For *Acta Analytica*

Stake-Invariant Belief[1]

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Abstract

What can rational deliberation indicate about belief? Belief clearly influences deliberation. The principle that rational belief is stake-invariant rules out at least one way that deliberation might influence belief. The principle is widely, if implicitly, held in work on the epistemology of categorical belief, and it is built into the model of choice-guiding degrees of belief that comes to us from Ramsey and de Finetti. Criticisms of subjective probabilism include challenges to the assumption of additive values (the package principle) employed by defenses of probabilism. But the value-interaction phenomena often cited in such challenges are excluded by stake-invariance. A comparison with treatments of categorical belief suggests that the appeal to stake-invariance is not *ad hoc*. Whether or not to model belief as stake-invariant is a question not settled here.

Stake-sensitive belief?

There are any number of things we do in the neighborhood of believing that are properly sensitive to contexts and to what is at stake in those contexts. Choosing, acting, accepting, asserting, having justification, and knowing are examples of the sorts of things I have in mind, and the list can no doubt be extended. By 'properly sensitive to contexts and stakes' I mean that they are the sorts of things that, in one or many ways, reasonably depend upon contexts in which they are present. There is room for debate about whether and in what ways the epistemic members of the list—having justification and knowing—are context sensitive, particularly since the contextual feature in which I am presently interested is what is at stake for the person involved.[2] There are a number of recent discussions that take the stake-sensitivity of justification, knowledge, and their ascription seriously,[3] and we will see glimpses of some of them, but it is not my main purpose to enter into those discussions. Instead, here I entertain the question of whether belief itself is (properly) sensitive to what is at stake.

Now there are ways in which belief might reasonably depend upon its context. The *content* of belief, and attributions of content to a belief are sensitive to the context in which it is present. Whether or not a belief is occurrent, and what it may lead one to say, are surely sensitive to context. The overall, all-things-considered reasonability of holding one belief or another can depend on the context, and on what is at stake in the context: It is a familiar general idea, explored at length by many, that pragmatic reasons may favor holding a belief even when epistemic reasons do not.[4]

But the question I want to entertain concerns an idea different from these. The issue I have in mind is more like this: Suppose John presently believes something—that *p*, let us say—and so he is in a state which is, or includes, the having of that belief. (Let us take this to be a dispositional state, so we are supposing that John presently has a dispositional belief that *p*.) Is his state of belief sensitive to the significance of the choices that are available to John, in the sense that in his present state, his believing that *p*, or the extent to which he believes that *p*, may vary according to the practical significance of what he takes to depend upon the truth of his belief? Or, put another way, might John be in a kind of mixed

state, such that in the presence of some choices with stakes of magnitude *S*, his state is, or yields, a believing that *p* to one extent, yet in the presence of other choices with stakes of magnitude *S**, a believing that *p* to a different extent?[5] I want to raise this question both about belief-states that are taken to be categorical, and belief-states that are taken to come in more fine-grained degrees. In the former case, believing that *p* to a particular extent might be believing, or disbelieving, or withholding. Or if our taxonomy of categorical belief admits more categories, like *really* believing, being morally certain, doubting, and so on, then to believe to a particular extent would be to be in one of those categories. For belief-states that are taken to come in degrees, believing to a certain extent is believing to some particular degree. There are a variety of things that might mean, but I will focus here on the familiar account that derives from Ramsey and de Finetti.[6]

I am not asking whether *all* belief-states are stake-sensitive in roughly this way, but instead whether some belief-states are. Further, in asking whether they are properly sensitive to, whether they reasonably depend on stakes, I mean to neglect the empirical possibility of psychological states that are akin to ordinary beliefs, but that we might regard as deviant or pathologically different from ordinary beliefs. I need to be careful here, to avoid, for example, stipulating an answer *via* a premature judgment that any stake-sensitive belief would be pathological.

One way of thinking about this aspect of the issue is to frame the question this way: Is it a reasonable way of modeling belief-states to regard them as stake-sensitive, or not? Now whether it is reasonable to model *x* as being *p* depends in part on the point of the model. A model of belief employed in logic or epistemology is one thing, a model employed in efforts to develop techniques for manipulating voters and consumers is likely something else. A model employed in efforts to build artificial reasoners, voters, and consumers might differ from either.

I arrive at my present interest in features of belief from the direction of epistemology and logic, and so I am interested in treatments of belief that are appropriate and useful for those normative subjects. The question of what is a reasonable way of modeling belief is not generally identical to the question of

what is a reasonable way of modeling *rational* belief, since reasonable ways of modeling beliefs might treat beliefs both rational and irrational. But there is some ambiguity to that point. What counts as rational belief depends upon the norms we have in mind—logical, epistemic, pragmatic norms can all be relevant. I do not want to presuppose some rich account of rational belief in entertaining the issue of stake-sensitivity, and I am not asking whether a finished account of, say, justified belief would regard beliefs as sometimes stake-sensitive. So I am interested in how to model beliefs that may be rational or not, with respect to many norms of rationality. But an epistemic or logical theory may, and typically does, make use of some normative assumptions concerning what belief may be, in the course of developing the theory's epistemic or logical content. In asking about belief as treated in epistemology and logic, I am asking whether stake-sensitivity is compatible with assumptions of those treatments, some of which may be normative assumptions.

Belief models, partial belief, and categorical belief.

Any account of what beliefs are and what they do (or what we do with them) that we can actually construct and present will be an incomplete one; it will be a model, more or less successful, of some feature(s) of beliefs. The model of partial belief that derives from the work of Ramsey and de Finetti takes them to be judgmental weights in deliberation about actions. This is a model of *choice-guiding* degrees of belief (Ramsey called them belief *qua* basis for action[7]); from here on when I speak of choice-guiding degrees of belief, it is the Ramsey-de Finetti model that I have in mind. Associated with this model of choice-guiding degrees of belief is the *betting model* of degrees of belief, according to which *S*'s degree of belief that *p* is indicated by the precise betting quotient corresponding to the least favorable rate at which he will bet on *p*.[8] This idealized betting model is wholly motivated by the idea that it sheds light on choice-guiding degrees of belief. (That is, on the denizens of the choice-guiding model of degrees of belief.) The models have much in common, but it is worth noticing that the models are different: the choice-guiding model reflects the more general idea that degrees of belief are influences on deliberations about choices of all sorts. The betting-model simplifies things by using a bet on a proposition to represent

an action whose outcomes depend upon whether or not that proposition is true, and by making idealized assumptions about bets (for example, that their values lie entirely in their payoffs). An important feature of the choice-guiding model is that it is a *causal-role model*.[9] It is potentially compatible with other causal-role accounts (models) of beliefs and mental states like causal-role functionalism, and that looks like an advantage.

Neither the choice-guiding model nor the betting model of partial belief depicts all the features that we take beliefs to have. This is so in multiple ways, and one of them is that, in some of their roles or guises, we treat beliefs as categorical rather than as coming in fine-grained degrees. The relationship, tenuous or close, between categorical beliefs and degrees of belief is at least in part a matter of the relationship, tenuous or close, between assertion and action, and I do not propose to do a thorough investigation of it here. One topic that such an investigation might confront is the question of identifying, distinguishing, and counting varieties of states that are belief-states, or that are in the neighborhood of belief-states. Are categorical beliefs and degrees of belief different aspects of a single kind of state, or are they different but related states? If the latter, are there other underlying states on which, *qua* belief, each depends and to which each contributes? Let us set these questions aside, and recognize that a choice-guiding model of degrees of belief neglects some categorical features apparent in belief's guidance of assertion, and models of belief that attend only to its categorical features neglect some properties apparent in belief's influence on deliberation.

What I *am* interested in, however, is a comparison of the two ways of thinking about belief in regard to the influence that stakes may or may not exert on them. Consider for a moment the epistemology and the logic of belief. The idea that epistemic and logical norms apply to categorical belief, and govern the rationality of categorical belief, is just about universally held, even if we lack consensus on the precise character of those norms. The idea that epistemic and logical norms apply to choice-guiding degrees of belief, and that they govern the rationality of degrees of belief, is widely but not universally held. Degrees of belief, some would say, may be appropriately governed by pragmatic

norms, but those are norms of a different kind, answering to different goals than do epistemic and logical norms. On reflection (but without argument) I think we can recognize that both categorical beliefs and degrees of belief are subject to epistemic and logical norms as well as to pragmatic norms. But the fact that there is no doubt that there are such things as epistemology and logic for categorical belief, while doubts are sometimes expressed about epistemology and logic of degrees of belief, is one motivation for here considering both sorts of belief in connection with their possible sensitivity to stakes.

What would stake-sensitivity be?

Several sorts of *context*-sensitivity that are not my present concern were mentioned above (sensitivity of content, of occurrence, of overall reasonability). *Stake*-sensitivity in particular can be exhibited by a number of things that we do in the neighborhood of believing, or that are under the influence of our beliefs. Let us take a moment to distinguish some of them from the target of our interest. Our *decisions* are sensitive to the stakes at hand. This is so in the obvious sense that our consequentialist reasons for acting involve, among other things like probabilities, the relative values of the possible consequences of the acts. It is so in the further sense that we do not treat weighty high-stakes decisions in the same way we treat trivial ones. We typically put more time and effort into weighty deliberations, and we usually choose more conservatively when stakes are high than when they are not. Now, we deliberate on the basis of what we believe, but the fact that deliberations are stake-sensitive does not guarantee that the beliefs involved are themselves stake-sensitive. They might be (that's the question we are raising), but it is entirely possible that the stake-sensitivity of deliberation and choice arises elsewhere: in the particular values to which we attend, in our regard for those values and risks, and in the assessments of risky choices that we derive from them.

The *attentive effort* that we devote to our beliefs may also be stake-sensitive. In deliberative contexts, I may tend to neglect some beliefs that I would recognize, were I to try to think of them, to be relevant to making trivial decisions, whereas I would pay more attention, and look more carefully for (beliefs about) factors relevant to weighty matters. This stake-sensitivity of attentive effort is probably

not confined to deliberation. Even when no particular choice is at hand, if I am reasoning about a weighty matter, I may well give consideration to more (beliefs about) relevant reasons than I do if I am engaged in inference about a subject of trivial significance.

What we are willing, or think it appropriate, to *say* is stake-sensitive. The importance of matters at hand may, via expectations associated with conversational implicature, influence what we think it is worth bothering to say. The weightiness of matters at hand makes us more or less careful about making or withholding *assertions* to others. And how we *describe* our doxastic state to others (how sure we say we are about *p*, for example) may be influenced by the importance of matters to which the content of the doxastic state, or perhaps the presence of the doxastic state, is relevant. As with deliberation and decision-making, it might be that these sensitivities to stakes involve a sensitivity of belief itself to the stakes, but it is possible that the stake-sensitivity of such sayings arises elsewhere: in the conventions of conversational implicature, in patterns of expectations tied to assertion, in our introspective assessments of our doxastic states.

What about what we *accept*? 'Acceptance' is used in many ways, and whether its stake-sensitivity or stake-invariance differs from the stake-sensitivity or stake-invariance of belief depends upon what sort of acceptance we have in mind, and how close or distant it is from belief. If acceptance is no different from (categorical) belief, we can expect the stakes to influence them, or not, to the same extent. But in many uses, 'acceptance' is understood to differ from belief, and usually in ways that suggest context- and stake-sensitivity.[10] For present purposes, I am less interested in this than in whether stake-sensitivity is a feature of belief.

Whether or not, or the extent to which, a belief is *epistemically justified* may depend on what is at stake. And so may whether or not it is *knowledge*. Or perhaps the stakes matter to how we *judge* whether a belief is justified, or is known. On some views the stake-sensitivity of justification or knowledge is very closely tied to the stake-sensitivity of assertion. But whether we think the connection between justification or knowledge and assertability is immediate, or is just often strong, what is at stake seems to

matter to justification and to knowledge. Here again, the stake-sensitivity might be a stake-sensitivity of belief itself, but it is possible that the stake-sensitivity lies elsewhere: in our expectations concerning epistemic standards that a belief must meet in order to be justified (to a particular extent, perhaps), or to be known.

The *access* we have to our beliefs is context-sensitive, and so might be stake-sensitive (what is at stake being a part of context). It may be less clear than in the previous cases whether this would imply a stake-sensitivity of belief. The line between holding a belief that is variably accessible in different contexts—so is present, perhaps to different extents, in some contexts yet not in others—and holding a variety of related beliefs in those contexts, may be hard to draw. Indeed it may be hard to see what would be a basis for drawing it. One reason for drawing it is the familiar phenomenon of overcoming imperfect access, as when one remembers something with an effort. This typically seems less like belief acquisition or belief change and more like a renewed engagement with a persistent unchanged belief. But that observation does not definitively settle the matter.

Now one way of thinking about the sensitivity or invariance of a doxastic state to what is at stake is to think about its *responsiveness to changes* in what is at stake. So, we might imagine that John gives thought to the possibility of a storm this afternoon as he leaves the house without bothering about an umbrella, but that, upon learning that his sister is spending the day offshore on a small sailboat, he thinks about it quite differently. If the extent to which John believes there will be a storm this afternoon changes, it might be a sign that he holds a stake-sensitive belief.[11] And generally, if the extent to which one believes that *p* changes from one occasion to another with altered stakes, that might be a sign that one holds a stake-sensitive belief. In fact, if we seek evidence that beliefs are stake-sensitive, this seems the most natural sort of case to seek. But another possibility is that the altered stakes provoke a belief *change*; maybe John just changes his mind about the afternoon storm. No one doubts that new information can provoke belief change, and (awareness of) altered stakes is new information that may carry a little or a lot of epistemic import. It might in one way or another indicate further significant

information (as when they would only go out in the small sailboat if they had good evidence for clear weather, or more foolishly, if they had good evidence that the weather will be exciting and dangerous). We change our minds often and for all sorts of reasons, and the responsiveness-to-altered-stakes approach to judging stake-sensitivity will always bring with it the question of whether there is a persistent stake-sensitive belief, or a change of mind.[12]

We may be stuck with the need to attend to responsiveness to altered stakes, and so be stuck with the question of what such responsiveness indicates. But what I want to bring out is that responsiveness to altered stakes is not, in itself, the sort of stake-sensitivity of belief that I am curious about. We want to separate the question of how learning the stakes may lead to diachronic belief change from the question of whether the sort of synchronic belief that is present depends on what is at stake. The question I mean to raise is better indicated by the mixed-state metaphor used earlier; other ways of getting at it are: Is the extent (understood either categorically, or in degree) to which a belief-that-*p* is held partly determined by a parameter that reflects the stakes that depend on *p*? Is the extent to which *p* is believed *indeterminate* in the absence of information about the relevant stakes? May John, at *t*, simultaneously believe that *p*, and also <u>not</u> believe that *p*, depending on what's at stake on the truth of *p*?[13] (Or, may he be simultaneously disposed to believe that *p*, and also disposed otherwise, depending on what's at stake?) In order to accurately say what it is that John believes concerning *p*, do we need to specify what he takes to be at stake on *p*? Is that a natural and plausible way to model belief?

When we are acquainted with other persons in life or in literature, it is rare that the acquaintance is confined to doxastic matters alone. We usually learn of others' beliefs and interests together (with parts of their past thrown in), and thereby have a better understanding of both than we would if they were revealed independently. Assertions and actions, and narrators' descriptions of them, tend to inform us about both. We typically do not acquire information about another person's beliefs without also getting information about his or her interests. But interests can also be hidden, and they often are. There is no reason to think that we are always well informed about what another person takes to be at stake, or to be

potentially at stake, on the truth of each his beliefs (or even each of those of which we are aware.) How strongly does that curtail our understanding of the beliefs of others? If belief is stake-sensitive, and we do not know what he takes the stakes to be, do we lose our understanding of what John believes? Not always, no doubt, but more often that we would otherwise think?

How does the garden of models grow?

The choice-guiding model of degrees of belief (the one I have in mind) takes a clear stand on the stake-sensitivity of belief; let us defer that for the moment and consider categorical belief. *Are* categorical beliefs modeled as being stake-sensitive? I think typically not. The various forms of context-sensitivity mentioned above are generally recognized by epistemologists, even if often neglected (the context-sensitivity of justification and knowledge being clear exceptions). But it is hard to find stake-sensitive beliefs treated in work in epistemology. In work on reasoning and AI the idea that belief is context-sensitive, and perhaps that it is stake-sensitive, may be more widespread; there are at least suggestions of a need for such models (Thomason 1986, 2007).[14] *Should* beliefs be modeled as (sometimes) stake-sensitive? That surely depends on the aims of the modeler, and the chances that such a model would be fruitful. In a spirit of open-mindedness, I suggest that the answer is *it depends* rather than *no*. The theme of this section is that there is a general neglect of stake-sensitive belief in epistemology, but I will not seek to establish that here through an extensive survey. Instead I offer some brief remarks, and then display several views expressed by other philosophers. The chosen sample of views is small and far from comprehensive, but interesting nonetheless. Some of the views are chosen not because they exhibit a neglect of stake-sensitive belief, but because they come near to, or actually do, entertain it—in one or two cases, favorably.

Belief is tied to truth. Truth is the condition of *correctness* for (categorical) belief (Shah 2003, Gibbard 2005), something belief shares with other states (Stalnaker 1984). Belief *aims* at the truth (Velleman 2000, Wedgwood 2002). Now truth's being the condition of correctness does not, in itself, preclude a sensitivity of belief to stakes; many beliefs are false, and are no less beliefs for that. And many

false beliefs are reasonable by any standards, including epistemic ones. If a tension can be found between truth and stake sensitive belief, it will depend on taking truth to be the aim of belief. If truth is the aim, and for epistemic purposes perhaps the sole aim of belief, what follows concerning stake-sensitivity?[15] Suppose a stake-sensitive belief is a doxastic commitment of mixed character, resolvable in a variety of ways in the presence of different stakes. Is its pursuit of truth thereby undermined, hampered to an extent that disqualifies the commitment as belief? The variety of potential resolutions constitutes a capacity to produce definite beliefs achieving scattered degrees of success. Some of the resolutions would yield beliefs that fall farther from their aim than others do. But some of the resolutions would yield beliefs that come nearer to achieving their aim than others do, so it is hard to see that the problem, if there is one, lies here. A more likely qualm is this: Stake-sensitive belief is unstable in its pursuit of the aim of truth, and this instability is induced by *pragmatic* influence. What is troubling is not the variety of potential resolutions, it is the non-epistemic influence that produces them. This line of thought discounts stake-sensitive beliefs on grounds of their epistemic irrationality, traceable to an influence regarded as beyond the epistemic pale.

Another idea is this: belief is one of a family of states, and other members of the family are states that exhibit varying degrees of compartmentalization (Stalnaker 1984, 1999; Bratman 1992, Velleman 2000). Pretending, imagining, accepting for the sake of argument, accepting for the sake of planning: these are all valuable things we can do. Belief is like them in some ways but different in others, and an important difference is that a belief is a state that engages our reasoning and deliberation in all contexts (or at least a wide range of contexts); it is a more general, less compartmentalized commitment. Its presence across contexts is not just a matter of exerting some influence or other on reasoning and action in different contexts, it involves a constancy of such influence. This is a conception that leaves little room for stake-sensitivity.

> "Reasonable belief is, in an important way, context independent: at any one time a reasonable agent normally either believes something (to degree *n*) or does not believe it

> (to that degree). She does not at the same time believe that *p* relative to one context but not relative to another. …
> An agent's beliefs are subject to an ideal of integration. Other things equal one should be able to agglomerate one's beliefs into a larger, overall view; and this larger view should satisfy demands for consistency and coherence." (Bratman 1992)

> "We think of our ordinary concepts of knowledge and belief as concepts of available knowledge and belief… but *we are also inclined to think of knowledge and belief as states that at least ought to be independent of what we want or are inclined to try to get.* … Rational creatures, or cognitive beings, are organisms or machines that are capable of making their behavior sensitive to facts about their environments. Our folk theory, as well as our attempts at more scientific theories of cognition and rationality, assume, in their explanations of this capacity, that cognitive beings have two independent but interacting components—one that is a representation of the way the world is…and another that represents the goals, purposes, ends, desires that its actions are aiming to achieve or satisfy….*Our belief states are supposed to be generalized capacities that would serve our ends whatever they happened to be.*" (Stalnaker 1999, p. 270, my emphasis)[16]

Moving along, let us look at several other recently expressed views. The first two do not address stake-sensitive belief dead on, but they get into the neighborhood. John Hawthorne (2004) discusses the influence that salience of the possibility of error may have over knowledge, and considers:

> "*(i) The Belief Removal Model*. First, salience might destroy knowledge that *p* by destroying the belief that *p*. It seems to one that it might be that not-*p*… This in turn induces one to stop believing that *p*, which, if knowledge requires belief, entails that one now does not know that *p*. … [T]he question is whether belief is extinguished in the cases we are considering… On the face of it, this is not so plausible, since there seems to be a perfectly reasonable sense of 'belief' in which one believes one will lose a lottery even when the possibility of error is salient in the relevant sense." (p. 169)

Hawthorne is neither explicitly considering nor rejecting stake-sensitive beliefs. In discussions of the influence of context on justification and knowledge, it is often imagined that salience of the possibility of error is evoked by shifting stakes, say from low to high. This at most lands us in the neighborhood, because a destruction of belief by salience of the possibility of error looks like a response to an evidential stimulus, rather than to high stakes *per se*. For our present purposes, the question is whether there seems to be a reasonable sense of belief in which belief is constant in the face of stakes of different magnitudes.

Fantl & McGrath (2002) offer an account of stake-sensitive justification. In the course of presenting an argument against evidentialism, they write:

> "…But it ought to be common ground between theories of evidence that having a lot at stake in whether *p* is true does not, by itself, provide evidence for or against *p*. Evidence for *p* ought to raise the probability of *p*'s truth (in some appropriate sense of 'probability'). But having a lot at stake in whether *p* is true doesn't affect its probability…."

Again, this is in the general neighborhood at best. Fantl & McGrath do not take the argument under consideration to be decisive, though their reason for that lies in a possible ambiguity concerning justification. They are not explicitly discussing belief, and are rather cagey about what goes into their key concept *preferring as if p*. One story might be that subjective probabilities (of *p*'s truth) are involved, as measures of belief, and that they are stake-invariant.

A third recently expressed view is closer to our target. Weatherson (2005) develops a 'probability first' account that encompasses degrees of belief and categorical belief. Contrary to Fantl & McGrath, and others, Weatherson advances the view that pragmatics matter not to justification, but to rational categorical belief. In this paper (which he regards as an exploration of a possible account), Weatherson treats categorical belief as a psychological phenomenon grounded on an underlying system of degrees of belief, a phenomenon that serves us in practical reasoning. Rational degrees of belief are responsive to evidence rather than to pragmatic influences, but categorical belief in *p* is associated with having thoroughly incorporated *p* into the basis of one's preferences for action. This will be influenced by one's degree of belief that *p*, and also by how the values of live options among which one can choose depend on *p*.

> "In cases like [Fantl & McGrath's], interests matter not because they affect the degree of confidence that an agent can reasonably have in a proposition's truth. (That is, not because they matter to epistemology.) Rather, interests matter because they affect whether those reasonable degrees of confidence amount to belief. (That is, because they matter to philosophy of mind.) There is no reason here to let pragmatic concerns into epistemology." (p. 435-6)

This is an interesting view in more ways than I can explore here. Note the idea that degrees of belief are stake-invariant; we will return to it later. The specific development of the view that categorical beliefs are stake-sensitive is not a traditional treatment of categorical belief (which is no argument against it), but it

is akin to some accounts of acceptance. The idea that stake-sensitivity lies outside epistemology is more familiar.

Differences in the ways epistemologists and other theorists typically think of and model belief are in part a matter of tradition, but also derived from the purposes of the models. In work more closely aligned with research on reasoning and AI than with traditional epistemology, Thomason writes:

> "There are occasions when we can't act without a belief, and in which high standards for belief prevent us from having an appropriate belief. In these cases, an urgent need to act can cause us to lower our standards. … There are occasions when we have a belief that is well justified, but the consequences of acting on this belief if we are wrong are very harmful. In these cases, we can destroy the belief by changing our standards. …
>
> We can model these effects by supposing that beliefs are local. Rather than appealing to a global, monolithic attitude, we construct belief-like attitudes for the occasion at hand out of a large stock of potential beliefs that can be combined much as we might select and combine propositional axioms for some ad hoc purpose. Potential beliefs come with features indicating their provenance and, for instance, the circumstances under which we learned them, and they are sorted according to their entrenchment or plausibility. When we combine potential beliefs into a modality that will guide our actions in a given situation, we can manipulate the beliefs by filtering out less plausible proto-beliefs *in the presence of risk*, or allowing them in when it is urgent to have a belief of some sort." (Thomason 2007, section 3, my emphasis)

In earlier papers, Thomason sketches a framework on which to build the sort of model he has in mind (1986, 2000). The belief states and associated mechanisms are complex; the account employs modular sub-agents, and relations of limited accessibility between belief-holding modules, to model an individual's beliefs and the roles of belief in social interactions. Beliefs that are so modeled may be highly sensitive to context, or at least their influences may be. To the extent that such accounts dwell on the complex ways in which highly specific beliefs are *activated* in different contexts (as opposed to being *characterized* by contextual features), this is not quite context-sensitivity as I described it. And to the extent that the activations are sensitive to *epistemic* stimuli, the source of the context-sensitivity is generally different from the sort of stake-sensitivity about which I am inquiring. Nevertheless, Thomason clearly seeks to model belief as, among other things, stake-sensitive: "Part of the context, then, that

sustains a belief is the current assessment of risk that attaches to acting on that belief; and by reassessing risk, we are able to undermine beliefs by increasing our threshold of credulity" (1986).

Let us return to models of partial belief. I do not claim that all such models are in agreement, but the (Ramsey-de Finetti) model of choice-guiding degrees of belief, and its associated betting model, does take a clear stand on whether stakes influence belief. The answer is negative: degrees of belief are stake-invariant. The idea is that at a given time an agent has *a* degree of belief that *p*, not lots of them that depend on the stakes: "Having any definite degree of belief implies a certain measure of consistency, namely willingness to bet on a given proposition at the same odds for any stake…"[17] There are, of course, other respects in which this account of belief differs from treatments of categorical belief implicit or explicit in much of epistemology, but on the question of stake-invariance, at least, the two approaches agree much more often than not.

Motivating the logic of partial belief.

According to the model of choice-guiding degrees of belief, the logic of partial belief is, at least in part, (standard) probability. Preference-theoretic representation arguments, Dutch book arguments, and error-minimization arguments can be offered in support of that claim. The stake-invariance of degrees of belief is important to each of these arguments for probabilism. Here I will focus on one of them, the Dutch Book argument—in particular, the standard synchronic Dutch Book argument that rational degrees of belief should satisfy the rules of finitely additive probability. The argument dates back to Ramsey and de Finetti, and it has provoked a long history of discussion and criticism. What I want to bring out here is how the stake-invariance of belief bears on one strand of that critical discussion that concerns the additivity of probability, and the additivity of the values of bets. I make no effort here to assess all the criticisms that have been raised against the Dutch Book argument. But since if other criticisms devastate the argument, if the value-additivity of bets were the least of the worries that can be marshaled against it, it would be a scholastic exercise to focus on that issue alone, I will briefly say this: many objections to the Dutch Book argument can be dismissed when we adopt its dramatic-device interpretation (Ramsey 1926;

Skyrms 1980, 1984; Armendt 1993), and other objections are less than devastating when we recognize that the argument is offered in concert with an effort to model belief, and that all models have limitations. This is not to say that no other interesting criticisms can be given, but the value-additivity issue is worth some attention.

The Dutch Book argument defends probabilism by showing that if a system of degrees of belief violates any one of a set of sufficient conditions for probabilism, the holder of the system of beliefs is vulnerable to a Dutch Book. Vulnerability to a Dutch Book is a flawed state of affairs, and the converse Dutch Book argument shows that it is avoidable when the system of beliefs conforms to probabilism; that is, when the quantitative degrees of belief are probabilities. The addition rule usually gets the most attention, and the idea used in the argument is this: a violation of the additivity of degrees of belief is an indication that the believer exhibits an inconsistency in assessing his options. As Ramsey expresses it, his choices would depend upon the forms in which the options are presented, which, Ramsey goes on to say, would be absurd. The plausibility of this judgment comes from the nature of the additivity violation: Depending on the direction of the violation, the agent is willing to pay more (less) for a pair of bets on p and on q, when they are incompatible, than he is willing to pay for a bet on the disjunction $p \vee q$. (Recall that in the betting model, degrees of belief are indicated by the odds at which one would bet, or by the price one would pay for a bet-ticket that pays a fixed amount.) Since holding the pair of bets is exactly equivalent to holding a bet on the disjunction, there is an inconsistency in the agent's evaluations (and it can be argued that this is traceable to an inconsistency in his beliefs' influence in deliberation).

But hold on, says the critic. An important and unargued assumption is being made in connection with the sum of the values of the bets on p and on q. The violation of additivity occurs when that sum differs from the value of the bet on the disjunction. But the holdings that are said to be equivalent are on one hand, a bet on a disjunction, and on the other, a pair of bets on p and on q. Is the value of the pair of bets held together the same as the sum of the values of the individual bets that might each be held alone? This is the question of the value-additivity of bets; the required assumption has been dubbed the *package*

principle. If it is legitimate, then it remains plausible that Dutch Book vulnerability (in this case, at least) is tied to inconsistency, but if not, there is a gap in the argument. So what's wrong with the package principle? Well, all sorts of things readily come to mind. The principle says that when added together the separate values of two things held individually is the same as the value of the two things held together. When it comes to valuing things, it is easy to think of situations where this is not so. The two things may be complementary goods (a hen and a rooster), or substitution goods (a coat and a sweater). The values I judge the individuals and the pair to have (think of my willingness to offer value in exchange) may be affected by the size of my fortune or bankroll. Whatever are the goods in which the bets pay off, they may exhibit significant declining marginal value. These complications are all familiar to utility theorists, and they are hardly dismissible as entirely irrational.

Stake-invariance and the package principle.

The complications just raised arise from interactions among quantities of value; call objections to the package principle that are based on them *value-interaction* objections. There may be other sources of doubts about the additivity of degrees of belief, but these are prevalent in discussions of the package principle. And here is where stake-invariance bears some relevance. Value-interaction reasons for dissenting from the package principle appear to equally be reasons for dissenting from the stake-invariance of belief. If the quantities of value attached to a wager on p and to a wager on q interact with each other, or interact with other circumstances such as the size of my fortune, then why not quantities of value that are attached to a wager on p and to another wager on p? But the combination of a wager on p and another wager on p just is a wager on p at enhanced stakes. If the value of a wager at enhanced stakes is not proportional to the enhancement of the stakes, there is no single degree of belief in p represented by the odds at which the wagers are made, and stake-invariance of belief has been lost.

So a commitment to stake-invariant belief amounts to a commitment that value-interaction complications are excluded. The choice-guiding model of belief takes partial beliefs to be insensitive to the effects of interactions among quantities of value. This is not a rejection of the idea that our

deliberations can be influenced by such interactions. It is a constraint on beliefs, built into a model that focuses on the role of belief in deliberation and choice. Is it a reasonable constraint? It is at least a common one, judging from our discussion of categorical belief.

If this is right, then one implication is that defenses of probabilism that rely on the stake-invariance of belief are leaning on a widely accepted principle concerning belief itself, and on an even more widely accepted principle concerning rational belief. One of those defenses is the Dutch Book argument. When it is understood that the argument is used in connection with a model of stake-invariant belief, we are in a position to see that some objections to it, the ones I have labeled value-interaction objections, can be defused. The objections focus on deliberative phenomena that the model, incorporating a standard presupposition about belief, discounts. The phenomena may be often realized, but they arise from sources taken to be outside the doxastic inputs to deliberation, that is from sources other than belief.

Conclusion.

I have raised the question of whether it makes sense to treat belief as stake-sensitive, with a particular sort of stake-sensitivity in mind. The question arises both for categorical belief and for degrees of belief. Treatments of categorical belief as stake-sensitive are rare in epistemology, perhaps less so in other work. The stake-invariance of belief is built into the choice-guiding model of degrees of belief that comes to us from Ramsey and de Finetti. Commonly offered attacks on the package principle, and on Dutch Book arguments that employ it to motivate probabilism, rely on value-interaction phenomena that are ruled out by stake-invariance. One might wonder whether a response to those attacks by appeal to stake-invariance is well-motivated, or merely an *ad hoc* response. The comparison with categorical belief indicates at least that the appeal is not *ad hoc*. No knock-down argument for stake-invariance has been offered, and in a spirit of open-mindedness, we need not insist that any model that omits it is

bound to be fruitless. But treatments of choice-guiding degrees of belief that take beliefs to be stake-invariant are not at present outliers in epistemology.

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[2] Or persons, but I will suppose that what is at stake for others matters by way of the interests of the first person involved—the believer himself. What others take to be at stake for him may influence what they attribute to him; how that goes might provide us with reasons for thinking that his belief is or is not stake-sensitive, but I will not explore that indirect approach here.

[3] For examples, Lewis (1996); Cohen (1999); Fantl & McGrath (2002).

[4] For examples see Heil (1992), Foley (1993), Kelly (2002; 2003); there are many others. That belief may be held or withheld for pragmatic reasons is a familiar idea. How that may be accomplished and how pragmatic norms may govern believing is open to discussion, but it is not my present concern. I am instead interested in logical and epistemic norms for belief, whether for categorical belief or for choice-guiding belief that comes in degrees. So I am here less interested in how stakes can be pragmatic reasons for believing, for choosing to believe, for bringing it about that one believes, and instead more interested in whether stakes are determiners of what sort or degree of belief one has. I will try to make that idea clearer below. See also note (13).

[5] The issue may be more complex; the *magnitude* of what is at stake, however measured, might not be the only source of stake-influence on belief. But I will not explore that here.

[6] Ramsey (1926); de Finetti (1937).

[7] Ramsey (1926), p.67.

[8] Here I focus on models of *precise* degrees of belief. About vague degrees of belief we can also raise questions of stake-sensitivity. Does what is at stake shift the range that characterizes a vague degree of belief? Does it make vague degrees of belief sharper or vaguer? These are models and questions that I set aside in this paper, except to suggest that the first sort of influence is at odds with usual ways of thinking of categorical belief in epistemology.

[9] "We are driven therefore to the second supposition that the degree of a belief is a causal property of it, which we can express vaguely as the extent to which we are prepared to act on it. … As soon as we regard belief quantitatively, this seems to me the only view we can take of it." (Ramsey 1926, pp. 65-66). His assertion is that this is the only *workable* view. There can clearly be others; he immediately pursues a criticism of one, the view that degrees of belief are introspectible feelings.

[10] For examples: Stalnaker (1984, Chapter 5) regards belief as one sort of acceptance concept; other sorts of acceptance involve acting as if one believes, in a variety of ways that may be for a purpose, compartmentalized, and direct products of decision. Similarly Bratman (1992). Note that Stalnaker distinguishes a belief from a belief state; the latter is a state of having a total set of beliefs. Van Fraassen (1980) takes acceptance of p (a theory T) to involve belief in a related p^* (that T is empirically adequate), together with pragmatic commitments. Kaplan (1996) ties categorical belief that p to preference for asserting p in a particular sort of circumstance, a context of inquiry; this account is a descendent of one in which accepting that p was treated in a similar way. In both accounts Kaplan contrasts acceptance/belief with degrees of confidence. There are many other accounts that make use of an idea of acceptance.

[11] I do not mean to assume here that it is entirely natural to think that his belief does shift. The point here is to suppose that a shift occurs and to reflect on what would follow from that.

[12] I take responsiveness-to-altered-stakes to be a matter of the believer's responsiveness to his revised assessment of stakes (not to their mere presence, of which he might be unaware); this is meant to include such cases as when one gives little or no occurrent thought to the stakes and then suddenly understands them to be high. The sudden understanding might be taken to be a revision of a dispositional doxastic state that differed from the belief that the stakes are high.

[13] Notice that in focusing on the possibility of influence by what is at stake on the *truth of p*, our present concern differs from questions about the influence of what is at stake in *believing that p*. The former attends to the pragmatic significance of *p*, the latter attends to the pragmatic significance of belief that *p*, and is the central concern of discussions concerning pragmatic reasons for believing. I think the two issues are not completely and cleanly separable, but here I will so treat them, and will concentrate on the former.

[14] Perhaps such models have been well developed; a more thorough search of the literature than I have done so far would tell.

[15] The idea of beliefs having aims is of course metaphorical.

[16] Stalnaker is discussing two ways of thinking about belief that are in tension: Available belief is appropriately calibrated to motivational states that determine how the information is to be used. The quoted remarks occur in a discussion of the problem of logical omniscience, and his larger point is to suggest that we need more subtle ways of thinking about these two sides of doxastic states, though there is no particular reason to think that stake-sensitivity would be a significant feature of the beliefs more subtly understood. In any case, my suggestion is that the quoted remarks express a standard approach in epistemology, as well as in our folk theory.

[17] Ramsey (1926) p. 78.