DISAGREEMENT, CREDENCES, AND OUTRIGHT BELIEF

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Abstract

This paper addresses a largely neglected question in ongoing debates over disagreement: what is the relation, if any, between disagreements involving credences (call them credal disagreements) and disagreements involving outright beliefs (call them full disagreements)? The first part of the paper offers some *desiderata* for an adequate account of credal and full disagreement. The second part of the paper argues that both phenomena can be subsumed under a schematic definition which goes as follows: A and B disagree if and only if the accuracy conditions of A's doxastic attitude are such that, if they were fulfilled, this would *ipso facto* make B's doxastic attitude inaccurate, or vice-versa.

1. Introduction and overview

Disagreement has been receiving much attention in contemporary philosophy of language and epistemology. In philosophy of language, the debate between *Invariantism*, *Contextualism* and *Relativism* about the semantics of certain expressions, such as predicates of personal taste, epistemic modals and knowledge ascriptions, is often adjudicated on the basis of disagreement data. By contrast, in epistemology there is much debate on how to correctly respond to a disagreement with an acknowledged epistemic peer.

Semantic and epistemological disputes about disagreement mostly operate under different conceptions of the doxastic attitudes held by two subjects in disagreement.[1] The semantic debate assumes what I shall call the *qualitative model of belief* to the effect that there are all-or-nothing,

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[1] For exceptions, see Richard Feldman, 'Epistemological Puzzles about Disagreement', in Hetherington, S. (ed.), *Epistemology Futures* (Oxford: Oxford University Press, 2006), pp. 216-236; and Torfinn Huvenes, 'Epistemic Modals and Credal Disagreement', *Philosophical Studies* 172 (4) (2015), pp. 987-1011.

binary attitudes one might take toward a proposition: either one believes that p, or one fails to believe it. It is commonly held that what is distinctive of full belief is that it is the cognition which aims at truth in a distinctive way: when one believes that p, one takes p to be true for the sake of getting p's truth-value right, as it were.[2] Moreover, truth provides the standard of accuracy for a full belief. That is to say, a full belief that p is accurate just in case p is true. Let us call the phenomenon of disagreement involving full beliefs *full disagreement*. What follows is a typical case discussed in the philosophy of language literature on disagreement:

(ICE CREAM)
Oliver believes the proposition expressed by the sentence: 'Ice cream is tasty'.
Julie believes the proposition expressed by the sentence: 'Ice cream is not tasty'.

By contrast, the vast majority of authors contributing to the epistemology of disagreement endorse a different conception of doxastic attitudes that I shall call the *quantitative model of belief*.[3] The quantitative model of belief countenances a fine-grained approach to doxastic attitudes to the effect that these are the levels of confidence subjects invest in the truth of the targeted proposition p. These levels of confidence are usually modelled by real-valued credence functions which assign a real number between 0 and 1 (inclusive) to the propositions they take as arguments. This means that instead of having a binary doxastic option to take towards a proposition, a subject has – at least ideally – infinitely many doxastic attitudes to take. Roughly put, the more confident one is in p, the higher one's credence in p.[4] Let us call disagreement involving credences *credal disagreement*.[5]

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[2] This is what distinguishes full belief from other ways of regarding a proposition as true, such as assumption, hypothesis, imagination, and so on.

[3] See e.g. David Christensen, 'Epistemology of Disagreement: The Good News', *The Philosophical Review* 116 (2) (2007), pp. 187-217; and Thomas Kelly, 'Peer Disagreement and Higher-Order Evidence', in Feldman, R., Warfield, T. (eds.), *Disagreement* (Oxford: Oxford University Press, 2010), pp. 111-174. A notable exception is Feldman, 'Epistemological Puzzles about Disagreement', but he is criticised by Kelly for not assuming the quantitative model of belief.

[4] I have offered a minimal characterisation of the two models of belief by confining myself to what most – virtually all – authors who have explored the relationship between the two models of belief agree upon. Disagreement begins when, for instance, we focus on the kind of rational requirements that govern full belief and degrees of belief. For an in-depth study of this issue, see e.g. David Christensen, *Putting Logic in Its Place* (Oxford: Oxford University Press, 2004).

What follows is a typical case discussed in the epistemological literature on disagreement:

(RAIN-Cr)[1] [SEP]

Marc assigns .6 credence to the proposition expressed by the sentence 'It's raining in Barcelona right now'.

Lucy assigns .9 credence to the same proposition.[6]

In this paper I would like to address the following question: what is the relation, if any, between credal and full disagreement? Clearly, it seems that credal and full disagreement are two ways whereby doxastic disagreement manifests itself, and the aim of this paper is to get clear about their relation and explain why credal and full disagreement appear to be varieties of the *same* phenomenon.

The motivation behind this project is as follows. It is somewhat surprising that the vast majority of philosophers contributing to semantic and epistemological debates about disagreement seem to work in compartments without caring too much – or at all – about whether their fellow epistemologists (or semanticists, respectively) are targeting different aspects of the same phenomenon or not. No substantive attempt has, as of yet, been made at shedding some light on the general issue whether credal and full disagreement are two different phenomena of disagreement which require the specification of two different definitions; or whether they can be accounted for in an unified way; or else, whether their respective definitions exhibit noteworthy common traits. Moreover, we should not forget that disagreement is not only an alleged datum in the contextualism *vs.* relativism controversy, or one of the ingredients of an interesting epistemological puzzle. It is also – if not mostly – a pervasive feature of our intellectual lives. For this reason, I believe that it deserves to be analysed *per se*.

The rest of the paper is organised as follows: in section 2 I lay out some *desiderata* for a plausible explanation of the relation between credal and full disagreement. In section 3 I develop

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[5] Henceforth I will interchangeably use 'full belief(s)', 'outright belief(s)', 'full attitude(s)' to refer to doxastic attitudes as conceived within the qualitative model of belief. I will interchangeably use 'partial belief(s)', 'degree of belief(s)' 'partial attitude(s)' and 'credence(s)' to refer to doxastic attitudes as conceived within the quantitative model of belief.

[6] For simplicity's sake I will use examples involving precise credences, even though everything I am going to say can be rephrased in terms of imprecise credences.

my own account of the relation between credal and full disagreement. The key contention of such an account is that there is a schematic definition of doxastic disagreement which can be suitably articulated to account for credal and full disagreement and meet the *desiderata* in a satisfactory way. The schematic definition goes as follows: two subjects A and B disagree if and only if the accuracy conditions of A's doxastic attitude are such that, if they were fulfilled, this would *ipso facto* make B's doxastic attitude inaccurate, or vice-versa.

2. *Desiderata*

In this section I will propose three *desiderata* that any account of the relation between credal and full disagreement should meet in order to count as a good account.

First, I submit that the account has to yield most – hopefully all – of the intuitively correct verdicts about a vast array of disagreement-related data. Call this the EXTENSIONAL ADEQUACY *desideratum*. Besides the two cases already mentioned in the introduction, I want to present other data that seem to be relevant to the problem this paper is concerned with. I will split them into three groups. Let me also stress that – to the best of my knowledge – these data, except for the first example of the first group, have been overlooked in current debates on disagreement.

2.1. No transworld disagreement data

Consider these two cases:

(MOON)

Consider Jane (who inhabits this world, the actual world) and June, her counterpart in another possible world. Jane believes the proposition expressed by the sentence 'Mars has two moons', while June disbelieves it.[7]

(MOON-Cr)

Consider Jane (who inhabits this world, the actual world) and June, her counterpart in another possible world. Jane assigns .4 credence to the proposition *that Mars has two moons*. June assigns .8 credence to the same proposition.

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[7] This example is due to John MacFarlane, 'Relativism and Disagreement', *Philosophical Studies* 132 (2007), pp. 17-31, at p. 23.

Let us focus on (MOON). Although Jane and June entertain attitudes towards a proposition that a single subject cannot jointly hold without being in some sense incoherent, these attitudes *concern* two distinct possible worlds. So, Jane and June are talking about different things, namely how things are in the actual world and how things are in a possible world. For this reason, it seems that Jane and June do not disagree. [8] The same intuitive verdict applies to cases such as (MOON-Cr).

2.2. *Degrees of credal disagreement data*

Compare (RAIN-Cr) and the following case:

> (NOBEL)
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> Masuka assigns .1 credence to the proposition *that Haruki Murakami will be the next Nobel literature laureate*. Miyuki, by contrast, is fairly confident that Murakami will be the next Nobel literature laureate, and she therefore assigns .9 credence to this proposition.

Intuitively, there is a difference between (RAIN-Cr) and (NOBEL): in the latter, the disagreement appears to be stronger than in the former, in that the difference between the degrees of confidence assigned to *p* in (NOBEL) is far greater than that in (RAIN-Cr). It seems implausible to capture this difference by saying that (NOBEL) is a real and genuine case of disagreement whereas (RAIN-Cr) is not, for it is felicitous to describe both of them as cases of credal disagreement. Thus, to capture both the idea that (NOBEL) and (RAIN-Cr) are disagreement cases and the intuition that they somehow differ, it seems natural to maintain that in (NOBEL) Masuka and Miyuki disagree to a greater extent than Marc and Lucy do in (RAIN-Cr).

Cases like this show that two subjects can be more or less in disagreement with one another. So, credal disagreement admits of degrees.

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[8] There is wide consensus on the idea that cases like (MOON) are not cases of disagreement. See e.g. Teresa Marques, 'Doxastic Disagreement', *Erkenntnis* 79 (1) (2014), pp. 121-142; and Jonathan Schaffer, 'Perspective in Taste Predicates and Epistemic Modals', in Egan, A., Weatherson, B. (eds.), *Epistemic Modality* (Oxford: Oxford University Press, 2011), pp. 179-226. The consensus is not universal, though. For instance, Herman Cappelen and John Hawthorne, *Relativism and Monadic Truth* (Oxford: Oxford University Press 2009) at pp. 64-66, have tried to resist the majority view. It is not my aim here to discuss in detail both Cappelen and Hawthorne's diagnosis and subsequent – to my mind successful – criticism of their diagnosis proposed by various authors, e.g. Marques, 'Doxastic Disagreement'.

2.3. Shaky intuitions data

Consider the following case:

> (HILLARY)
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> Bill assigns .25 credence to the proposition *that Hillary Clinton will be the next president* and Chelsea assigns credence .26 to the same proposition.[9]

Do Bill and Chelsea disagree? Some might answer the question in affirmative, some in the negative.

It is far from obvious how to establish which intuition is the correct one, for both of them strike us as *prima facie* permissible. Expanding on (HILLARY), we should say that, in cases where the difference between the degrees of belief assigned to a proposition is very small, intuitions might be shaky. Hence, I contend that we had better have an account of the relation between full and credal disagreement which complies with the permissible shakiness of our intuitive verdicts about these cases. That is to say, the account should be in principle able to accommodate opposite intuitions about cases like (HILLARY).

I have so far reviewed three distinct kinds of data we have to pay attention to in order to satisfy EXTENSIONAL ADEQUACY. Let us turn now to the second *desideratum*. Plausibly, a good account of the relation between credal and full disagreement should be compatible with various approaches to the relation between the quantitative model and the qualitative model of belief. There is much debate about how full belief and partial belief are related to each other, if at all. Broadly speaking, we can distinguish between three different approaches to such a question. According to *eliminativism*,[10] either full belief or partial belief do not really exist. According to *non-reductionism*,[11] the two models pick out different and non-reducible features of a subject's doxastic state. Finally, according to *reductionism*, we might either reduce partial belief to full

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[9] This case presupposes the non-obvious thesis that such precise degrees of belief can really be attributable to subjects. Notice, however, that it is possible to construe structurally similar cases even if we take doxastic attitudes to be imprecise credences.

[10] See e.g. Richard Jeffrey, 'Dracula Meets Wolfman: Acceptance vs. Partial Belief', in Swain, M. (ed.), *Induction, Acceptance, and Rational Belief* (Dordrecht: Reidel, 1970), pp. 157-185.

[11] See e.g. Jacob Ross and Mark Schroeder, 'Belief, Credence, and Pragmatic Encroachment', *Philosophy and Phenomenological Research*, 88 (2) (2014), pp. 259-288.

belief, or vice versa.

It is impossible to do justice to the various articulations of these approaches in the space of this paper. For this reason, I will henceforth disregard the eliminativist approach and explore the question of what doxastic disagreement is within a non-eliminativist framework. However, I want to emphasise that even if eliminativism were correct, the paper would nonetheless accomplish an important task. To illustrate. On closer inspection, if eliminativism were correct, the difference between full and credal disagreement would not exist. Yet, we would still be left with the question of what – if we endorsed full belief eliminativism – credal disagreement is (and the same question would arise, *mutatis mutandis*, if we endorsed partial belief eliminativism). This is a non-trivial question to which this paper offers an answer. Moreover, as will become apparent below, the paper defends a schematic notion of disagreement whose main tenets are compatible with taking doxastic attitudes to be either full or partial. This means that, even if we had to adopt an eliminativist approach, the definition of disagreement presented in the paper would enable us to avoid any commitment to a specific version of such an approach, for it would be available to both partial and full belief eliminativists. I regard this neutrality as a theoretical advantage.

Having clarified this, I will focus on a specific way of cashing out the reductionism *vs.* non-reductionism dichotomy. It is widely agreed that the most promising reductionist strategy consists in reducing full belief to partial belief.[12] More specifically, the most popular reductionist view adopts what Richard Foley has called the *Lockean Thesis*.[13] The Lockean Thesis holds that a subject believes that *p* in the full sense just in case she believes it with a degree of confidence that meets a certain threshold. If the subject's credence in *p* is sufficiently high (but not necessarily 1), the subject's attitude falls in the area of belief; when the credence is low (but not necessarily 0), the subject's attitude falls in the area of disbelief.[14]

I contend that a good account of credal and full disagreement should be available to both advocates and detractors of the Lockean Thesis. This is the second *desideratum*, which I will call LOCKEAN NEUTRALITY. Such a *desideratum* is motivated by two considerations. First, generality is taken to be a theoretical virtue of a view: roughly put, the more a view can be shared,

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[12] See Christensen, *Putting Logic in Its Place*, chapter 2 for a nice survey of attempts in both directions.

[13] Richard Foley, *Working Without a Net* (New York: Oxford University Press, 1993).

[14] To be more precise, Foley takes the Lockean Thesis to concern the relation between *rational* belief and *rational* credences. See also Christensen, *Putting Logic in Its Place*, chapter 2; and Scott Sturgeon, 'Reason and the Grain of Belief', *Noûs* 42 (2008), pp. 139-165.

the more it is praiseworthy. Thus, if an account of credal and full disagreement can be accepted by both advocates and detractors of the Lockean Thesis, such an account will exhibit significant theoretical generality. Secondly, since there is little agreement on the status of the Lockean Thesis, it seems that we had better not commit ourselves to its acceptance or denial in our attempt at getting clear about the relation between credal and full disagreement. These two considerations support the more general thought that a definition of disagreement should carry as few potentially controversial commitments as possible without losing extensional adequacy.

Finally, it is important to bear in mind that the aim of this paper is not to argue for a specific semantic theory on the basis of disagreement data. More specifically, it is not my aim to argue for a specific view about what kind of semantic content (or proposition) is expressed by sentences featuring notoriously problematic expressions, such as meteorological and taste predicates, epistemic modals, knowledge ascriptions, and the like. For this reason, a good account of the relation between credal and disagreement should be – at least in principle – available to most (if not all) views on semantic content on the market. Call this *desideratum* CONTENT NEUTRALITY.

I should hasten to clarify that a theory of semantic content does not affect the extensional adequacy data I have presented earlier. To put it differently, the no transworld disagreement data presented above do not depend on taking the semantic content expressed by sentences to be modally neutral, as opposed to modally specific. The data stem from the powerful intuition that Jane and June are talking about different things, as it were. Thus, a theoretically satisfactory definition of disagreement has to capture such data without *ipso facto* committing us to a specific view about whether propositions are modally neutral or not. This point carries over to the debate about whether propositions are temporally specific (that is, their truth-values vary across possible worlds only) or neutral (that is, their truth-values vary across both possible worlds and times). Since cases of alleged transtemporal disagreement are structurally identical to cases of alleged transworld disagreement, a definition respecting CONTENT NEUTRALITY has to yield the verdict that they are merely apparent cases of disagreement irrespective of whether the believed contents are temporally specific or neutral.

Having laid out the *desiderata*, I will move on to develop and defend my account of the relation between credal and full disagreement.

3. The View

In the next three (sub)sections I will propose what I shall dub the *Kinship View* of the relation

between credal and full disagreement (the Kinship View for short). The first component of the view is a *schematic* definition of disagreement which goes as follows:

> [Schematic Accuracy View]
> A and B disagree if and only if the accuracy conditions of A's doxastic attitude are such that, if they were fulfilled, this would *ipso facto* make B's doxastic attitude inaccurate, or vice-versa.[15]

I take this to be a schema since three things need to be specified:

(i.)   The logical form of the disagreement relation;

(ii.)   The notion of 'accuracy conditions';

(iii.) The notion of 'fulfilment of accuracy conditions'.

I will now turn out to specify (i.)-(iii.) for the case of full belief. I will then move on to specifying the schema for the case of partial belief, and conclude by outlining the relation between credal and full disagreement.

3.1 Full Belief

To begin with, let us refer to the fact that the doxastic attitudes at stake are full by the expression 'doxastic attitude$_f$'. The logical form of the disagreement relation can be specified as follows: x disagrees with y's ϕ-ing in context c, where 'ϕ' can be replaced here with the verb 'believe' (or 'disbelieve').[16] Now, since full belief is an all-or-nothing state, it seems plausible to contend that either two subjects instantiate the disagreement relation, or they do not. Let us call this relation 'Disagreement$_f$'.

Having clarified this, let us turn to the notion of accuracy. To begin with, notice the platitude that if John and Shirin believe the propositions expressed by the sentence 'I am hungry', it is

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[15] This view has been firstly put forward in Delia Belleri and Michele Palmira, ''Towards a Unified Notion of Disagreement', *Grazer Philosophische Studien* 88 (2013), pp. 139-159. I have changed the formulation of the definition offered there for simplicity's sake, but nothing hinges on such a modification.

[16] This formulation is borrowed from John MacFarlane, *Assessment Sensitivity. Relative Truth and Its Applications* (Oxford: Oxford University Press, 2014), chapter 6.

possible for their beliefs to be both accurate. This intuitive pronouncement can be theoretically systematised within the well-tried Kaplanian semantic framework.[17] The conventional meaning of indexicals and demonstratives - called by Kaplan *character* - is what determines the semantic value of an expression in a context. This means that John's and Shirin's utterances of the sentence 'I am hungry' express different semantic contents (or propositions), for 'I' receives different semantic values. Hence, we correctly predict that John and Shirin do not disagree. Furthermore, the Kaplanian framework allows us to take proper account of the fact that doxastic attitudes are held in context, and that there are features of the context in which a sentence is used (and a belief mentally tokened) that determine its appropriate truth-value. The best-known case is contingency: contingent sentences are sensitive to the world at which they are evaluated. In order to make sense of this second form of interaction between semantics and context, the meaning of sentences is also relativised to coordinates of the circumstances of evaluation.[18]

This double influence of context gives rise to the following definition of accuracy, which I shall label 'Accuracy$_t$':[19]

> A belief that *p* held at a certain context c_u is accurate just in case *p* is true at c_u, at the relevant circumstance of evaluation c_e .[20]

Finally, the fulfilment of outright beliefs' accuracy conditions should be understood in a *categorical* manner: either the accuracy conditions are fulfilled, or they are not, for either the believed

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[17] See David Kaplan, 'Demonstratives', in Almog, J., Perry, J. and Wettstein, H. (eds.), *Themes From Kaplan* (New York: Oxford University Press, 1989), pp. 481-563.

[18] The values of the coordinates of the circumstances of evaluation are, by default, those of the context of utterance, even though the presence of expressions behaving as intensional operators (e.g. 'possibly', 'necessarily') may shift them.

[19] See also Belleri and Palmira, 'Towards a Unified Notion of Disagreement'; Ragnar Francén, 'No Deep Disagreement for New Relativists, *Philosophical Studies* 151 (1) (2010), pp. 19-37; and MacFarlane, *Assessment Sensitivity*.

[20] For present purposes, I do not have to take a stand on which coordinates, besides a possible world coordinate, should enter into a circumstance of evaluation. This issue is fully addressed in Belleri and Palmira, 'Towards a Unified Notion of Disagreement'. Below, I note that the definition of full disagreement I offer which relies on this notion of accuracy is in a position to meet CONTENT NEUTRALITY. This means that my view is neutral on the kind of coordinates that enter into a circumstance of evaluation.

proposition is true (and the belief accurate), or it is not. Let us refer to this with 'Fulfillment$_c$'. The foregoing observations give rise to the following instance of the Schematic Accuracy View:

[Full Accuracy View]

A and B disagree$_f$ if and only if the accuracy conditions$_t$ of A's doxastic attitude$_f$ are such that, if they were fulfilled$_c$, this would *ipso facto* make B's doxastic attitude$_f$ inaccurate$_t$, or vice-versa.

Having clarified the content of the Full Accuracy View, let us put it to test. Consider this case:

(RAIN)

Frank believes the proposition expressed by the sentence 'It's raining in Barcelona right now'.

Emily believes the proposition expressed by the sentence 'It's not raining in Barcelona right now'.

The intuition of disagreement is accounted for thusly: the accuracy conditions of Frank's belief *that it's raining in Barcelona right now* are such that, if they were fulfilled – that is, if the proposition believed by Frank were true - this would *ipso facto* make Emily's belief *that it's raining in Barcelona right now* inaccurate.

Let us take now (MOON). The Full Accuracy View correctly establishes that Jane and June do not disagree since the accuracy of Jane's attitude, e.g. a belief in the proposition *that Mars has two moons*, is fulfilled just in case the proposition is true at the actual world *w*; the fulfilment of this accuracy condition, however, does not *ipso facto* make June's attitude of disbelieving that very proposition inaccurate, since the accuracy of June's attitude depends on another possible world *w**.

Let us turn now to (RAIN-Cr) and ask: can the Full Accuracy View account for it?

This question should be answered in the negative. Credal disagreement is a certain relation that involves credences as *relata*. However, it is false to say that Marc's .6 credence assigned to the proposition *that it's raining in Barcelona right now* is accurate just in case the proposition is true: truth offers a categorical standard of evaluation of accuracy that applies to the qualitative model of belief only. For this reason, the Full Accuracy View is unable to make sense of credal disagreement. In the next (sub)section, however, I articulate another instance of the Schematic Accuracy View

which is equipped to define credal disagreement.

3.2 Partial Belief

Let us refer to the fact that the doxastic attitudes at stake are partial by using the label 'doxastic attitude$_p$'. Since in section 2.3 we have seen that it makes sense to conceive of credal disagreement as coming in degrees, this fact can be reflected at the level of the logical form of the disagreement relation by saying that two subjects disagree to a certain degree. So, we will have that: *x* disagrees to degree *d* with *y*'s ϕ-ing in context *c*, where 'ϕ' can be replaced here with the verb 'assigning a given credence *Cr* to a proposition *p*'. Call this relation 'Disagreement$_p$'.

Let us turn now to the notion of accuracy. The intuitive idea I will use in order to define the notion of accuracy for credences is the following. Let us characterise a subject's credence *Cr* as the subject's numerical estimate of the truth-value of *p*:[21] plausibly, the more one's estimates get closer to the truth, the more accurate they are. That is to say, it seems intuitive to regard the notion of accuracy for credences as coming in *degrees*. In order to establish the degree to which a credence is accurate we should look at its closeness to the truth.[22]

These informal considerations can be made more precise by availing ourselves of a so-called *scoring rule*, namely a formula that enables us to calculate the inaccuracy of a credence in *p* by measuring how far it is from the truth-value *p* would have in the actual world *w*. More precisely, for any proposition *p*, credence *Cr*, and truth-value *v*, a scoring rule assigns a real number ≥ 0 which measures the inaccuracy of holding *Cr* when the truth-value of *p* in *w* is as given in *v*. The best score achievable is 0, which means the distance from truth is minimised to 0. If *Cr*'s score is higher than *Cr**'s is, *Cr** is closer to the truth than *Cr* is; so, it is less inaccurate. There are various scoring rules one can avail oneself of, but it is not my aim here to compare their respective pros and cons. Thus, for present purposes, I shall adopt the Brier Score rule. Here it is. Let *w* be a possible world and *p* a proposition; let us say that $V(p, w)$ is 1 if *p* is true in *w*, and 0 otherwise. The inaccuracy of having a credence *Cr* towards a proposition *p* relative to *w* is defined thus: $|Cr(p) - V(p, w)|^2$.

This provides us with a formally adequate elaboration of the idea that, as far as credences are concerned, it does not make sense to talk of accuracy *simpliciter*. A credence can be more or less

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[21] See e.g. Richard Jeffrey, 'Probabilism and Induction', *Topoi* 5 (1986), pp. 51-58. (1986); and James M. Joyce, 'A Nonpragmatic Vindication of Probabilism', *Philosophy of Science* 65 (4) (1998), pp. 575-603.

[22] See Joyce, 'A Nonpragmatic Vindication of Probabilism'.

accurate, depending on its distance from the truth. Call this notion of accuracy 'Accuracy$_g$'.[23]

Relatedly, we should not look at the fulfilment of partial beliefs' accuracy conditions by adopting a black-or-white perspective. Recall that the fulfilment of full beliefs' accuracy conditions has been understood in *categorical* terms: either the accuracy conditions are fulfilled, or they are not, since either the believed proposition is true, or it is not. Yet, categorical considerations are simply not the right currency when we deal with partial attitudes' accuracy conditions. More naturally, credences' accuracy conditions should be seen as fulfilled to a certain degree, where this degree is given by their (in)accuracy score. Hence, credences' accuracy conditions can be fulfilled to a maximal degree, a minimal degree, or a certain degree. More precisely:

-   credences' accuracy conditions can be fulfilled to the maximal degree only when one entertains a true proposition with the highest degree of belief;
-   credences' accuracy conditions can be fulfilled to the minimal degree only when one entertains a true proposition with the lowest degree of belief;
-   credences' accuracy conditions can be fulfilled to a certain degree only when one entertains a true proposition with some other degree of belief.

Call this notion of fulfilment of partial attitudes' accuracy conditions 'Fulfilment$_d$'.

Finally, let me clarify the idea that credal disagreement comes in degrees. The driving thought is that the degree to which two subjects disagree is given by the absolute distance between the (in)accuracy scores of their respective credences across two possible worlds, the one at which the relevant proposition is true and the one at which it is false. Intuitively, the greater the absolute distance between (in)accuracy scores, the more the disagreement. The reason why I am taking into account the absolute distance between the inaccuracy scores across two possible worlds is that we have to consider both the possible worlds at which the proposition would be true and those at which the proposition would false in order to give a complete measure of credences' (in)accuracy conditions. To illustrate this point, consider Marc and Lucy's disagreement in (RAIN-Cr). Bear in mind that Marc assigns .6 credence to the proposition *that it's raining in Barcelona right now* and Lucy assigns .9 credence to the same proposition. If the proposition *that it's raining in Barcelona*

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[23] One might say that it makes sense to talk of accuracy *simpliciter* in the case of assigning 1 or 0 credence to a proposition. Yet, it would be more appropriate to say that credence 1 in the proposition has maximal degree of accuracy (if the proposition is true), and credence 0 has maximal degree of inaccuracy (if the proposition is false).

right now were true, the degree to which the accuracy conditions of Lucy's attitude are fulfilled is equal to 0.01. This would make *ipso facto* Marc's attitude more inaccurate, for its (inaccuracy) score is higher, i.e. 0.16. However, if the proposition *that it's raining in Barcelona right now* were false, the degree to which the accuracy conditions of Marc's attitude are fulfilled is equal 0.36. This would make *ipso facto* Lucy's attitude more inaccurate, for its inaccuracy score would be higher, i.e. 0.81. If we maintained that the difference between the single (in)accuracy Brier scores is the numerical value of the degree to which Marc and Lucy disagree, we would have that the degree to which Marc and Lucy disagree varies depending on whether the target proposition is true or false, for the difference between 0.16 and 00.1 is lesser than the difference between 0.36 and 0.81. Yet, this would be an odd result: by defining disagreement in terms of the obtaining of a *counterfactual* relation between accuracy conditions, the Schematic Accuracy View preserves the idea that disagreement is a relation which obtains between subjects independently of who is right and who is wrong. That is to say, two subjects disagree independently of whose doxastic attitudes' accuracy conditions are actually fulfilled. Similarly the extent to which two subjects disagree should not depend on who's more likely to have gotten things right than the other. I submit that we respect this fact by taking the absolute value of the difference/square root of the Brier score to yield the degree to which two subjects disagree.

The foregoing observations give rise to the following instance of the Schematic Accuracy View:

> [Partial Accuracy View]
> A and B disagree$_p$ if and only if the accuracy conditions$_g$ of A's doxastic attitude$_p$ are such that, if they were fulfilled$_d$, this would *ipso facto* make B's doxastic attitude$_p$ inaccurate$_g$, or vice-versa.

3.3 The Relation Between Credal and Full Disagreement

We are now in a position to answer the guiding question of this paper: what is the relation between credal and full disagreement?

I will defend what I have dubbed the Kinship View of doxastic disagreement. As its name suggests, the Kinship View maintains that credal and full disagreement are related phenomena. However, it must be emphasised that the extent to which they relate to one another, their degree of kinship, as it were, varies depending on whether one subscribes to the Lockean Thesis or not. If one

does, full disagreements would form a subset of the set of all credal disagreements and would be accounted for by the Partial Accuracy View. So, if one subscribes to the Lockean Thesis, the reason why full and credal disagreement seem to be instances of the same phenomenon, viz. doxastic disagreement, is explained by reducing one variety, i.e. full disagreement, to the other, i.e. credal disagreement.

This much seems uncontroversial, even though it must be stressed that the Partial Accuracy View accomplishes the non-trivial task of providing a definition of credal disagreement. However, if one rejected the Lockean Thesis and adopted nonreductionism, how could one make sense of the appearance that credal and full disagreement are varieties of the same phenomenon?

If one is a nonreductionist, one should adopt the Full Accuracy View to account for full disagreement and the Partial Accuracy View to account for credal disagreement. These two views differ in two main respects: they define the notion of *accuracy* and the notion of *fulfilment of accuracy conditions* differently. However, even if gradational and full accuracy are two distinct properties, they can both be traced back to what I take to be the key concept to establishing the accuracy of both partial and full belief, that of *truth-directedness*.[24] In my view, this concept is instantiated by different properties depending on the kind of doxastic attitude, i.e. full or partial, we focus on. In the case of full belief, the concept is instantiated by the property of full truth (relative to the relevant circumstance of evaluation c_e); in the case of partial belief, it is instantiated by the property of approximation to the truth (always relative to the relevant circumstance of evaluation c_e).

Secondly, even if the fulfilment of full and partial attitudes' accuracy conditions should be spelled out in different ways (i.e. in a categorical way for full beliefs and in a graded way for partial beliefs), both the Full Accuracy View and the Partial Accuracy View require the instantiation of a counterfactual relation involving the fulfilment of attitudes' accuracy conditions in order for disagreement to arise.

So, since gradational and full accuracy are different ways of instantiating the *same* concept whereby we characterise the very idea of a doxastic attitude being accurate, and since the counterfactual relation required for disagreement has the same logical form in both cases, we can safely conclude that the Full Accuracy View and the Partial Accuracy View enable to preserve the apparent unity of the phenomenon of doxastic disagreement across its different manifestations.

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[24] Notice that I am not using here truth-directedness in the technical sense used in Joyce, 'A Nonpragmatic Vindication of Probabilism'.

Let us now turn to evaluate the Kinship View against the *desiderata*. The foregoing considerations show that the Kinship View makes room for enough flexibility so as to satisfy LOCKEAN NEUTRALITY. One can accept that credal and full disagreement are significantly related to one another independently of the truth of the Lockean Thesis. More specifically, an acceptance (or denial) of the Lockean Thesis would not establish whether credal and full disagreement are (or are not) related phenomena, but it would only establish the degree to which they are related.

Consider now CONTENT NEUTRALITY. I have elsewhere argued at length that the Full Accuracy View can be adopted irrespective of whether one takes propositions to be temporally neutral or specific, or whether one adopts a certain relativist or a certain contextualist framework.[25] The key contention of such a defence is that the notion of accuracy could be defined no matter how many and what kinds of coordinates are included in the circumstances of evaluation. I will not rehearse the arguments for this conclusion here, for the point that is of import is to show that The Partial Accuracy View is compatible with such an insight. To see why, let me point out that while, for ease of exposition, I have offered a measure of a credence's (in)accuracy by looking at the truth-value the relevant proposition would have relative to the actual world, nothing prevents us from calculating it by looking at the truth-value of the proposition relative to a worlds-times pair, or to a worlds-times-locations triple, and so on and so forth. This shows that since the Kinship View appeals to the Full Accuracy View and the Partial Accuracy View, and since these two views do not hide specific commitments about semantic content, the Kinship View manages to satisfy CONTENT NEUTRALITY.

Thirdly, let us assess the Kinship View against the disagreement-related data mentioned in section 2. First off, the no transworld disagreement data are correctly captured. We have seen how the Full Accuracy View captures (MOON). In a similar fashion, the Partial Accuracy View offers the intuitively correct verdict about (MOON-Cr). To illustrate. Since Jane's and June's attitudes are credences, we should establish their gradational accuracy. A scoring rule like Brier's enables us to measure gradational accuracy relative to possible worlds; since Jane's and June's attitudes are held in different worlds, it makes no sense to ask whether June's accuracy towards the proposition *that Mars has two moons* is more accurate than Jane's, or vice versa. To put it differently, Jane's attitude has a certain degree of closeness to the truth relative to *w*, whereas June's has a different degree of

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[25] See Belleri and Palmira, 'Towards a Unified Notion of Disagreement'.

closeness to the truth relative to another possible world $w*$. So, it makes no sense to ask whether June's attitude is closer to the truth than Jane's, for closeness to the truth is defined as closeness to the truth *at a possible world*. This means that the relation required for disagreement is not instantiated by the accuracy conditions of Jane's and June's attitudes. Therefore, the Partial Accuracy View delivers the correct verdict that, in (MOON-Cr), Jane and June do not disagree.

Secondly, I submit that the intuition that credal disagreement comes in degrees is preserved by including *in the very formulation of the disagreement relation* specified by the Partial Accuracy View the fact that credences' accuracy conditions can be more or less fulfilled since they can be more or less close to the truth. Thus, in (NOBEL) Masuka and Miyuki are more in disagreement than Marc and Lucy are in (RAIN-Cr) because the absolute value of the distance between the inaccuracy scores of Masuka's and Miyuki's credences is higher than the absolute value of the distance between the inaccuracy scores of Marc's and Lucy's credences.

Finally, consider the shaky intuitions data. In (HILLARY), Bill's and Chelsea's credences end up having different (in)accuracy scores: so, the disagreement relation is instantiated *to a certain degree*. As has emerged previously, this degree is measured by looking at the difference between the two inaccuracy measures of their respective doxastic attitudes. The question whether the numerical difference of their inaccuracy scores is enough to make *a real difference* and give rise to something like a *real* or *genuine* disagreement is, to some extent, a matter of stipulation which need to be settled independently of the present definition of disagreement. So, cases like (HILLARY) do not undermine the application of the Partial Accuracy View to credal disagreement. Rather, they require the fixation of a threshold, i.e. a value of the difference between the inaccuracy values of two attitudes, which should be met in order for something like a realy disagreement to arise. Different ways of fixing the threshold, i.e. either the value of the difference between the inaccuracy values of Bill's and Chelsea's attitudes is enough to count them as *really* disagreeing, or it is not, are compatible with this idea.

The discussion of the disagreement-related data pursued so far shows that the Kinship View satisfies EXTENSIONAL ADEQUACY.

4. Conclusion

I have argued for the view that doxastic disagreement, in both its credal and full varieties, is a phenomenon which occurs if and only if the accuracy conditions of the subjects' doxastic attitudes stand in a given counterfactual relation: if one's doxastic attitude's accuracy conditions were

fulfilled (or fulfilled to a certain degree), this would make *ipso facto* the other's doxastic attitude inaccurate (or inaccurate to a certain degree). This definition enables us to preserve the unity of the phenomenon of doxastic disagreement across its full and credal varieties.[26]