If beliefs are subject to a basic norm of correctness—roughly, to the principle that a belief is correct only if the proposition believed is true—how can this norm guide believers in forming their beliefs? Answer: This norm guides believers indirectly: believers are directly guided by requirements of rationality—which are themselves explained by this norm of correctness. The fundamental connection between rationality and correctness is probabilistic. Incorrectness comes in degrees; for beliefs, these degrees of incorrectness are measured by the so-called Brier score. This account is defended against objections; and its implications for suspension of judgment are explored.

It is clear that beliefs can be correct or incorrect: beliefs can get things right, or they can get things wrong; when beliefs get things wrong, they are erroneous or mistaken, while when beliefs get things right, they are in some way fitting or appropriate. It is less clear what this amounts to.

Pascal Engel and I are in agreement about a number of crucial points:

1. The notion of ‘correctness’ is a normative concept;
2. For a belief to count as correct, the proposition believed must be true;
3. This principle defining when beliefs count as correct is one of the essential or constitutive features of beliefs.

Nonetheless, there are some differences between us about how exactly we understand what sort of normative concept ‘correctness’ is; and these differences lead us to give rather different answers to some of the objections that Engel responds to in his paper.

In these comments, I shall focus on the second and third objections that Engel considers—specifically, the objection that we cannot be guided by a truth-norm of this sort, and the objection that this truth-norm cannot explain why we sometimes ought to suspend judgment about certain propositions instead of forming any definite beliefs in those propositions at all. In responding to these objections, I shall explain what the sort of normative concept that I take the concept of ‘correctness’ to be, and I shall a more precise account of the principle that defines when—and to what degree—a belief counts as incorrect.
Correctness and the problem of guidance. According to the assumption (which Engel and I share) that ‘correctness’ is a normative concept, if your belief is incorrect, it has a certain sort of defect—while if your belief is correct, it is wholly free from that defect.

When I judge that your belief is correct, or that it is incorrect, I am focusing on a particular belief-state that you actually have, and I am assessing that actual belief-state as correct or as incorrect. I am in that sense making a retrospective or ex post assessment of your belief.

However, when you actually formed the belief in question, you could hardly have been guided by a retrospective assessment of this sort—since such a retrospective assessment presupposes that you actually have the belief in question. So perhaps there is some other way in which you could have been guided by judgments involving this concept of correctness. In particular, perhaps you could have been guided by prospective judgments about the ways in which you must revise your beliefs if you are to avoid having incorrect beliefs about the topic in question.

In my view, the judgment that you must form or revise your beliefs in a certain way if you are to avoid having incorrect beliefs on a certain topic is equivalent a kind of ‘ought’-judgment.¹ In general, whenever there is a kind of defect that an agent’s conduct or thinking can exemplify, and there is a chance that your conduct or thinking will avoid exemplifying this kind of defect at a certain time, there is a related sense of ‘ought’, such that you ‘ought’ in this sense to φ if and only if every available state of affairs in which your conduct and thinking avoid this defect at that time is a state of affairs in which you φ.

If my view on this point is correct, there is also a sense of ‘ought’—perhaps not a sense that is in common use, but an intelligible sense nonetheless—in which the proposition that you must revise your beliefs in a certain way if you are not to have incorrect beliefs on the relevant topic is equivalent to the proposition that you in this sense ‘ought’ to revise your beliefs in this way. So, we might consider the suggestion that in forming and revising your beliefs, you can be guided by prospective ‘ought’-judgments of this sort.

However, the objections of Sosa (2011) and Glüer and Wikforss (2009), which Engel considers above, still seem to pose a fatal problem for this suggestion—at least on the assumption that a belief cannot be correct unless the proposition believed is true. Given that assumption, the only way in which you could be justified in judging that you must believe p if you are not to have incorrect beliefs about p is if you are also justified in believing that p is true (or at least that p would be true if you had any beliefs about p). But if you are justified in believing that p is true, you must presumably also have justification for p itself; and in that case, it seems, you could have been guided to forming a belief in p by whatever justification you have for p. It would an entirely redundant fifth wheel if you also formed a judgment about whether or not you must believe p in order to avoid incorrect beliefs on this topic. So, it

¹ I have defended my opinions about ‘ought’ elsewhere; see especially Wedgwood (2009; 2007, ch. 4–5).
seems, in forming and revising our beliefs, we cannot be fundamentally guided by prospective correctness-judgments of this kind.

Does this show that we should reject the very idea that belief is subject to a norm of correctness of this sort? Not if we can find a better way of explaining how one can be guided by this norm of correctness. I shall attempt to provide such an explanation in the next four sections.

II

**Correctness guides indirectly; rationality guides directly.** The central proposal that I wish to make here is this: if you are rational, your beliefs will be *directly* guided by the requirements of rationality that apply to you; and those requirements of rationality are in a fundamental way *explained* by this fundamental norm of correctness. So, being directly guided by the requirements of rationality is a way of being indirectly guided by this norm of correctness. Clearly, this proposal needs to be developed in much greater detail.

I shall not analyse in depth how it is possible to be guided by the requirements of rationality. To fix ideas, however, I shall briefly sketch my view of the matter.² A rational agent has a number of reasoning dispositions—at least some of which are essentially *rational* dispositions. For you to have one of these rational dispositions is for there to be a range of cases in which, at least *ceteris paribus* and in normal conditions, you will respond to the fact that you are in a case in which some way of thinking is rationally required of you by thinking in that very way. To be guided by the requirements of rationality, in my view, is simply to manifest one of these essentially rational dispositions. However, the main question that I shall explore here is how and in what sense the requirements of rationality are ‘explained by’ this fundamental norm of correctness.

I suggested above that the judgment that you must think in a certain way if you are to avoid having incorrect beliefs about the topic at issue is itself a kind of ‘ought’-judgment. The reason for this, I suggested, was that ‘correctness’ is an essentially normative concept, so that incorrectness is essentially a kind of flaw or defect.

Intuitively, however, irrationality also seems to be a defect or flaw in any process of thinking. So there is also another kind of ‘ought’-judgment that we can make about you in your current situation: we can judge that you must think in a certain way if you are to avoid thinking *irrationally* in this situation. This judgment is, at least as I am using the terms, precisely what I mean to express when I say that in your current situation, you are ‘rationally required’ to think in that way. In short, the notion of what is rationally required of you in this situation is also a kind of ‘ought’.

This raises the question, What is the relation between these two kinds of ‘ought’—the ‘ought’ of correctness and the ‘ought’ of rationality? How exactly are the two connected to each

² For a more detailed account, see Wedgwood (2007, ch. 8).
other? As I shall explain in the following section, the connection is an instance of a pattern that is found with many different kinds of ‘ought’: many different kinds of ‘ought’ can take both an objective form and a corresponding subjective form; and in each case, there is fundamentally the same kind of relationship between the two.

III

Objective and subjective ‘ought’: The probabilistic connection. The distinction between objective and subjective kinds of ‘ought’ is familiar in ethics, since the kinds of ‘ought’ that are of central concern to ethics also seem to have both objective and subjective forms. The objective ethical ‘ought’ applies to the situation of an agent at a time in virtue of the objective facts about the agent’s situation at that time—where these objective facts may include facts that the agent is not in a position to know at that time. A subjective ethical ‘ought’ applies to the situation of an agent at a time in virtue of something like the information or evidence that the agent actually possesses at that time.

The distinction is perhaps clearest in the context of an act consequentialist theory like classical utilitarianism. Act utilitarianism would use these two kinds of ‘ought’ in the following way. The act that you ‘ought’ in the objective sense to perform is the act that will actually produce the most happiness for the world as a whole (whether you are in a position to know which act this is or not); let us say that this is the act with the greatest actual happiness-value. By contrast, the act that you ‘ought’ in the subjective sense to perform is the act that has the greatest expected happiness-value.

Various accounts could be given of what is meant by speaking of an act’s ‘expected happiness-value’, but it seems most plausible to resort here to the familiar probabilistic notion of the expected value of a function. The definition of this notion involves two elements: the first element is a probability function; the second element is a partition of propositions—that is, a set of propositions such that according to this probability function, it is certain that exactly one of these propositions is true—where each of these propositions implies a definite answer to the question of what the act’s actual happiness-value is. Then the act’s expected happiness-value can be defined as the weighted sum of these propositions’ answers to that question, where for each of these propositions, the relevant weight is the probability that this probability function assigns to the proposition.

This probabilistic conception of the connection between the objective and the subjective forms of the ethical ‘ought’ is not limited to consequentialist theories like utilitarianism. This conception does require some kind of value—a value that comes in degrees, and is exemplified, to some degree or other, by each of the acts that are being assessed. However, the degree to which each of these acts exemplifies the relevant value need not be determined purely by the act’s total consequences; and this value also need not be agent-neutral or time-

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3 See for example the discussion of these questions by Parfit (2011, ch. 7).

4 For a definition of this general notion, see for example Joyce (1999, pp. 16–17).
neutral—it can be a value that is essentially indexed to the situation of a particular agent at a particular time.

Moreover, this conception of the relationship between objective and subjective kinds of ‘ought’ is also not limited to the kinds of ‘ought’ that are of particular interest to ethics, where the items that are being assessed by these kinds of ‘ought’ are, most commonly, acts. There are kinds of ‘ought’ that are used to assess items other than acts—such as mental states (like beliefs) and mental events (like events in which you form or revise your beliefs).

So it is possible to see the ‘ought’ of correctness and the ‘ought’ of rationality as also having this relationship. On this way of seeing things, there is a kind of value that corresponds to correctness; this value comes in degrees, and is exemplified to various degrees by beliefs of various kinds. Indeed, it does not seem intuitively objectionable to me to say that incorrectness itself comes in degrees. Some beliefs get things wrong; but among the beliefs that get things wrong, some beliefs get things more badly or more seriously wrong than others, while other beliefs get things only slightly wrong.

If incorrectness does come in degrees in this way, then we can give a simple probabilistic account of the relationship between correctness and rationality. A belief’s actual degree of incorrectness depends (at least in part) on whether the proposition believed is actually true. A belief’s degree of irrationality is determined by the belief’s expected degree of incorrectness; and a belief is fully rational if and only if it is optimally rational—that is, no more irrational than any other belief on the same topic that is available to the believer at the time. It is in this way, I propose, that the principle defining when beliefs count as correct explains the requirements of rationality that apply to belief.

If this proposal is correct, it is presumably just an instance of a more general pattern. Many types of mental states besides beliefs can be correct or incorrect; they can get things right or wrong; they can be appropriate or inappropriate, fitting or mistaken. For example, choices can get things right or get things wrong, to various degrees. In that sense, choices also have various degrees of incorrectness. The requirements of rationality that apply to choices can be explained by the principle that a choice’s degree of irrationality is determined by the choice’s expected degree of incorrectness. In general, every type of mental state that can be rational or irrational can also be correct or incorrect, and in each case, a mental state’s degree of irrationality is determined by its expected degree of incorrectness.

As we have seen, the definition of a mental state’s expected degree of incorrectness involves a probability function. So, the proposals that I am making here imply that, for each thinker and each time, there is a single probability function that plays this role in determining the mental states that it is rational for the thinker to have at that time. But which probability function is it that plays this role?

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5 Strictly, this is what determines a belief’s degree of prospective or ex ante irrationality. If you have a belief without being guided by the requirements of rationality in the appropriate way, then even if the belief is prospectively highly rational, it will not count as retrospectively rational. As many epistemologists would say, the belief is propositionally but not doxastically justified.
The particular probability function that plays this role seems to be in some way determined by the cognitive situation of the thinker at the relevant time. However, there are many different possible views about how the thinker’s cognitive situation determines this. Philosophers sympathetic to J. M. Keynes (1921) or to Timothy Williamson (2000) might think of the relevant probability as a special ‘evidential’ kind of probability; philosophers who are more sympathetic to Richard Jeffrey (2004) might think of it as a more ‘subjective’ kind of probability. Unfortunately, this question is too large to be addressed here. I shall simply assume that for each cognitive situation in which a thinker can be in at a time, there is a probability function that is involved in this way in explaining the mental states that it is rational for the thinker to have in that situation. Just to give it a label, I shall call the probability function that plays this role in a given cognitive situation the ‘rational probability’ of that situation.

Even if we bracket all the questions about this idea of the ‘rational probability’ of a given cognitive situation, we might still have some concerns about the assumption that incorrectness comes in degrees. In the next section, I shall defend this assumption.

IV

**Degrees of incorrectness defended.** Engel (above, Section IV) firmly rejects the suggestion that incorrectness comes in degrees. First, he points out that truth does not come in degrees, which in his view casts doubt on the suggestion that incorrectness comes in degrees. But truth is a property of *propositions*, whereas correctness (as I am interpreting it here) is a property of *mental states* and *mental events*. Even if the correctness of a belief depends on the truth-value of the proposition that is believed, it may depend on more besides; so the fact that there are no degrees of truth does not show that there are no degrees of incorrectness.

Secondly, Engel points out, in effect, that in ordinary language, adjectives like ‘right’ and ‘correct’ do not have comparative forms. This is true, but it is compatible with the suggestion that to call something ‘correct’ is normally to say that it is *perfectly* or *completely* correct—that is, that its degree of incorrectness is 0 (it is not incorrect to any degree at all). Ordinary ethical thought certainly distinguishes between wrongs, regarding some wrongs as more gravely or seriously wrong than others. My notion of degrees of incorrectness is simply analogous to this, drawing similar distinctions between beliefs on the basis of how seriously wrong they are.

Thirdly, Engel objects that my proposal ‘conflates’ the objective ‘ought’ with the subjective ‘ought’. But this objection is simply mistaken. I sharply distinguish between the objective and the subjective ‘ought’. Neither correctness nor rationality should be conflated with the other. Through sheer dumb luck, a belief that is highly irrational might actually be almost perfectly correct; and through bad luck, a perfectly rational belief might have to a very serious degree incorrect. My claim is that *both* the objective defect of incorrectness and the subjective defect of irrationality come in degrees: in my view, there are both degrees of incorrectness and degrees of irrationality.
Under other names, several other philosophers have explored the idea that beliefs have
degrees of incorrectness of this sort. Most notably, J. M. Joyce (1998 and 2009) has explored
these degrees of incorrectness under the name ‘inaccuracy’: as Joyce puts it, some sets of
beliefs can be more inaccurate than others. In my view, ‘inaccuracy’ is not the ideal word. It
is typically items like reports and maps that can be described as ‘accurate’ or ‘inaccurate’.
There are items that are presented to an audience as conveying numerous truths. One such
item counts as ‘more inaccurate’ than another if it contains more errors than the other—that
is, if a larger proportion of the propositions that it presents as true are in fact false. This is
why I prefer to speak of degrees of incorrectness rather than of degrees of inaccuracy.

Some other philosophers, such as Hilary Greaves and David Wallace (2006) and Richard
Pettigrew (2011) have spoken of ‘epistemic utility’. While I would not object to the phrase
‘objective doxastic value’ or the like, the term ‘epistemic utility’ has two problems: first,
what is at issue is belief and not knowledge, and so the word ‘epistemic’ is out of place here;
secondly, ‘utility’ in the strict sense is a measure of subjective preference. As I conceive of
the matter, the principle that defines what gives each belief the degree of incorrectness that it
has is determined by the nature of belief itself, and not by the individual thinker’s subjective
preferences. In spite of these terminological differences, the degrees of incorrectness that I
am speaking of here amount to the very same phenomenon that has been discussed by
philosophers like Joyce, Pettigrew, and Greaves and Wallace.

Measuring incorrectness. If there are degrees of incorrectness, how exactly is a belief’s
degree of incorrectness to be measured? What determines the degree of incorrectness that the
belief has?

For the sake of simplicity, I shall assume here that we are only concerned with believers
whose beliefs can be represented by a unique credence function. A full treatment of the topic
would have to generalize what I say here so that it can also apply to believers whose belief-
sets that can be represented by a plurality of such credence functions, and perhaps to
believers of other kinds as well. Unfortunately, however, I shall not have time to give such a
full treatment of the topic here.

If the notion of a belief’s ‘expected degree of incorrectness’ is to make sense, then these
degrees of incorrectness must give more than just a ranking of various possible beliefs and
sets of beliefs; they must be measurable on at least an interval scale—that is, a scale where
both the unit and the zero-point may be arbitrary, but the ratios between intervals on the scale
are non-arbitrary. (Again, the assumption that degrees of incorrectness have enough structure
to be measurable in this way also requires a detailed defence, which I cannot attempt to give
here.\textsuperscript{6})

\textsuperscript{6} In fact, I would defend this assumption by arguing that the degrees of incorrectness of the various
possible sets of beliefs that a believer might have towards a given set of propositions form a difference structure.
First, if $b_1$ and $b_2$ are two different sets of doxastic attitudes towards the same set of propositions, then either $b_1$
The way in which these degrees of incorrectness can be measured may be captured by a ‘scoring rule’. We may think of this scoring rule as assigning an incorrectness-score to every belief and every belief-set, relative to each possible world. This scoring rule articulates the principle that determines the degree of incorrectness that each belief-set has. On my view, this principle is the fundamental norm applying to belief, grounded in the essential nature of belief itself. For that reason, I shall assume that this norm is part of the bedrock of the normative domain: there is no deeper explanation for why this norm is what it is.

However, we still need justifications for our claims about what the appropriate ‘scoring rule’ is. However, these justifications will not explain why this rule is the appropriate rule; rather the justification will take the form of an inference to the best explanation—an argument that shows that this rule gives the best explanation of a range of intuitively plausible phenomena that need to be explained.

Intuition gives us some guide about the features that this scoring rule must have. Consider a very simple credence function that is defined for just a single proposition $p$. First, then, one feature that the scoring rule must have is the following: if $p$ is true, then the higher the believer’s credence in $p$, the less incorrect the credence is—while if $p$ is false, then the higher this credence in $p$, the more incorrect the credence is. Since this score is a measure of the credence’s incorrectness, the lower a credence’s incorrectness score, the better the credence in question is. The very best score that you could achieve is when you have maximum confidence (represented here as credence 1) in a true proposition, or maximum disbelief (represented here as credence 0) in a false proposition; the very worst score that you could achieve is when you have maximum confidence (credence 1) in a false proposition, or maximum disbelief (credence 0) in a true proposition.

In short, it seems clear that the appropriate scoring rule must have the two features that Joyce (2009, p. 274) calls normality and truth-directedness. The ‘incorrectness score’ of your credence in $p$ depends purely on the distance between the actual truth-value (0 or 1) of $p$ and the credence that you have in $p$; and the smaller the distance between your credence in $p$ and the actual truth-value of $p$, the better your credence is—that is, the lower the credence’s incorrectness score is.\footnote{I interpret ‘truth-directedness’ so that it includes the feature that Leitgeb and Pettigrew (2010) call ‘minimum inaccuracy’ (if the distance between one’s credence and the truth is 0, then one’s credence has the lowest possible degree of incorrectness—which we can represent as degree of incorrectness 0).}

How shall we extend this measure to credence functions that are defined for more than just this one proposition $p$? The most natural measure to use for such a credence functions is simply some sort of weighted average of the incorrectness scores of all your individual credences. This then is a second feature that the scoring rule must have: the incorrectness of a

or $b_2$ may be more incorrect than the other. Secondly, it may also be the case that the degree to which a set of beliefs $b_1$ is more incorrect than another set of beliefs $b_2$ is greater than the degree to which a set of beliefs $b_2$ is more incorrect than a set of beliefs $b_4$. A complete difference structure of this sort over an infinite domain of possible belief-sets is enough to determine a unique interval scale for these degrees of incorrectness.

\footnote{I interpret ‘truth-directedness’ so that it includes the feature that Leitgeb and Pettigrew (2010) call ‘minimum inaccuracy’ (if the distance between one’s credence and the truth is 0, then one’s credence has the lowest possible degree of incorrectness—which we can represent as degree of incorrectness 0).}
whole system of credences is a weighted average of the incorrectness scores that it gets for each individual proposition. (That is, in effect, I am assuming what Joyce (2009, pp. 271–2) calls ‘separability’.)

A third feature that the appropriate scoring rule must have is **continuity**: there must be no sudden jumps in the curve that represents the relation between your credence’s distance from the truth and your credence’s incorrectness score: a tiny change in your credence’s distance from the truth will never result in a sudden huge change in your credence’s incorrectness score. (This is a rough and intuitive statement of what continuity amounts to; see Joyce (2009) for a more precise statement.)

A fourth feature of this scoring rule, I propose, is that it must be **convex**: if you revise your credence outwards, towards the extremal credences of 0 and 1, then the extent to which your credence’s incorrectness score *improves* if this revision brings it closer to the truth is always *less* than the extent to which the score *deteriorates* if the revision takes your credence further away from the truth. (As Joyce illuminatingly explains, this feature of the scoring rule encapsulates what could be called a ‘modestly Cliffordian’ epistemology—in which what you would gain in jumping to an extreme credence if this jump takes you closer to the truth is never greater than what you would lose if it took you further away from the truth instead.) The proposal that the scoring rule must have this fourth feature is justified as the best explanation of the intuitive fact that it is not rational for you to jump arbitrarily from an intermediate credence of 0.5 to an extreme credence of 1, just on the chance that this jump will take you to a correct belief rather than an incorrect belief.

These four features do not exhaust the essential character of these degrees of incorrectness. As I shall now argue, it also seems plausible that the appropriate scoring rule for measuring these degrees of incorrectness must be—in the terminology of statisticians—‘proper’. That is, the scoring rule must ensure that if a set of credences’ ‘expected’ degree of incorrectness is calculated according to a given probability function \( P \), then the sets of credences that have an *optimal* expected degree of incorrectness always include the credences that coincide with \( P \) itself. If the scoring rule is not just ‘proper’ but ‘strictly proper’, then when calculated according to \( P \), the sets of credences that coincide with \( P \) will have the *uniquely best* expected degree of incorrectness of all possible sets of credences.

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8 Since the score for the whole set of credences is a weighted average of this kind, we should not assume that there is any meaning to a comparison between the incorrectness score of one set of credences defined over one set of propositions, and the incorrectness score of a second set of credences defined over a *different* set of propositions. The weight that is applied to each individual credence to yield this weighted average may be determined holistically by the whole set of propositions; so a different set of propositions might determine a completely different set of weights. It is enough for our purposes if we can compare the incorrectness scores of two sets of credences that are defined over the *same* set of propositions.

9 For some recent discussions of the idea of a ‘proper’ scoring rule, see especially Joyce (2010, p. 276), and Greaves and Wallace (2006).
What justifies the claim that the scoring rule is ‘proper’ in this way? Within the perspective that I am advocating here, the most illuminating justification appeals to the following two premises. First, the requirements of rational belief must all be explicable on the basis of the general conception of rationality that I proposed in Section III, together with a perfectly general scoring rule for beliefs. Secondly, it seems plausible that at least one response that it is always rational for you to make to your cognitive situation is to proportion your credence, in each proposition \( p \) that you have any attitudes towards, to the probability of \( p \) according to what I have labelled the ‘rational probability function’ of your situation. This is the probability function that plays the fundamental role that I described in Section III in determining the mental states that it is rational for you to have in this situation.

However, according to the general conception of rationality that was proposed in Section 3, this set of credences will not be perfectly rational unless it has a minimal expected degree of incorrectness—when this expectation is calculated according to the rational probability function of your cognitive situation. But if the incorrectness scoring rule were not proper, then it could well happen that in some cases, the set of credences that coincides with this probability function would not always have a minimal expected incorrectness score—and so would not always count as perfectly rational. Hence these two premises require that this scoring rule must indeed be ‘proper’.

In general, as Joyce (2009) has shown, the measures of incorrectness that have this feature of ‘propriety’, as well as the other features listed above (normality and truth-directedness, separability, continuity, and convexity), are all measures that are positive affine transformations \(^\text{11}\) of the so-called ‘Brier score’—which simply identifies the incorrectness score of each credence with \( |Cr(p) - v(p)|^2 \), the square of the distance between the credence and the actual truth-value of the proposition in question. So, it seems, the appropriate scoring rule for measuring credences’ degrees of incorrectness must in effect be the Brier score.

To avoid misunderstanding, let me emphasize that the argument that I gave above for the claim that the appropriate scoring rule must be ‘proper’ is not intended as an explanation of why these degrees of incorrectness have this Brier-like structure. On the contrary, the approach that I am advocating here involves explaining the requirements of rationality on the basis of the structure of these degrees of incorrectness. The structure of these degrees of incorrectness is itself explanatorily basic, and so I am not aiming to give any further explanation of this structure here.

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\(^{10}\) Joyce (2009, p. 279) suggests that the appropriate good scoring rule must also have the further property that for every probabilistically coherent set of credences \( C_1 \), it will never allow there to be another set of credences \( C_2 \) that is more correct than \( C_1 \) in every possible world. At the end of the day, I accept that the appropriate scoring rule does have this property. However, I do not find this claim to be intrinsically plausible in itself. Intuitively, it seems to me, some probabilistically coherent sets of credences are just so irrational, so crazy, that it is not obvious that they should not be ruled out as ‘inadmissible’ in this way.

\(^{11}\) The positive affine transformations of a function \( f(x) \) are all those of the form \( (a \cdot f(x) + b) \), where \( a \) is a positive real number, and \( b \) is any real number (whether positive or non-positive).
This argument for the ‘propriety’ of the appropriate scoring rule rests on two premises: (i) the general conception of rationality that I proposed in Section III, and (ii) the assumption that proportioning your credences to the situation’s ‘rational probability function’ is always rational. So, in giving this argument for the claim that the appropriate scoring rule must be proper, I am already making assumptions about the requirements of rationality. So the Brier-like structure of these degrees of incorrectness is not explained by the ‘propriety’ of the scoring rule. On the contrary, the order of explanation goes in the opposite direction: it is the fact that these degrees of incorrectness have the structure of the Brier score that explains the fact that the scoring rule for measuring these degrees of incorrectness is proper.

In general, I am bringing up these intuitions about rational sets of credences, not as an explanation of the structure of degrees of incorrectness, but merely as a reason for accepting that degrees of incorrectness have this structure. We can come to accept that degrees of incorrectness have this structure precisely by means of an inference to the best explanation of our intuitions about the rationality of such sets of credences.\(^\text{12}\)

\section*{VI}

\textit{Consequences of this measure of incorrectness}. In fact, the Brier score is not just a proper scoring rule, but a strictly proper rule: when judged from the standpoint of a probability function \(P\), the only set of credences that has an optimal expected Brier score is the set of credences that coincides with \(P\) itself. In the previous section, I argued that the appropriate scoring rule that measures credences’ degrees of incorrectness is the Brier score. For this reason, the general conception of rationality proposed in Section III leads directly to the conclusion that the rationally optimal credences for each agent to have in every cognitive situation are precisely those credences that coincide with the rational probability function of that situation.

It obviously follows from this that the rationally optimal credences for the agent to have must be probabilistically coherent. So to that extent, this approach agrees with the dominant tradition within formal epistemology, which offers a range of arguments for the conclusion that a perfectly rational agent’s credences must be probabilistically coherent—that is, they must at least be capable of being extended into a complete probability function. Within this tradition, the best-known arguments for this conclusion include the famous ‘Dutch Book’ arguments, and Joyce’s ‘accuracy dominance’ arguments, among others. However, within my framework, as we have seen, there is a much simpler and more direct argument for this conclusion. This is because, within this framework, the fundamental connection between rationality and probability is not restricted to the special case of beliefs; it is a more general connection that holds across the whole domain of rationality.

\(^{12}\) As Michael Dummett (1975) would put it, my argument for the Brier-like structure of the relevant degrees of incorrectness is not meant to be an ‘explanatory argument’ but merely a ‘suasive argument’. (In general, every inference to the best explanation is a merely suasive and not an explanatory argument, since in an inference to the best explanation, the conclusion is precisely what explains the premises and so is not explained by them.)
Taken together, then, this conception of rationality, along with the principle that the appropriate incorrectness scoring rule for beliefs is the Brier score, leads to a further implication about the nature of belief. Just as the correctness of beliefs has a special connection with the truth, the rationality of beliefs has a special connection with this kind of probability. In a sense, it is the essential function of rational beliefs to register or keep track of this kind of probability, by placing more confidence in the more probable propositions, and less confidence in the less probable propositions. This in turn underscores what an important kind of mental state belief is. This kind of probability is what guides the rational agent in forming and revising attitudes of every kind; and it is the function of rational belief to register and keep track of this kind of probability.

This point demonstrates how crucial it is, for understanding the implications of the picture that I have sketched here, to understand exactly how the cognitive situation of each thinker at each time determines exactly which particular probability function counts as the rational probability function of that situation. Unfortunately, as I mentioned above, I cannot explore that issue here; it remains a pressing topic for further investigation.

VII

Suspension of judgment. Finally, let us turn to one other issue that Engel addresses. If belief is subject to a norm of correctness of the sort that I have described, what does that imply about the attitude of suspending judgment?

Doxastic correctness, as I interpret it, ranks different possible doxastic attitudes that one might have towards a given proposition \( p \); but it does not rank belief in \( p \) in relation to the property of having no doxastic attitude towards \( p \) at all. The property of having no doxastic attitude towards \( p \) cannot be said to be correct or incorrect at all. (This is why my interpretation does not imply that you ought to amass a vast body of beliefs in true propositions: amassing true beliefs in this way is not necessary for optimizing the correctness of the beliefs that you actually have.)

However, suspending judgment about a proposition is not identical to the property of having no doxastic attitude towards that proposition; even rocks and prime numbers have that property. On the contrary, suspending judgment about \( p \) does seem to be a broadly doxastic attitude that one can have towards \( p \).\(^{13}\) (In my view, the main reason for regarding suspension of judgment as a broadly doxastic attitude is that it seems clearly irrational—if indeed it is even possible—for an agent simultaneously to believe \( p \) and to suspend judgment about \( p \).) If that is right, then presumably suspending judgment about \( p \) will also get an incorrectness-score of some kind.

It seems intuitively plausible to me that suspension of judgment gets an intermediate incorrectness score, somewhere between the perfect correctness of having maximum confidence in the truth, and the complete incorrectness of having maximum confidence in something false. In suspending judgment about \( p \), one cannot be said to have got things

\(^{13}\) For an illuminating discussion of suspension of judgment, see Friedman (2013).
perfectly right about \( p \), although one also has not got things as badly wrong as one would have if one had maximum confidence in \( p \) when \( p \) is false (or maximum disbelief in \( p \) when \( p \) is true).

It may be, however, that in some cases, suspending judgment about \( p \) is perfectly rational. Indeed, in some of these cases, suspension might even be the only rational response to one’s cognitive situation. If so, then there would be a sense in which one ‘ought’ to suspend judgment about \( p \)—specifically, one is rationally required to suspend judgment about \( p \). Still, even if suspending judgment is rationally required, in the sense that I have tried to define here, suspending judgment is not perfectly correct. It is only because of one’s ignorance that suspension of judgment is rational. In ethical cases, it can often be rational for one to choose an option \( C \) that one knows to be objectively second-best, given one’s ignorance of whether the objectively best option is \( A \) or \( B \). The rationality of suspension of judgment, I propose, is precisely analogous to this.

In fact, suspension of judgment is an instance of a broader kind of doxastic attitude, which we also need to take account of here. This is the attitude that you have towards a proposition \( p \) when you consider \( p \) but you do not have any definite level of confidence in \( p \). I suggest that this attitude towards \( p \) should also get an intermediate degree of incorrectness, somewhere between the perfect correctness of complete confidence in \( p \) when \( p \) is true and the total incorrectness of complete confidence in \( p \) when \( p \) is false.

If this suggestion is correct, then as soon as you consider a proposition \( p \), you cannot avoid having some doxastic attitude towards \( p \)—and the only fully correct attitudes will be to believe \( p \) if it is true, and to disbelieve \( p \) is \( p \) is false. In this case, remaining without any definite level of confidence in \( p \) will be a doxastic attitude that falls short of being fully correct. Given my conception of rationality, this explains why as soon as you consider an obviously true proposition, you will be rationally required to believe it; but it is also explains why there is nothing theoretically irrational in simply never considering such obvious truths.

In this way, the idea that beliefs are subject to a norm of correctness of this sort seems capable of explaining several phenomena that seem to call out for explanation; and as I have tried to show here, it can also be defended against many of the objections that have been raised against it.

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