1-q)} \quad \text{iff} \quad 0 = b(1-q) \quad \text{iff} \quad b = 0 \text{ or } q = 1 \qquad (9)$$

If $b = 0$, then the hearer's prior probability in h is 1. This does not look like a case of transmission by testimony, however, so PR is irrelevant. It only applies here if $b \neq 0$ and $q = 1$. In that case, PR is compatible with Bayesian Transmission, but at a price, since then the hearer's chance that the testifier is right is one and we have already explained our doubt about representing their authority by that.

5. Knowledge is Not Sufficient for Transmission

Equipped with the foregoing analyses we now return to the question of whether a testifier having knowledge is necessary or sufficient for testimonial knowledge transmission. Consider first the traditional sufficiency version of knowledge transmission,

> KTS: If a testimonial authority, S, knows p and tells p to a hearer, H, then—assuming that H does not know p already and has no undefeated defeaters for p—S's testimony puts H in a position to know p as well.

Plausible as this claim may appear at first sight, our analysis shows that it is probably false. For it is incompatible with Bayesian Transmission. Given what has been said so far, the problem is not hard to see. Consider, for example, a credence threshold k required for knowledge, somewhere in the interval (½, 1). Suppose that $k = 4/5$. Assume that the speaker satisfies the threshold and that all other conditions for knowledge are in place as well. However, let the hearer be doubtful about the hypothesis, with their hypothesis ratio being 5, for example. Then, their credence rises above the threshold, putting them in the position to acquire the knowledge,[16] only if their evidence ratio encoding their assessment of the speaker's epistemic reliability is no greater than 1/20.[17] If the evidence ratio is greater, then knowledge transmission fails. Certainly, for a sufficiently confident authority ($C(h) \geq 20/21$), whose authority we represent by Equation 5, transmission will occur.[18] But of course, their credence may be less than that, and then it will not occur.

Note that the no-defeater condition that, as presented in our reconstruction, is often included in principles like KTS,[19] does not entail that the hearer's prior credence cannot be low enough (and their hypothesis ratio high enough) to block knowledge transmission. Laymen, for example, usually have no defeater against glass being merely empty space (as the atomic theory says), but they have a low probability for it since it seems solid.[20]

The case of $k = 1$ is even simpler. An infallible authority with credence $C(h) = q = 1$ is a case where testimony suffices for the hearer to reach the knowledge threshold by Bayesian Transmission and also to satisfy the Parity Requirement, irrespective of their prior view. PR requires $P^{**}(h) = 1$ and BT gives $P^*(h) = q/(q+b-qb) = 1/(1+b-b) = 1$. Unfortunately, epistemic authorities (at least human ones) are not infallible. However, a *fallible* authority with credence 1 is one in which the hearer will *not*

acquire a credence of 1 because the BT for the fallible authority gives the hearer credence $F^*(h)$ and $F^*(h)<P^*(h) = 1$; hence, knowledge will not be transmitted.

In general, then, the speaker may tell what they know and yet *not* thereby putting the hearer in a position to know. This can occur just because the hearer's prior views of the hypothesis and the speaker's authority, as represented by the hypothesis and evidence ratios, do not result in a sufficient rise in the hearer's credence and hence block the transmission.

Essentially, the traditional view is that, except in very special cases, it is the speaker's state that is mainly responsible for putting a hearer in the position to share that knowledge. This is mistaken because, not solely in very special cases, but in fact in the general case, the hearer's prior credence is also an essential condition on transmission. The vehicle for the effect of this condition is the probabilistic updating of partial belief and the consequence that this has for acquiring knowledge. So KTS is false. The correct principle for knowledge transmission from a speaker S who is a testimonial authority (because they have the relevant knowledge) to a hearer (who wishes to acquire it) is:

Testimonial Transmission of Knowledge (TTOK):

If

1. *speaker condition*: S knows p and tells p to a hearer H, and

2. *hearer condition*: H's prior views on the hypothesis and speaker are such that H's testimonial uptake would yield a partial belief strong enough for the relevant knowledge threshold, and H does not know that p already,

then S's testimony puts H in a position to know p.

6. Credit Theories of Knowledge

Our principle of knowledge transmission also sheds light on a prominent debate at the intersection of the epistemology of testimony and virtue epistemology. Credit theories of knowledge, as advanced and defended by Zagzebski (2003), Sosa (2007), and in multiple other places, Greco (2003), and in multiple other places, Riggs (2009), maintain that what distinguishes mere true belief from knowledge is that the knowing subject deserves credit for the intellectual performance or competence that produced it. An influential objection, again advanced by Lackey (2007, 2009), is that in many situations it is the testifier rather than the hearer who deserves the credit. If a tourist asks for directions – in Lackey's example you arrive in Chicago and inquire about how to get to the Sears Tower – then when they acquire testimonial knowledge, according to Lackey, it is the speaker rather than the hearer who is to be credited. Often, it seems, we can acquire testimonial knowledge by passively absorbing what we are told. Credit theorists have responded by questioning whether the hearer actually *does* acquire knowledge in such easy credit scenarios (Riggs 2009). If they ask a random passer-by, this is doubtful (for not everyone is likely to have or hand down the relevant true belief). But if the inquirer chooses their interlocutor carefully, plausibly they do deserve credit.

Our model shows this: if it *is* knowledge the hearer acquires, then credit theorists can plausibly claim that the hearer is to be credited for their prior views of both the hypothesis and the speaker, encoded in the hypothesis ratio and evidence ratio, that interact in suitable ways with each other *and* with the speaker's testimony, in order to allow the hearer to acquire knowledge. So this supports, and also systematically explains, the original idea advanced by credit theorists. However, the speaker, too, deserves considerable credit, as Lackey rightly observes, since without their knowledgeable testimony the hearer would not acquire knowledge. Our analysis thus supports a shared-credit view for such cases, thereby neatly illuminating, in our view, the social distribution of epistemic labour.

7. Knowledge is Not Necessary

We now move on to the necessity of knowledge:

> KTN: If *H* comes to know *p* via *S*'s testimony, then either *S* or someone else in the relevant testimonial chain knows *p*.

Our results show that this principle is also false and, furthermore, provide a systematic explanation of why it is false that is lacking from the counterexamples to it originating with Lackey. The latter show that hearers may acquire testimonial knowledge from testifiers who fail to know (because they do not believe or fail to be justified), just because the hearers nevertheless acquire true and justified or well-grounded beliefs through the testimony. Our systematic explanation, however, is provided by a rise in partial belief producing a full belief adequate for knowledge. This rise depends both on the testimony and on the hearer's prior views of the hypothesis and speaker. It can, in general, be the vehicle for the acquisition of knowledge from an unknowing testimonial authority (when the other conditions on knowledge are met).

Suppose *S* tells *H* something and that neither *S*'s nor any other person's credence in the testimonial chain meets the knowledge threshold. Our arguments show that *H* may nonetheless rationally update to a strength of partial belief that does meet that threshold, wherever exactly one sets it. In our examples based on Bayesian Transmission, suitable hypothesis and evidence ratios will produce this result. For example, suppose $k = 4/5$, $C(h) = 3/5$ and $b = 3/8$. These last imply that prior to testimony neither testifier nor recipient know (if $b = 3/8$ then $P(h) = 8/11 < 4/5$). However, after the testimony,

$$P^*(h) = \frac{\frac{3}{5}}{\frac{3}{5} + \frac{3}{8}(1 - \frac{3}{5})} = \frac{4}{5} = k. \tag{10}$$

So the recipient of testimony may meet the threshold for knowledge and thereby, assuming other conditions on knowledge are met, may yet come to know from testimony despite the testifier not knowing.

Consequently, the correct principle is:

> **Testimonial Acquisition of Knowledge** (TAK): If hearer *H* comes to know *p* from speaker *S*'s testimony, then—whether or not *S* or anyone else in the testimonial chain knows *p*—*H*'s prior views of hypothesis and speaker are such that *H*'s testimonial uptake yields a partial belief strong enough to meet the threshold required for knowledge.

8. Applying TAK to Lackey-Style Counterexamples

Taking a closer look at how Lackey-style counterexamples fare under our analysis, we find that it confirms some of their conclusions but does not support others. It also supplements or, for some versions, corrects parts of their reasoning. Due to space constraints we confine ourselves to the debate about KTN. Two questions are especially important in the present context. (i) If, as in Lackey-style counterexamples, testifiers fail to know what they tell their audience, then exactly what cognitive attitude do they hold? (ii) Does the full picture really suggest, as Lackey argues, that we should adopt a 'statement view of testimony' and relocate the epistemic significance of testimony in the speakers' words instead of their minds?

In Lackey's most famous counterexample a creationist teacher who does not believe (and hence does not know) any of the propositions constitutive of evolution theory, nonetheless teaches evolution theory, whereby her pupils do acquire knowledge of propositions pertaining to evolution theory (2008, 48). Graham (2006, see also Carter and Nickel 2014) extends the case and directs a similar example against the more liberal claim (see Dummett 1994; Faulkner 2011, 73) that

knowledge must occur, not necessarily in the testifier, but somewhere in the testimonial chain. Suppose that on a field trip, a creationist teacher finds a dinosaur fossil in an area that no one had previously identified as a former dinosaur habitat. The teacher tells her students—again based on good evidence, but disbelieving what she asserts—that dinosaurs had been living in the area. Suppose that the students believe what the teacher tells them and meet all other conditions relevant for knowledge. Then they acquire testimonial knowledge, as Graham claims. But what cognitive attitude may we ascribe to the speaker?

Lackey leaves this open; she only assumes, negatively, that in selfless assertions the speaker does not believe what they assert. Critics have objected, however, that whether or not the examples are coherent depends on the account of belief one adopts, and that on some standard accounts the examples are not coherent. After all, in the stories the testifier (e.g. the creationist teacher) is supposed to possess sufficient evidence for the proposition they are said *not* to believe, and they are portrayed as being fully aware of the epistemic force of that evidence.[21] However, as Kelp (2009) observes, on evidentialist accounts of belief such as, for example, Adler's (2002) this means that the testifier, contrary to what Lackey claims, does believe the proposition in question.

Graham (2006) proposes that the teacher, while not believing what she testifies, still *accepts* evolution theory, in some technical sense of 'acceptance', which Graham describes in terms of merely 'acting as if *p* were true'.[22] However, this proposal also has its problems.

To begin with, it is unclear whether acceptance can in fact appropriately represent the speaker's mental attitude. After all, the creationist teacher emphatically *rejects* evolution theory and believes in creationism, which on many accounts of acceptance—e.g. accounts that require the proposition in question to be a real epistemic possibility for the agent—is incompatible even with merely accepting it. True, Stella regards it as 'her duty as a teacher' to teach and assert in that context that *homo sapiens* evolved from *homo erectus*, but her assertions as a teacher do not reflect her doxastic attitude about the issue. We need not go into discussions of various accounts of acceptance, however, for even if invoking one of them would work as an explanation of the speaker's assertion, the point is inessential for an analysis of the conditions of testimonial knowledge transmission or generation. There is always a difficulty in explaining why the speaker we take to be an authority (and who is supposed not simply to lie) asserts something they do not believe. But what matters for Lackey-style examples—at least on standard accounts that consider (full or partial) belief and not acceptance to be constitutive of knowledge—is whether the assertion yields credence in the hearer adequate for knowledge. When what is offered does provide a ground for knowledge, then the decisive factors are the speaker's credence (which can, but need not correspond to acceptance) and the hearer's prior opinion of the hypothesis and of the speaker. If, for whatever reason, they take the speaker to be a sufficient authority[23] (in our Bayesian model, their evidence ratio is sufficiently low) and this is matched with a suitable prior opinion (their hypothesis ratio is adequate to the scaling available by the evidence ratio), then they come to know. So it follows immediately from our analysis that the disbelieving teacher may indeed *generate* knowledge in her pupils instead of transmitting it to them. Yes, testimony can be a generative source of knowledge. But if, and only if, the hearer's prior views interact in suitable ways with one another and with the speaker's testimony, testimony can play that epistemic role. Consequently, we conclude that a systematic explanation of why authoritative testimony can generate knowledge need not invoke attitudes such as acceptance. Rather, our argument shows that what is decisive is the hearer's prior views of hypothesis and speaker.

All this also yields an answer to the controversy over belief versus statement views of testimony. What is right about the conclusion Lackey and friends draw from their insights is that the testifier need not believe and hence not know what they assert in order for their testimony to be a source of knowledge for the hearer. However, when we look deeper into the mechanisms of testimonial uptake, we see that—contrary to what advocates of the statement view claim—this does by no means suggest that it is merely the speakers' words instead of their minds that matter for the

attitude produced in the hearer. Yes, testimony can be a generative (as opposed to a transmissive) source of knowledge, but it normally produces knowledge in the hearer by revealing something about the speaker's mind, just as traditional 'belief theories' of testimony maintain. In the creationist case, the hearer thinks that such a revelation has occurred but in fact, they are deceived. Were the speaker's mind to be revealed in that case, without the additional belief that the speaker is a reliable reporter of evolutionary science (encoded in high $P(e|h)$ whilst estimate of $C(h)$ low), no knowledge would be generated.

9. Testimony and Causation

Finally, a point that we do not have the space to dwell upon or develop in depth, but we think is nevertheless worth mentioning given the interest in what relation testimony has to cause knowledge. There is an implication of our principles TTOK and TAK that suggests a route by which testimony might be causal, although it would require updating in terms of more recent theories of causality. Together, these principles give us the answer to the impact of speaker knowledge in testimonial transmission: the speaker having knowledge is *an insufficient but necessary part of an unnecessary but sufficient condition* for the testimonial transmission of knowledge. Those familiar with Mackie's INUS account of causes as conditions (Mackie 1965) will immediately recognise the italicized phrase as announcing a case in which (on that account) the speaker's knowledge is a cause whose effect is the hearer's knowledge.

10. Conclusion

We articulated the prominent traditional principles for the sufficiency and necessity of speaker knowledge in testimonial knowledge transmission. We showed that they give rise to the Parity Requirement for the transmission of partial belief from speaker to hearer. Adopting the standard, probabilistic model of representing partial belief in terms of credences, we have shown that the Parity Requirement is inconsistent with Bayesian updating, specifically with what we call Bayesian Transmission. If we update the testifier telling us what they believe, we need not end up with the testifier's credence. We have shown that this holds not only for testifiers we take to be fallible, but also for those we take to be infallible, unless the threshold for knowledge is extreme, when we meet again the problem we saw if we represent authority by them having zero chance of being wrong.

We have used the inconsistency of the Parity Requirement with Bayesian Transmission to show that the traditional principles of the sufficiency and necessity of speaker knowledge are both false, and false because they neglect the hearer's state. We have advanced the correct principles, Testimonial Transmission of Knowledge (TTOK) and Testimonial Acquisition of Knowledge (TAK), that accommodate the impact of the hearer's prior opinion and view of the authority. Interesting consequences follow. TTOK supports the shared-credit view of knowledge transmission. Our argument for TAK provides a more systematic account of why knowledge on the testifier's part is not necessary for testimonial knowledge acquisition than the Lackey-style counterexamples. It also shows that there is no need to resort to the speaker's utterance being the sole bearer of the epistemic significance of testimony in order to explain how testimony can be generative of knowledge. Finally, we showed a route by which testimony might cause hearer knowledge.

Notes

1. Classical formulations of this view can be found in Burge (1993); Dummett (1994); Audi (1997, 2013); cf. also the influential critical discussions in Lackey (2008); Graham (2006); Faulkner (2011).
2. Lackey also presents examples in which the speaker believes, but fails to be justified or warranted in believing, what they assert.
3. A few pages later he says that '[t]he right to say "I know" is transmissible' (110).

4. See also Craig, who in an influential study argues that 'it codifies a widespread intuition' that, 'if someone who knows that p tells me that p, I myself then know that p. . . . It is perfectly normal to speak of someone as knowing something just because he was told it by someone else who knew it' (Craig 1990, 134). Other authors who explicitly argue for testimony as a knowledge transmitter include Audi (1997, 2013); Goldberg (2005); and many others.
5. See, e.g. Zagzebski (2012). Goldmann (2018, 5) argues that an expert in a given domain is someone who holds substantially more true and fewer false beliefs concerning propositions pertaining to that domain, than most people in their epistemic community do.
6. Our Bayesian set-up originates in a presently unpublished paper that gives our full justification for the set-up used here and uses it for a deep and extensive analysis of the relation of testimony and the formal epistemological modelling of partial belief.
7. From Bayes theorem $P(h|e)=P(e|h)P(h)/P(e)$ apply the theorem of total probability and rearrange.
8. For those familiar with the terminology, the evidence ratio is the inverse of the likelihood ratio and the hypothesis ratio is the inverse of the initial/prior odds. We prefer the evidence ratio to the likelihood ratio because the latter is unbounded in some parts of our analysis whilst the former is finite.
9. This is for the recognitional ease of the reader, who may have some familiarity with Bayesian formulae in terms of evidence e and hypothesis h but not in terms of other variables.
10. For literature on assessing testifier reliability, including aggregating multiple testimonies probabilistically and updating on other's credences, see Bovens and Hartmann (2003); McGrew and McGrew (2012); Easwaran et al. (2016).
11. We say 'usually' because epistemic peers or even inferiors may be regarded as having some degree of testimonial authority. The systematicity of the Bayesian model we propose needs no modification to treat such exceptions smoothly because our view of their degree of testimonial authority is already coded in exactly the way we have just described.
12. For example, by applying van Fraassen's diachronic reflection principle (Van Fraassen 1984) with time increment of zero: $C(h|C(h)=q)=q$.
13. If $x' > x$ and $b > 0$ then $1 + bx' > 1 + bx$ so $F^*(h) = \frac{1}{1+bx'} < \frac{1}{1+bx} P^*(h)$
14. Recent proponents of threshold views concerning the relation between full and partial belief include Foley (2009); Easwaran (2016); Dorst (2019); Shear and Fitelson (2019), and many others.
15. For example, a popular permissive bridge principle posits a threshold $k \in (1/2, 1]$. Yet, problems concerning such views include, e.g. the arbitrariness and the agglomeration problems. The arbitrariness problem is that there appear to be no convincing reasons for opting for any particular threshold in that interval. According to the agglomeration objection, a threshold of $k < 1$ violates the natural (and theoretically powerful) principle that believing A and believing B entails believing A and B. Below, we also discuss a threshold k = 1, which avoids these problems.
16. Modulo the other conditions on knowledge.
17. Equation 3, solving for x in $k = 4/5 \leq 1/(1 + 5x) = P^*(h)$. In general, the hearer satisfying the threshold for knowledge requires $x \leq (1-k)/bk$.
18. Equation 5, solving for q in $(1-q)/q \leq 1/20$. In general, sufficient confidence requires $C(h)=q \geq 1/(1+x)$.
19. See Lackey (2008), 39–40) or Elgin (2025, see our quote in Section 1).
20. Thanks to an anonymous referee for urging us to clarify the role of the no-defeater condition.
21. Lackey explicitly says that her creationist teacher 'regards her duty as a teacher to involve presenting material that is best supported by the available evidence, which clearly includes the truth of evolutionary theory' (2008, 48).
22. An acceptance view of selfless assertions is also discussed sympathetically by Tebben (2020).
23. In this case, the hearer is deceived about the speaker's credence, which is low, whereas their estimate of that credence will be a poor estimate because it is high. Our model can also apply even when the hearer knows the creationist speaker does not believe their testimony provided they think the speaker is a reliable testifier of the content of evolutionary science. In this case, they may give a low estimate of the speaker's credence $C(h)$ and yet $P(e|h)$ will still be high because it now encodes that reliable content testifier view, and so to model this we no longer identify $P(e|h)$ with the hearer's estimate of the speaker's credence.

Disclosure Statement

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