

# Suspending Belief in Credal Accounts

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## Abstract

Traditionally epistemologists have taken doxastic states to come in three varieties—belief, disbelief, and suspension. Recently many epistemologists have taken our doxastic condition to be usefully represented by credences—quantified degrees of belief. Moreover, some have thought that this new credal picture is sufficient to account for everything we want to explain with the old traditional picture. Therefore, belief, disbelief, and suspension must map onto the new picture somehow. In this paper I challenge that possibility. Approaching the question from the angle of suspension, I argue that all possible credal accounts face serious challenges. They either (i) falsify central claims that uphold the credal picture itself or (ii) do not permit suspension in cases where it is permissible or (iii) rule out the possibility of plainly possible confidence comparisons.

## 1 | INTRODUCTION

Rocks are not agnostics. Neither are people who have no concept of God. Why? Presumably because an agnostic must have some attitude toward the proposition that God exists.<sup>1</sup> I'll call this attitude *suspension*.<sup>2</sup> Suspension is of a kind with belief and disbelief, but in-between them. Belief, suspension, and disbelief together complete the traditional doxastic picture.

A new doxastic picture—the credal picture—is made up of credences, or quantified degrees of belief. This picture is compelling and fruitful in many ways. At one time I hoped it would solve mysteries that seemed intractable on the traditional picture. With

<sup>1</sup> Hence Ayer's (1952) assertion that along with theism and atheism "agnosticism also is ruled out" by his view. See also Oppy (2018) who distinguishes between *agnostics* that suspend and *innocents* that have never considered the question and therefore have no attitude toward the proposition that God exists.

<sup>2</sup> See Friedman (2013b) for argument that suspension is an attitude rather than the absence of an attitude.

others I thought that belief, suspension, and disbelief could be identified with or reduced to credences.<sup>3</sup>

Here I argue that they cannot. At least, the traditional attitudes cannot be identified with or reduced to credences without great cost. Unlike other contributions to this debate that focus largely on belief and credence, the arguments offered here emerge from sustained reflection on suspension. My thesis is that there are no good credal accounts of suspension—ones that cohere well with plausible assumptions about our doxastic condition. Since suspension is one part of the traditional doxastic picture, there are also no good credal accounts of the traditional doxastic picture.<sup>4</sup>

A credal account of the traditional picture, as I'm using the terms, would entail that an agent's traditional doxastic attitudes are a function of the agent's credences alone. This means that two agents with identical credences would also have identical traditional doxastic attitudes and that one agent's traditional attitudes could not change without a change in that agent's credences. My argument does not directly target more complicated accounts where credences are partial but not complete grounds of the traditional doxastic attitudes. Nevertheless, in the end I show that my argument does apply to the two more complicated credal views of suspension that have been proposed in the literature. Therefore, my conclusion that there are no good credal accounts supports either eliminating the traditional picture altogether, developing a novel partial-grounds credal view, or establishing the traditional picture as a fundamental doxastic domain.

The paper is divided into two major parts. The first part (section 2) focuses on problems for accounts that allow only precise credences; the second part (section 3) focuses on problems for accounts that also involve imprecise credences. What emerges in the end is a trilemma where every possible account faces a serious problem. Every account is either (i) *maximizing*—says all beliefs are credence 1—or (ii) *anti-maximizing*—says some beliefs are credences less than 1. Every anti-maximizing account is either (iia) *extreme*—says imprecise credences with endpoints of 0 and 1 are cases of suspension—or (iib) *regular*—says imprecise credences with endpoints of 0 and 1 are not cases of suspension. In the end we are in a position to understand a unique cost associated with each of the maximizer, the extreme anti-maximizer, and the regular anti-maximizer. The maximizer falsifies central claims that uphold the credal picture itself, the extreme anti-maximizer rules out the possibility of plainly possible confidence comparisons, and the regular anti-maximizer cannot permit suspension in cases where it is permissible.

## 2 | PRECISE AND MAXIMIZING CREDAL ACCOUNTS OF SUSPENSION

According to precise credal accounts, all credences are precise and some precise credence(s) are suspension. Which credences are suspension? Credal accounts of suspension standardly posit

<sup>3</sup> For example, Hájek (1998), Christensen (2004), and Sturgeon (2010, 2020), argue for some kind of identification of the traditional picture with the credal picture; Greco (2015) and Clarke (2013) argue that belief is credence 1.

<sup>4</sup> There are three positions on the relationship between the traditional doxastic attitudes and credences; pluralism, traditionalism, and credalism. The *pluralist* claims that both the traditional attitudes and credences are fundamental parts of our doxastic condition—neither can be reduced to or identified with the other. The *traditionalist* claims that only the traditional attitudes are fundamental while the *credalist* claims that credences are the only fundamental doxastic attitudes. See Buchak (2014), Ross and Schroder (2014), Weatherson (2016), and Jackson (2019) for a direct attack on credalism in defense of pluralism. See Harman (1986), Holton (2014), Easwaran (2016), Moon (2017) and Moon and Jackson (2020) for a defense of traditionalism. See Christensen (2004) for a defense of credalism and Titelbaum (2022) for an attack on traditionalism.

some interval within the unit interval  $[0, 1]$  that identifies the credences that are suspension—the suspension interval. The simplest credal account of suspension identifies suspension with the degenerate interval  $[0.5, 0.5]$ . Call this the Narrow Precise View.

**Narrow Precise View:** Suspension on  $p$  is a precise credence within the interval  $[0.5, 0.5]$ .

That is,  $S$  suspends on  $p$  just in case and in virtue of  $S$ 's  $cr(p) = 0.5$ . This suspension interval is too narrow. Take a large lottery case where there is one more winning ticket than there are losing tickets. When the objective chance is known, one's credence should always match the objective chance.<sup>5</sup> So one's credence should be above 0.5. But it is very plausible that one should suspend on whether her ticket is a winning ticket. Therefore the Narrow Precise View seems unsatisfactory.<sup>6</sup> The challenge then is to determine a more plausible suspension interval.

## 2.1 | The Disjunction/Conjunction Argument

The most sustained attack thus far on precise credal accounts is Friedman (2013a).<sup>7</sup> Friedman argues that precise credal accounts must make the suspension interval much wider, at least as wide as  $(0, 1)$ . Other philosophers working on suspension, such as McGrath (2021), Raleigh (2021), and Lord (2020), endorse her argument.<sup>8</sup> I'll rely on her argument here.

The rough and ready version of Friedman's argument is that suspension on propositions for which we have no relevant evidence is rationally permissible, and we have no relevant evidence for either the conjunction or the disjunction of those propositions for which we have no relevant evidence.<sup>9</sup> Therefore any satisfactory account of suspension will have to be consistent with the following condition.

**Disjunction/Conjunction Condition:** There are some cases such that it is rationally permissible to suspend on an arbitrary number of propositions and to suspend on their conjunction and to suspend on their disjunction.

The suspension interval must be wide enough to include the appropriate credences for the disjunction and the conjunction of any finite number of "no evidence" propositions. Because of the constraint of probabilistic coherence, the probability must rise for a disjunction and fall for a conjunction as more disjuncts and conjuncts are added. For every interval smaller than  $(0, 1)$  there is some number of propositions that it is permissible to suspend on, that probabilistic coherence will require the disjunction or conjunction to be outside the interval. But then that interval is too small because we already stipulated that it is permissible to suspend on the conjunction and dis-

<sup>5</sup> See section 2.3.1 for discussion of the Principal Principle.

<sup>6</sup> However, for a defense of views similar or complementary to the Narrow Precise View, see Hempel (1962), Swinburne (2001), and Hawthorne, Rothschild, and Spectre (2016).

<sup>7</sup> See Monton (1998) for a shorter critique of credal accounts of suspension.

<sup>8</sup> Rosa (2021), though short of a full endorsement, says "Friedman has made a good case."

<sup>9</sup> Here we must stipulate that the individual propositions that are conjoined and disjoined be *independent*. Two propositions are independent in the relevant sense when changing one's credence in one proposition does not rationally require changing one's credence in the other.

junction. Therefore the suspension interval must be at least  $(0, 1)$ .<sup>10</sup> We are left with the following account of suspension if we are to think in terms of precise credences:

**Broad Precise View:** Suspension on  $p$  is any precise credence that  $p$  within the interval  $(0, 1)$ . Credences of 0 and 1 are not cases of suspension.

Given Friedman's Disjunction/Conjunction argument, this is the best precise account of suspension. Friedman (2013a) also argues against the Broad Precise View, but she does this in a way that is not persuasive. Those that are not familiar with her argument may want to skip to section 2.3 where I argue against the Broad Precise View, identifying two ways in which the view is in tension with central tenets of a credal approach to epistemology.

## 2.2 | Excursus on Friedman's Infinite Partition Argument

Here I'll assume some familiarity with Friedman's argument and be brief in my critique since I have given an extended critique of her argument in del Rio (forthcoming).

Friedman argues that:

1. Credence 1 is sometimes required in the absence of evidence.
2. Suspension is always permitted in the absence of evidence.
3. Therefore, the Broad Precise View is false. Suspension cannot be just credences within the interval  $(0, 1)$ .

The idea is that if credence 1 is required, then credences between 0 and 1 cannot be permitted; according to the Broad Precise View credences between 0 and 1 and only credences between 0 and 1 are suspension. So if the Broad Precise View is correct and suspension is permitted, then credence 1 would be required and not required at the same time. Assuming the notion of requirement is univocal, we have a contradiction. So the Broad Precise View must be incorrect. There are two problems with this argument.

The first problem is that though premise 1 and premise 2 sound plausible taken individually (given a certain story supporting each), they are not jointly plausible. It is plausible that suspension is always permissible in the absence of evidence under the intuitive assumption that maximal confidence is never required in the absence of evidence. If Friedman persuades us that maximal confidence is sometimes required in the absence of evidence (premise 1), we should be very dubious of the claim that suspension is always permissible in the absence of evidence (premise 2). If that claim were also true, then it would be epistemically rational to suspend on  $p$  while being maximally confident that  $p$ . But it is plausibly incoherent (and perhaps impossible) to suspend on  $p$  while being maximally confident that  $p$ . The truth of premise 1 undermines premise 2.

The second problem with this argument is that multiple notions of epistemic rationality are in play, when a single notion is required for a valid argument. Friedman defends premise 1 by appeal to the Bayesian Superbaby's ur-priors. The Superbaby, who by definition has no evidence, must have credences of 0 for an uncountable number of contingent propositions about, for example, the

<sup>10</sup> Could context-sensitive thresholds help? Yes, but only if the context in which one considers the individual propositions is in principle a different context than the one in which one considers the conjunction and disjunction. See discussion below in section 3.2.3 Contextualist Variations.

length of a table  $T$  or the US President's credence that  $p$ . The partitions of possibilities here are uncountably infinite, which requires these 0s on the pain of probabilistic incoherence. The negations of those propositions require credence 1. These are merely structural requirements. This is crucial. Credence 1 is only required for some particular proposition, relative to a particular doxastic structure. There is nothing incoherent about assigning some positive credence less than 1 to any particular propositions in the uncountable partition, as long as other credences are adjusted so the sum of the uncountable partition's propositions never exceeds 1. It is not the absence of evidence cited in premise 1 that requires credences of 0 and 1. Credences of 0 and 1 are required whatever the evidence. Such requirements are structural requirements. But premise 2 is not plausibly read as a permission to suspend, whatever doxastic structure one might have in the absence of evidence. Rather than a structural permission, it is an evidential permission. The fact that suspension is always permissible is a claim about what attitudes the evidence does or doesn't rule out. In this case, the (lack of) evidence doesn't rule out suspension. One can justifiably suspend with this (lack of) evidence. That is, there is some coherent set of doxastic attitudes that is permitted by the evidence and includes suspension on the relevant propositions. That doesn't mean that suspension on those propositions will be included in every coherent set of doxastic attitudes that is permitted by the evidence. Suspension can be permissible on the evidence but impermissible given one's other attitudes. So, when the kind of normativity at play in premise 1 and premise 2 is disambiguated, these premises do not entail that the Broad Precise View is false. Credence 1 is required given a certain doxastic structure, but not required given the evidential state. Suspension (credence between 0 and 1) is permitted given the evidential state, but not permitted given some doxastic structures. The Broad Precise View can accommodate these claims and so this argument against the Broad Precise View is unsuccessful.

I will now provide a new argument against the Broad Precise View. It, jointly with the argument in 2.1, will accomplish what I take to be the aim of Friedman (2013a)—showing that there are problems for all the (non-contextualist) precise views of suspension. My argument accomplishes this by defending the broad claim that there are problems for all views (with precise or imprecise credences) that hold belief to be credence 1. Then, starting in section 3, I will go further. I will demonstrate that there are problems for all the remaining (non-contextualist) *imprecise* credal accounts of suspension and show that these problems are not avoided by the *contextualist* credal accounts that are defended in the literature.

### 2.3 | The Price of Maximizing Views

Going forward, I'll assume:

**Exclusivity:** If  $S$ 's  $cr(p)$  is suspension then  $S$ 's  $cr(p)$  is not belief.

It is never the case that one believes in virtue of having a credence that is suspension. Any particular credence will be at most one of the traditional attitudes. Why is this important? Because the Broad Precise View of suspension only leaves one point available for belief. Assuming belief is also to be found in the interval  $[0,1]$  and not to be found at 0, belief that  $p$  is credence 1. I'm assuming below then that the Broad Precise View entails that belief that  $p$  is  $cr(p) = 1$ . As such, the Broad Precise View is a maximizing view—belief is maximal credence.

A view is a **maximizing view** just in case it requires belief that  $p$  to be credence 1 that  $p$ .

I will point out some known costs for the Broad Precise View and some costs that as far as I'm aware have yet to be pointed out; namely the view conflicts with the Principal Principle and the basic observations that motivate talk of credences to begin with. These problems plague the Broad Precise View in virtue of its maximizing nature. That is, these are problems for all maximizing views.

First the more evident costs. It doesn't seem to be the case that whenever I'm uncertain that  $p$ , I suspend on  $p$ , or that whenever I believe that  $p$ , I'm certain that  $p$ . But maximizing views require this. Defenders of maximizing views of belief claim that context sensitivity alleviates the worry.<sup>11</sup> For example, Greco (2015) claims that he normally has credence 1 that it is the time his computer screen indicates it is. But if he were asked to bet his life on the matter for a penny, that would be a context in which he does not have credence 1 that it is the time his computer screen indicates it is. In that context Greco's credence drops below 1 so that he suspends.<sup>12</sup> This contextualist maneuver is supposed to help with the criticism that we believe things without certainty. We normally believe those things (have credence 1) but in the context in which we lack certainty we actually do not believe. The problem is that I do not seem to suspend on where my car is parked, even when one raises the possibility that it could have been stolen. Nor suspend on what time it is, even when you bet me my life for a penny. I believe it is 5:26pm while I'm unwilling to bet my life on it.

Another evident cost is that the maximizing views conflict with orthodox Bayesianism. Orthodox Bayesianism requires updating by conditionalization. Updating by conditionalization does not allow a credence of 1 to ever drop below 1. Once you are certain, you cannot rationally become uncertain. Since we can rationally move from belief to suspension (or disbelief), maximizing views require rejecting orthodox Bayesianism. There is some internal tension here because Bayesianism is presumably part of the credal picture that many find attractive.

Those difficulties are well-known, but there are also other challenges. I will now explain two less evident but no less serious costs associated with known objective chances and the standard motivations for adopting credences. The standard views on these topics are not in accord with maximizing views.

### 2.3.1 | Denying the Principal Principle

Any account of subjective probabilities—credences—must have something to say about the relationship between subjective probabilities and known objective probabilities. Very roughly, David Lewis's (1980) Principal Principle states that one's credence should match what one knows of the objective chances. Though people differ on how to correctly formulate the principle, the Principal Principle is widely endorsed.

<sup>11</sup> See Clarke (2013) and Greco (2015).

<sup>12</sup> The notion of the credence dropping isn't quite right. Rather than a single credence that  $p$  moving up and down from context to context, Greco argues that he *believes* (his  $cr(p) = 1$ ) that his computer accurately indicates the time [for the purposes of knowing when to go to lunch] even while he simultaneously *doesn't believe* (his  $cr(p) < 1$ ) that it accurately indicates the time [for the purposes of winning a penny on his life]. Each doxastic attitude is purpose-relative. This doxastic fragmentation does help with the typical problem cases, but only at the cost of belief *simpliciter*, something quite plausibly essential to the traditional doxastic picture. Thanks to Daniel Greco for discussion here.

A maximizing view leads to rejection of the Principal Principle. Here's why. It is permissible to believe lots of things that we know have an objective chance of less than 1. First I'll give a preliminary argument that assumes it is permissible to believe on statistical grounds (since I think it is). Then I'll give a further argument that does not depend on that assumption.

Consider a fair million ticket raffle. We know of a million-ticket raffle that the probability is less than 1 that ticket #635,782 is a loser. It is 0.999999. But it seems rationally permissible to believe ticket #635,782 is a loser. The Principal Principle does not permit taking a credence of 1 when you know the objective chance is less than 1. So the Principal Principle conflicts with the idea that belief (as understood by the maximizer) is rationally permissible in this case. The Principal Principle demands a credence of 0.999999, and that's not belief!

Some will see no problem here for the maximizer. They think I haven't given an example where belief is rationally permissible because they think it is not rationally permissible to believe on merely statistical grounds. That is, they think it is never permissible to conclude that some  $Y$  is a  $Z$  on the grounds that  $X\%$  of  $Y$ 's are  $Z$ 's. I can't believe that my lottery ticket is a loser, for example, on the grounds that 99.9999% of these lottery tickets are losers. So no conflict between the Principal Principle and maximizing views.

I think that is a mistake. With Turri (2011), I think "manifestly statistical grounds can suffice for knowledge" and therefore also justify beliefs. I won't defend that claim here, but it is worth noting that the "no rational beliefs on statistical grounds" view seems to grant that it is possible to form an irrational belief that ticket #635,782 is a loser while having the correct credence of 0.999999. The debate about these beliefs is not typically seen to be a debate about which credence one should have. The credence is a given and the question is whether belief ought to be permitted given those kinds of evidential grounds. That idea that the normative profile of one's credence that  $p$  could differ from the normative profile of one's traditional attitude towards  $p$  is inconsistent with the view that belief just is credence 1.

Nevertheless, even if merely statistical grounds cannot justify belief, maximizing views still run into trouble with the Principal Principle. That's because there is a set of propositions that we justifiedly believe (and that therefore couldn't be based on merely statistical grounds if merely statistical grounds cannot justify belief), but that also have an objective chance of less than 1. Namely, our beliefs in everyday future events.

According to quantum mechanics (QM), the very laws of nature are probabilistic. The objective chance of everyday future events is less than 1.<sup>13</sup> Therefore, by the Principal Principle, my credence for everyday future events should be less than 1. Given the controversial nature of most claims in QM, one might be dismissive of these probabilistic claims. However, since some (and arguably all) formulations of QM do have this consequence, I should at least have *some positive credence* that the chance of my computer staying on my desk in the next second is less than 1 (some credence that there is some chance of it falling through the desk). This is enough to create the problem for maximizing views.

<sup>13</sup> The matter is, in fact, complicated and not completely clear. In discussions, Tim Maudlin affirmed the unqualified statement that the objective chance of everyday future events is less than 1 according to QM; Hans Halvorson affirmed that QM makes it "epistemically more likely" that the objective chance of every future event is less than 1; Sean Carroll, noting the difficulty in defining 'objective chance,' affirmed that on some formulations of QM the "future is only probabilistically entailed" by the present, rather than "entirely entailed"; David Wallace affirmed that the objective chance of everyday future events is less than 1 on several interpretations of QM, including dynamical-collapse interpretations and, in his view, the Everett interpretation.

According to the Principal Principle, it is irrational to have *any positive credence* that the objective chance of  $p$  is less than 1 and to have a credence of 1 that  $p$ .<sup>14</sup> On maximizing views then, it would be irrational to have *any positive credence* that the objective chance of  $p$  is less than 1 and to believe that  $p$ . Since it is rational to have some positive credence that the objective chance of future events is less than 1 and rational to believe that those events will occur, a maximizing view and the Principal Principle cannot both be correct.

So maximizing views require giving up the idea that we should match our credences to known objective chances. This creates a kind of internal inconsistency. The credal account is one where the whole of our doxastic condition is supposed to be represented by precise subjective probabilities but we must not conform those probabilities to known objective probabilities in many instances. This seems a major cost for a credal account of suspension.

### 2.3.2 | Denying Credal Motivations

Another internal inconsistency arises from the motivations for adopting a credal view to begin with. What's wrong with the traditional way of doing things? Why not just have belief, suspension, and disbelief? Typical reasons offered to justify adding credences to the traditional picture (or replacing the traditional picture altogether with a credal picture) include the following:<sup>15</sup>

**Credal Motivation 1:** We are more confident in some beliefs (e.g.,  $p \vee \text{not-}p$ ) than we are in some other beliefs (e.g.,  $p$ ).

**Credal Motivation 2:** We can believe  $p$  at  $t_1$  and respond to new evidence for  $p$  at  $t_2$  by becoming more confident that  $p$ .

**Credal Motivation 3:** We can believe  $p$  at  $t_1$  and respond to mild new evidence against  $p$  at  $t_2$  by becoming mildly less confident that  $p$  while continuing to believe that  $p$  at  $t_2$ .

**Credal Motivation 4:** We can rationally believe each of a long string of conjuncts and also rationally believe in the negation of the conjunction.<sup>16</sup>

The traditional doxastic picture is supposed to struggle to make sense of these observations and therefore justify a shift to credences. The problem for maximizing views is that they don't fare any better than the traditional account in dealing with these considerations, at least not in any straightforward manner. On maximizing views, one cannot be more confident in some beliefs than we are in some other beliefs. One cannot believe  $p$  at  $t_1$  and respond to new evidence for  $p$  at  $t_2$  by becoming more confident that  $p$ . One cannot believe  $p$  at  $t_1$  and respond to mild new evidence against  $p$  at  $t_2$  by becoming less confident that  $p$  while continuing to believe that  $p$  at  $t_2$ . One cannot rationally believe of each raffle ticket that it is a loser and rationally believe some

<sup>14</sup> See Titelbaum (2022), section 5.2.1.

<sup>15</sup> These considerations for adopting credences are appealed to in Christensen (2004) and Titelbaum (2022).

<sup>16</sup> See Kyburg (1961) and Makinson (1965) for the classic presentations of this puzzle. See Hawthorne and Bovens (1999) for a credal treatment. See Hawthorne (2004), Weintraub (2001), and Easwaran (2016) for treatments of this puzzle that do not rely on credences.

ticket is a winner, or rationally believe each claim in one's book, but believe one has made at least one mistake. So maximizing views require rejecting the Credal Motivations—the very claims that provided the motivation for embracing credences to begin with.<sup>17</sup>

In summary, we have seen that any precise credal account of suspension faces serious challenges. The Narrow Precise View has an unsatisfactorily small window—just 0.5—for suspension. Views with wider thresholds seem more promising, but Friedman's Disjunction/Conjunction argument rules them all out, except the Broad Precise View with thresholds wide-open from 0 to 1, entailing a maximizing view of belief. In addition to the initial implausibility of maximizing views, they also require denying the Principal Principle and the Credal Motivations. This means we have seen problems for every kind of precise credal account and for any kind of maximizing account. The rest of the paper will show that there are problems for all the imprecise *anti-maximizing* views—views that involve imprecise credences and that hold that some beliefs are credences less than 1.<sup>18</sup>

### 3 | IMPRECISE AND ANTI-MAXIMIZING CREDAL ACCOUNTS OF SUSPENSION

Many have argued that we need imprecise credences to model human doxastic attitudes and rationality.<sup>19</sup> An imprecise credence is a credence spread across multiple points of the unit interval. Since precise credal accounts face serious hurdles perhaps imprecise credal accounts will fare better.

For a moment let's think about a view according to which all credences are precise. On such a view, if one is rational, all of one's (precise) credences will form a probability function—that is, they will relate to each other in such a way that they conform to the probability axioms. On this picture, one's doxastic condition is represented by a single probability function or credence function.

One may add imprecise credences to this picture by adding more credence functions that differ one function to the next. An agent's doxastic condition is represented by a set of credence functions—a representor—rather than a single function. We may consider this *the standard view* among proponents of imprecise credences.<sup>20</sup> Whatever all of the functions in the representor agree on will be true of the agent, and where they disagree, this will be represented by an imprecise credence. So, an agent S will have a precise credence of 0.5 that  $p$  just in case every function in S's

<sup>17</sup> Perhaps contextualist maneuvers could help maximizers save (some of) Credal Motivations 1-4, but we would still have lost the motivation for a move to credences. Presumably the same contextualist maneuvers could have been applied to belief, to the same end.

<sup>18</sup> One potential view of belief that I do not address is the view that belief is credence 1 or an imprecise credence with an upper endpoint of 1. This view is not well formed since it doesn't give a threshold for the lower endpoint of the imprecise credence. Surely the imprecise credence  $[0, 1]$  cannot be belief, for considerations of symmetry would require that it is also disbelief. Nor is some imprecise credence with a slightly raised lower endpoint an attractive candidate. All the views of this alternative maximizing kind are also susceptible to a number of the problems I raised for the maximizing view. Going forward, therefore, I will assume that the view of belief we are left with is anti-maximizing in the following sense: there are some beliefs which are neither a precise credence 1 nor an imprecise credence with an upper endpoint of 1.

<sup>19</sup> Levi (1974, 1980, 1985), Jeffrey (1983), van Fraassen (1989), Walley (1991), Kaplan (1996), Joyce (2005), and Schoenfield (2012). Others like White (2010) and Elga (2010) argue that credences must be precise.

<sup>20</sup> Early proponents of this model include Levi (1980), Jeffrey (1983), and van Fraassen (1990). Kyburg (1983) represents a different approach.

representor assigns 0.5 to  $p$ .  $S$  will have an imprecise credence of  $[0.25, 0.75]$  that  $q$  just in case for every real number  $r$  in the interval  $[0.25, 0.75]$  some function in  $S$ 's representor assigns  $r$  to  $q$ , and no function assigns a real number to  $q$  that is outside the interval  $[0.25, 0.75]$ . I'll assume the standard view of imprecise credences moving forward.

My argument proceeds by way of a dilemma. Recall that we are only dealing with anti-maximizing views at this point. Since we've added imprecise credences to the mix, every view will have to say whether imprecise credences with 0 and/or 1 as an endpoint are cases of suspension. As I'm using the term, both  $[0.5, 1]$  and  $(0.5, 1)$  have 1 as an endpoint. I'll call these imprecise credences that have 0 and/or 1 as endpoints, **extreme** imprecise credences. Below I'll also refer to **regular** imprecise credences, which are those that do not have an extreme endpoint. Section 3.1 shows that anti-maximizing views denying that extreme imprecise credences are cases of suspension cannot satisfy the Disjunction/Conjunction Condition we saw above. Section 3.2 shows that anti-maximizing views affirming that extreme imprecise credences are cases of suspension face two problems with confidence comparisons.

### 3.1 | The Disjunction/Conjunction Argument and Regular Anti-Maximizing Views

In section 2 we saw that Friedman gives an argument for what I'm calling the Disjunction/Conjunction Condition. Recall that it says,

**Disjunction/Conjunction Condition:** There are some cases such that it is rationally permissible to suspend on an arbitrary number of propositions and to suspend on their conjunction and to suspend on their disjunction.

While Friedma used this condition to rule out views of suspension that require precise credences, we can develop an argument with this condition that has a much broader scope. In particular we can rule out any view that seeks to satisfy the Disjunction/Conjunction Condition with imprecise credences but also claims that those credences must be regular. In other words, the Disjunction/Conjunction Condition requires an account of suspension where imprecise credences with extreme endpoints are cases of suspension. The argument cuts down regular anti-maximizing views by attacking the regularity constraint on imprecise credences that are suspension.

Let me provide a little motivation for the Disjunction/Conjunction Condition before extending it. Friedman relies on a norm concerning the absence of evidence.

**Absence of Evidence Norm:** In the absence of evidence for or against an ordinary contingent proposition  $p$ , it is epistemically permissible to suspend judgment about  $p$ .

Rather than defend the Disjunction/Conjunction Condition by appealing to that norm, I will appeal to a case that I think clearly exemplifies the various permissible suspensions.

**Mystery Urn:** There is an urn. All you know about this urn is that it contains at least one marble, that it contains nothing that is not a marble, and that each marble

it contains is either blue or red. You have no idea how its contents were selected nor how marbles are drawn from the urn.

Mystery Urn contains then an arbitrary number of marbles greater than zero.

Now think about the proposition ALL BLUE.

**ALL BLUE:** All the marbles in Mystery Urn are blue.

I take it as a datum that it is permissible to suspend on ALL BLUE. The same goes for ALL RED.

**ALL RED:** All the marbles in Mystery Urn are red.

It is just as obvious to me that suspension is permissible on SOME BLUE and SOME RED.

**SOME BLUE:** Some of the marbles in Mystery Urn are blue.

**SOME RED:** Some of the marbles in Mystery Urn are red.

Indeed, this follows from the permissibility of suspension on ALL BLUE and ALL RED. Notice that the permissibility of suspension is closed under negation. If it is epistemically permissible to suspend on ALL RED then it is epistemically permissible to suspend on NOT(ALL RED). In the case described NOT(ALL RED) is logically equivalent to SOME BLUE which means it is permissible to suspend on SOME BLUE. By parity of reasoning we get that it is permissible to suspend on SOME RED.

Finally, I think it is obvious that this situation also permits suspension on the  $n$ th marble being blue/red, for any  $n$ .

**$n$ th BLUE:** The  $n$ th marble will be blue.

**$n$ th RED:** The  $n$ th marble will be red.

This is true for an arbitrary number of marbles.

ALL BLUE and ALL RED are logically equivalent to the *conjunction* of the claims about individual marbles being blue or being red. SOME BLUE and SOME RED are logically equivalent to the *disjunction* of the claims about individual marbles being blue or being red. And  $n$ th BLUE and  $n$ th RED represent the atomic propositions being conjoined and disjoined. Therefore I think we have an intuitive example where it is rationally permissible to suspend on an arbitrary number of propositions, to suspend on their conjunction, and to suspend on their disjunction.

How does all this relate to credal accounts of suspension? Essentially we ask ourselves what credences would be assigned to the various propositions. Any such credences would have to count as cases of suspension in a credal account of suspension. In section 2.1 we assumed that there was some case like this where each atomic proposition was independent. Independence is relative to an agent's credence function. Two propositions  $p$  and  $q$  are independent when an agent's credence function has the following feature:  $cr(p) = cr(p|q)$ . In this case, no matter what middling credence a function assigns to the atomic propositions, because there are an arbitrary number of them, the probability of the conjunction will be arbitrarily low and the probability of the disjunction will be arbitrarily high. So, a precise credal account has to count arbitrarily low

and arbitrarily high credences as cases of suspension and therefore entails a maximizing view of belief.

Arguments against maximizing views, however, should lead us to look for another way of satisfying the Disjunction/Conjunction Condition. Enter imprecise credences. If we assign imprecise credences to the conjunction and disjunction and count those as cases of suspension, we satisfy the Disjunction/Conjunction Condition without entailing the maximizing view of belief.

What will these imprecise credences have to be like? In order for them to satisfy the Disjunction/Conjunction Condition, they will have to be extreme imprecise credences. That is, the lower endpoint of the imprecise credence for the conjunction will have to be 0 and the upper endpoint for the imprecise credence in the disjunction will have to be 1. This does not mean that some function in the agent's representor must assign 0 to the conjunction and 1 to the disjunction, for the relevant endpoint in the interval of the imprecise credence could be open, like  $(0, 0.5]$ —every real number greater than 0 up to and including 0.5 is assigned to the conjunction by some function in the agent's representor and no number greater than 0.5 is assigned to the conjunction in any function in the agent's representor. The crucial point is that an extreme imprecise credence is necessary to allow for a finite but arbitrary number of atomic propositions.

If the imprecise credences were regular (non-extreme) imprecise credences, then the imprecise credence assigned to the conjunction in the Disjunction/Conjunction Condition could be represented by  $[x, y]$  where  $0 < x < y < 1$ . In that case, no function in the agent's representor could assign the conjunction a credence lower than  $x$ . But then there would not be an arbitrary number of atomic propositions that could be conjoined. Assuming each atomic proposition is assigned a uniform credence of  $z$ , the lower endpoint  $x$  would determine a set number  $n$  of atomic propositions that could be conjoined.<sup>21</sup> These variables are related in the following way:  $n = \log(x)/\log(z)$ . So, say  $x = 0.0001$ . Further, assume that a function assigns each of the conjuncts a credence of  $0.5 = z$ .<sup>22</sup> Then  $n = \log(0.0001)/\log(0.5)$ . Rounding down to an integer,  $n = 13$  atomic propositions. The agent's representor could not have functions that coherently assign credences of 0.5 to an arbitrary number of atomic propositions; it couldn't even have functions that assign it to 14 atomic propositions. Since it is possible to coherently suspend on an arbitrary number of propositions and on their conjunction—the imprecise credences assigned to the conjunction cannot be regular.

Put another way, for any regular interval  $[x, y]$  where  $0 < x < y < 1$ , there is some possible number of marbles in the Mystery Urn such that a function assigning 0.5 to each atomic proposition will require a credence in the conjunction that is lower than  $x$  and a credence in the disjunction that is higher than  $y$ . Since the resulting imprecise credence that contains that function would, according to our Mystery Urn considerations, be a permissible case of suspension, no regular lower endpoint is low enough. That is, the additional values in the interval  $(0, x)$  will be assigned to the conjunction by some functions in the agent's representor, and the additional values in the interval  $(y, 1)$  will be assigned to the disjunction by some functions in the agent's representor. And

<sup>21</sup> Though it is not necessary that the credences assigned to the atomic propositions are uniform, that makes the problem easiest to see and makes the most sense for the Disjunction/Conjunction cases at hand. One has no more (and no less) reason to think the  $n$ th marble will be red than they do to think the  $n$ th + 1 marble will be red. As long as some functions may permissibly assign a uniform credence to the atomic propositions in the Disjunction/Conjunction condition, then the problem persists.

<sup>22</sup> A credence of 0.5 seems to be as good as any credence one could assign in the case at hand, but any non-extreme uniform assignment will suffice.

if that's the case, then the imprecise credences assigned to the conjunction and the disjunction will be extreme. Finally, if we satisfy the Disjunction/Conjunction condition with extreme imprecise credences, then extreme imprecise credences must count as cases of suspension.

Here is a worry: everything I just said assumes probabilistic independence among the atomic propositions. That's not quite right. Certain dependence relations would not undermine my fundamental point, but the point is easiest to see if the relations are independent. For then the conjunction is calculated very simply by merely multiplying the numbers assigned to each atomic proposition. It should be clear that the more numbers between 0 and 1 that are multiplied together, the closer the product gets to 0. Though the calculation is not as straightforward, the disjunction also approaches 1 the more independent disjuncts that are in play (think of how the likelihood that some string of coin flips produces heads at least once is ever increasing with each additional coin flip that is added to the string).

The worry is that our Mystery Urn case—the case where we can clearly see that suspension is required for the relevant atomic and complex propositions—doesn't include any information about the dependence relations between the atomic propositions. If it doesn't, would the case actually require extreme imprecise credences? Without knowledge or even any evidence about the dependence relations, I suggest that the agent's representor should have some functions where the propositions are dependent and other functions where they are independent. Remember that dependence relations are relative to specific credence functions. So the atomic propositions can be independent for just some functions in the agent's representor. But if the atomic propositions are independent for some functions, then the worry that the representor would not include functions that make for an extreme imprecise credence is misplaced.

The upshot of this section is that if an imprecise view is going to avoid the problems posed for precise views in section 2, then it must count extreme imprecise credences as cases of suspension and must assign those credences to the disjunction and conjunction of the Disjunction/Conjunction Condition. Furthermore, the imprecise view must allow there to be cases of belief that are less than credence 1. In my terminology, it must be an extreme anti-maximizing view. This all sounds pretty good. These seem like plausible things to say about belief and suspension. Unfortunately, extreme anti-maximizing views stand in conflict with the possibility of plausible confidence comparisons.

## 3.2 | Confidence Comparisons and Extreme Anti-Maximizing Views

Having certain pairs of traditional doxastic attitudes seems compatible with being more confident in one than the other. Specifically, this is the case when (i) one suspended proposition is logically weaker than another suspended proposition and (ii) one proposition is suspended while the other is believed. Certain cases of (i) and (ii) are not possible on extreme anti-maximizing views of suspension. But these sets of doxastic attitudes and confidence comparisons are intuitively possible (and plausibly rational!).

### 3.2.1 | Confidence Inequalities between Extreme Cases of Suspension

One consequence of imprecise credal accounts of suspension is that suspension can come in greater or lesser degrees of fullness. If I'm told that the chance of rain is 60% or higher, I might

suspend on whether it will rain by having an imprecise credence over the interval  $[0.6, 1]$ .<sup>23</sup> This state is a partial degree of suspension since I have ruled out all the possibilities where the chance of rain is less than 60%. Knowing that the chances are not below 60% is not the kind of case that produces full suspension. Full suspension might be described as the attitude of having no clue. This is the kind of suspension warranted by the complete absence of evidence. If one really has no idea whether the Mystery Urn is full of blue marbles, we can assume they would have the imprecise credence ranging over the whole interval  $[0, 1]$ . This is indeed the view defended by major proponents of imprecise credences, including Kaplan (1983, 1996), Walley (1991), and Joyce (2005). Kaplan (1983) says “when you have no evidence whatsoever pertaining to the truth or falsehood of a hypothesis, you should rule out no confidence [(no part of the interval)] for that hypothesis.” Let’s assume for the sake of argument then that the extreme imprecise credence  $[0, 1]$  is the fullest case of suspension. I’ll call this the Whole Interval View of suspension.

**Whole Interval View:** The imprecise credence spread across the whole interval  $[0, 1]$  is the fullest possible case of suspension.

To see the confidence inequality challenge, we need two propositions one of which is logically weaker than the other and on both of which you fully suspend. ALL BLUE and SOME BLUE may be good examples, but we can get there without appeal to that case. Think about two probabilistically independent propositions that you fully suspend on. Pick any two that satisfy the conditions of independence and full suspension. I’m assuming that some two propositions do satisfy the conditions. I’ll refer to those two propositions as FS1 and FS2.

Given that you fully suspend on FS1 and FS2, then  $cr(FS1) = [0, 1]$  and  $cr(FS2) = [0, 1]$ . What should your credence be in CON:  $(FS1 \wedge FS2)$ ?

**CON:**  $(FS1 \wedge FS2)$

Presumably full suspension,  $[0, 1]$ . You also have no clue whether  $(FS1 \wedge FS2)$ . And what should your credence be in DIS:  $(FS1 \vee FS2)$ ?

**DIS:**  $(FS1 \vee FS2)$

Presumably full suspension,  $[0, 1]$ . You also have no clue whether  $(FS1 \vee FS2)$ . The key point here is that it is possible to simultaneously fully suspend on the conjunction and fully suspend on the disjunction of some two propositions.

Furthermore, notice that because DIS is logically weaker than CON, it seems at the same time rationally permissible to be more confident that DIS than that CON. If I were forced to bet on either DIS or CON, the choice would be obvious, despite the fact that I fully suspend on each. Though I have no idea whether CON or NOT(CON) are true, I do know that if CON then DIS. But DIS may be true while CON false. So, it is rational to be more confident in DIS.<sup>24</sup>

<sup>23</sup> This assumes that the threshold for belief is not between  $[0, 0.6]$ . If it were then according to some views, this imprecise credence would be belief.

<sup>24</sup> Schoenfield (2012) argues for a similar point. In her case we suppose that there is little to no evidence for the existence of any four legged creatures. She says “the fully rational agent will, I think, be more confident in the proposition that there are at least seventeen four legged creatures than in the proposition that there are at least seventeen elephants.”

From these observations I conclude that it is possible to have a confidence inequality between two cases of full suspension. Call this the Unequal Confidence Possibility.

**Unequal Confidence Possibility:** Full suspension on  $p$  and full suspension on  $q$  is compatible with greater confidence that  $p$  than that  $q$ .

Now we can see the problem for extreme imprecise views. Being more confident in one proposition than in another proposition presumably has to be represented by one's credence function. This is what credences are meant to represent. Assume I fully suspend on CON and on DIS while being more confident that DIS than that CON. Since I have an unequal confidence in CON and DIS, my credence in CON and my credence in DIS must be unequal. Since full suspension is  $[0, 1]$ , and I fully suspend on each of CON and DIS, then my credence in CON and my credence in DIS must both equal  $[0, 1]$ . So, the extreme imprecise view generates a contradiction. Namely, my credences in CON and DIS are both equal and unequal.

There are three claims the proponent of an extreme imprecise view might reject.

**Whole Interval View:** The imprecise credence spread across the whole interval  $[0, 1]$  is the fullest possible case of suspension—full suspension.

**Unequal Confidence Possibility:** Full suspension on  $p$  and full suspension on  $q$  is compatible with greater confidence that  $p$  than that  $q$ .

**Interval Comparison Rule:** If  $S$  assigns the credence interval  $[x, y]$  to  $p$  and  $[x, y]$  to  $q$ , then  $S$  is not more confident that  $p$  than that  $q$ .

Extreme imprecise views do not allow for all of these to be true.

Recall that the standard view among proponents of imprecise credences is that one's doxastic condition is represented by a set of probability functions—one's representor. Whatever all of the functions in the representor agree on will be true of the agent. The standard view seems to provide the resources to account for confidence inequalities between these cases of suspension. If every individual function assigns a higher credence to  $p$  than to  $q$ , then even if  $S$ 's imprecise credence in  $p$  and imprecise credence in  $q$  are represented by the same interval,  $S$  is more confident in  $p$  than in  $q$ .<sup>25</sup> Call this the Greater-Than Comparison Rule.

**Greater-Than Comparison Rule:** Every function in  $S$ 's representor assigns a greater probability to  $p$  than to  $q$ , iff  $S$  is more confident that  $p$  than that  $q$ .

One might think that if the Greater-Than Comparison Rule is correct then the Interval Comparison Rule is incorrect, but that is not so. That isn't the case because the Interval Comparison Rule is stated in terms of *closed* intervals and there is no way for every function in  $S$ 's representor to assign a higher probability to  $p$  than to  $q$  if  $p$  and  $q$  are both assigned the same closed interval. Say an agent  $S$  has the same imprecise credence  $[x, y]$  in  $p$  and in  $q$ . There is no way for every function to assign a higher probability to  $p$  than to  $q$  since some function will have to assign  $x$  to  $p$  and no function can assign a number less than  $x$  to  $q$ . In the case of CON and DIS, given that

<sup>25</sup> See Joyce (2010).

full suspension is the closed interval  $[0, 1]$ , some function must assign 0 to DIS and that function cannot assign a lower probability to CON. Therefore, the Greater-Than Comparison Rule is insufficient to solve the problem.

The proponent of an extreme imprecise view that grants the Unequal Confidence Possibility has two options. The first option is to reject the Whole Interval View. As we saw above, this view is grounded in the standard way of thinking about the relationship between evidence and probability assignments. Again Kaplan (1983) says “when you have no evidence whatsoever pertaining to the truth or falsehood of a hypothesis, you should rule out no confidence [(no part of the interval)] for that hypothesis.” The proponent of an extreme imprecise view could claim that full suspension must be represented by the *open* interval  $(0, 1)$ , ruling out 0 and 1.

**Open Interval View:** The imprecise credence spread across the open interval  $(0, 1)$  is the fullest possible case of suspension.

This would allow for every function in S’s representor to assign a higher probability to DIS than it assigns to CON. This is the first option.

The second option is to retain the Whole Interval View but reject the Interval Comparison Rule. This would require some addition to the Greater-Than Comparison Rule. Rather than requiring that *every* function in S’s representor assigns a higher probability to  $p$  than to  $q$ , as is standard amongst proponents of imprecise credences, we might require that just *some* function in S’s representor assigns a higher probability to  $p$  than to  $q$ , and no function assigns a higher probability to  $q$  than to  $p$ . This allows for the possibility of some functions assigning equal probability to each of  $p$  and  $q$ .

**Greater-than/Equal-to Comparison Rule:** Some function in S’s representor assigns a greater probability to  $p$  than to  $q$ , and no function in S’s representor assigns a greater probability to  $q$  than to  $p$ , iff S is more confident that  $p$  than that  $q$ .

This could explain the confidence inequality between DIS and CON, since a representor could satisfy the relevant conditions even with closed  $[0, 1]$  intervals assigned to each proposition. The functions that caused trouble on the former comparison rule were the function(s) that assign 0 to DIS and the function(s) that assign 1 to CON. But as long as each of these functions assign the same number to DIS and CON, then no function in S’s representor need assign a higher probability to CON than to DIS, and the rest of the functions could assign a higher probability to DIS than to CON, thereby satisfying the conditions for S’s being more confident that DIS than that CON.

The price then for extreme imprecise views of suspension is denying the Unequal Confidence Possibility or endorsing either the Open Interval View or the Greater-than/Equal-to Comparison Rule. But that’s not all! Next, I will raise a challenge for which denying the Unequal Confidence Possibility and endorsing both the Open Interval View and the Greater-than/Equal-to Comparison Rule is of no help.

### 3.2.2 | Confidence Inequalities between Extreme Suspension and Belief $< 1$

It is possible to be more confident that  $p$  than that  $q$ , where one suspends on  $q$  but believes  $p$ . Indeed, this seems to be the case for every comparison between a belief and a suspension.

If I believe  $p$  and I suspend on  $q$ , then I'm more confident that  $p$  than that  $q$ . Call this Rough Confidence Inequality.

**Rough Confidence Inequality:** If  $S$  believes that  $p$  and suspends on  $q$ , then  $S$  is more confident that  $p$  than that  $q$ .

I endorse Rough Confidence Inequality on its intuitive grounds and think it is fundamental to the traditional doxastic picture. Some may think they have principled reasons to reject Rough Confidence Inequality. I explore and respond to that worry in the footnote below.<sup>26</sup>

Now, if either credences of  $[0, 1]$  or credences of  $(0, 1)$  are cases of suspension and some cases of belief are credences that are less than 1—as extreme anti-maximizing views claim—then Rough Confidence Inequality is false.<sup>27</sup>

Assume that there are some beliefs that are not credence 1. More carefully, assume that for some belief that  $p$  there is some point  $x$  in the interval  $[0, 1]$  such that  $x > cr(p)$  and  $x < 1$ . It matters not whether  $cr(p)$  is precise or imprecise. According to the Whole Interval View,  $[0, 1]$  is a possible case of suspension. Take this case. Say that  $S$  fully suspends on  $q$ . So  $S$ 's belief that  $p$  is a credence less than  $x$  which is less than 1 and  $S$ 's suspension that  $q$  is  $[0, 1]$ .

<sup>26</sup> This note replies to a challenge raised by Thomas Kelly and an anonymous referee. That challenge says my argument is weakened by the view that it is impermissible to believe on merely statistical grounds (call that view *No-Stats-Beliefs* and those that hold it *Stats-Unbelievers*). Specifically, Rough Confidence Inequality (RCI) is challenged. Consider this case:  $S$  has an extremely high credence in some lottery claim  $l$  based on merely statistical grounds, but a slightly lower credence in some other claim  $t$  based on testimony. If *No-Stats-Beliefs* entails the possibility that  $S$  suspends on  $l$  but believes that  $t$ , then  $S$  would be more confident about something she suspends on ( $l$ ) than she is about something she believes ( $t$ ), contradicting RCI. That would provide extreme anti-maximizers with either an independent reason for rejecting RCI (if they are *Stats-Unbelievers*) or a companions-in-guilt argument (*Stats-Unbelievers* must also deny RCI). Below I suggest (1) that the argument of 3.2.2 can be recast in terms of an ideally rational agent  $S^*$  and RCI\*: Rough Confidence Inequality holds for ideally rational agents. Then I argue (2) that *No-Stats-Beliefs* doesn't provide credalists with reason to deny RCI\* because it is not a credalist view. Finally, I argue (3) that traditionalism/pluralism combined with *No-Stats-Beliefs* does not entail the possibility that  $S^*$  suspends on  $l$ , which is what might generate a contradiction with RCI\*. This means the extreme anti-maximizer is alone in their conflict with RCI\*. First, my argument can be recast in terms of an ideally rational agent. None of the points of my argument in 3.2.2 require an agent to form irrational attitudes. In order to avoid cluttering my argument, I have not stated the argument in terms of  $S^*$  and RCI\*. Nevertheless, the weaker (and equally or more plausible) RCI\* is sufficient to generate the problem I raise in 3.2.2 for extreme anti-maximizers. Second, notice that *No-Stats-Beliefs* seems to assume either a traditionalist or pluralist account—it seems to assume that in a single situation we could have a justified credence that  $l$  and an unjustified belief that  $l$ . This kind of commitment rules out all credal accounts. Traditional attitudes would be fundamental and independent of credences. So it doesn't look like credalists (extreme anti-maximizers) can use *No-Stats-Beliefs* as independent reason to deny RCI\*. Third, traditionalists and pluralists can hold *No-Stats-Beliefs* and RCI\* together. The extreme anti-maximizers' best bet seems to be a companions-in-guilt argument, granting that they must deny RCI\* for the reasons I give, but claiming that it's not so costly since certain pluralists and traditionalists (*Stats-Unbelievers*) must also deny it. But it is consistent with *No-Stats-Beliefs* that statistical grounds only permit credences towards  $p$ . And credences towards  $p$  are not traditional attitudes towards  $p$ , according to traditionalists/pluralists. If that is right, then  $S^*$  should neither believe  $l$  nor suspend on  $l$ , eliminating any potential conflict with RCI\*. Couldn't  $S^*$  suspend on  $l$  anyway? This is why the argument must be recast in terms of an ideally rational agent.  $S^*$  cannot suspend because, with merely statistical grounds,  $S^*$  is only permitted to take some credence. Therefore, though *No-Stats-Beliefs* might cast doubt on RCI (it might not if confidence comparisons are even partially grounded in traditional doxastic attitudes), it doesn't cast doubt on RCI\*. Since my argument can be stated with RCI\*, my argument is not weakened by the possibility that we are not permitted to believe on merely statistical grounds.

<sup>27</sup> My argument in this section builds on the argument of Rinard (2013). She argues that extreme imprecise credences generate confidence comparison difficulties. I argue that extreme anti-maximizing credal accounts of suspension also generate these confidence comparison difficulties.

Let's give it a first pass with the Greater-than Comparison Rule. In order to be more confident that  $p$  than that  $q$ , it must be true that every function in  $S$ 's representor assigns a greater probability to  $p$  than to  $q$ . But since there is some point  $x$  in the interval  $[0, 1]$  such that  $x > cr(p)$  and  $x < 1$ , there will be an uncountable number of functions in  $S$ 's representor that assign a greater probability to  $q$  than to  $p$ . Since  $cr(p) < x$  then all the functions that assign to  $q$  a probability in the interval  $[x, 1]$  will assign a greater probability to  $q$  than to  $p$ . Therefore the Imprecise View with the Whole Interval View and the Greater-than Comparison Rule does not allow for the perfectly plausible assumption that if one believes  $p$  and suspends on  $q$ , then one is more confident that  $p$  than that  $q$ .

Above we saw that moving to the Open Interval View of full suspension and the Greater-than/Equal-to Comparison Rule was a way of alleviating the challenge from the first confidence comparison. Not so here. According to the Greater-than/Equal-to Comparison Rule, in order to be more confident that  $p$  than that  $q$ , it must be true that some function in  $S$ 's representor assigns a greater probability to  $p$  than to  $q$ , and no function in  $S$ 's representor assigns a greater probability to  $q$  than to  $p$ . But as we saw above, all the functions that assign to  $q$  a probability in the interval  $[x, 1]$  will assign a greater probability to  $q$  than to  $p$ . Moving from the Whole Interval View to the Open Interval View just removes one point from among  $S$ 's functions, namely 1. There are still all the points in the interval  $[x, 1)$  that assign a greater probability to  $q$  than to  $p$ . So there are an uncountable number of functions that assign greater probability to  $q$  than to  $p$ .<sup>28</sup>

Therefore even with the Open Interval View and the Greater-than/Equal-to Comparison Rule, extreme anti-maximizing views are not compatible with being more confident in that which one believes than in that which one suspends. In fact, unlike the argument in 3.2.1, this argument does not depend on imprecise credences that have both an extreme lower endpoint and an extreme upper endpoint. The problem arises from the fact that the upper endpoint is extreme, even if the lower endpoint is not.

A final point is that even if one were to deny the universal claim that all cases are such that there is less confidence with suspension than with belief, it looks like the extreme anti-maximizer is stuck with the wrong verdict in cases where one is obviously more confident in one thing than the other. For example, take SOME BLUE alongside a proposition about a near future event.

**SOME BLUE:** Some of the marbles in Mystery Urn are blue.

**NEAR FUTURE:** The book on my desk will still be on my desk in the next second.

It should be obvious that we can and should be more confident about NEAR FUTURE than about SOME BLUE. Indeed, even if we extended the time frame in NEAR FUTURE to five minutes, allowing for not only quantum events but airplanes crashing into the building, earthquakes, book thieves, etc., it is still obvious that we can and should be more confident in NEAR FUTURE than in SOME BLUE. But for the reasons just explained, this is not consistent with extreme anti-maximizing views. Here I am assuming that an extreme imprecise credence is assigned to SOME BLUE and a credence less than 1 is assigned to NEAR FUTURE. This is a case where we are

<sup>28</sup> Isn't it possible to come up with an even further refined comparison rule that permits  $S$  to be more confident that  $p$  than that  $q$  and have an uncountable number of functions in  $S$ 's representor that assign a greater probability to  $q$  than to  $p$ ? Surely it's possible. I leave it to others to advance such a rule. If a plausible rule is suggested that does the job, then this paper provides reason to reject credal accounts that do not endorse that rule.

more confident in what we believe than in what we suspend, but extreme anti-maximizers cannot countenance this.<sup>29</sup>

In summary of these arguments about confidence comparisons, we saw in section 3.2.1 that extreme anti-maximizing views require denying at least one of the following three claims:

**Whole Interval View:** The imprecise credence spread across the whole interval  $[0, 1]$  is the fullest possible case of suspension.

**Unequal Confidence Possibility:** Full suspension on  $p$  and full suspension on  $q$  is compatible with greater confidence that  $p$  than that  $q$ .

**Interval Comparison Rule:** If  $S$  assigns the credence interval  $[x, y]$  to  $p$  and  $[x, y]$  to  $q$ , then  $S$  is not more confident that  $p$  than that  $q$ .

We saw in section 3.2.2 that extreme anti-maximizing views also require denying both:

**Rough Confidence Inequality:** If  $S$  believes that  $p$  and suspends on  $q$ , then  $S$  is more confident that  $p$  than that  $q$ .

**SOME BLUE/NEAR FUTURE Confidence Inequality:** We are more confident in NEAR FUTURE than in SOME BLUE.

### 3.2.3 | Contextualist Variations

Very few philosophers have provided accounts of suspension. Two worth mentioning here are Hájek (1998) and Sturgeon (2010, 2020).<sup>30</sup> Though space does not permit full exposition of their views, both are extreme anti-maximizers. They both think a doxastic attitude represented by the full unit interval is a case of suspension. And they both reject the idea that all beliefs are credence 1. Also, both of their accounts embrace a form of contextualism: the thresholds that determine whether a credence counts as belief, suspension, or disbelief are relative to the context (the details

<sup>29</sup> Other credal accounts do not have this problem since they either demand that all belief is credence 1 (maximizers) or demand that all credences are precise (some regular anti-maximizers) or can deny that we ever assign extreme imprecise credences (the rest of the regular anti-maximizers). A number of options are available to the pluralist and traditionalist to avoid this problem. They might claim that all credences must be precise or that no imprecise credences should include 0 or 1 as endpoints, or that traditional doxastic attitudes (which do not reduce to credences) ground confidence facts. The fact that one believes that  $p$  and suspends on  $q$ , could partially or wholly ground the fact that one is more confident that  $p$  than that  $q$ . The traditionalist might also be an eliminativist about credences. All these suggestions are ways out of the problem, but are unavailable to the extreme anti-maximizer.

<sup>30</sup> Two other contextualist views, though not directly about suspension, are worth mentioning. Both Leitgeb (2014, 2017) and Lin and Kelly (2012) provide elegant if complicated accounts of the relation between rational belief and rational credence. These accounts may provide resources for developing a contextualist response to Friedman's argument that I discuss in section 2.1. Giving a sufficient explanation of their views, much less a response, is beyond the scope of this paper, but I will note two things: (i) in their argument for rules of belief revision that perfectly track Bayesian conditioning, Lin and Kelly (2012) presuppose that there is an ontological reduction of beliefs to credences, (at least, Leitgeb attributes this presupposition to Lin and Kelly. See Leitgeb (2017) p. 236); and (ii) Leitgeb (2017) argues (against Leitgeb (2013)) that beliefs are not ontologically reducible to credences and that the ontological *independence* of belief and credence is "the most plausible [option]" (p. 26. See also pp. 230-236).

here are left open, but beliefs must be close to 1 and disbeliefs close to 0). I want to briefly say how my arguments relate to their views.

Neither Hájek nor Sturgeon gives a credal account, in the strict sense defined in the introduction. There I said that a credal account is one where an agent's traditional doxastic attitudes are a function of the agent's credences alone. Hájek and Sturgeon think context is an additional factor. Sturgeon's view is even further from a strict credal account because he also thinks the belief/suspension threshold is vague, that precise middling credences are not cases of any traditional attitudes, and that many cases of suspension do not involve any credences at all.<sup>31</sup>

Note that the contextualism of Hájek and Sturgeon differs from the contextualist maximizing view mentioned above (section 2.3). The contextualist maximizing view is a strict credal account because the context affects both the traditional and credal attitudes at the same time—the traditional attitudes are a function of just the credences while the credences themselves are sensitive to one's context.

Though my arguments are focused on strict credal accounts of suspension, the arguments also bear on what we might call *relaxed* contextualist variations, like those of Hájek and Sturgeon. In general, the strategy for attacking relaxed contextualist variations is to deploy versions of the above arguments indexed to specific contexts. If the relevant features that generate a problem for strict credal accounts can be shown to obtain in a context, then the contextualist variation fares no better.

Consider whether the arguments against extreme anti-maximizers can be indexed to a context. First, consider the *extreme* aspect of Hájek's and Sturgeon's accounts. Since they both think that imprecise credences with endpoints of 0 and 1 are cases of suspension, then, naturally, there is some context where imprecise credences with endpoints of 0 and 1 are cases of suspension. In that context, one's credence in DIS and one's credence in CON will each be a case of suspension—they are both the same credence. But then the argument of section 3.2.1 proceeds normally. The argument can be indexed to that context. In fact, as I understand their views, it is true in every context that imprecise credences with endpoints of 0 and 1 are cases of suspension. Contextual changes in thresholds would affect whether a credence of .95 or of (0.9, 0.95) counts as near 1, but a credence of (0, 1) will never count as being near 1 (or near 0).

Second, consider the *anti-maximizing* aspect of their accounts. As anti-maximizing accounts, there must be some contexts in which some credences less than 1 are beliefs. The pertinent question then is whether an extreme imprecise credence, say (0, 1), is ever suspension in those contexts. As I just said, there is no context, on their views, in which (0, 1) is not a case of suspension. But then the argument of section 3.2.2 proceeds normally, indexed to that context.

There could, of course, be other kinds of contextualist views that fare better. I do not claim to be making an exhaustive argument against contextualist credal accounts of suspension. Each will have to be evaluated on its own terms. I do, however, think that Hájek and Sturgeon are the central credal accounts of suspension defended in the literature and their contextualism does not immunize their views from my argument.

<sup>31</sup> A credence, according to Sturgeon (2010), is always a point-valued (precise) subjective probability. No credences are cases of suspension, he says. Though he eschews the term 'imprecise credence,' he still uses the notion of a doxastic attitude that can be represented by a non-degenerate numerical interval. Those attitudes are sometimes cases of suspension. Nevertheless, many cases of suspension, on his view, are not things we would classify as imprecise credences, e.g., what he calls 'fuzzy thick confidence.'

## 4 | CONCLUDING TRILEMMA

Let's take stock. The view that extreme imprecise credences are cases of suspension generates confidence comparison conflicts. So imprecise credal accounts of suspension must not count extreme imprecise credences as cases of suspension. But as we saw above, the only way for imprecise credences to satisfy the Disjunction/Conjunction Condition is by counting extreme imprecise credences as cases of suspension. If we abandon imprecise credences and claim that all cases of suspension are precise credences, we are left with either the inability to satisfy the Disjunction/Conjunction Condition or the challenges for maximizing views. What has emerged then are worries for all possible credal accounts of suspension whether precise or imprecise.

Every possible credal account falls into one of three groups:

**Maximizer:** *All beliefs are credence 1.* Accounts of suspension that entail that all beliefs are credence 1 conflict with the Principal Principle and the original claims that motivated the adoption of credences as a way of representing our doxastic condition.

**Extreme Anti-Maximizer:** *Some beliefs are credences  $< 1$  AND imprecise credences with endpoints of 0 and 1 are suspension.* Accounts that do not fall into the first category and that claim that extreme imprecise credences are cases of suspension conflict with the idea that we are more confident in what we believe than in that on which we suspend in general and more confident in immediate future events than in total mystery events in particular. They also conflict with one of: the Whole Interval View, the Unequal Confidence Possibility, or the Interval Comparison Rule.

**Regular Anti-Maximizer:** *Some beliefs are credences  $< 1$  AND imprecise credences with endpoints of 0 and 1 are not suspension.* The rest of the accounts (all the precise views that accept that some beliefs are credence less than 1 and all the imprecise views that, in addition, accept that extreme imprecise credences are not cases of suspension) conflict with the Disjunction/Conjunction Condition or more concretely, conflict with the permissibility of jointly suspending on whether the Mystery Urn contains all blue marbles and suspending on whether it contains all red marbles.

None of these are good options. This, in turn, means that none of the credal accounts of the traditional doxastic picture—belief, suspension, disbelief—are good options. One could abandon the traditional picture altogether, but for those who want to retain it, I have shown that a credal account of the traditional doxastic picture will lead to the forfeiture of some very plausible claims.

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