

A Bayesian vindication of Wright's account of failure of transmission of warrant

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ABSTRACT

According to Wright, Moore's contentious "proof of the existence of a material world" is not cogent because no warrant can transmit from its premise to its conclusion. Since Bayesian confirmation theory probably affords the best account of inductive reasoning we have today, if Wright's analysis of Moore's "proof" could be translated in Bayesian language, it would probably be preferable to rival analyses that cannot be reformulated in the same way. Okasha has recently proposed a Bayesian model that apparently vindicates Wright's analysis on the whole. In this paper I first argue that Okasha's Bayesian vindication is in different respects flawed and thus unacceptable. I then propose a more suitable Bayesian framework, resting on the so-called Lockean Thesis, which does vindicate Wright's analysis. My investigation sheds new lights on the logical features proper to the warrant that Wright deems not to transmit across entailment, on the constituents of the logical "mechanism" that according to Wright engenders failure of transmission, and on the fine structure of the rational architecture of perceptual warrant outlined by Wright.

1. Introduction

According to Crispin Wright (2002) and (2004), Moore's notorious "proof of the existence of a material world" is not cogent because the warrant for the premise of Moore's argument cannot transmit to its conclusion.¹ Wright's analysis of Moore's "proof" is controversial but not more than other interesting views in philosophy. Since Bayesian confirmation theory presumably affords the best account of inductive reasoning we have today, if Wright's analysis could be reformulated in Bayesian language, it would be justified or vindicated in the sense of being shown to be coherent with principles of inductive logic that are widely accepted. Samir Okasha (2004) has put forward a Bayesian model for Wright's explanation of failure of transmission that *seems* to vindicate that

¹ Indeed, this thesis was first put forward in Wright (1985).

informal account. In this paper I scrutinize both Wright's original explanation and Okasha's model. I show that the latter diverges from former in a number of crucial respects; the result is that it is cannot be accepted. I propose an alternative Bayesian reconstruction that fits better Wright's explanation and appears to vindicate it. Much of the disagreement between my Bayesian reconstruction and Okasha's turns on the fact that my reconstruction makes use of both the notion of *incremental* confirmation and that of *absolute* confirmation, while Okasha's relies on only the first notion. My Bayesian construal appeals to the so-called *Lockean Thesis* (according to which *plain* belief corresponds to a high degree of confidence that falls short of the maximum) to reproduce formally both the central *synchronic* features and the central *diachronic* features of Wright's informal explanation. My investigation sheds some new lights on the logical features proper to the type of warrant that Wright deems not to transmit, on the rational constituents of the "mechanism" that according to Wright engenders failure of transmission, and on the fine structure of the rational architecture of perceptual warrant outlined by Wright.

In more details, § 2 scrutinizes Wright's general conception of failure of transmission of warrant. § 3 analyses Wright's explanation of failure of transmission in Moore's "proof". § 4 suggests reasons to formulate Wright's explanation in Bayesian language. § 5 introduces the Bayesian model advocated by Okasha. § 6 argues that Okasha's model is unacceptable. § 7 argues in favour of an alternative Bayesian framework. § 8 draws the conclusions of the paper.

2. Wright on failure of transmission of warrant

According to Wright,

A particular warrant w *transmits* across a valid argument just in case the argument is cogent when w is given as the warrant for the premises.² (2002: 331).

² Wright endorses a disjunctive notion of warrant that comprehends both a notion of *evidential* justification and Wright's complex concept of *entitlement*, where to say that a thinker S is *entitled* to accept P means, roughly, that it is epistemically appropriate for S to accept P without any evidential (even *a priori*) justification. (Cf. 2004: 174-212). In this paper I will only consider Wright's notion of evidential warrant.

Where a cogent argument is:

An argument, roughly, whereby someone could/should be moved to rational conviction of the truth of its conclusion – a case where it is possible to *learn* of the truth of the conclusion by getting warrant for the premises and then reasoning to it by the steps involved in the argument in question. (2003: 57. Cf. also 2002: 331).

Wright gives a second characterization of transmission of warrant:

A warrant is transmissible [across a valid argument] when we may envisage a logically non-omniscient but otherwise perfectly rational subject coming to believe [its conclusion] for the first time in a way which depends on their recognizing *both* the validity of the [argument] in question *and* that they possess a warrant for its premises. (2002: 332).

These two characterizations of transmission of warrant are roughly equivalent. For (first characterization) someone could/should be moved to rational conviction of the truth of the conclusion of an argument by getting a warrant for its premises and deducing its conclusion, but not by carrying out only one of these two acts, *if and only if* (second characterization) a non-logically omniscient but perfectly rational thinker would come to believe the conclusion of that argument in a way that depends on her recognizing that she has that warrant for the premises and that the conclusion is deducible from the premises, but not in a way that depends on her recognizing only one of these two facts. This broad equivalence holds true because, first of all, '[being] moved to rational conviction of the truth of a proposition' and 'coming to believe a proposition' are loose synonyms.³ Furthermore, it is intuitively true that the propositions that a concrete thinker *could* and *should* arrive at rationally believing on the grounds of specific information and warrant coincide

³ In the above passage Wright writes 'coming to believe [a proposition] *for the first time*'. Yet since Wright writes '*coming* to believe', it seems to me that the expression 'for the first time' is pleonastic.

with the propositions that a rational thinker (in Wright's sense)⁴ *would* arrive at believing on the grounds of the same information and warrant.

Coming to believe the conclusion of an argument via transmission of warrant entails *acquiring* a warrant to rationally believe the conclusion of the argument for the first time. This entailment entitles Wright to characterize the notion of transmission of warrant in accordance with the following supplementary principle:

[A warrant transmits across a valid argument just in case] to acquire [that] warrant for the premises of [the] argument and to recognize its validity is *thereby* to acquire – perhaps for the first time – a warrant to accept the conclusion. (Ibid.).

On the grounds of these three characterizations of the notion of transmission of warrant we can conclude that, for Wright, a warrant *w* for the premises of a valid argument is transmissible to its conclusion if and only if we can envisage a rational subject *S* such that (a) *S* acquires a warrant that *moves* her to believe the conclusion of the argument as a result of *S*'s having acquired the warrant *w* for its premises⁵ and *S*'s having deduced the conclusion from the premises, and such that (b) *S* could not have acquired the warrant for the conclusion as a result of carrying out only *one* of these two acts.⁶

The transmissibility of warrant is important for our cognitive processes because it makes the advancement of knowledge (or of warranted belief) by reasoning possible. (Cf. *ibid.*). One of Wright's examples of transmission of warrant is this:

E. Three hours ago, Jones has inadvertently consumed a large risotto of *Boletus Satana*.

⁴ Hereafter, I will always use the expressions 'rational thinker', 'rational subject' and similar to refer to a non-logically omniscient but perfectly rational agent.

⁵ Notice that if the warrant for the premises of an argument is not evidential, there are presumably cases in which a rational thinker could only *acknowledge* that she has already that warrant, but not *acquire* it – e.g. the cases in which a rational subject is *entitled* in Wright's specific sense (see above note 2), to believe those premises. As in my analysis I focus on evidential warrant only, in the remainder of the paper I will generically speak of acquiring a warrant for the premises of an argument and never of acknowledging it.

⁶ There is a possible interpretation of (a) according to which satisfying (a) entails satisfying (b), but I interpret (a) in a way that does not entail it.

P. Jones has absorbed a lethal quantity of the toxin that toadstool contains.

Therefore:

Q. Jones will shortly die. (Ibid.).

E does afford a warrant to believe P (on suitable background information). Furthermore, P does entail Q. It is intuitively plausible that the warrant afforded by E for P does transmit to Q in Wright's sense. For we can envisage a rational thinker *S* acquiring a warrant that is moving *S* to believe Q as a result of her having acquired the warrant afforded by E for P and her having deduced Q from P, but not as a result of *S*'s having carried out just one of these two acts. In this example, both conditions (a) and (b) for transmission of warrant are satisfied.

A known valid argument with warranted premises may however *fail* to be transmissive in this sense. Wright emphasizes that this happens whenever 'the route to warrant for its premises goes – of necessity, or under the particular constraints of a given epistemic context – *via* a prior warrant for its conclusion' (2003: 57. Cf. also 2002: 131). Arguments of this type are customarily said to *beg the question* or to be *viciously circular*. A very simple case of transmission failure depending on vicious circularity is one in which 'the conclusion of a valid argument features explicitly among its premises' (2002: 332). In this case, the condition (b) for transmission of warrant will prove unsatisfied (while (a) will be fulfilled). This is so because any one who acquired a warrant for the conclusion of the argument by acquiring a warrant for its premises and recognizing its validity could have acquired the warrant for the conclusion by just acquiring the warrant for the premises⁷ and quite independently of recognizing the validity of the argument.

A less trivial case of transmission failure depending on epistemic circularity is that in which one could acquire a warrant for the premises of a valid argument only if one had *prior* and *independent* warrant – in short, *antecedent* warrant – to believe the conclusion of the argument. (Cf. 2003: 57-60 and 2002: 332-335). This is an example by Wright: suppose that you know that Jessica and Jocelyn are two identical twins and that they are so similar that no one can distinguish them in ordinary

⁷ Precisely, to believe *each* premise.

circumstances. This piece of knowledge is part of your collateral information K (which also includes our standard and ordinary assumptions). Suppose also that *G* is a girl you have meet somewhere. Consider the following reasoning:

E. *G* looks just like Jessica.

P. *G* is Jessica.

Therefore:

Q. *G* is not Jocelyn. (Cf. 2003: 59).

Here P does entail Q. It seems correct to say that, given your collateral information K, evidence E could make you believe P only if you had *antecedent* warrant to accept Q.⁸ Wright concludes that in these circumstances the warrant bestowed on P by E cannot transmit to Q. For a ‘you will need [Q] *already* in place as collateral information *before* you can reasonably take E as a warrant for P’ (ibid. All emphases are mine). What Wright intends to say is presumably this: in the case described, the warrant afforded by E for P, which is conditional on K, cannot transmit to Q because we cannot envisage any rational subject *S*, provided with collateral information K, who is getting a warrant that is *moving S* to believe Q as a result of the two-step process of having acquired the warrant for P from E and having deduced Q from P. For, if *S* accepts K as collateral information, the very implementation of this two-step process presupposes that *S* accepts also Q as collateral information. Since *S* must *already* believe Q *before* starting this process and quite *independently* of it, *S* cannot certainly be *moved* to believe Q as a result of this process.

Note that it is condition (a) that is not satisfied in the above case (while (b) is certainly fulfilled). There is thus a neat difference between the respective ways in which a trivially circular argument and an argument instantiating the more sophisticated epistemic circularity fail to be transmissive. While the trivially circular argument fails because it does not fulfil condition (b), the argument of the more sophisticated type fails because it does not fulfil condition (a).

⁸ Given the circumscribed purpose of this paper, I will treat the notion of *believing* rationally a proposition and the notion of *accepting* rationally a proposition as if they were equivalent.

Wright suggests that sophisticated cases of failure of transmission will not be infrequent if the thesis – traceable to Quine’s epistemological holism – that warrant is normally *information-dependent* is actually true. (Cf. 2002: 335). This thesis states that whether some body of evidence supports or does not support a given proposition normally depends on both the body of evidence in itself and the available collateral information. For instance:

If you hear rustling and you see a flash of grey in the trees above you: is that evidence of a squirrel? Yes, if you are knowingly in woodlands in the Eastern United States; no, if you are knowingly in a Scottish pine forest (where the squirrels are still red and it is much more likely to be a wood-pigeon). (Ibid.).

Wright has put forward a template that accounts for the cases of transmission failure resting on information-dependent warrant. This is the template:

Consider a case where one’s collateral information, **I**, does indeed sustain *E*’s warranting *P* but where *E* could not rationally be regarded as warranting *P* if certain elements of **I** were missing and uncompensated for. Such a relationship is always liable to generate examples of transmission-failure: it will do so just when the particular *E*, *P* and **I** have the feature that needed elements of the relevant **I** are themselves entailed by *P* (together perhaps with other warranted premises). In that case, any warrant supplied by *E* for *P* will not be transmissible to those elements of **I**. Warrant is transmissible in such a case only if a rational thinker could cite as her ground for accepting [those elements of] **I** the fact that she has warrant for *P*, supplied by *E*, together with the entailment. No rational thinker could do that if the warrant for *P* supplied by *E* originally depends on prior and independent warrant for **I**.

(2003: 57. Cf. also 2002: 336).

I interpret the above passage as follows: consider one’s collateral information **I** and suppose that *E* can afford a warrant for *P* only conditional on being *Q* included in **I**. In this case, one could be

justified in believing P upon learning E only if one had antecedently accepted Q (i.e. only if one possessed a warrant antecedent to her warrant for P that entitled one to accept Q as collateral information). Suppose also that one knows that P entails Q . The warrant supplied by E for P cannot transmit to Q in this case. For this known valid argument with warranted premise proves viciously circular in the more interesting of the two senses illustrated before, which depends on condition (a) remaining unfulfilled. (I will refine this explanation in § 6).

Wright hastens to emphasize that this type of failure of *transmission* of warrant does not entail failure of *closure* of warrant. The principle of *closure* of warrant across known entailment – which Wright finds very plausible – says that ‘whenever there is warrant for the premises of a known valid argument, there is warrant for the conclusion too’ (2002: 331-332). If warrant fails to transmit in accordance with Wright’s template, this principle is not infringed. For the warrant for P unable to transmit to P ’s logical consequence Q is conditional on the existence of antecedent warrant for Q . Consequently, the claim that whenever there is warrant for the premise P of a known valid argument there is also warrant for its conclusion Q is not jeopardized. (Cf. 2002: 332).

3. Wright on Moore’s “proof”

We are now in the position to understand Wright’s explanation of the failure of transmission in Moore’s “proof”. The deductive argument embedded in this “proof” can be rendered as follows:

P. Here is a real hand.

Therefore:

Q. There is a material world.

P entails Q because a real hand is something material, and Q merely says that there is something material. P was asserted by Moore in a context where he had (possibly non-veridical) perceptual evidence to suppose that he was holding his hand up in front of his face. (Cf. 2002: 330-331).

This “proof”, which is generally interpreted as a response to the sceptic about the external world,⁹ strikes almost everyone as obviously ineffective. The feeling is, typically, that some kind of vicious circularity is involved by it. Wright has an ingenious explanation of how this circularity is instantiated. He first reconstructs the “proof” by making Moore’s perceptual evidence explicit as follows:

E. My experience is that of a hand held up in front of my face.

P. Here is a real hand.

Therefore:

Q. There is a material world. (Cf. 2002: 336-337).

Note that P is taken here to be warranted by a *belief* or a *proposition* about sensory evidence; namely, E. This reconstruction could be questioned. For it could be objected that P should be taken to be warranted directly by Moore’s *experience*. Wright is aware of this criticism and argues that Moore’s “proof” would still instantiate a kind of failure of transmission based on circular reasoning even on the alternative construal. (Cf. 2002: 340-347 and 2003: sect. III). For limit of space and time, I cannot but ignore this complication here.¹⁰ Whenever I speak of evidence or experience, I will always refer to a belief or a proposition.¹¹

According to Wright, we should take for serious the thesis that perceptual warrant is typically information-dependent. Consequently, the question of whether, in Moore’s “proof”, E actually affords a warrant for P is to be assessed considering the available collateral information. Wright believes that E can supply a warrant for P only if collateral information includes Q. The result is that the warrant for P cannot transmit to Q on pain of circularity. This is what Wright says:

⁹ In reality, Moore’s “proof” was meant to constitute a reply to the *idealist*. (Cf. Moore 1942).

¹⁰ I postpone the Bayesian analysis of this response by Wright for a future article.

¹¹ Let me stress, however, that the thesis that sensory experience can directly warrant beliefs or propositions is notoriously controversial. For a defence of the propositional conception of evidence see Williamson (2000).

[Moore's "proof"] exemplifies exactly the template for transmission failure latterly defined: ... the status of Moore's experience as a warrant for the proposition that he is perceiving a hand is not unconditional but depends on certain ancillary [assumptions] and ... paramount among [them]... is the hypothesis that there is indeed a material world whose characteristics are mostly, at least in the large, disclosed in routine sense experience. So the "proof" begs the question.¹² (2002: 337).

Why should the evidential force of Moore's experience depend on the assumption that there is a material world? This is so because:

Sensory evidence for *any* particular proposition about the [immediate] material world depends for its force on independent warrant for the belief that the material world so much as exists – it would not be warranted to treat our experience as evidence for claims about our immediate physical environment if we were antecedently agnostic about the existence of a material world. (2002: 338. My emphasis. Cf. also 2004: 170-171).

Let us call *P-proposition* any contingent proposition purportedly about objects or events in our immediate physical environment (e.g. 'There is a black cat on the mat'). And let us call *E-proposition* any contingent proposition that asserts that someone has the possibly non-veridical sensory experience that *P*, where *P* stands for a *P-proposition*. Let us stipulate that $E_{x,P}$ stands for an *E-proposition* asserting that someone *x* has the possibly non-veridical sensory experience that *P*. Suppose finally that *Q* is 'There is a material world'. Wright appears to believe that a tenet of the rational architecture of perceptual warrant states roughly this:

¹² Wright is no sceptic though. He rejects Moore's "proof" as circular but he maintains that we are warranted – so to say – *by default* in believing that there is a perceivable material world. For we would possess a kind of non-evidential and defeasible warrant for this belief that Wright calls *entitlement*. (Cf. 2004: 174-212).

(pw) For any $E_{x,P}$, $E_{x,P}$ affords a warrant to believe P if both Q and suitable K are antecedently warranted, but $E_{x,P}$ does not afford a warrant to believe P if only K , and not Q , is antecedently warranted.

K is a conjunction of ancillary beliefs that, together with Q , have the function of rationally guaranteeing the reliability of x 's perceptions. Many of the beliefs embedded in K will presumably vary depending on the specific epistemic situation in which x is and on the particular P . Yet one of the beliefs that, for Wright, must *always* be entailed by K in order for $E_{x,P}$ to afford a warrant to believe P says more or less this:

(R) If there is a material world, the features of it that belong to our immediate physical environment are at large correctly representable in our sense experience.

Although Wright runs together Q and R in a passage quoted above and in others,¹³ I prefer to keep Q and R apart because this will simplify the rest of my discussion.¹⁴

In conclusion, Wright's explanation of transmission failure in Moore's "proof" apparently consists of two components: one *methodological* and one *substantive*. The first component is given by the template for transmission failure, and the second is the epistemological thesis (pw). The two components play distinct but complementary roles in the explanation. The template describes a general situation in which the warrant for the premise of a known deductively valid argument fails to transmit to the conclusion because it satisfies certain conditions; (pw) certifies that the perceptual

¹³ I take the conjunction of Q and R to be equivalent in content to 'there is indeed a material world whose characteristics are mostly, at least in the large, disclosed in routine sense experience' (Wright 2002: 337). More recently, Wright has run again Q and R together. He has written: 'the warrant provided by E for P is ... *information-dependent*. And paramount among the pieces of information that have to be in place in order for the move from E to P to be warranted is Q : that there is a material world in the first place (whose characteristics, at least at the level of description typified by P , are representable, and normally successfully represented, in sense experience).' (2004: 170-171).

¹⁴ Wright (2004) calls the propositions or beliefs like Q and R *cornerstones for a given region of thought*. A cornerstone for a region of thought is a belief such that 'it would follow from a lack of warrant for it that one could not rationally claim warrant for any belief in the region' (2004: 168-169). The relevant region of thought in our case is that of the physical objects normally observable by us. Another cornerstone belief is for example the one that 'other people have minds whose states are broadly in keeping with the way they behave' (2004: 173). For Wright, it would follow from a lack of warrant for this proposition that one could not rationally claim warrant to believe any particular belief about other people's mental states.

warrant for the premise of Moore's argument does satisfy those conditions. There is a relation of *inclusion* (or perhaps *encapsulation*) between these two components of Wright's account of transmission failure. Wright's template states, in short, that for any proposition E , P , Q and K :

If (i) E supplies a warrant to believe P when both Q and K are antecedently warranted, but (ii) E does not supply a warrant to believe P when only K , and not Q , is antecedently warranted, and (iii) P knowingly entails Q , then (iv) the warrant that E supplies for P fails to transmit to Q .

(pw) is equivalent to the potentially infinite conjunction of all instances of

(i) and (ii),

in each of which E and P are replaced with, respectively, an E -proposition and its correlated P -proposition, Q is replaced with Q , and K is replaced with the appropriate collateral proposition additional to Q .

4. Motivating the Bayesian analysis of Wright's account

The problem of whether Wright's explanation of failure of transmission in Moore's "proof" is acceptable is open and hotly debated. My major contribution to this debate will be producing a workable and coherent Bayesian version of Wright's informal explanation. This finding is valuable because, first of all, Bayesianism arguably provides the most precise and sophisticated account of evidential support and inductive reasoning we have today. If the logical kernel of Wright's explanation could not be formulated in Bayesian language, one may legitimately doubt of its correctness.

There is another reason to analyse Wright's explanation in Bayesian terms. An analysis of this type should produce a probabilistic model of both components of that explanation – i.e. the template for transmission failure and the epistemological principle (pw), which is encapsulated in the former. Showing that (pw) is expressible in a formalized language would not guarantee that (pw) is true, for

(pw) might not reflect the *actual* structure of perceptual warrant despite the formalization. This result would however be important in the dialectics of the current debate about the architecture of perceptual warrant centred on the competing views by Wright and by James Pryor (see for instance Pryor 2000 and 2004). (pw) – or a proposition very close to it – constitutes a key principle of Wright’s conception of perceptual warrant. Pryor’s position – called *dogmatism* – is incompatible with (pw).¹⁵ According to dogmatism, for at least some proposition *P* about one’s immediate physical environment, one’s apparent perception that *P* can *by itself* justify one’s belief that *P*,¹⁶ i.e. regardless of whether one is antecedently justified in accepting any supplementary hypothesis.¹⁷ A proposition *P* provided with these characteristics is, for Pryor, the Moorean one that asserts: ‘I have a real hand’. (Cf. 2004: 356). Since Pryor rejects (pw), he also rejects Wright’s explanation of the failure of transmission in Moore’s “proof”, and the very claim that Moore’s argument is not cogent. (Cf. 2004: §§ 3 and 4).¹⁸ Roger White (2006) has mounted some interesting objections against dogmatism. He has argued that dogmatism cannot be formalized in Bayesian terms because some of its key claims prove false (i.e. probabilistically incoherent) as a natural Bayesian formalization of dogmatism is implemented. (See mostly White 2006: § 5).¹⁹ While this upshot casts reasonable doubts on the tenability of dogmatism, Wright’s rival conception would acquire an advantage over it if (pw) were shown to possess an acceptable Bayesian translation.

¹⁵ Variants of dogmatism have recently been put forward by – among others – Burge (2003), Davies (2004) and Pollock and Cruz (1999).

¹⁶ The notion of justification used by Pryor in this context roughly corresponds to Wright’s notion of evidential warrant.

¹⁷ More precisely, dogmatism says that for some proposition *P*, if one has the apparent perception that *P* and no reason to believe that any (known) sceptical alternative to *P* is true, one is defeasibly justified in believing that *P* independently of possessing any antecedent justification for denying any sceptical alternative. A sceptical alternative is any hypothesis entailing that one’s sensory experience is not veridical. For instance, if my apparent perception is that I have a hand, a sceptical alternative could state that I am a handless brain in a vat having a computer-generated experience of a hand, or that I am a disembodied soul living in an immaterial world who has the hallucination of a hand induced by a malign demon, or that I am a handless individual who has inadvertently taken a hallucinogen that is inducing the experience of a hand in me, and so on. (Cf. 2004: § 3). Consider any *E*-proposition $E_{x,P}$. To conclude that (pw) and dogmatism are incompatible it is sufficient to realize the following: the dogmatist would probably admit that (i) $E_{x,P}$ affords a warrant for *P* if *Q* and *K* are antecedently warranted. Yet the dogmatist will *deny* – at least for some $E_{x,P}$ – that (ii) $E_{x,P}$ does not afford a warrant for believing *P* if *Q* is not antecedently warranted. For any warrant for *Q* would ipso facto be one for denying sceptical alternatives.

¹⁸ Pryor believes however that Moore’s “proof” is *dialectically ineffective* against the sceptic. (Cf. 2004: §§ 5-7).

¹⁹ White’s central objection is this: suppose *E* is ‘I have the experience of a hand’, *P* is ‘This is a real hand’ and *P** is the catchall sceptical alternative ‘This is a fake hand (i.e. a plastic replica, or a hallucinated hand, or a holographic hand generated by a computer or... etc.)’. On very elementary assumptions, it is easy to show that $\Pr(P|E) < \Pr(\text{not-}P^*)$. A natural interpretation of this inequality says that *E* can render me confident (to any given degree) that *P* is true *only if* I am independently confident (to a higher degree) that the sceptical hypothesis *P** is false. (Cf. White 2006: 534).

As a final point, formalizing (pw) will help to clarify the content of this important thesis (and thus of Wright's analysis of transmission failure in Moore's "proof"). I will show that an easy and tempting probabilistic construal of (pw), which Okasha (2004) appears to be committed to, proves untenable under scrutiny.

5. Okasha's Bayesian model

As Okasha (2004: 139-140) has noted, Wright sees a very close link between the notion of evidential *warrant* and the notion of evidential *support* while discussing the topic of transmission failure. For Wright switches freely from the language of evidential warrant to the language of evidential support. For example, when Wright writes that one can acquire a warrant for P from E , or that E affords a warrant for P , he also writes – very often – that E does support P . (Cf. Wright 2002: 132-135). This encourages believing that Wright's conception of evidential warrant can be formalized by a Bayesian notion of evidential support.²⁰ Loosely speaking, a Bayesian theory is any theory of inductive reasoning based on the probability calculus.²¹ Most Bayesians interpret the probabilities appealed to in inductive reasoning as the degrees of certainty (or credence or confidence) of a rational subject. This is the interpretation of probability I will presuppose in this paper and that is apparently accepted by Okasha (2004). On this reading, the *prior* probability of the proposition X – i.e. $\Pr(X)$ – gives the degree of confidence of a rational subject in the truth of X . The *conditional* probability of X given Y – i.e. $\Pr(X|Y)$ ²² – provides the degree of credence of a rational subject in X conditional on her supposition that Y is true. Y *confirms incrementally* X if and only if $\Pr(X|Y) > \Pr(X)$. Y *disconfirms incrementally* X if and only if $\Pr(X|Y) < \Pr(X)$. Confirmation and disconfirmation are conditional on a proposition Z if the probabilities in the inequalities are

²⁰ Indeed, Wright acknowledges that evidential support typically comes in *degrees* of strength (see for instance Wright 1992: 57). Furthermore, Wright (2002: 333, note 7) explicitly endorses a notion of *defeasible* evidential support, according to which if E supports P and E^* is new evidence, the conjunction $E \& E^*$ may not support P . This closely reflects the non-monotonic nature of Bayesian (incremental and absolute) confirmation (see below), according to which if E confirms P and E^* is new evidence, $E \& E^*$ may not confirm P .

²¹ For an updated critical discussion of modern Bayesianism see Weisberg (2008).

²² Where $\Pr(X|Y) =_{\text{def}} \Pr(X \& Y)/\Pr(Y)$. In this paper I always assume that the conditional probabilities like $\Pr(X|Y)$ are well defined, in the sense that $\Pr(Y) > 0$.

conditioned on Z . For instance, Y confirms incrementally X conditional on Z if and only if $\Pr(X|Y \& Z) > \Pr(X|Z)$.

Okasha seems to believe that we can convert Wright's notion of *providing a warrant for a proposition* into the Bayesian notion of *confirming incrementally a proposition* and that this translation will sustain an acceptable formalization of Wright's explanation of failure of transmission (Cf. 2004: 139-140).²³ In particular, he concentrates on the methodological component of Wright's explanation, i.e. the template for transmission failure. As we have seen, the latter states that for any proposition E, P, Q and K :

If (i) E supplies a warrant to believe P when both Q and K are antecedently warranted, but (ii) E does not supply a warrant to believe P when only K , and not Q , is antecedently warranted, and (iii) P knowingly entails Q , then (iv) the warrant that E supplies for P fails to transmit to Q .

Consider first the conjunction of (i) and (ii). Okasha suggests that one very natural construal of it is $\Pr(P|E \& Q \& K) > \Pr(P|Q \& K)$ and $\Pr(P|E \& K) \leq \Pr(P|K)$ (cf. 2004: 141 and 145), i.e. E confirms P conditional on both Q and K , but not on only K .²⁴ Consider now (iv). Okasha believes that the most obvious probabilistic construal of this is simply $\Pr(Q|E \& K) \leq \Pr(Q|K)$. (Cf. 2004: 141 and 145), i.e. E does not confirm Q conditional on K . On the grounds of his analysis, Okasha formalizes Wright's template for transmission failure as follows:

(I) $\Pr(P|E \& Q \& K) > \Pr(P|Q \& K)$ (E confirms P conditional on both Q and K).

(II) $\Pr(P|E \& K) \leq \Pr(P|K)$ (E does not confirm P conditional on K).

(iii) P knowingly entails Q .²⁵

²³ Okasha would seem to believe that an increase in subjective probability would in general produce an acquisition of warrant or justification. (Cf. 2004: 139). There are objections to this thesis, but I will not press these problems here. For a discussion, see for instance Maher (1996), Achinstein (2001) and Roush (2005).

²⁴ To be more accurate, Okasha initially leaves K implicit in his formalism, but he recognizes that each inequality is to be conditioned on K at the end of the paper. (Cf. 2004: 145).

²⁵ (iii) is left implicit in Okasha's template.

Therefore:

$$(IV) \Pr(Q|E \& K) \leq \Pr(Q|K) \quad (E \text{ does not confirm } Q \text{ conditional on } K).$$

(Cf. 2004: 142 and 145).

Okasha shows that the conjunction of (I), (II) and (iii) does entail (IV). (Cf.: 2004: 142 and 145). He believes that ‘the valid kernel of Wright’s informal reasoning [of why warrant fails to transmit from P to Q] is ... captured in the proof [that (I), (II) and (iii) entail (IV)]’ (2004: 145).

6. Okasha’s model is inadequate

Okasha’s framework is simple and elegant and constitutes a valuable first step towards a formalization of Wright’s account of transmission failure. I believe however that this formalism does not really capture what Wright has in mind. The analysis of the flaws of Okasha’s model will shed further light on Wright’s explanation of failure of transmission and will uncover certain basic conditions that an acceptable Bayesian construal of this explanation should meet; this will pave the way to the framework I will lay down in the next section.

To start with, let me show that the conjunction of (I) and (II) is unsuitable to formalize the conjunction of (i) and (ii). I have two arguments. The first turns on Wright’s epistemological principle (pw), which is neglected by Okasha (2004). As I have indicated in § 3, (pw) is equivalent to a potentially infinite conjunction of instances of (i) and (ii). Thus, if (i) and (ii) were actually translatable into (I) and (II), (pw) should be formalizable into a corresponding potentially infinite conjunction of instances of (I) and (II). The problem is that the latter conjunction entails weird and intuitively false consequences that do not seem to formalize any actual feature of (pw).

In more detail, if (I) and (II) actually translate (i) and (ii), (pw) should be formalizable as the potentially infinite conjunction of all instances of the following schema:

$$(PW) \Pr(P|E_{x,P} \& Q \& K) > \Pr(P|Q \& K) \text{ and } \Pr(P|E_{x,P} \& K) \leq \Pr(P|K).$$

(PW) says that any E -proposition $E_{x,P}$ confirms incrementally its correlated P -proposition P conditional on both Q (i.e. “There is a material world”) and additional collateral belief K , but not conditional on only K . Although Okasha (2004) never focuses on (pw), his formalization of Wright’s template in terms of (I)-(IV) commits him to accepting (PW) as an adequate construal of (pw).

It is easy to show that (I), (II) and (iii) jointly entail that $\Pr(Q|E \& K) < \Pr(Q|K)$. Here is a proof:

- | | |
|--|--|
| (1) $\Pr(E P \& K) \leq \Pr(E K)$. | From (II). As if E does not confirm P given K , P does not confirm E given K . |
| (2) $\Pr(E P \& Q \& K) \leq \Pr(E K)$. | From (1) and (iii). |
| (3) $\Pr(E Q \& K) < \Pr(E P \& Q \& K)$. | From (I). As if E confirms P given Q and K , P confirms E given Q and K . |
| (4) $\Pr(E Q \& K) < \Pr(E K)$. | From (2) and (3). |
| (5) $\Pr(Q E \& K) < \Pr(Q K)$. | From (4). As if Q disconfirms E given K , E disconfirms Q given K . |

QED.

Note now that in *each* instance of (PW), the P -proposition that replaces P entails Q . (For example, the P -proposition that there is a black cat on the mat does entail Q , which merely asserts that there is something material). Consequently, the propositions occurring in each instance of (PW) – i.e. the replacements for $E_{x,P}$, P , K and the proposition Q – do satisfy schemata (I), (II) and (iii) and, given the above proof, they also satisfy (5). The result is that if one accepts (PW), one should accept that, for any $E_{x,P}$, it is the case that $\Pr(Q|E_{x,P} \& K) < \Pr(Q|K)$, where the latter states that $E_{x,P}$ *disconfirms* Q given K .²⁶ It is easy to show that this disconfirmation will be *massive* for most $E_{x,P}$.²⁷ All this

²⁶ It is curious that Okasha (2004: 142) derives (IV) directly from (5) (in which K is left implicit). Okasha seems not to realize that (5) is problematic.

²⁷ Let us replace Q for Q and $E_{x,P}$ for E in (I), (II) and (iii) and in the proof of (5). (I) is now $\Pr(P|Q \& K) < \Pr(P|E_{x,P} \& Q \& K)$. Note that $\Pr(P|Q \& K)$ is in general very small. For the mere assumptions Q that there is something material and K that perceptions are reliable will not make it probable that it is just the case that P . Yet, we can plausibly assume that $\Pr(P|E_{x,P} \& Q \& K)$ is close to 1. Therefore, $\Pr(P|Q \& K) \ll \Pr(P|E_{x,P} \& Q \& K)$. Given that $\Pr(P|E_{x,P} \& Q \&$

entails claiming that if a thinker x accepted the collateral hypothesis K functional to guarantee the reliability of x 's perceptions, if x had the apparent perception of something material, x 's rational confidence in the hypothesis Q that there is something material (i.e. a material world) should *dramatically decrease*. This claim is odd and intuitively false.²⁸ Consider for instance that, for Wright, K has always to entail R . The latter says that *if there is a material world, the features of it that belong to our immediate physical environment are at large correctly representable in our sense experience*. Most of us will find it natural that if x accepted R as true, x 's rational confidence in the existence of a material world should in general *increase* when x had the apparent perception of a something material.

It is dubious that (PW) constitutes an accurate formalization of (pw). The reason is this: if one accepts (PW), one is committed to maintaining that for every $E_{x,P}$, $\Pr(Q|E_{x,P} \& K) < \Pr(Q|K)$. It is not evident however that if one accepts (pw), one is committed to any non-formalized proposition corresponding to this odd and intuitively false claim.²⁹ Consequently, any alternative Bayesian translation of (pw) that involved no commitment to the thesis that for every $E_{x,P}$, $\Pr(Q|E_{x,P} \& K) < \Pr(Q|K)$ should presumably be preferred, *ceteris paribus*, to (PW). Since there is a formalization of (pw) preferable to (PW) in this sense – I will detail it in the next section – it appears to me that (PW) cannot be used to formalize (pw). This entails that the instances of the conjunction of (I) and (II) constitutive of (PW) cannot be used to formalize the instances of the conjunction of (i) and (ii) constitutive of (pw). This means – more generally – the conjunction of (I) and (II) cannot be used to formalize the conjunction of (i) and (ii).

$K)/\Pr(P|Q \& K) = \Pr(E_{x,P}|P \& Q \& K)/\Pr(E_{x,P}|Q \& K)$, it follows that $\Pr(E_{x,P}|Q \& K) \ll \Pr(E_{x,P}|P \& Q \& K)$. The latter in conjunction with (2) (after the replacements) entails that $\Pr(E_{x,P}|Q \& K) \ll \Pr(E_P|K)$. Since $\Pr(E_{x,P}|Q \& K)/\Pr(E_{x,P}|K) = \Pr(Q|E_{x,P} \& K)/\Pr(Q|K)$, it follows that $\Pr(Q|E_{x,P} \& K) \ll \Pr(Q|K)$. So $E_{x,P}$ *massively* disconfirms Q given K .

²⁸ Even a sceptic about the existence of a material world would probably be reluctant to assert it. The sceptic would more probably contend that x 's apparent perceptions do increase her confidence in the existence of a material world, but just *as much as* they increase x 's confidence in *incompatible* sceptical hypotheses (e.g. in the hypothesis that x is disembodied soul in an immaterial world deceived by malign demons). A sceptic might perhaps contend, in alternative, that x 's apparent perceptions *neither diminish nor increase* her confidence in the hypothesis that there is a material world.

²⁹ For instance, it is far from evident that one's endorsement of (pw) would commit one to the odd thesis that one's apparent perception of something material should (forcefully) boost one's justification to believe that no material world exists if one were sure that R and other collateral hypotheses that are meant to back the reliability of one's perceptions are true.

My second argument to conclude that the conjunction of (I) and (II) is unsuitable to formalize the conjunction of (i) and (ii) turns directly on Okasha's model. The latter is meant to provide a formal rationale for Wright's explanation of failure of transmission. In particular, Okasha's proof that (I), (II) and (iii) jointly entail (IV) is meant to justify formally Wright's contention that if (i), (ii) and (iii) are true, then (iv) is true. If I understand Okasha, this justification would come through a reasoning that can be summarized as follows: suppose (i), (ii) and (iii) are true. Then, (I), (II) and (iii) are true via formal translation. Therefore, (IV) is true via Okasha's proof. Hence, (iv) is true via informal translation (i.e. translation from formalized language to ordinary language). In conclusion, if (i), (ii) and (iii) are true, then (iv) is true, just as Wright maintains. This reasoning reveals two things. First, the conjunction of (I) and (II) can be accepted as a probabilistic version of the conjunction of (i) and (ii), for the purpose of justifying formally Wright's account of transmission failure via Okasha's proof, only if the truth of conjunction of (I), (II) and (iii) can be inferred from the truth of the conjunction of (i), (ii) and (iii). Second, (IV) can be accepted as a probabilistic version of (iv), for the same purpose, only if the truth of (iv) can be inferred from the truth of (IV). I will now show that the first condition remains unsatisfied, so that the conjunction of (I) and (II) is unacceptable as a formalization of the conjunction of (i) and (ii). (Before concluding this section, I will show that also the second condition remains unsatisfied, so that (IV) is no acceptable formalization of (iv)).

As we have seen in § 2, according to Wright, the warrant afforded by E for P transmits to P 's known consequence Q only if a rational thinker S could acquire a warrant that would *move S to believe Q* as a result of both S 's acquiring the warrant for P from E and S 's deducing Q from P . Although Wright is not explicit about this, it is natural to assume that, in case of transmission, the warrant that S would acquire for P is one that would *move S to believe P*. In other words, the process of transmission that Wright has in mind is presumably one according to which, since S has come to believe P on the grounds of E , as S realizes that P entails Q , S comes to believe also Q . A reason to think so is that it is strongly plausible that warrant often transmits in this way. On the

other hand, it seems very implausible that a warrant could transmit from P to Q such that S would arrive at believing Q at the end of the process, if the warrant initially acquired for P by S were insufficient to make S believe P .³⁰ Suppose, for instance, that E provides S with a weak warrant for P that can only move S from, say, her initial *disbelieving* P , to *withhold* her belief in P , or – more simply – that can only make S disbelieve P *less than initially*. It is quite clear that in both cases S could not get any warrant capable *to move her to believe* Q via the process described by Wright.

Now it should become easier to understand why the truth of conjunction of (I), (II) and (iii) cannot be inferred from the truth of conjunction of (i), (ii) and (iii). Let us focus on (i) and (ii). Proposition (i) states that E supplies a warrant to believe P whenever both Q and K are antecedently warranted. Proposition (ii) states that E does not supply a warrant to believe P if only K , and not Q , is antecedently warranted. As we have seen, the warrant one can acquire for P in the process of transmission analysed by Wright is a warrant that *would move a rational thinker to believe* P – shortly, a warrant *sufficient to make* P *believable* or *credible*. Hence, the cases of failure of transmission investigated by Wright must primarily concern situations in which a warrant *sufficient to make* P *believable* falls short of transmitting. Consequently, it is possible that Wright understands (i) and (ii) precisely as follows: (i) says specifically that E affords a warrant *sufficient to make* P *believable* whenever both Q and K are antecedently warranted; (ii) says specifically that E does not afford any warrant *sufficient to make* P *believable* if only K is antecedently warranted. Note that this reading of (ii) does *not* exclude that for certain propositions E , P , K and Q – which do satisfy (i), (ii) and (iii) – a rational thinker S could get some warrant from E that would *increase* her confidence in P if S accepted only K , but not Q , as collateral information. (ii) rules out only the possibility that this increase in S 's confidence could be so substantive to make S *believe* P .

Indeed, the above interpretation of (i) and (ii) must be the one that Wright primarily accepts or is committed to accepting. This is so because the paradigmatic cases of failure of transmission

³⁰ Wright certainly does not presuppose that S already believes P *before* acquiring evidence for it from E . For if S were already warranted in believing P before learning E , S could arrive at believing Q , on the ground of the principle of *closure* of warrant under known entailment, by just deducing Q from P . (Wright tends to believe that this principle of closure is correct. Cf. 2002: 331-332). The problem is that the failure of transmission instantiated in this case would be *trivial*, in the sense that it would depend on condition (b) – and not (a) – remaining unsatisfied.

described in Wright (2002) and (2003) just require this specific reading of (i) and (ii). One of these cases has already been described in § 2. In this example, we can envisage a rational thinker *S* who possesses collateral information *K* that entails (among standard and ordinary assumptions) that Jessica and Jocelyn are indistinguishable twins. *S* learns the evidence *E* that a given girl *G* looks very much like Jessica. Wright maintains that upon learning *E*, *S* would come to believe the proposition *P* that *G* is actually Jessica only if *S* had antecedent reason to believe *P*'s consequence *Q*, stating that *G* is not Jocelyn. This is indeed plausible. My point is that, in this example, it is strongly intuitive that if *S* antecedently believed only *K*, but not *Q*, *S*'s learning *E* would provide *S* with *some* warrant that would *increase* *S*'s confidence in both *P* and not-*Q* (i.e. '*G* is Jocelyn') individually taken, though this warrant would not suffice to move *S* to *believe* *P* or not-*Q* individually taken.

Analogous remarks apply, for instance, to the following example of failure of transmission that Wright has presented as another paradigmatic case:

E. Jones has just kicked the ball between the white posts.

P. Jones has just scored a goal.

Q. A game of soccer is taking place. (2002: 133-135).

Here *P* entails *Q*. Wright would seem to maintain the following: if a rational thinker *S*'s collateral information *K* entailed (among ordinary and standard assumptions) that Jones may kick the ball between the white posts in many situations other than a real match of soccer, *S* could acquire from *E* a warrant sufficient to make *P* credible only if *S* had some independent reason to accept *Q*. Consequently, the warrant from *E* for *P* does not transmit to *Q*. I find this plausible. Note that in this case too it is intuitive that had *S* accepted only *K* but not *Q*, *S*'s learning *E* would provide *S* with

some warrant that would *enhance* her confidence in P , though not to the point to make S believe P .³¹

Consider now (II), i.e. $\Pr(P|E \& K) \leq \Pr(P|K)$. The truth of (II) cannot be inferred from the truth of the conjunction of (i), (ii) and (iii). This is the reason: there are presumably many E , P , Q and K for which (ii) is true because if S accepted only K but not Q , S would acquire a weak warrant from E that would increase S 's confidence in P without entitling S to believe P . In some of these cases also (i) and (iii) are true – situations of this type are illustrated by the two sample cases considered before. In these situations, since S 's learning E conditional on S 's acceptance of K would (slightly) *increase* S 's confidence in P , S 's confidence in P given both E and K should be higher than S 's confidence in P given only K . We can conclude that in these cases $\Pr(P|E \& K) > \Pr(P|K)$, which is incompatible with (II). There are thus cases in which (II) is false while (i), (ii) and (iii) are true together. From this, it follows that the joint truth of (I), (II) and (iii) cannot be inferred from the joint truth of (i), (ii) and (iii). This is why the conjunction of (I) and (II) gives no suitable formalization of the conjunction of (i) and (ii).

Okasha's model is inadequate in another respect: schema (IV), i.e. $\Pr(Q|E \& K) \leq \Pr(Q|K)$, provides no acceptable formalization of (iv). The content of the latter proposition can now be made more precise. (iv) asserts that the warrant supplied by E sufficient to render P believable fails to transmit to Q (where E , P and Q do satisfy the first three conditions of Wright's template). To articulate my argument, I need to make the analysis of Wright's explanation of transmission failure a bit more accurate. Note first that the warrant that a rational thinker S would acquire *for* Q *via* *transmission* – i.e. by acquiring a warrant from E for P and deducing Q from P – is one supplied by evidence E . In case of transmission, S would acknowledge that E provides a ground for believing Q as a result of carrying out the above two-step procedure. This means that Wright's principle for transmission of warrant should more carefully be formulated as follows:

³¹ I think that the very same discourse can be made for the other two sample cases of transmission failure given in Wright (2002) and (2003) – precisely, the one called *Election* in Wright (2002: 333-334), and the one called *Airport* in Wright (2003: 59).

- (tr) The warrant supplied by *E* sufficient to make *P* believable does transmit to *P*'s known logical consequence *Q* if and only if we can envisage a rational thinker *S* acquiring a warrant *from E* that moves *S* to believe *Q* as a result of both *S*'s having acquired the warrant from *E* for *P* that has moved *S* to believe *P* and *S*'s having deduced *Q* from *P*.

This basic formulation of Wright's principle of transmission of warrant does not mention explicitly any collateral belief that *S* may have to entertain to acquire the warrant from *E* for *P*. Yet the first two conditions of Wright's template do impose that *S* could obtain a warrant for *P* only if *S* entertained certain collateral beliefs. Since the analysis of Wright's explanation of transmission failure requires us to apply his principle of transmission to the very situation set out by his template, we have now to work out the appropriate version of (tr) suitable to apply when the warrant for *P* depends on collateral information. Suppose then that *S* could obtain a warrant from *E* for *P* only if she entertained a collateral belief *B*, and that this warrant were actually transmissible to *P*'s consequence *Q*. A question crucial for our purpose is whether the warrant that *S* would get from *E* for *Q*, in conclusion of the process of transmission, would be one the existence and the strength of which presupposes that *S* still entertains *B*. In short, the question is whether the warrant supplied by *E* for *Q* via transmission is one conditional on *B*. The answer is affirmative. This follows from two considerations: first, the mere deduction of *Q* from *P* could give *S* no reason to drop the collateral belief *B* entertained by *S* before the deduction;³² second, the *rational* thinker *S* should abide by the rational rule – often called Principle of Total Evidence – according to which an agent's epistemic assessment of a hypothesis or a belief requires the agent to consider *all* information she possesses at the time of the assessment. The first consideration entails that *S* must still entertain the belief *B* at

³² We might perhaps think of a peculiar (perhaps perverse) situation in which the collateral belief *B* necessary to acquire a warrant from *E* sufficient to make *P* believable entails that *Q* is not deducible from *P*. In this case, *S*'s mere recognizing that *Q* is deducible from *P* would make *S* drop *B* from her collateral information. I am not sure, however, that we can really think of *concrete* cases that instantiate this abstract situation. Furthermore, in these cases the deduction of *Q* would undermine the initial warrant acquired by *S* for *P*, which is necessary for instantiating both transmission and failure of transmission. So if such concrete cases exist, they must be implicitly set aside by Wright while discussing transmission and failure of transmission of warrant – when Wright says that *E* affords a warrant for *P*, he must presuppose that this warrant cannot be defeated by just deducing *Q* from *P*.

the time of S 's epistemic appraisal of Q at the end of the transmission process. The first and second considerations together entail that S must take into account B in her epistemic appraisal of Q .³³

In conclusion, the version of the principle of transmission of warrant that should be used when the warrant for P depends on collateral information is this:

- (ctr) The warrant supplied by E conditional on B and sufficient to make P believable does transmit to P 's known logical consequence Q if and only if it is possible to envisage a rational thinker S who is acquiring a warrant from E depending on S 's having antecedently accepted B that is moving S to believe Q as a result of both S 's having acquired the warrant from E depending on S 's having antecedently accepted B that has moved S to believe P and S 's having deduced Q from P .

Let us now apply (ctr) to the specific situation of Wright's template. In this case, since (i) and (ii) hold true, the warrant supplied by E conditional on B and sufficient to make P believable corresponds to the one supplied by E conditional on the conjunction of Q and K . To establish whether this warrant does transmit to P 's consequence Q , we should replace all occurrences of B in (ctr) with occurrences of the conjunction of Q and K . We obtain the following condition:

The warrant supplied by E , conditional on Q and K , and sufficient to make P believable does transmit to P 's known logical consequence Q if and only if it is possible to envisage a rational thinker S who is acquiring a warrant from E depending on S 's having antecedently accepted Q and K that is moving S to believe Q as a result of both S 's having acquired a warrant from E depending on S 's having antecedently accepted Q and K that has moved S to believe P , and S 's having deduced Q from P .

³³ Note that S must take into account B in her epistemic evaluation of Q also before acquiring E and deducing Q from P . This is so because the warrant from E is one supposed to move S to believe Q conditional on S 's having antecedently accepted B (if transmission goes through). Therefore, S has to judge that she does not believe Q while accepting only B and not yet E .

This condition cannot be satisfied because the sentence in *italic* in the above passage cannot possibly be true. The reason is simply this: *S* could acquire no warrant from *E* that would *move S* to believe *Q* if *S* should *antecedently* believe *Q* and *K* to be able to acquire that very warrant with that specific force. This is the precise reason why the proposition (iv) of Wright’s template is true – namely, the reason why the warrant supplied by *E* sufficient to make *P* believable falls short of transmitting to *Q*.

Okasha contends that (IV) – i.e. $\Pr(Q|E \ \& \ K) \leq \Pr(Q|K)$ – is an appropriate Bayesian construal of (iv). I can make sense of Okasha’s claim only if I partly reinterpret it. What Okasha presumably means is that (IV) is an appropriate Bayesian translation of the proposition that states the reason why (iv) is true. As we have just seen, this proposition asserts that a rational thinker could acquire no warrant from *E*, on suitable collateral information, that would move her to believe *Q*. If this is what Okasha intends to say (and I see no other plausible interpretation of his words)³⁴ Okasha is mistaken.³⁵ For what (IV) precisely says is that *Q* is not confirmed by evidence *E* conditional on *only K*, whereas we have seen before that the evidence that engenders the failure of transmission in Wright’s template is given by *E* conditional on *both Q and K*. To be more precise: since (IV) asserts that *E* does not confirm *Q* conditional on *only K*, we could infer from (IV) that a rational thinker *S* could get no warrant from *E* for *Q* depending on *S*’s antecedently accepting *only K*, and thus that *S* could get no warrant from *E* that would move *S* to believe *Q* depending on *S*’s antecedently believing *only K*. This is irrelevant for the truth of (iv). For the reason why (iv) is true is that *S* could get no warrant from *E* that would move *S* to believe *Q* depending on *S*’s antecedently

³⁴ This is what Okasha literally writes (I have made some irrelevant notational changes): ‘What about the claim that the support *E* provides for *P* “fails to transmit” to *Q*? The most obvious probabilistic construal of this is simply $\Pr(Q|E) \leq \Pr(Q)$, i.e. *E* does not support *Q*’. (2004: 141). Some lines ahead, Okasha recognizes that the formalization of Wright’s account of failure of transmission requires conditioning all probabilities on background *K*. He thus reformulates the above inequality as $\Pr(Q|Q \ \& \ K) \leq \Pr(Q|K)$. (Cf. 2004: 145).

³⁵ Indeed, even if Okasha were right here, there would still be a problem for his Bayesian vindication. For if (VI) is no *direct* formalization of (iv), some explanation should be given concerning why the truth of (IV) entails the truth of (iv). This would plausibly involve showing that Wright’s principle of transmission of warrant cannot be satisfied when the informal proposition corresponding to (IV) is true together (i), (ii) and (iii). Since Okasha’s model would offer no probabilistic validation of this component of the informal explanation of failure of transmission, Okasha’s vindication could be argued to be incomplete.

believing *both Q and K*. In conclusion, the translation of (IV) into ordinary language gives us no grounds to conclude that (iv) is true.³⁶ So (IV) provides no suitable Bayesian construal of (iv).

A schema more adequate than (IV) to formalize the reason why (iv) is true (coherent with the other formal conditions proposed by Okasha) would be this:

$$(IV^*) \Pr(Q|E \ \& \ Q \ \& \ K) \leq \Pr(Q|Q \ \& \ K).$$

(IV*) says that *E* cannot confirm *Q conditional on Q and K*. This could be taken to correspond to the claim that *S* could acquire from *E* no warrant for *Q* – and thus no warrant capable to move *S* to believe *Q* – *depending on S's antecedently believing both Q and K*. Note that (IV*) is true *a priori* because for every *X* and *Y*, and on any *Pr*, $\Pr(X|X \ \& \ Y) = 1$.

At this point someone might be tempted to replace Okasha's proof with the *trivial* proof that (IV*) follows from (I), (II) and (iii). I doubt, however, that this would provide us with any Bayesian justification of Wright's account of failure of transmission – even if the objections raised against (I) and (II) were somehow met, or if these two schemata were accordingly revised. For this trivial proof could at best certify formally the truth of the following claim: the conjunction of (i), (ii) and (iii) (trivially) implies that a rational thinker *S* could acquire no warrant from *E* capable to move *S* to believe *Q* conditional on *S's* antecedently believing *Q* and *K*. This claim says *literally* nothing about transmission failure, nor it entails *by itself* that warrant fails to transmit in Wright's template. To substantiate the thesis that warrant fails to transmit in Wright's template, one should rather show – as I have done above in this section – that Wright's *principle of transmission of warrant* cannot be satisfied when (i), (ii) and (iii) are true. Hence, a Bayesian vindication of Wright's explanation of transmission failure need not embed the trivial proof mentioned before. Instead, it should consist of a *probabilistic version* of the analysis of Wright's explanation I have already given – i.e. it should

³⁶ An additional problem for (IV) might be that certain instances of this schema appear just *false* in some of Wright's examples of transmission failure. (Cf. Okasha 2002: 143-6). Okasha believes however that Wright misinterprets at least one of these examples, which would in fact concern a case in which warrant *transmits* across entailment. (Cf. 2004: 145). I prefer not to embark on the hard task of finding the correct interpretation of Wright's controversial examples. The general objections I have raised to Okasha's model in this section are sufficient to conclude that it should be rejected. Furthermore, my formalization of Wright's reasoning will not entail (IV).

be a demonstration that a suitable *probabilistic version* of Wright's principle of transmission of warrant cannot be satisfied when suitable *probabilistic versions* of (i), (ii) and (iii) are true. I will provide this demonstration in the next section.

To recap, I have raised three objections against Okasha's formalization of Wright's template. The first two objections hit Okasha's thesis that the conjunction of (I) and (II) provides a suitable probabilistic construal of the conjunction of (i) and (ii). I have shown that the instances of (I) and (II) that should be used to formalize the instances of (i) and (ii) constitutive of (pw) entail weird and intuitively false consequences. It is dubious that these consequences should follow from an accurate formalization of (pw), and thus from an accurate formalization of (i) and (ii). I have also argued that the conjunction of (I), (II) and (iii) proves false in many situations in which the conjunction of (i), (ii) and (iii) is true. This should not happen if (I) and (II) were an appropriate probabilistic construal of (i) and (ii). My third objection hits Okasha's claim that (IV) does translate formally (iv). I have argued that Okasha's claim is false because, substantially, (IV) formalizes a proposition about evidence which is not conditional on Q , while (iv) is about evidence conditional on Q . The conclusion I ought to draw at this point is that Okasha's framework cannot be accepted as a formalization of Wright's template. Despite Okasha's conviction, it is untrue that the valid kernel of Wright's informal explanation of why warrant fails to transmit across entailment is captured in the proof that (I), (II) and (iii) jointly entail (IV).³⁷

7. An alternative Bayesian vindication

A notion that plays a crucial role in Wright's explanation of failure of transmission is that of a *warrant that would move a rational subject to believe a proposition* – shortly, *a warrant sufficient to make a proposition believable*. To produce a Bayesian vindication of Wright's explanation we should work out, to begin with, a probabilistic translation of this notion. The version that I am going to define here depends the so-called *Lockean Thesis* and the concept of *absolute* confirmation. Let

³⁷ In spite of this, I am reluctant to deny that Okasha's ingenious framework might account for *some type* of failure of transmission of justification. My point is simply that it does not account for the specific type of failure of transmission that Wright has in mind.

us consider both of them in turn. The Lockean Thesis has been first stated by Richard Foley in this manner:

It is epistemically rational for us to believe a proposition just in case it is epistemically rational for us to have a sufficiently high degree of confidence in it, sufficiently high to make our attitude towards it one of belief.³⁸ (1992: 111).

The term ‘belief’ in this quotation refers to a doxastic state that can only be categorically present or absent in a thinker; I will call this state *plain* belief. Wright’s notion of a warrant sufficient to make a proposition credible apparently presupposes the notion of a plain belief. For claiming that one is moved to believe a proposition is presumably the same as claiming that one is moved to entertain the attitude of plain belief towards that proposition.³⁹ The advocates of the Lockean Thesis typically assume that the rational degrees of confidence do comply with the probability calculus. The consequence is that the Lockean Thesis is customarily interpreted as stating that it is rational for us to believe a proposition *X* just in case it is rational for us *to assign X a degree of subjective probability that exceeds a sufficiently high threshold t*. I will stick to this interpretation.

It is reasonable to assume that $\frac{1}{2} \leq t < 1$. For complying with the first inequality will prevent us from rationally believing trivial logical inconsistencies,⁴⁰ and complying with the second inequality will allow us to rationally believe many different things other than trivial tautologies and conceptual truths. Concrete human beings typically do not have precise degrees of confidence in propositions and, to the extent they actually employed numerical degrees of confidence to mark out their plain

³⁸ Foley has called this the Lockean Thesis because he believes it is suggested by Locke’s discussion of probability and degrees of assent.

³⁹ The same appears true of other notions used by Wright, such as ‘be[ing] moved to rational conviction of the truth of [a proposition]’ (Wright 2003: 57), ‘learn[ing] of the truth of [a proposition]’ (ibid.) and ‘coming to believe [a proposition]’ (Wright 2002: 332). All these expressions could be paraphrased without loss of relevant content (in the context of the discussion of failure of transmission) by making use of the term ‘plain belief’.

⁴⁰ Notoriously, if we assume that plain belief depends on the Lockean Thesis, the probability calculus *and further logical principles* – like closure principles – we may arrive at the paradoxical conclusion that we rationally believe propositions that are logical inconsistent with one another. For instance, this happens with the so-called Lottery Paradox. The mere assumption that $t \geq \frac{1}{2}$ cannot settle this problem. Note however that the inconsistent propositions involved in paradoxes of this sort are not *trivial* logical inconsistencies (such as ‘I am in Melbourne and I am not in Melbourne’). One has to accept principles not validated by the axioms of probability and to work a bit to produce these contradictions. (I will come back to this issue at the end of the section).

beliefs, such values might not converge on any given t , furthermore these values might be vague and context-dependent. Nevertheless, the thesis that there exists a threshold for our degrees of confidence that determines whether to believe a proposition is to be conceived of as a *normative* claim, or as an *idealization* that specifically concerns (perfectly) rational beings. The Lockean Thesis, if conceived of in this way, is intuitive and fashionable. Indeed, there are also reasons that make this Thesis contentious. I will touch upon the difficulties most frequently adduced in epistemology against it in the end of the section.

The Bayesian accepts that Y confirms *absolutely* X if and only if the probability of X conditional on Y is above a given value v . It is natural to think of v as the threshold for the degrees of confidence in X the exceedance of which entitles a rational thinker to *accept* or *believe* X . I will therefore assume that $v = t$. Accordingly, I will say that Y confirms absolutely X if and only if $\Pr(X|Y) > t$. Note that Y can confirm X *incrementally* while not confirming X *absolutely*, for it may be that $\Pr(X|Y) > \Pr(X)$ and $\Pr(X|Y) \leq t$. The reverse is also true: Y can confirm X *absolutely* while not confirming X *incrementally*, for it may be that $\Pr(X|Y) > t$ and $\Pr(X|Y) \leq \Pr(X)$.

Consider now Wright's notion of supplying a warrant sufficient to make a proposition X believable. As we shift from the language of warrant to the language of probabilistic support and we accept the Lockean Thesis, it becomes quite natural to translate this notion into the notion of making X believable by confirming X *absolutely* and *incrementally* all at once. Let us work out the details of this formal translation. Suppose Y affords a warrant for X that would move a rational thinker S to believe X . Since S would be moved to *believe* X if S learned Y , we should assume that $\Pr(X|Y) > t$, i.e. Y confirms X absolutely. Furthermore, since S would be *moved* to believe X if S learned Y , we should assume that $\Pr(X) \leq t$, i.e. the prior probability of X is smaller than or equal to t . (It should be noted that satisfying these two conditions entails that $\Pr(X|Y) > \Pr(X)$, i.e. Y confirms X also *incrementally*). We can then accept the following principle:

If Y supplies a warrant for X that would move a rational thinker S to believe X , then $\Pr(X|Y) > t$ and $\Pr(X) \leq t$.

This conditional can presumably be reverted. Suppose its consequent is true. Since S would believe X if S learned Y , but S would not believe X if S did not learn Y , we can conclude that Y does afford a warrant capable to move S to believe X . We can then accept this biconditional:

Y affords a warrant for X that would move a rational thinker S to believe X if and only if $\Pr(X|Y) > t$ and $\Pr(X) \leq t$.

The obvious variant of this principle that applies to *conditional* warrant is this:

(C) Y affords a warrant for X that would move a rational thinker S to believe X if S antecedently believed Z if and only if $\Pr(X|Y \& Z) > t$ and $\Pr(X|Z) \leq t$.

To simplify my language, I will sometimes say that Y *confirms* X across t conditional on Z to refer to the case in which $\Pr(X|Y \& Z) > t$ and $\Pr(X|Z) \leq t$.

I suggest replacing Okasha's (I) and (II) with these two schemata:

(I*) $\Pr(P|E \& Q \& K) > t$ and $\Pr(P|Q \& K) \leq t$;

(II*) $\Pr(P|E \& K) \leq t$ and $\Pr(P|K) \leq t$.

Thanks to (C) and the Lockean Thesis, (I*) and (II*) can respectively be inferred from (i) and (ii) and vice versa. The precise content of latter pair is this: (i) E provides a warrant for P that would move a rational thinker S to believe P if S antecedently believed Q and K , but (ii) E provides no warrant for P that would move S to believe P if S antecedently believed only K . Given (C), it is immediate that (I*) is true if (i) is true. We can also prove that (II*) is true if (ii) is true. Suppose that (ii) is true. Wright's understanding of (ii) is certainly this: if S accepted only K , S would not believe P , and if S accepted only E and K , S would not believe P either. Consequently, it must be that both $\Pr(P|E \& K) \leq t$ and $\Pr(P|K) \leq t$; namely, (II*) is true. Finally, given (C), it is trivial that (i) and (ii) are true if (I*) and (II*) are respectively so.

In the former section, I have argued that an acceptable Bayesian construal of (i) and (ii) in conjunction with (iii) should allow E to confirm incrementally P conditional on K . This constraint appears now satisfied because (II*) does not entail that $\Pr(P|E \& K) \leq \Pr(P|K)$. (II*) is compatible with the claim that $\Pr(P|E \& K) > \Pr(P|K)$. A worry could perhaps be that (I*), (II*) and (iii) *jointly* entail that $\Pr(P|E \& K) \leq \Pr(P|K)$, but it is easy to show that this is not the case.⁴¹

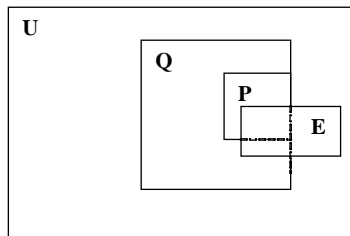
(I*) and (II*) allow for a formalization of (pw) alternative to (PW); precisely, this:

$$(PW^*) \Pr(P|E_{x,P} \& Q \& K) > t \& \Pr(P|Q \& K) \leq t; \quad \Pr(P|E_{x,P} \& K) \leq t \& \Pr(P|K) \leq t.$$

From the first two inequalities of (PW*) we derive that any E -proposition confirms its correlated P -proposition *across* t conditional on Q (i.e. ‘There is a material world’) and auxiliary K . From the last two inequalities of (PW*) we derive that no E -proposition can confirm its correlated P -proposition *across* t conditional on only K , though an E -proposition can confirm *incrementally* its correlated P -proposition conditional on only K .

The conjunction of the first two schemata of (PW*) trivially entails that $\Pr(P|E_{x,P} \& Q \& K) > \Pr(P|Q \& K)$, which coincides with one of the two schemata of the problematic (PW). (PW*) does not entail however the second schema of (PW) – i.e. $\Pr(P|E_{x,P} \& K) \leq \Pr(P|K)$. For (I*), (II*) and

⁴¹ There are Euler-Venn diagrams that validate (I*), (II*), (iii) and the claim that $\Pr(P|E \& K) > \Pr(P|K)$ all at once. To simplify, let us suppose that K is tautological, so that K can be omitted from all these inequalities. Consider now the following diagram:



U is the set of all epistemically possible worlds; let us suppose that the probability \Pr is uniformly distributed over U 's area. E is the set of all worlds where E is true, P is the set of all worlds where P is true, and Q is the set of all worlds where Q is true. The claim that P entails Q is represented in the diagram by the inclusion of P in Q . Suppose for instance that $t = 1/2$. The claim in (I*) that $\Pr(P|E \& Q) > 1/2$ (equivalent to $\Pr(P \& E \& Q)/\Pr(E \& Q) > 1/2$) is represented in the diagram by the fact that the overlapping area of P , E and Q is more than $1/2$ of the overlapping area of E and Q . The claim in (I*) that $\Pr(P|Q) \leq 1/2$ (equivalent to $\Pr(P \& Q)/\Pr(Q) \leq 1/2$) is represented by the fact that the overlapping area of P and Q is less than $1/2$ of the area of Q . The claim in (II*) that $\Pr(P|E) \leq 1/2$ (equivalent to $\Pr(P \& E)/\Pr(E) \leq 1/2$) is represented by the fact that the overlap of P and E is smaller than $1/2$ of E . The claim in (II*) that $\Pr(P) \leq 1/2$ is represented by the fact that P is smaller than $1/2$ of U . Finally, the claim that $\Pr(P|E) > \Pr(P)$ (equivalent to $\Pr(P \& E)/\Pr(E) > \Pr(P)$) is represented by the fact that the fraction of E that overlaps P is wider than the fraction of U that overlaps P . Analogous diagrams are easily producible for the other possible values of t .

(iii) do not entail that $\Pr(P|E \& K) \leq \Pr(P|K)$. Consequently, (PW*) will not imply the weird and intuitively false consequences that follow from (PW). This gives us a good reason to prefer the former to the latter.

The above discussion was meant to substantiate the thesis that (I*) and (II*) are suitable Bayesian translations of Wright's (i) and (ii) – or, at least, that (I*) and (II*) are better construals of the latter than Okasha's (I) and (II). My vindication of Wright's explanation of failure of transmission makes use of neither Okasha's (IV) nor any replacement for it. It deploys instead a probabilistic version of Wright's principle of transmission of warrant hinging on the Lockean Thesis. My vindication will reproduce the informal analysis of Wright's explanation of failure of transmission put forward in the final part of § 6 by making use of quantitative notions. More precisely, I will demonstrate that (I*), (II*) and (iii) in conjunction with a probabilistic version of Wright's principle of transmission of warrant directly entail (iv). Since (i) and (ii) can be translated into (I*) and (II*), this amounts to a probabilistic vindication of Wright's explanation.

So far we have dealt with *conditional* degrees of confidence but not with *changes* in degrees of confidence – in other words, my quantitative analysis has only been concerned with *synchronic* aspects of Wright's account of transmission failure. To lay down a probabilistic version of Wright's principle of transmission of warrant, we should turn our attention to the *diachronic* dimension. For Wright's principle, from a probabilistic point of view, deals with *changes* in degrees of confidence of a rational subject *S* who learns from experience. Since I will follow the classic Bayesian in using the procedure *simple conditionalization* – or just *conditionalization* – to model the process of learning, I have to idealize some of the features of *S*'s learning. Precisely, I will work with two idealizations that concern the *evidence* available to *S* and the *collateral beliefs* that *S* may entertain while acquiring that evidence. Hereafter, when I say that *S* learns evidence *E*, I will mean that *S* becomes *absolutely certain* of *E*'s truth. Furthermore, when I say that *S* increases her confidence in *X* above *t* upon learning *E* depending on *S*'s having antecedently accepted *B*, I will mean that *S* increases her confidence in *X* above *t* upon learning *E* depending on *S*'s having become *absolutely*

certain of B 's truth prior to and independently of learning E . I will detail the reasons of these two idealizations shortly, while introducing the notion of conditionalization.

Although Wright does not appear to idealize the features of S 's learning in the way I do, I do not think that my idealizations conflict with the purpose of giving a vindication his informal explanation. For it is reasonable to assume that if S could come to believe Q by acquiring the warrant from E for P conditional on B and deducing Q from P (even) if S were in *non-ideal* epistemic circumstances (i.e. if S were not perfectly certain of the truth of E and B while accepting them), then S would come to believe Q by carrying out the same procedure if S were in *ideal* epistemic circumstances (i.e. if she were perfectly certain of the truth of E and B while accepting them). This entails that if S *failed* to believe Q via acquiring the warrant from E for P conditional on B and deducing Q from P (even) if S were in *ideal* epistemic circumstances, S would *fail* to believe Q via carrying out the same procedure if S were in *non-ideal* epistemic circumstances. Thus the probabilistic framework I put forward here does provide a rationale for Wright's informal explanation.⁴²

Conditionalization models a rational agent S 's learning from experience as a change of S 's probability function. Let Pr be the *old* probability function initially entertained by S , and let Pr_E be the *new* probability function⁴³ entertained by S after learning E , where E is the *total* evidence available to S in a given time. Conditionalization imposes that when S learns E , it is true that $\text{Pr}_E(\dots) = \text{Pr}(\dots|E)$. Namely, for *any* proposition X , the new *prior* probability of X must be identical to the old *conditional* probability of X given E .⁴⁴ Bayesians often say that the evidence E has been *absorbed* into the new probability function Pr_E just in case S has learned E and Pr has been updated into Pr_E as specified. Note that since $\text{Pr}(E|E) = 1$, it is true that $\text{Pr}_E(E) = 1$. This means that when S

⁴² It would perhaps be possible to get round both idealizations if simple conditionalization could be replaced, in this context, with Jeffrey's conditionalization or with other probabilistic models of learning. I will examine this interesting issue elsewhere.

⁴³ As S is not logically omniscient, S can only entertain *partial* probability functions. So, to be precise, we should characterize Pr and Pr_E as the probability functions that the old *partial* probability function and the new *partial* probability function actually accepted by S respectively *approximate to*. Alternatively, we could directly focus on Pr and Pr_E conceived of as *partial* probability functions. For the sake of simplicity, I will however keep my language imprecise.

⁴⁴ It can be shown that if Pr is a probability function and Pr_E is obtained from Pr via conditionalization, then Pr_E is a probability function too.

learns E , S becomes completely certain of E 's truth. This gives the reason of my first idealization. Note also that if $\Pr_E(E) = 1$, for any proposition Y ,⁴⁵ it is true $\Pr_E(E|Y) = 1$. This entails that any update of \Pr_E via conditionalization cannot but assign again probability 1 to E . Thus, if E has been absorbed into a probability function, it will remain absorbed – or embedded – into all updates of that function.

Consider now the claim that S increases her confidence in X above t upon learning E *depending on S 's having antecedently accepted B* . It is quite natural to understand this claim as stating that S increases her confidence in X above t upon learning E *depending on S 's having learned B antecedently to learning E* . Therefore – if we use conditionalization to model S 's learning – we should impose, in this case, that when S learns E , $\Pr_{BE}(\dots) = \Pr_B(\dots|E)$.⁴⁶ Namely, for any proposition X , the new value of prior probability that X receives upon acquiring evidence E is identical to the old conditional probability of X given E , *provided that the function that defines the old conditional probability of X given E is one that has absorbed B* .⁴⁷ This construal presupposes that the sequence of S 's epistemic acts is the following: S has first learned B , to the effect that $\Pr_B(B) = 1$, which means that S has become completely certain of B 's truth. This gives the reason of my second idealization. Afterwards, S has learned E , to the effect that $\Pr_{BE}(E) = 1$. In this model, saying that S raises her confidence in X above t upon learning E depending on S 's having antecedently accepted B is just saying that $\Pr_{BE}(X) = \Pr_B(X|E) > t$ and that $\Pr_B(X) \leq t$. While the first formula only certifies that S 's confidence in X *is* above t , the first and the second formula together certify that S 's confidence in X *lifts* above t .

Let us now reformulate the principle of transmission of warrant using the quantitative language of the Lockean Thesis. I will directly focus on the variant of this principle that deals with conditional warrant. Suppose that a rational thinker S is coming to believe P upon learning E and

⁴⁵ Such that $\Pr_E(Y) > 0$.

⁴⁶ I take the *external* subscript of a probability function to refer to the *latest* piece of evidence that has been learned to obtain that function from a former function via conditionalization. For instance, ' Z ' in ' \Pr_{XYZ} ' means that \Pr_{XYZ} has been obtained from \Pr_{XY} by learning Z . Likewise ' Y ' in ' \Pr_{XY} ' means that \Pr_{XY} has been obtained from \Pr_X by learning Y .

⁴⁷ Since $\Pr_B(\dots|E) =_{\text{def}} \Pr_B(\dots \& E)/\Pr_B(E)$, if \Pr_B is obtained from \Pr via conditionalization, when S learns B , it must be the case that $\Pr_B(\dots|E) = \Pr(\dots \& E|B)/\Pr(E|B)$, with $\Pr(E|B) > 0$.

depending on S 's having antecedently accepted B . Given the Lockean Thesis, we can translate this claim into the following: S is raising her degree of confidence in P above t upon learning E and depending on S 's having antecedently accepted B . (Note that this claim implies that S 's confidence in P was lower than or equal to t when S had only accepted B but not yet E). We can easily extend this translation to redescribe in probabilistic terms S 's coming to believe Q via transmission of warrant. We can thus reformulate the principle of transmission of warrant (ctr), introduced in § 6, as follows:

(CTR) The warrant supplied by E conditional on B and sufficient to make P believable does transmit to P 's known logical consequence Q if and only if it is possible to envisage a rational thinker S who is raising her confidence in Q above t after learning E depending on S 's having antecedently accepted B , as a consequence of both S 's having raised her confidence in P above t after learning E depending on S 's having antecedently accepted B , and S 's having deduced Q from P .⁴⁸

Before applying this principle to the situation described by (I*), (II*) and (iii), I would like to simplify (CTR) a little bit. The function proper to (CTR) is that of determining whether *the warrant supplied by E conditional on B and sufficient to make P believable* does transmit to P 's known logical consequence Q . Accordingly, (CTR) can be used if and only if two conditions are satisfied. The first condition says that E must actually supply a warrant conditional on B sufficient to make P believable – thanks to our principle (C), this condition is equivalent to the Bayesian requirement that (α) $\Pr(P|E \ \& \ B) > t$ and (β) $\Pr(P|B) \leq t$. The second condition says that Q must actually be a known logical consequence of P .

Note that if the first condition is satisfied, we can envisage a rational thinker S raise her confidence in P above t upon learning E depending on S 's having antecedently accepted B . Suppose in fact that (α) and (β) are true. (α) is equivalent to:

⁴⁸ To substantiate the thesis that if S raises her confidence in Q above t after carrying out the first two steps of the procedure described in right-hand side of (CTR), S will raise her confidence in Q depending on her having antecedently accepted B , we can just recycle the arguments used in § 6 to sustain the parallel claim related to (ctr).

$$\frac{\Pr(P \& E | B)}{\Pr(E | B)} > t.$$

This formula entails, via conditionalizing on B (i.e. via assuming that B has been learned by S and applying the rule of conditionalization), that:

$$\frac{\Pr_B(P \& E)}{\Pr_B(E)} > t.$$

This inequality is equivalent to the claim that $\Pr_B(P|E) > t$, which in turn entails, via conditionalizing on E , that $\Pr_{BE}(P) > t$. On the other hand, (β) entails, via conditionalizing on B , that $\Pr_B(P) \leq t$. Thus, if the first condition of use of (CTR) is satisfied to the effect that (α) and (β) are true, it is the case that $\Pr_{BE}(P) > t$ and $\Pr_B(P) \leq t$. Hence, we can envisage S raise her confidence in P above t upon learning E depending on S 's having antecedently accepted B . It is also trivially true that if the second condition of use of (CTR) is satisfied – i.e. if Q is a known logical consequence of P – we can envisage S deduce Q from P . Note finally that if S raises her confidence in P above t upon learning E depending on S 's having antecedently accepted B , and S deduces Q from P , S 's confidence in Q after learning E and depending on S 's having antecedently accepted B must be above t . This is so because S can raise her confidence in P above t in the way specified only if $\Pr_{BE}(P) > t$, and S can deduce Q from P only if P entails Q . Since $\Pr_{BE}(P) > t$ and P entails Q , we logically derive through the axioms of probability that $\Pr_{BE}(Q) > t$.⁴⁹

To recap, if the conditions of use of (CTR) are satisfied, we can envisage a rational agent S who raises her confidence in P above t upon learning E depending on S 's having antecedently accepted B , and who deduces Q from P . Furthermore, if the same conditions are satisfied and we envisage S carry out these two acts, we should conclude that immediately after performing them, S 's confidence in Q depending on S 's learning E and having antecedently accepted B will be above t . This means that we can infer that S 's confidence in Q has *risen* above t if and only if we are entitled to think that S 's confidence in Q was lower than or equal to t when S accepted only B but not yet E – namely, if and only if we are entitled to think that $\Pr_B(Q) \leq t$. In conclusion, whenever the

⁴⁹ Because, for any X and Y and on any probability function \Pr , if X entails Y , then $\Pr(Y) \geq \Pr(X)$.

conditions of use of (CTR) are satisfied, the right-hand side of (CTR) proves true if and only if $\Pr_B(Q) \leq t$. We can thus reformulate (CTR) very concisely as follows:

(CTR*) The warrant supplied by E conditional on B and sufficient to make P believable does transmit to P 's known logical consequence Q if and only if $\Pr_B(Q) \leq t$.

Let us test the adequacy of (CTR*) on Wright's sample case of *transmission* of warrant presented before in § 2. Wright maintains that the warrant supplied by E ('Three hours ago, Jones has inadvertently consumed a large risotto of *Boletus Satana*') for P ('Jones has absorbed a lethal quantity of the toxin that toadstool contains') is transmissible to Q ('Jones will shortly die'). If K is ordinary background knowledge (with the additional information that Jones is a standard human being and a normally careful and healthy individual),⁵⁰ it is true that $\Pr(P|E \ \& \ K) > t$ and $\Pr(P|K) \leq t$. Furthermore, P knowingly entails Q . Therefore, we can *use* (CTR*) to ascertain whether the warrant supplied by E conditional on K and sufficient to make P believable does transmit to Q . This involves substituting in (CTR*) E for E , P for P , Q for Q , and K for both the propositional variable B and the subscript B of \Pr . Since it is true that $\Pr_K(Q) \leq t$, (CTR*) does certify that warrant from E for P conditional on K actually transmits to Q . This encourages believing that (CTR*) is a suitable probabilistic version of the principle of transmission of warrant that Wright's has in mind.

Let us now return to the issue of *failure* of transmission. Suppose that the conditions (i)-(iii) of Wright's template are true. Since (i) and (ii) translate into (I*) and (II*), it is true that (I*) $\Pr(P|E \ \& \ Q \ \& \ K) > t$ and $\Pr(P|Q \ \& \ K) \leq t$, and that (II*) $\Pr(P|E \ \& \ K) \leq t$ and $\Pr(P|K) \leq t$. It is also true that (iii) P knowingly entails Q . Note that only (I*) and (iii), but not (II*) and (iii), satisfy the conditions of use of (CTR*). This reflects the fact that, in the situation described by Wright's template, the only warrant available for P that proves capable to make P credible is that afforded by E conditional on Q and K . We can appeal to (CTR*) to ascertain whether *this* warrant transmits to Q . This requires

⁵⁰ Wright would seem to assume that something like this constitutes the collateral information of the rational thinker S appealed to in his principle of transmission of warrant.

replacing B in (CTR*) with the conjunction of Q and K , and replacing the subscript B of Pr in (CTR*) with the conjunction $Q \& K$. We obtain the following biconditional:

The warrant supplied by E conditional on Q and K and sufficient to make P believable does transmit to P 's known logical consequence Q if and only if $\text{Pr}_{Q\&K}(Q) \leq t$.

The right-hand side of this biconditional is false because the conjunction $Q \& K$ has been absorbed into $\text{Pr}_{Q\&K}$, thus it is true that $\text{Pr}_{Q\&K}(Q \& K) = 1$ and this implies that $\text{Pr}_{Q\&K}(Q) = 1 > t$. Hence, it follows by modus tollens that the warrant supplied by E conditional on Q and K and sufficient to make P believable does *not* transmit to P 's known logical consequence Q . This entails that (iv) is true: in the epistemic situation set out by Wright's template, the warrant supplied by E sufficient to make P believable does *not* transmit to Q . In this reasoning we have initially assumed that the propositions (i)-(iii) of Wright's template are true, and we have then derived – by making use of only probabilistic principles and bridging principles – that the proposition (iv) of Wright's template is true. This amounts to a Bayesian vindication of Wright's explanation of failure of transmission of warrant.⁵¹

At this point, someone might complain that the good news that Wright's account of transmission failure can be vindicated formally is accompanied by a bad news: the vindication heavily relies on the Lockean Thesis, which is contentious. The objections most typically raised against the Lockean Thesis in epistemology turn on the claim that plain belief appears closed under conjunction, to the effect that if one believes X and Y individually taken, one should also believe the conjunction of X and Y . The problem would be, to begin with, that this closure principle, when it is coupled with the Lockean Thesis that there is a (non-maximal) threshold t for plain belief, is not validated by the probability calculus. For, if $\frac{1}{2} \leq t < 1$, it is quite possible that $\text{Pr}(X) > t$ and $\text{Pr}(Y) > t$, but $\text{Pr}(X \& Y)$

⁵¹ Note that this achievement harmonizes with Wright's conviction that failure of *transmission* of warrant does not produce failure of *closure* of warrant. As we have seen in § 2, the principle of closure says, for Wright, that whenever *there is* a warrant for the premises of a known valid argument, *there is* a warrant for its conclusion. On the probabilistic vindication of Wright's explanation of transmission failure, when the warrant for the premise of an argument fails to transmit to the conclusion, the latter must be believed to be certainly true – so there is warrant for it.

$\leq t$. It is also argued – notoriously – that this closure principle and the Lockean Thesis, if enforced at the same time in reasoning, entail problematic consequences such as the Lottery Paradox and the Preface Paradox.⁵² I cannot address these thorny issues here. Let me just stress that if, on the one hand, nothing in Wright’s informal explanation of failure of transmission would seem to commit him to the principle of closure under conjunction for plain belief, on the other, this principle is generally rejected as not rationally justified by the advocates the Lockean Thesis (see for instance Bovens and Hawthorne 1999, Sturgeon 2008 and Hawthorne 2009). Thus, it is far from clear that a Bayesian vindication of Wright’s account of transmission failure that relies on the Lockean Thesis should be dismissed as incoherent or irrational.

8. Concluding remarks

In this paper I have provided a Bayesian vindication of Wright’s explanation of why warrant fails to transmit from the premise to the conclusion of Moore’s “proof”. This formal achievement does not guarantee that Wright’s explanation of failure of transmission in Moore’s “proof” is correct and acceptable *on the whole*. For Wright’s account relies on a substantive principle concerning the rational architecture of perceptual warrant – the thesis (pw) – the truth of which should be assessed independently. My formal analysis essentially clarifies what could be called the *logic* of failure of transmission of warrant; it apparently certifies that from a logical point of view – supposing that (pw) is true – Wright’s explanation is correct.

An interesting by-product of my inquiry is the precisification of the content of (pw). This principle could be interpreted as stating that our apparent perceptions *cannot increase in the slightest* our confidence in our claims about our physical environment if we do not independently believe that the world exists. This is the reading of (pw) that those who accept Okasha’s model are committed to. A problem with it is that if (pw) is interpreted in this fashion and is translated into Bayesian language, it will imply weird and intuitively false consequences. My vindication of

⁵² These two paradoxes were first presented by, respectively, Kyburg (1961) and Makinson (1965). For an excellent critical overview of the recent discussion on these issues see Sturgeon (2008).

Wright's account of failure of transmission shows however that, as long as (pw) is functional to explain the failure of transmission in Moore's "proof" (and in similar unsophisticated responses to the sceptic), this reading of (pw) is not enforced. To avoid these odd consequences, Wright can interpret (pw) as stating that our apparent perceptions do not supply warrant *sufficient* to persuade us that our claims about our physical environment are true if we do not independently accept that there is a material world. Indeed, if Wright believes that the warrant that fails to transmit across entailment is primarily one capable to justify plain belief in a proposition – as I have argued in this paper – this is plausibly the interpretation of (pw) that he already accepts. On this interpretation, our apparent perceptions can *raise a little* our confidence in our statements about our physical environment even if we do not independently accept that the world exists, though this increase of confidence is insufficient to vanquish our sceptical doubts. On this reading, Wright's conception of perceptual warrant and the one defended by Prior (or by other dogmatists) might fit together to some extent. Whether this is actually so and what would follow from it are interesting issues to be thoroughly investigated elsewhere.

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