Rationalist Contingency

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Abstract

The Principle of Sufficient Reason holds that there is a complete explanation for absolutely everything. While historically significant, it has largely fallen from favor among contemporary metaphysicians. In full generality, it is held to have untenable implications. Foremost among these is necessitarianism—the claim that everything actually true is necessarily true. I argue that this is not the case; the argument linking the PSR to necessitarianism relies upon assumptions that rationalists have independent reasons to reject. I close by providing positive reasons to hold that the PSR allows for contingency. There are various models for the structures of facts: models that are all compatible with the PSR, yet are incompatible with one another. If we are to reject the Principle of Sufficient Reason, it is not because it gives rise to necessitarianism.

Introduction

It is not entirely obvious how rationalism ought to be defined. Luminaries like Leibniz, Spinoza and Du Châtelet share important commonalities—but any similarities are punctuated by sharp disagreements. Rationalists often emphasize the role of *a priori* reflection as a basis for understanding, but diverge over the nature of substance, the existence of free will, and the relationship between mind and body. Nevertheless, if we were forced to identify rationalist metaphysics with a single, unifying doctrine, we would be hard-pressed to do any better than the Principle of Sufficient Reason (the *PSR*): the principle that there exists a reason for absolutely everything.

The *PSR* continues to play a significant (if sometimes implicit) role in metaphysical inquiry. Theories that posit brute, unexplained facts are often treated with healthy suspicion, if not outright derision. There is something deeply unsatisfying about the claim that nothing explains why the world is structured in the way that it is—a sense of instability arising from the thought that reality is fundamentally arbitrary.

Nevertheless, many metaphysicians reject the *PSR*—at least in full generality. It is widely held to have untenable implications, chief of which is necessitarianism: the claim that everything actually true is necessarily true. Necessitarianism does violence to ordinary modal judgments. It seems perfectly clear that Napoleon could have won the Battle of Waterloo (though he actually lost) and that the Apollo XIII mission could have ended

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in disaster (though everyone actually survived). If the *PSR* conflicts with these sorts of judgments, perhaps we ought to reject the *PSR*.

There is an argument—hereafter referred to as 'the Standard Argument'—linking the *PSR* to necessitarianism.[2] Different versions vary in their details, but a typical formulation is as follows.[3] Suppose, for *reductio*, that the *PSR* is true and that there are contingent truths. Because there is a sufficient reason for everything, there exists a sufficient reason R for the conjunction of all contingent truths C. In order for R to be a sufficient reason for C, it must entail C; it must be necessary that if R is true, then C is true. No necessity entails a contingency, so R must itself be contingent.[4] But if R is contingent—and if C is the conjunction of all contingencies—then R is one of C's conjuncts. R is both a sufficient reason for, and a conjunct of, C, and so is a sufficient reason for itself. But nothing is a sufficient reason for itself. Therefore, the *PSR* entails necessitarianism.

This argument depends upon more than the *PSR*. Unstated assumptions regarding the modal and logical structure of sufficient reason are in play. I believe that philosophers have generally—perhaps even universally—failed to appreciate their gravity. In conjunction with the *PSR*, they not only give rise to necessitarianism, but are logically inconsistent. While some might interpret this inconsistency as a decisive blow to rationalist metaphysics, my own view is that the rationalist faces maximal pressure to reject one of these background assumptions. My first task is thus to reconstruct the Standard Argument in a manner that makes its assumptions explicit, so that they can be considered in isolation. Ultimately, there are several that rationalists could reasonably reject—and one that is particularly suspect.

My aims are not entirely negative. I will close by offering positive reasons to think that the *PSR* allows for contingency. Various candidate models for the structures of facts are each compatible with the *PSR*, yet are incompatible with one another. As a result, the *PSR* does not determine which (if any) of these models obtains. I conclude that, if we are to reject the Principle of Sufficient Reason, it is not because it entails necessitarianism.

The Standard Argument

We can reconstruct the Standard Argument in terms of the following assumptions:

i. *The PSR* — There is a sufficient reason for every truth.

[2]This argument is most often associated with van Inwagen (1983, 2015) and Bennett (1984). However, versions of it predate these—see Rowe (1975). See, also, Oppy (2009); Della Rocca (2010) and McDaniel (2019).

[3]This version of the Standard Argument most closely aligns with that presented in Levy (2016).

[4]Proof: Suppose $p \vdash q$ and $\Box p$. By the Deduction Theorem, we have $\vdash p \rightarrow q$. The Necessitation Rule entails $\vdash \Box(p \rightarrow q)$, and the K axiom entails $\vdash \Box p \rightarrow \Box q$. A simple application of Modus Ponens then results in $\Box q$.

ii.	*Factivity*	If p is the sufficient reason for a true proposition q, then p is true.
iii.	*Irreflexivity*	Nothing is a sufficient reason for itself.
iv.	*Comprehension*	For every condition ϕ, if some propositions satisfy ϕ, then there exists a conjunction of all propositions that satisfy ϕ.
v.	*Strict Implication*	If p is a sufficient reason for q, then p necessitates q—i.e., $\Box(p \rightarrow q)$.
vi.	*Distribution*	Sufficient reason distributes over conjunction. If p is a sufficient reason for a conjunction of truths $q_1 \wedge q_2 \wedge ...$, then p is also a sufficient reason for q_1 and a sufficient reason for q_2, ...

As before, suppose (for *reductio*) that there are contingent truths. Because there are some contingent truths, *Comprehension* entails that there is a conjunction of all contingent truths—dubbed 'C'. Any conjunction of contingent truths is itself a contingent truth—so C is both contingent and true. The *PSR* entails that there is a sufficient reason for C—dubbed 'R.' *Factivity* entails that R is true; *Strict Implication* that R is not necessarily true. R is thus a contingent truth, and is, by definition, a conjunct of C. By *Distribution*, it follows that R is a sufficient reason for itself—which contradicts *Irreflexivity*. Therefore, there are no contingent truths.

As noted above, these assumptions do not merely entail necessitarianism; they are logically inconsistent. Regardless of whether there are contingent truths, there must exist *truths*. (After all, classical logic requires there to be at least two propositions: one true, the other false). Given *Comprehension*, there exists a conjunction of all truths—dubbed 'T.' Any conjunction of truths is itself true, so T is true. The *PSR* then entails that there is a sufficient reason for T—dubbed $R^\star$. *Factivity* entails that R^* is true, and the definition of T entails that R^* is one of T's conjuncts. *Distribution* then entails that R^* is a sufficient reason for itself, which contradicts *Irreflexivity*.

This inconsistency is significant for at least two reasons. First, the rationalist cannot respond to this dilemma by embracing necessitarianism.[5] The claim that everything actually true is necessarily true is counterintuitive; the claim that a contradiction obtains is absurd. Every philosopher committed to consistency must reject one of the assumptions in play. Second, inconsistency helps hone our attention. While *Strict Implication* seems implicit in the Standard Argument (in particular, it serves to establish that the sufficient

[5] Della Rocca (2010) suggests embracing necessitarianism as a response to the Standard Argument.

reason for the conjunction of contingencies is itself contingent), it plays no role in the derivation of inconsistency. We can thus exclude it as a candidate principle to reject.[6] This is not to deny that *Strict Implication* is controversial—nor to claim that every rationalist ought to accept some principle along these lines.[7] But we face a contradiction that forces the rejection of another principle *regardless* of whether *Strict Implication* is true. For our purposes, we may set it aside.

The rationalist thus faces a choice: to reject *Factivity*, *Irreflexivity*, *Comprehension*, or *Distribution*. Ultimately, I think that the most promising candidate for rejection is *Distribution*—though there is some reason to resist *Irreflexivity* or *Comprehension* as well. But before evaluating each of these principles, I briefly discuss the *PSR* itself. This discussion is intended to be interpretive, rather than defensive. My aim is to investigate the relationship between the *PSR* and necessitarianism; to reject the *PSR* at this stage would be to abandon this inquiry. To that end, the following remarks are merely intended to clarify what the Principle means.

The Principle of Sufficient Reason

The Principle of Sufficient Reason, as I interpret it, concerns metaphysical explanation. A sufficient reason for p is a complete explanation for why p is true.

There is currently no consensus on how explanation ought to be understood—and only a modicum of consensus on what explanations there are. Plausibly, the fact that a ball is some shade of red is explained by the fact that it is maroon, and the fact that Leo XIV is Pope is explained by the fact that he was elected by the College of Cardinals. The salient notion of explanation is metaphysical, rather than epistemic. I am concerned with what *makes it the case* that the ball is red and that Leo is Pope—not with how someone comes to know that these are so.

I remain neutral on the nature of explanation; I do not endorse accounts in terms of causation, modality or ground.[8] Nothing within my argument turns on which (if any) of these interpretations is correct. What matters is that explanations—whatever those might

[6] See Pruss (2006) and Amijee (2020) for two philosophers who respond to the Standard Argument by rejecting *Strict Implication*.

[7] While I myself maintain that *Strict Implication* is true, Bricker (2006), Schnieder (2006), Schaffer (2010), Leuenberger (2013) and Skiles (2015) have argued against principles of this sort in the context of ground.

[8] A causal account might interpret the *PSR* as the claim that event C is a sufficient reason for event E just in case the former is a full cause of the latter. See Leibniz (1991) and Pruss (2006) for theories along these lines. A modal account might interpret the *PSR* as the claim that p is a sufficient reason for q just in case it necessitates q—see van Inwagen (1983). A grounding account might interpret the *PSR* as the claim that p is a sufficient reason for q just in case p grounds q, where ground is a primitive relation of metaphysical dependence—see Dasgupta (2014*b*). Philosophers have argued that each of these relations is in some sense confused or unintelligible. For a critique of causation, see Hume (2003); for modality, see Quine (1953); for ground, see Wilson (2014) and Fritz (2022). I do not claim that these alternatives are exhaustive. Perhaps some other sort of 'building relation'—as in Bennett (2017)—accounts for metaphysical explanation.

be—logically interact with the principles within the Standard Argument. While this paper doubtlessly makes numerous contestable claims, my particular conception of explanation is not among them.

The term 'every' within 'There is a sufficient reason for every truth' is intended to express absolute generality.[9] By contrast, some metaphysicians defend restricted interpretations. Some merely require explanations for facts about existence, while others claim that there is a class of autonomous facts (which are inapt for explanation), and hold only that heteronomous facts are explained.[10] A fully general interpretation is more demanding than any restriction. (After all, if there is an explanation for absolutely everything, then there are explanations for all existence and heteronomous facts). If even the most demanding version of the *PSR* allows for contingency, then less demanding versions presumably do so as well—so it is reasonable to focus attention on the most general interpretation.

Here, I interpret *is a sufficient reason for* as a binary relation; one fact explains another. By contrast, some treat this relation as variably polyadic—so that any number of facts can serve as sufficient reasons.[11] Perhaps propositions collectively constitute the sufficient reason for their conjunction—so that the plurality p, q is the sufficient reason for $p \wedge q$. There is a danger that variable polyadicity dooms the Standard Argument from the outset. If the sufficient reason for the conjunction of contingencies is a plurality of facts (perhaps the plurality of all contingencies) then the claim that this plurality is a sufficient reason for itself is strictly ungrammatical, and presumably cannot be derived.[12] This objection is not my current focus. On behalf of proponents of the Standard Argument, I grant that *is a sufficient reason for* is binary.

I have nothing more to say regarding the interpretation of the *PSR*. I turn my attention to the remaining principles: *Factivity*, *Irreflexivity*, *Comprehension* and *Distribution*.

Factivity

Factivity is the principle that falsehoods do not explain why truths obtain. If p is the sufficient reason for q, and if q is true, then p is true. If the reason that my cup of coffee is hot is that the kinetic energy of its molecules is high—and if my cup of coffee is actually hot—then the proposition *the kinetic energy of its molecules is high* is true.

[9] I discuss the interaction of absolute generality with the *PSR* in the section *Evaluating Comprehension* below.

[10] See Shaul (2024) for a discussion of the *PSR* restricted to facts regarding existence, and Dasgupta (2016) for a version restricted to heteronomous facts.

[11] See Schnieder and Steinberg (2016). For an argument that the problem resurfaces if we allow *is a sufficient reason for* to be fully polyadic—as suggested in Dasgupta (2014*a*)—see McDaniel (2019). For a reply, see Werner (2020).

[12] That is, if the grammatical category of 'being a sufficient reason' allows for any number of facts to serve as this relation's first input—but a single fact to serve as the second—then there is no formula within our language that expresses the claim that this plurality is a sufficient reason for itself.

Factivity is deeply embedded within our explanatory practice. Candidate explanations are—perhaps universally—apt to be rejected if their explanans is false.[13] 'India is either in Asia or Europe because it is in Europe' ought to be rejected on the grounds that India is not in Europe—and 'Porcupines are mammals because they lay eggs' ought to be rejected on the grounds that porcupines do not lay eggs.

Factivity does not deny that negations serve as sufficient reasons. It could be that the reason John is a bachelor is that he is not married. But in this case, it is the true negation—rather than the false negatum—that performs explanatory work. It is *true* that John is not married, and it is this truth that explains his bachelorhood. Nor does *Factivity* claim that false propositions *cannot* explain truths: merely that they *do* not. A false proposition p might explain in counterfactual situations in which it is true. Even if it is not actually raining, if it *were* to be raining, then the fact that it is raining would plausibly explain why it is either raining or sunny.

It is natural to suspect that *Factivity* is inordinately restrictive. It does not rule out the possibility that falsehoods are sufficient reasons for other falsehoods. For all that it says, it could be that the reason that the Eiffel Tower is the size of a thimble is that it is two centimeters tall. Arguably, metaphysical explanation is more demanding. Sentences of the form 'p because q' are (at best) misleading in contexts where p is false; perhaps only true propositions are apt to be explained. Along these lines, we could strengthen *Factivity* so that it requires both p and q to be true in order for p to be the reason for q. While this strengthening strikes me as eminently plausible, it is unneeded for the Standard Argument; for our dialectical purposes, a weak principle will suffice.

Resisting the Standard Argument by rejecting *Factivity* does not seem particularly promising. The intuitions driving this principle are strong—and I can think of no independent reason why it should fail.

Irreflexivity

Irreflexivity is the principle that nothing is a sufficient reason for itself. Like *Factivity*, it is deeply embedded within our explanatory practice; those who would explain why p is the case do not merely repeat the fact that p. Consider the following conversation:

A: What explains the fact that p?

B: p

[13] Some philosophers (e.g., Elgin (2010, 2017) and Strevens (2020)) deny epistemic analogs of *Factivity*—holding that falsehoods can epistemically explain truths. Perhaps we further our scientific understanding by reasoning with models that, while approximately true are strictly false. However, I know of no philosophers who have denied *Factivity* for metaphysical explanation.

A: I am not interested in *whether* *p* is true—I am willing to grant that it is. What is the *reason* that *p* is true?

B: *p*

A: Are you claiming that *p* is a brute fact? That it holds, but there is no explanation for why it holds; it is an arbitrary aspect of reality?

B: Of course not! That would violate my core rationalist tenets. There is a perfectly good explanation for absolutely everything—including *p*. The reason that *p* is true is that *p* is true.

A: Let's try another gloss. *p* is true in some possible worlds, and false in others. The *p*-worlds seem to differ systematically from the $\neg p$-worlds—a difference, we might think, that explains why *p* is true in the situations that it is. What is this difference?

B: The *p*-worlds are *p*-worlds.

A: But that's no explanation at all! Of *course* all of the *p* worlds are *p* worlds. That's true for every proposition whatsoever—and tells us nothing about the truth of *p* in particular. *Why* is it the case that *p* is true in these worlds?

B: Because *p* is true in these worlds.

A: ????

It is easy to sympathize with *A*'s frustration. There is a nagging suspicion that *B* has provided no explanation whatsoever; merely repeating the fact that *p* does not constitute an explanation for why *p* is the case. It is remarkable how widespread the commitment to *Irreflexivity* is given that it rests largely upon intuitions like this.[14]

[14]Others defend *Irreflexivity* by endorsing a layered conception of reality—see deRosset (2023). Perhaps there is a gradable notion of fundamentality—where absolutely fundamental facts serve as an explanatory basis for less fundamental facts. Since no fact is more fundamental than itself, no fact explains itself. This layered conception of reality provides a motivation for *Irreflexivity*—but not one the rationalist can endorse. Central to layered structure is that some facts hold without a sufficient reason (after all, these are to be identified with the absolutely fundamental facts). The rationalist rejects facts that hold without reason, and cannot endorse this picture.

Commitment to *Irreflexivity* is not universal. Jenkins (2011) suggests that metaphysicians err in assuming that metaphysical explanation is irreflexive; perhaps the fact that Mark is in pain is both explained by—and identical to—the fact that Mark's C-fibers are firing. However, Rubenstein (2024) argues (convincingly, in my view) that metaphysics requires two notions of explanation: one where more fundamental entities generate

Nevertheless, there are some independent reasons to reject *Irreflexivity*. A rationalist might hold that, while explanations are *typically* irreflexive, there are exceptions—at least in special, isolated cases.

Some endorse specific examples of reflexive reasons—and so deny that *Irreflexivity* holds with generality. Perhaps, as Spinoza (1996) claimed, the fact *God exists* explains itself. Or, to use a less theistic example, it may be that the fact *there exists at least one fact* is a sufficient reason for itself. If existential facts are explained by their witnessing instances, then *there exists at least one fact* explains itself because it witnesses itself.[15]

Alternatively, a rationalist might maintain that there are structural reasons to endorse reflexive reasons—even if they cannot pinpoint which reasons they are. Metaphysicians in the business of providing explanations face the Agrippan Trilemma.[16] There are three candidate structures for facts:

i.	*Primitivism*	There are brute facts: those that hold without a sufficient reason, and that form the ultimate reasons for everything else.
ii.	*Infinitism*	There are infinite chains of reasons, such that for every fact, there exists another which serves as the sufficient reason for it.
iii.	*Circularity*	Facts form circles of explanation; for some facts $F_1, F_2, ..., F_n$, F_1 is a sufficient reason for F_2, F_2 is a sufficient reason for F_3, ... , F_{n-1} is a sufficient reason for F_n, and F_n is a sufficient reason for F_1.

These alternatives are exhaustive (at least within the framework that treats *is a sufficient reason for* as binary propositional relation). This relation is either well-founded, or non-well-founded. If it is well-founded, then *Primitivism* is true; if it is non-well-founded, then either *Infinitism* or *Circularity* is true.

Rationalism precludes *Primitivism*; it denies that brute facts exist. The remaining possibilities are *Infinitism* and *Circularity*—and it is not at all obvious which of these is preferable. However, some might maintain that *Infinitism* also ought to be rejected.

less fundamental entities, and another where the nonfundamental reduces to the fundamental. Even granting that neurology explains pain, there seems to be genuine disagreement about which sort of explanation is at issue: an irreflexive dependence associated with generation, or the reflexive identity associated with reduction. Additionally, Bliss (2013, 2018) argues against *Irreflexivity* on the grounds that it tracks an epistemic—rather than a metaphysical—conception of explanation.

[15]This puzzle was first noted in Fine (2012). It is not at all clear that the appropriate response to this is to reject *Irreflexivity*. For others, see Correia and Schnieder (2012), Litland (2015) and Fritz (2021).

[16]The Agrippan Trilemma was named by Sextus Empiricus after the skeptic Agrippa. While originally presented as an argument for skepticism, an analog of the trilemma applies to metaphysical explanation.

According to this view, questions of the form 'Why is it the case that *p*?' always have an answer—but not a particularly satisfying one. A philosopher who was told that the reason for *p* is *q* might suspect that the explanatory burden has merely been shifted from *p* to *q*. Without an adequate explanation for why it is the case that *q*, we also lack an adequate explanation for why it is the case that *p*. In the case of infinite series of explanation, the explanatory burden is indefinitely shifted, yet never answered. It is for this reason that, in his correspondence with Leibniz, Clarke (1716) claimed "A chain, composed of infinitely many links, can have no dependence unless it hangs upon something independent" and that Schaffer (2009)[pg. 364] claimed that, in infinite series of grounding, "[r]eality is forever deferred, never achieved." While not every rationalist rejects *Infinitism*, those that do must embrace *Circularity*.

The path between accepting *Circularity* to rejecting *Irreflexivity* is short. We need only assume that *is a sufficient reason for* is transitive; if *p* is a sufficient reason for *q*, and *q* is a sufficient reason for *r*, then *p* is a sufficient reason for *r*.[17] Collectively, *Circularity* and *Transitivity* entail that some facts are sufficient reasons for themselves.

The upshot is this: like *Factivity*, *Irreflexivity* is embedded within our explanatory practice. However, there is room for the rationalist to object—by appealing either to specific examples of reflexive reasons or to broader structural considerations.

Formulating Comprehension

Thus far, formalizing the assumptions within the Standard Argument has been straightforward (indeed, so straightforward that formalisms have been largely elided). By contrast, it is not at all obvious what *Comprehension* amounts to—so it is worthwhile to clarify what this principle means.

Comprehension is the principle that, if some propositions satisfy a condition ϕ, then there exists a conjunction of all propositions that satisfy condition ϕ. Both appeals to this principle within the Standard Argument generate conjunctions of infinite length. It generates the conjunction of all contingencies on one formulation, and the conjunction of all truths on the other. Presumably, if there are any contingent truths, then there are infinitely many; if it is contingently true that there are precisely n concrete objects, then it is also contingently true that there are not $n + 1$ concrete objects, that there are not $n + 2$ concrete objects, etc. And while Frege (1892) canonically held that there is but a single truth (in maintaining that the semantic values of sentences are their truth-values), the overwhelming consensus is that there are infinitely many: ones that differ with respect to their modal profiles.

[17] Proof: by induction on length of circularity. There are arguments in the literature that put some pressure on transitivity. Schaffer (2012) provides counterexamples to the transitivity of ground—though it is not immediately obvious how these examples translate to the case of sufficient reason. See Litland (2013) for a reply.

Traditional First-Order languages lack the ability to state infinitary conjunctions—and arguably cannot even express principles like *Comprehension*. Within these languages, every well-formed-formula has a finite length.[18] If infinitely many propositions satisfy an operator, their conjunction does not exist. Moreover, without the ability to quantify over operators themselves, principles like *Comprehension* can only be stated schematically—so that explicit quantification occurs exclusively within the metalanguage.

The standard remedy for this expressive limitation is to expand our language to include terms for propositional quantification.[19] Rather than conjoining each of the infinitely many ϕ-propositions (for a sentential operator ϕ), we assert that every ϕ-proposition is true:

$$\forall p(\phi(p) \rightarrow p)$$

If our language is supplemented still further (so as to allow for quantification not only over propositions, but also over operators) we could express *Comprehension* as:

$$\forall X \exists p(p = \forall q(X(q) \rightarrow q))$$

For every operator X, there exists some proposition p that is identical to the conjunction of X's extension. (Note that, in this formulation, the restriction to nonempty operators is strictly gratuitous). This principle is an elementary theorem of standard higher-order languages (like the simply-typed λ-Calculus). These systems are provably sound, so there is no risk of generating contradictions of the sort that often plague comprehension principles.[20]

When I first began to investigate the Standard Argument, I expected to express *Comprehension* in these terms—and to defend it by appealing to the plausibility of the systems in which it can be proven. However, I now believe that this formulation is inadequate.[21] The problem is that the relevant instances of *Comprehension* have the wrong modal profiles. On this approach, the conjunction of all contingencies is expressed by:

$$\forall p((p \wedge \neg \Box p) \rightarrow p)$$

This asserts that all contingent truths are true. While a somewhat natural way to express the conjunction of all contingencies, this holds necessarily; in an arbitrary possible world w, everything that is contingently true within w is true within w.[22] But our target

[18] Proof: by induction on syntax.

[19] While I take this to be standard, I do not mean to deny that there are alternatives. We might introduce new primitive constants used to express infinitary conjunction—as in Tarski (1965); Scott and Tarski (1965)—or else have the theoretical work intended for infinitary conjunction be performed by infinitely large sets of propositions. I myself find these alternatives to be costly, but for the sake of space will not discuss these costs here.

[20] For proof, see Barendregt (1992).

[21] My thanks to Alex Kocurek, who hammered home the shortcomings of my original formulation.

[22] This is an instance of a more general theorem of any (classical) modal logic with the Necessitation Rule: $\vdash \Box \forall p((p \wedge q) \rightarrow p)$.

conjunction does not hold necessarily. Rather, the conjunction of all contingencies ought to exhibit maximal modal fragility: a proposition that is false in absolutely every possible world except this one. This matters for the role that *Comprehension* plays within the Standard Argument. In order to establish that the conjunction of contingencies is one of its own conjuncts, we must first establish that it is contingent.

There are various potential remedies to this problem. We could introduce a rigidifying actuality operator @ into our language, or, alternatively, let the role of conjunctions be played by sets of propositions—and treat set membership as rigid.[23] By contrast, the solution I offer appeals only to the resources of propositional quantification and identity. Most immediately, this allows us to express *Comprehension* in manner that expresses what we intend to express—but my hope is that it is of independent interest. To the best of my knowledge, this constitutes a novel way to express infinitary conjunctions, which has applications in other domains.

Here is an outline of the strategy I will pursue. I begin by defining the relation of conjunctive parthood—conditions for one proposition to be a conjunctive part of another. These conditions are neutral with respect to how many conjunctive parts a proposition has; there could be either a finite or an infinite number. This relation is then used to define a property of propositions. For a given sentential operator ϕ, this is the property of *being the conjunction of everything within* ϕ*'s extension*.[24] I then establish existence and uniqueness: *Comprehension* entails that there is at least one such conjunction, and our background logic entails that there is at most one such conjunction. Because there is a unique conjunction of everything within ϕ's extension, we can provide this conjunction a name.[25] I then appeal to the name's rigidity to denote *that very proposition* in other modal contexts—including ones where the extension of ϕ would have differed. The remainder of this section will involve formulating *Comprehension* along these lines; evaluating it is the subject of the next.

Conjunctive parthood has been the subject of substantial discussion in recent years—most of which concern semantical approaches.[26] By contrast, my account is given is purely logical terms. A bit roughly, we might say that q is a conjunctive part of p just in case it

[23]I doubt that the introduction of an actuality operator will ultimately succeed. A standard axiom for this operator is $@p \rightarrow p$. If p is actually true, then p is true. Adopting this axiom forces restricting the Necessitation Rule to 'pure' formula—those that lack the actuality operator (see Davies and Humberstone (1980) and Williamson (2006, 2007) for discussions of this point). Without this restriction, our background logic will *itself* entail necessitarianism—as it will be provable that $\Box(@p \rightarrow p)$—and all metaphysical assumptions (including the *PSR*) will be strictly gratuitous. I was unable to formalize the Standard Argument without appealing to this illicit interaction between the actuality operator and the Necessitation Rule—and so do not believe that this problem can be resolved by appealing to this operator.

[24]Alternatively, we could consider this to be a relation between operators and propositions—though this relation will generate a property of propositions when Curried out in the standard way.

[25]This practice of establishing existence and uniqueness before dubbing a name is standard in mathematics—and is needed to ensure that our language obeys unfree quantification and does not tolerate ambiguity.

[26]This has occurred most explicitly in the literature on truth-maker semantics. See, e.g., Fine (2017*a*,*b*).

is one of p's conjuncts; i.e., in order for q to be a conjunctive part of p there must exist a proposition r such that $p = q \wedge r$. I take this thought to be fundamentally correct, but whether it captures the intended notion of parthood turns on a controversial principal of propositional granularity—Idempotence: the claim that $p = p \wedge p$.[27] Moreover, following the literature on mereology, we might recognize a distinction between two sorts of parthood: proper and improper. While no proposition is a proper conjunctive part of itself, every proposition is an improper conjunctive part of itself. We can regiment the distinction between proper and improper parthood (on both Idempotent and Nonidempotent approaches) as follows:

	Proper Parthood	**Improper Parthood**
Idempotence:	$p < q := \exists r((q = (p \wedge r)) \wedge (p \neq q))$	$p \leqslant q := \exists r(q = (p \wedge r))$
Nonidempotence:	$p < q := \exists r(q = (p \wedge r))$	$p \leqslant q := \exists r((q = (p \wedge r)) \vee (p = q))$

We remain strictly agnostic with respect to Idempotence by adopting the Idempotent definition of proper parthood and the Nonidempotent definition of improper parthood. Regardless of whether propositions are their self-conjunctions, there will be at least one clause which is strictly gratuitous, yet completely harmless. (That is, it does no harm to include a clause specifying that a proper part of p is distinct from p—nor any harm to include a clause specifying that an improper part of p might be identical to p).

Propositions could have any number of conjunctive parts. While $p \wedge q$ may have only two (proper) parts, in principle a proposition could have infinitely many. If infinitely many propositions are identical to p when conjoined with something-or-other, then p has infinitely many conjuncts. Of course, our syntax only permits listing finitely many in any well-formed-formula—but nothing prevents a proposition from figuring in infinitely many identifications.

It is more straightforward to express *Comprehension* in terms of improper parthood, rather than proper parthood.[28] In the case of haecceitistic operators—like $\lambda x.(x = p)$—it is far from clear what a proper conjunction of these operators' extensions amounts to. Any

[27]While coarse-grained accounts—like Stalnaker (1968); Lewis (1973); Bacon and Dorr (2024)—endorse Idempotence, many fine-grained accounts distinguish propositions from their self-conjunctions—see, e.g., Dorr (2016); Fine (2017*a*,*b*); Elgin (2020); Bacon (2023). This is not universal; see Correia and Skiles (2019) for a fine-grained theory that endorses Idempotence.

[28]The obvious way to define *Comprehension* in proper terms appeals to a trivial proposition $\top$, which is a conjunctive part of absolutely everything—i.e., such that $\forall p(p = p \wedge \top)$. Note that, on both coarse and fine-grained accounts of propositions, it is provable that if $\top$ exists, then it is both necessary and unique (at least, if we endorse the K axiom and Necessitation Rule, as well as the principle that conjunction is commutative—$p \wedge q = q \wedge p$). I briefly explored—and ultimately rejected—definitions of *Comprehension* in terms of $\top$. These systems violate the standard logic of grounding. This logic holds that conjunctions are grounded in their conjuncts: p, q collectively ground $p \wedge q$. If this is so, then $p, \top$ collectively ground $p \wedge \top$. Given the definition of $\top$, we have that $p = p \wedge \top$. Leibniz's Law then entails that $p, \top$ collectively ground p—in violation of the irreflexivity of partial ground. Some philosophers might reasonably cast the Standard Argument in terms of grounding. To allow for this, I will not formulate comprehension in terms of $\top$.

conjunction that contains p as a proper part contains other propositions as proper parts as well—ones not within the extension of $\lambda x.(x = p)$. By contrast, the conjunction may simply be p if the relevant notion of parthood is improper. Along these lines, we might formulate the property of *having all of the properties within ϕ's extension as conjunctive parts* as:

$$\lambda x.(\forall p(\phi(p) \rightarrow p \leqslant x))$$

This property is borne by all and only the propositions that contain ϕ's extension as conjunctive parts. There is no hope of establishing that this is uniquely satisfied. If it holds of any propositions, then it holds of infinitely many. While p contains the entirety of $\lambda x.(x = p)$'s extension as conjunctive parts, the propositions $p \wedge q$, $p \wedge q \wedge r$, etc. do as well.

Nor can *Comprehension* be expressed in terms of the property of *having all and only the propositions within ϕ's extension as conjunctive parts*—along the following lines:

$$\lambda x.(\forall p(\phi(p) \leftrightarrow p \leqslant x))$$

Take the operator $\lambda x.(x = p \vee x = q)$. This holds of two propositions: p and q. The intended conjunction of its extension is $p \wedge q$. However, this conjunction has a conjunctive part that is not within the operator's extension: itself.[29] Because $p \wedge q$ contains a conjunctive part that is not within the operator's extension, it does not satisfy this property's demands. While the former property applied to too many propositions, this later applies to too few.

I think that the right approach is to identify a property borne by the *smallest* proposition that contains an operator's extension as conjunctive parts.[30] Given an operator ϕ, we seek the proposition that satisfies two criteria. First, it contains every proposition within ϕ's extension as a conjunctive part. Second, it is a conjunctive part of every proposition that contains the entirety of ϕ's extension as conjunctive parts. (In some respects, this strategy is analogous to identifying the relevant conjunction with the least-upper-bound of a set). We can represent this more formally as the following:

$$\bigwedge_{\phi} := \lambda x.(\forall p(\phi(p) \rightarrow p \leqslant x) \wedge \forall p(\forall q(\phi(q) \rightarrow q \leqslant p) \rightarrow x \leqslant p)$$

Comprehension, then, becomes the following schematic principle:

[29]Note that this problem is not an artifact of operating with an improper notion of conjunctive parthood. This arises for the proper conception as well; the intended conjunction of $\lambda x.(x = p \vee x = q \vee x = r)$ is $p \wedge q \wedge r$. Yet, this proposition has proper conjunctive parts—like $p \wedge q$—that are not within the operator's extension.

[30]Another possibility that I considered—yet ultimately rejected—was to identify a proposition that satisfies two criteria: first, that it has everything within an operator ϕ's extension as a conjunctive part and, second, that each of its conjunctive parts itself have conjunctive parts within ϕ's extension. This too will fail to guarantee uniqueness—at least on Nonidempotent theories of propositional granularity. Given the operator $\lambda x.(x = p)$, the propositions p, $p \wedge p$, etc. all satisfy both criteria.

$$\exists p\phi(p) \rightarrow \exists p \bigwedge_{\phi}(p)$$

If any propositions satisfy ϕ, then there exists a conjunction of all propositions that satisfy ϕ.[31] What remains is to establish uniqueness: to show that there is a single conjunction of each operator's extension. The most obvious way to do so appeals to an antisymmetry principle—analogous to antisymmetry axioms of mereology:[32]

$$(p \leqslant q \wedge q \leqslant p) \rightarrow p = q$$

If p is an improper part of q and q is an improper part of p, then p is identical to q.[33]

It is straightforward to establish uniqueness with *Antisymmetry*. Suppose that $\bigwedge_{\phi}$ holds of p and of q. Given the definition of $\bigwedge_{\phi}$, both p and q contain the entirety of ϕ's extension as conjunctive parts. Moreover, p and q are themselves conjunctive parts of everything that contains ϕ's extension as conjunctive parts. Therefore, they are conjunctive parts of one another. Given *Antisymmetry*, it follows that $p = q$.

Jointly, *Comprehension* and *Antisymmetry* thus entail that there is a unique conjunction of every (nonempty) operator's extension. Because this conjunction is unique, we may provide it a name. We may let 'C' denote the conjunction of all contingent truths, and 'T' refer to the conjunction of all truths. Notably, the referents of 'C' and 'T' are determined by the *actual* extensions of the operators *is a contingent truth* and *is true* respectively. If it is contingently true that Socrates is a philosopher, then the proposition *Socrates is a philosopher* is a conjunctive part of both C and T. Given the rigidity of the referents of 'C' and 'T' (and given the necessity of identity), the proposition *Socrates is a philosopher* is necessarily a conjunct both of C and of T. Of course, in possible worlds where Socrates is not a philosopher, neither C nor T count as the conjunction of all contingencies nor the

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[31] As before, this quantification can be made explicit by quantifying over operators in the obvious way.

[32] We may not need to appeal to antisymmetry to guarantee uniqueness. Dorr (2016)'s principle Only Logical Circles will do as well. According to this principle, if there is a circular identification $p = \phi$ where p occurs within ϕ, then all of the other terms within ϕ must be logical.

Suppose that $p \leqslant q$ and $q \leqslant p$. Given the definition of $\leqslant$, the only way for p and q to be distinct is for the following to obtain:

$$\exists r(q = p \wedge r)$$

$$\exists s(p = q \wedge s)$$

A simple application of Leibniz's Law (coupled with Associativity) then entails:

$$\exists r, s(p = p \wedge (r \wedge s))$$

This violates Only Logical Circles—as $r \wedge s$ is not logical. So, if OLC holds, the definition of $\leqslant$ guarantees uniqueness.

[33] Note that this antisymmetry principle is not entirely neutral with respect to all considerations of granularity. In particular, it forces the acceptance of Commutativity—$p \wedge q = q \wedge p$—and Associativity—$p \wedge (q \wedge r) = (p \wedge q) \wedge r$.

conjunction of all truths (after all, in these situations one of their conjuncts is false). In these worlds, some other proposition counts as the relevant conjunction. We may thus assert:

$$\bigwedge_{\lambda x.(x \land \neg\Box x)}(C) \land \neg\Box C$$

$$\bigwedge_{\lambda x.x}(T) \land \neg\Box T$$

C is the conjunction of all contingent truths, and C could have been false. T is the conjunction of all truths, and T could have been false. These are precisely the claims that *Comprehension* is intended to express. I now turn to the question of whether it is true.

Evaluating Comprehension

Comprehension is trivially true for operators with finite extensions—at least within systems that obey classical propositional quantification. If an operator holds of p and of q, then the conjunction $p \land q$ exists.[34] Perhaps the best defense of *Comprehension* is that it is an extremely natural extension of a logical triviality. Given that our language can express infinitary conjunction—and given that all finite conjunctions exist—it is reasonable to expect all infinite conjunctions to exist as well. However, some of the most significant challenges to the Standard Argument concern *Comprehension*, so it is worthwhile to consider objections in detail.

Perhaps the most serious problems for *Comprehension* concern its consistency. Comprehension principles in other domains are often inconsistent; they self-applicate in a manner that engenders contradiction. And there is reason to suspect that this particular principle generates a version of the Russell Paradox.[35] Take the operator *is not one of its own conjuncts*—an operator that we might represent with:

$$\lambda x.(\neg\exists p(x = (p \land x)))$$

Given *Comprehension*, there exists a conjunction of all propositions that this holds of: the conjunction of everything that is not a conjunct of itself. Let us dub this conjunction 'S'. Is S one of its own conjuncts? It might appear that from each answer, the other arises; S is one of its own conjuncts just in case it is not. And if *Comprehension* really does generate this inconsistency, then it ought to be rejected—regardless of whatever virtues it might have.

Note, first, that this problem does not arise for Idempotent theories of identification. If every proposition is its self-conjunction, then the operator $\lambda x.(\neg\exists p(x = (p \land x)))$ has

[34] Proof: $p \land q = p \land q$, therefore, $\exists r(r = p \land q)$. However, see Gómez Sánchez and Rubenstein (Forthcoming) for a view operates with a free logic for propositional quantifiers and denies the existence of this conjunction.

[35] My thanks to Alex Kocurek for pressing me on this problem.

an empty extension—and *Comprehension* only generates conjunctions for operators with nonempty extensions.

However, even on Nonidempotent theories, contradiction can be avoided. One direction of the inconsistency derivation goes through. Because S contains every non-self-conjunction as a conjunctive part, it follows that if S is *not* a conjunct of itself, then it *is* a conjunct of itself. But the converse fails. For a given nonempty operator ϕ, *Comprehension* generates a proposition p that contains everything within ϕ's extension as a conjunctive part. It does *not* require that every conjunctive part of p fall within ϕ's extension. (Recall that $\lambda x.(x = p \vee x = q)$ generates the conjunction $p \wedge q$, which contains a conjunctive part—namely, itself—that is not within the operator's extension).

As a result, even if S is a conjunctive part of itself, it does not follow that it falls within the extension of $\lambda x.(\neg\exists p(x = (p \wedge x)))$. And if S is not within this operator's extension, it does not follow that S is not a conjunctive part of itself.

The upshot is this. We can indeed establish that if S is not a conjunct of itself, then it is a conjunct of itself. We cannot establish the reverse. Therefore, S is a conjunctive part of itself; the smallest proposition that contains the entirety of $\lambda x.(\neg\exists p(x = (p \wedge x)))$'s extension as conjunctive parts contains S as a conjunctive part. This is no contradiction. Moreover, given that the relevant notion of parthood is improper, we *already* ought to have accepted that S is a conjunctive part of itself. Resolving the Russell Paradox in this way adds no further commitments to our theory.

A second consistency concern arises from the number of conjunctions that *Comprehension* produces. A bit bluntly, the worry is that it generates *too many*—sufficiently many that it gives rise to cardinality problems. Historically, theories of conjunction have faced this precise issue. Russell (1903) and Myhill (1958) independently established the inconsistency of theories of structured propositions by showing that they generate so many that the cardinality of conjunctions is higher than itself.[36] This problem concerns the following two schematic principles:

i. $\forall pp\phi(pp)$
ii. $\forall pp\forall qq(\phi(pp) = \phi(qq) \rightarrow pp = qq)$

All instances of these schemata are logically inconsistent, but we can focus attention on the present concern of conjunction. On this application, the first principle asserts that, for every plurality of propositions *pp*, the conjunction of *pp*s exists. The second asserts that, if the conjunction of *pp*s is identical to the conjunction of *qq*s, then the *pp*s are identical to the *qq*s. Establishing their incompatibility is straightforward. The first generates a conjunction for every plurality of propositions, while the second entails that these conjunctions are all distinct from one another. Collectively, these principles generate an injection from the set

[36] There has been substantial discussion about this inconsistency in recent years—see, e.g., Goodman (2017); Dorr (2016); Fritz (2022). Note that the principles, as stated below, rely upon plural quantification—a slight increase in expressive power from the languages we previously employed.

of pluralities of propositions to the set of propositions.[37] This violates Cantor's Theorem; such an injection cannot exist. Any theory of conjunction that validates both principles is logically inconsistent.

If our language only allows for conjunctions of finite length, there is no cause for concern; there are infinitely large collections of propositions whose conjunctions do not exist—in violation of principle *i*. By contrast, languages with infinitary conjunction face a choice. On pain of inconsistency, they must either reject principle *i* or principle *ii*. This choice is pressing for *Comprehension*. If there is a unique operator for every plurality of propositions—and if any operators with different extensions generate distinct conjunctions—then *Comprehension* falls to the Russell-Myhill problem.

An easy way out would be to deny principle *i*. *Comprehension* generates a conjunction for every sentential operator; it takes no stand on how many sentential operators there are. If the cardinality of operators is the same as the cardinality of propositions, then there are some pluralities of propositions for which there is no operator that holds precisely of them. So, even if every operator generates a unique conjunction, no Cantorian problem need arise.

But perhaps some prefer languages where the cardinality of operators is strictly higher than the cardinality of propositions. This is not entirely unreasonable for languages with plural quantification. We might expect to be able to generate an operator for every plurality of propositions *pp*—the operator that corresponds to *is one of the pps*. For this to be expressible, the cardinality of operators must strictly exceed the cardinality of propositions. Within these languages, *Comprehension* allows us to generate a conjunction for each nonempty operator.

But regardless of the number of operators within our language, there is no cause for concern—as *Comprehension* violates principle *ii*. Even if operators have different extensions, the conjunctions that *Comprehension* generates from them may be the same. For example, take the operators $\lambda x.(x = p \vee x = q)$ and $\lambda x.(x = p \vee x = q \vee x = p \wedge q)$. Unquestionably, the extensions of these operators differ: $p \wedge q$ is within the extension of the latter, but not the former. Nevertheless, the conjunction that *Comprehension* generates for both operators is $p \wedge q$—as this is the smallest conjunction that contains everything within the operators' extensions as conjunctive parts. So, while *Comprehension* generates a conjunction for every operator, it does not guarantee that these conjunctions are distinct from one another—even for operators with different extensions. And because these conjunctions need not be distinct, the cardinality of conjunctions need not exceed itself. The result is that, *even if the cardinality of operators exceeds the cardinality of propositions*, *Comprehension* is immune to the Russell-Myhill problem.

These remarks do not establish that *Comprehension* is consistent. Doing so would require the introduction of a model theory—and the creation of a model that validates this

[37] This reference to set theory is purely expository; it is possible to generate this problem without reference to sets.

principle. But I take the most serious worries to be the Russell Paradox and Russell-Myhill problem. Because *Comprehension* avoids both, I do not believe that it faces any serious consistency concerns.

There is another objection to *Comprehension*—one not (directly) related to its consistency. Perhaps the most significant challenge to this principle was raised by Levy (2016), concerning the notion of *indefinite extensibility*. A property F is said to be indefinitely extensible just in case, for any collection of objects that satisfy F, there exists an F which is not a member of that collection.[38] For example, the property *is an ordinal number* is indefinitely extensible, since given any collection of ordinals, a further ordinal can always be found.

In particular, Levy argues that the contingent truths are indefinitely extensible. Given any collection of contingencies, there exists another which is not a member of that collection.[39] If no collection of contingencies is 'complete' in this sense, it may be impossible to generate the conjunction of every contingent truth. (After all, given any conjunction of contingencies that we formed, yet another contingency could always be found).

How ought extensibilists interpret *Comprehension* as it has been formulated here? Of course, they cannot endorse this principle—or their resistance to the Standard Argument would falter. But what *precisely* do they think has gone awry?

I think that the most natural reaction is that the quantifiers within *Comprehension* lack a truly general scope. This principle generates the proposition C, the conjunction of *all* contingent truths. If some contingent truth falls outside the quantifier 'all''s domain, then that contingency could be the sufficient reason for C without being one of C's conjuncts. Of course, this objection cannot concern *that particular* quantifier; it cannot be that metaphysicians have mistakenly employed a restricted quantifier that they could replace with an absolutely general one. Rather, there must be something illicit about the notion of absolute generality itself.

Advocates of indefinite extensibility often reason in just this way.[40] If it were possible to make claims with absolute generality, then the domain of this quantification could not be extended; because it includes absolutely everything, it is already as large as it could possibly be. If this is so, then there are domains that cannot be extended—which is precisely what the extensibilist denies. For this reason, those who subscribe to indefinite extensibility typically deny that it is possible to make absolutely general claims.

The denial of absolute generality is eminently defensible—but extremely controversial. Advocates of generality often emphasize the difficulty of denying that that we can

[38]For canonical discussions of indefinite extensibility, see Dummett (1963, 1978, 1991, 1993). See, also, Linnebo (2018). There are numerous precisifications of indefinite extensibility in the literature—see Uzquiano (2015). Some depend upon the interactions of extensions with modals, along the lines that, for any collection of objects that satisfy F, it is *possible* for there to exist another F—as in Builes (2022).

[39]Levy proposes—yet ultimately rejects—another objection to *Comprehension*, namely that there are 'too many' contingent truths to consider in a totality.

[40]See, e.g., Parsons (1974); Glanzberg (2004); Fine (2006); Studd (2019).

quantify unrestrictedly in a manner that is both consistent and expresses what we want to express.[41] The sentence 'All quantifiers are restricted' includes a quantifier itself. If this quantifier is unrestricted, then the sentence is inconsistent. If it is restricted, then there are quantifiers that fall outside of its domain—quantifiers that could be unrestricted.[42] Moreover, while set-theoretic paradoxes are challenging, they can be resolved while permitting unrestricted quantification—so long as comprehension principles are formulated carefully. In particular, these paradoxes do not impact *Comprehension* as it has been formulated here—so far from clear that these paradoxes motivate restricting this principle's interpretation.

In spite of this, some rationalists might prefer to resist the Standard Argument by denying absolute generality. This denial takes a stand on a contentious debate—but such stands are sometimes unavoidable. Are there any costs that the rationalist *in particular* incurs—ones beyond the cost that denying generality faces?

One significant cost is that, without the expressive resources of absolute generality, it is challenging to state the Principle of Sufficient Reason in a manner that expresses what it ought to express.[43] The *PSR* holds that there is a sufficient reason for *every* truth. If this quantifier is unrestricted, then it is possible to make claims with absolute generality—and the extensibilist's response fails. (After all, the rationalist cannot maintain that quantifiers are restricted, yet the quantifier in the statement of the Principle of Sufficient Reason is unrestricted). Alternatively, if this quantifier is restricted, then there are truths that fall outside its domain. If this is so, then the *PSR* allows there to be brute facts—those that hold without reason. So long as these facts fall outside the scope of the *PSR*'s quantifier, they may hold for no reason at all, and the sentence 'There is a sufficient reason for every fact' would remain true. But, presumably, this is *precisely* what the *PSR* was intended to deny. Rationalists who reject absolute generality thus struggle to state their view in a

[41]For defenses of absolute generality, see Lewis (1991); van Inwagen (2002); Sider (2003) and Williamson (2003).

[42]Several philosophers have attempted to resolve the expressibility concern. See, e.g., Fine (2006) and Studd (2013). In my view, the most successful attempt occurs in Russo (Forthcoming). Russo argues that an adequate denial of absolute generality requires the ability to make non-quantificational generalizing claims. Arguably, generalized identity fits the bill: 'To be made of water is to be made of H_2O' has generalizing implications for substances made of water, and 'To be a bachelor is to be an unmarried male' has generalizing implications for bachelors. In appropriate language, we could state 'To be a quantifier is to be a restricted quantifier'—a claim which involves identification, rather than a quantification—and yet has generalizing implications for quantifiers.

[43]I claim that it is challenging to state the *PSR*—not that it is impossible. But the rationalist would need to work hard to find a version of the *PSR* that could be expressed. Perhaps, as in Russo (Forthcoming), they could appeal to higher-order identity to generalize without the use of quantifiers; and make absolutely general claims even if quantifiers are universally restricted. One natural way to do so would be to accept 'For p to be true is for there to exist a sufficient reason that p is true.' I could not find any rationalists who endorse this precise identification—see Builes (2024) for a rationalist who considers (yet ultimately rejects) a version of the *PSR* along these lines. I suspect that any rationalist who rejects absolute generality would incur costs if their view is to be expressible—but these may be worth the price.

manner that expresses what they want to express.

The upshot is this: a rationalist could resist the Standard Argument by rejecting *Comprehension*—but it is not a path that everyone will comfortably embrace. Consistency concerns do not undermine this principle. Those who endorse indefinite extensibility likely deny that we can quantify with absolute generality. If it is impossible to make claims with absolute generality, *Comprehension* appeals to a restricted quantifier. While this undermines the Standard Argument, it also threatens the *PSR* itself, as it allows for there to be facts that hold without reason—so long as these facts are not within the scope of the *PSR*'s quantifier.

Distribution

What remains is *Distribution*: the principle that, if p is a sufficient reason for a conjunction then it is a sufficient reason for each of that conjunction's conjuncts. Ought *Distribution* be accepted, or rejected? Of course, any rationalist committed to *Factivity*, *Irreflexivity* and *Comprehension* must reject *Distribution*—on pain of inconsistency. But such a rationalist would rest on firmer ground with another reason to reject it: one independent of the Standard Argument.

Explicit discussion of *Distribution* in the literature is sparse. What little there is indicates that philosophers find it to be plausible—perhaps *so* plausible as to need no defense. Some have gone so far as to claim that it is obvious to the point of rendering it unimpeachable.[44]

On the contrary. I think that the rationalist can reasonably claim that while *Distribution* appears plausible in the abstract, closer examination reveals untenable implications. One argument against Distribution depends upon a principle of *Conjunctive Agglomeration*. According to this principle, if p_1 is a sufficient reason for q_1, and p_2 is a sufficient reason for q_2, then $p_1 \wedge p_2$ is a sufficient reason for $q_1 \wedge q_2$. If the reason that roses are red is that they reflect light of 665 nanometers, and if the reason that violets are blue is that they reflect light of 410 nanometers, then the reason that roses are red and violets are blue is that roses reflect light of 665 nanometers and violets reflect light of 410 nanometers.

Conjunctive Agglomeration is extremely plausible—but its interaction with *Distribution* is disastrous. The first problem is that it generates wildly irrelevant reasons; for nearly

[44] For a claim of unimpeachability, see Pruss (2006). Pruss briefly provides one argument for *Distribution*—though does not go into great depth (presumably because he believes that *Distribution* needs no serious defense). His argument is as follows:

i. If p is the sufficient reason for a conjunction, then it has sufficient information to explain all of the conjuncts.

ii. If p has sufficient information to explain q, then p is a sufficient reason for q.

iii. Therefore, if p is a sufficient reason for a conjunction, it is a sufficient reason for the conjuncts.

There is ample room for the rationalist to resist this argument. On the one hand, every fact presumably has sufficient information to explain itself (while p may not be self-explanatory, this is not because it lacks the information needed to explain p). Rationalists who accept *Irreflexivity* ought to reject premise *ii.* For a more detailed objection to Pruss, see Blado (2023).

every fact p, there are sufficient reasons for p that have almost nothing to do with the reason that p is true. Take an arbitrary collection of facts p_1, p_2, q_1 and q_2, such that p_1 is the sufficient reason for q_1, and p_2 is the sufficient reason for q_2. By *Agglomeration*, $p_1 \wedge p_2$ is the sufficient reason for $q_1 \wedge q_2$. *Distribution* then entails that $p_1 \wedge p_2$ is the sufficient reason for q_1. But p_2 is *completely irrelevant* to the truth of q_1; it does nothing to explain why q_1 is the case. The reason that it partially explains $q_1 \wedge q_2$ is that it explains q_2—not q_1. This problem generalizes. Just as it is possible to generate a conjunction with *one* conjunct that is irrelevant to the truth of q_1, it is possible to generate conjunctions *of arbitrary length* that are sufficient reasons for q_1. These conjunctions may be overwhelmingly irrelevant to why q_1 is the case—and contain but a single conjunct that bears upon its truth. Those who deny that irrelevant conjunctions serve as sufficient reasons—and who endorse *Conjunctive Agglomeration*—ought to deny *Distribution*.

Additionally, endorsing both *Conjunctive Agglomeration* and *Distribution* comes perilously close to violating *Irreflexivity*. Take an arbitrary p, q and r such that p is the sufficient reason for q and q is the sufficient reason for r. By *Agglomeration*, $p \wedge q$ is the sufficient reason for $q \wedge r$. *Distribution* then entails that $p \wedge q$ is the sufficient reason for q. But this seems to get things entirely backwards! q is typically taken to be (part of) the sufficient reason for $p \wedge q$—not the reverse. While this is not strictly a violation of *Irreflexivity*, the same motivations that lead philosophers to deny self-explanation presumably also lead them to deny that $p \wedge q$ explains q. As a result, rationalists who endorse *Conjunctive Agglomeration* ought to reject *Distribution*.

A second argument against *Distribution* is appeals to propositional granularity. Every rationalist will adopt either a coarse-grained or a fine-grained conception of propositions. *Distribution* generates violations of *Irreflexivity* on both, given minimal additional assumptions. So, rationalists committed to *Irreflexivity* ought to deny *Distribution*.

Begin with a coarse-grained conception: Classicism.[45] According to Classicism, provably equivalent propositions are identical; if it is provable that $p \leftrightarrow q$, then $p = q$. This view is closely associated with intentionalism—the claim that propositions are sets of possible worlds, and that propositions which are true in precisely the same worlds are identical.[46] Because all logical truths entail one another, Classicists maintain that they are all identical; each is to be identified with $\top$. Additionally, propositions are identical to their conjunction with $\top$. It is provable that $p \leftrightarrow (p \wedge \top)$, so Classicists hold that $p = (p \wedge \top)$.

One further assumption is needed to generate violations of *Ireflexivity*: the claim that every fact is the sufficient reason for something-or-other. This converse of the *PSR* is eminently plausible—we need only assume that every fact p is the sufficient reason for the fact that $p \vee q$.[47]

[45] See, again, Bacon and Dorr (2024).

[46] See Lewis (1986); Stalnaker (1968). The reason that these are merely associated (and not notational variants) is that possible worlds semantics ascribes a particular model theory to propositions—and there are classicist theories that endorse this logic under different model theories.

[47] Another assumption that would generate universality is that p is the sufficient reason for $\neg\neg p$, though

Select an arbitrary pair of facts p and q such that p is the sufficient reason for q. On Classicist theories of identification $q = q \wedge \top$. Because p is the sufficient reason for q, Leibniz's Law allows us to infer that p is the sufficient reason for $q \wedge \top$; *Distribution* then entails that p is the sufficient reason for $\top$. Because the selection of p was arbitrary, absolutely every fact is a sufficient reason for $\top$. But if every proposition is a sufficient reason for $\top$, then $\top$ is a sufficient reason for $\top$—in violation of *Irreflexivity*.

Coarse-grained conceptions of facts thus contradict *Irreflexivity*. What about fine-grained conceptions? On these, it is extremely plausible that every fact is the sufficient reason for its self-conjunction; p is the sufficient reason for $p \wedge p$. The standard logic of ground maintains that conjunctive facts are grounded in their conjuncts, which entails that every fact grounds its self-conjunction. If this logic is to serve as any guide to the *PSR*, it is reasonable to maintain that every fact is a sufficient reason for its self-conjunction. Even apart from ground-theoretic considerations, it is hard to conceive of a more satisfactory explanation for why it is the case that $p \wedge p$ than the fact that p. If p *really is* the sufficient reason for $p \wedge p$, *Distribution* would entail that p is a sufficient reason for itself—in violation of *Irreflexivity*. Note that this is not the claim that there are isolated, special cases where *Irreflexivity* fails. Rather, absolutely every fact would be a sufficient reason for itself. Rationalists who hold both that p is the sufficient reason for $p \wedge p$—and that there is *any fact whatsoever* that is not the sufficient reason for itself—must reject *Distribution*.

There is an eminently close connection between propositions and their self-conjunctions. The most plausible accounts of this connection are identity, and sufficient reason. Coarse-grained accounts identify propositions with their self-conjunctions—and so cannot hold that p is the sufficient reason for $p \wedge p$. But fine-grained theories make distinctions that coarse-grained ones do not. Many (though not strictly all) such theories reject this identification.[48] On these accounts, it is extremely natural to suggest that propositions are the sufficient reasons for their self-conjunctions—which forces the rejection of *Distribution*.

Let us take stock of our current position. The principles of *The PSR*, *Factivity*, *Irreflexivity*, *Comprehension*, and *Distribution* are jointly inconsistent. While *Factivity* is extremely compelling, there is some room to resist *Irreflexivity* and *Comprehension*. However, any rationalist who endorses both principles must reject *Distribution*. Any rationalist who endorses *Conjunctive Agglomeration* has an independent motivation for rejecting *Distribution*. Moreover, such a rationalist presumably endorses either a coarse-grained conception of facts, or a fine-grained conception of facts. Whichever conception they adopt, there are reasons to reject *Distribution* on the grounds that it violates *Irreflexivity*—with minimal additional assumptions. A coarse-grained theorist need only assume that every fact is the sufficient reason for something-or-other, and the fine-grained theorist need only assume that every fact is the sufficient reason for its self-conjunction.

The result is that there are remarkably few rationalists who ought to be moved by the

this is not amenable to Classicism, which identifies propositions with their double-negations.

[48] As before, see Dorr (2016); Fine (2017*a*,*b*); Elgin (2020); Bacon (2023) for fine-grained theories that deny Idempotence, and Correia and Skiles (2019) for a fine-grained theory that endorses Idempotence.

Standard Argument. The only ones who risk modal collapse are those who reject *Conjunctive Agglommeration*, accept a fine-grained conception of propositional granularity that nevertheless licenses *Idempotence*, and endorse both *Irreflexivity* and *Comprehension*. This is such an idiosyncratic combination of views that it is likely that virtually no rationalist need believe that the Standard Argument establishes modal collapse.

Conclusion

Thus far, this paper has been primarily negative; I have argued that the Standard Argument does not establish that rationalism gives rise to necessitarianism. I close by providing some positive reasons to endorse rationalist contingency. I suspect that, if there is any contingency, then there is widespread contingency, but I will focus on a special case: factual structure. There are multiple ways that the facts of the world could be ordered. These orderings are all compatible with the Principle of Sufficient Reason, yet are incompatible with one another. Because the *PSR* does not determine which obtains, it allows for it to be contingent how the facts of the world are structured. And because the *PSR* allows for this contingency, it does not entail necessitarianism.

Recall, from the earlier discussion of *Irreflexivity*, that there are three candidate structures for facts:

i.	*Primitivism*	There are brute facts: those that hold without a sufficient reason, and form the ultimate sufficient reasons for everything else.
ii.	*Infinitism*	There are infinite chains of reasons, such that for every fact, there exists another which serves as the sufficient reason for it.
iii.	*Circularity*	Facts form circles of explanation; for some facts F_1, F_2, ..., F_n, F_1 is a sufficient reason for F_2, F_2 is a sufficient reason for F_3, ... , F_{n-1} is a sufficient reason for F_n, and F_n is a sufficient reason for F_1.

Because rationalism rules our *Primitivism*—it does not allow for brute facts—the remaining options are *Infinitism* and *Circularity*.

The prospect of contingent structure already looms large. If both *Infinitism* and *Circularity* are compatible with the *PSR*, the rationalist could hold that it is contingent whether there are infinite chains or circles of metaphysical explanation. But some might maintain that one of these alternatives is metaphysically impossible, and so is incompatible with absolutely everything (including the *PSR*). However, each structure admits of numerous permutations. These permutations all validate the *PSR*, so the *PSR* does not determine which obtains. Let us take each of these in turn.

Infinitism is the claim that there are infinite chains of metaphysical explanation. While there is a sufficient reason for every fact, these reasons neither terminate nor circulate. Rather, there is an unending sequence, where each element is explained by that which precedes it.

While *Infinitism* holds that there are explanatory chains of infinite length, it does not determine how many chains there are. For the sake of simplicity, suppose that there are countably infinitely many facts—and index each of these facts with the whole numbers. There is thus a fact F_0, a fact F_1, a fact F_{-1}, etc. There are different ways that these facts could explain one another. On one model, each fact is the sufficient reason for its numerical successor; fact F_{-1} is the sufficient reason for fact F_0, fact F_0 is the sufficient reason for fact F_1, etc. On a second candidate structure, the facts 'leapfrog' within the ordering. Fact F_{-2} is the sufficient reason for fact F_0, fact F_{-1} is the sufficient reason for fact F_1, etc. On this second possibility, the even-numbered facts are sufficient reasons for other even-numbered facts, and the odd-numbered facts are sufficient reason for other odd-numbered facts.

These alternatives are not merely notational variants. They correspond to distinct ways that the world could be. On the first possibility, there exists a single, infinite explanatory chain; given any pair of facts, one is the ancestral sufficient reason of the other.[49] By contrast, on the second possibility, there are two infinite chains. Given an arbitrary pair of facts, it may be that neither is the ancestral sufficient reason of the other—should they figure in different explanatory chains.

Each alternative satisfies the rationalist's demands. Regardless of whether there is one explanatory chain or two, there exists a sufficient reason for everything. Nor are these alternatives exhaustive. Most straightforwardly, for any natural number n, there could be n infinite explanatory chains. But there are other, more exotic possibilities: ones that are also compatible with the *PSR*. Perhaps each fact 'branches'—in that every fact is the sufficient reason for two distinct facts (or for three facts, or four...). Or perhaps some facts branch while others do not. The most natural way to represent these various possibilities is with directed hypergraphs. Within a hypergraph, each 'node' corresponds to a fact, and each 'arrow' corresponds to a metaphysical explanation. As it turns out there are infinitely many hypergraphs that do not terminate in either direction.[50] These possibilities all entail that every fact has an explanation—and so all are compatible with the *PSR*. Because the Principle does not entail which of these obtains, it allows for it to be contingent which obtains—and so does not give rise to necessitarianism.

It might help to provide a quasi-formal explanation of this reasoning in terms of possible-worlds semantics. Let 'p' denote the claim that there is exactly one explanatory

[49]By 'ancestral sufficient reason' I mean the transitive closure of the relation *is a sufficient reason for*. If this relation is itself transitive, then to be an ancestral sufficient reason is to be a sufficient reason—but I strictly take no stand on transitivity.

[50]There are also infinitely many when additional restrictions for irreflexivity and transitivity are introduced. In fact, not only are there infinitely many such hypergraphs, but there are *uncountably* infinitely many. These are not isomorphic to one another, and so correspond to distinct possibilities.

chain, and 'q' denote the claim that there are exactly two. Because p and q are both compatible with the *PSR*, there is a possible world in which the *PSR* and p are true—as well as a possible world in which the *PSR* and q are true. That is to say, $\diamond(PSR \wedge p)$ and $\diamond(PSR \wedge q)$. Clearly, p and q are incompatible with one another (there cannot be both exactly one and exactly two explanatory chains simultaneously). So, there is no possible world in which both p and q are true. Thus, the possible world where the *PSR* and p are true is distinct from the possible world where the *PSR* and q are true. And because there are two distinct possible worlds, there must exist propositions that are true within one world that are false within the other—i.e., contingent truths. So, even if we only countenance worlds in which the *PSR* holds, there are contingent truths.

Turn now to *Circularity*—the claim that there are circles of metaphysical explanation. Like *Infinitism*, *Circularity* allows for every fact to hold for a sufficient reason. Unlike *Infinitism*, it is compatible with the existence of only finitely many facts. What it requires is that there is a sequence of facts, each of which is the sufficient reason for the next; at some point within this sequence, a fact 'doubles back', and is the sufficient reason for the fact that the sequence began with. For example, it may be that F_1 is a sufficient reason for F_2—and that F_2 is a sufficient reason for F_3—while F_3 is a sufficient reason for F_1. The simplest type of *Circularity* is *Reflexivity*: a fact which is the sufficient reason for itself. (As previously noted, if the relation *being a sufficient reason for* is transitive, *Circularity* entails *Reflexivity*).

While *Circularity* holds that there are circles of metaphysical explanation, it does not determine how many circles there are. Even if we restrict our attention to reflexive sufficient reasons, there are distinct models for factual structure that validate the *PSR*. On one, there is a single violation of *Irreflexivity*. There exists but a single fact that is the sufficient reason for itself. Alternatively, there could be two violations of *Irreflexivity*; two distinct facts could be sufficient reasons for themselves. As with *Infinitism*, these are not mere notational variants. On the first possibility, all facts share an ancestral sufficient reason; the sole fact which is the sufficient reason for itself is the ancestral sufficient reason for absolutely everything. On the second possibility, there are pairs of facts whose ancestral sufficient reasons are distinct; one's ancestral reason may be the first violation of *Irreflexivity*, while the other's is the second.

Nor are these alternatives exhaustive. Most obviously, there could be three violations of *Irreflexivity*, or four, or five, etc.[51] And, as with *Infinitism*, branching structures reveal more alternatives still. It could be that there is a single violation of *Irreflexivity*, but this fact is only an immediate sufficient reason for one other fact. Alternatively, it could branch, and be an immediate sufficient reason for two (or more) other facts. All of these infinitely many alternatives validate the *PSR*, as there is a sufficient reason for every fact. Because the *PSR* does not determine which alternative is true, it allows for it to be contingent which obtains.

[51] We could carry out analogous modal reasoning as in *Irreflexivity*—merely by allowing 'p' to denote the claim that there is one violation of *Irreflexivity*, and 'q' to denote the claim that there are two.

And because the *PSR* allows for this contingency, it does not entail necessitarianism.[52]

Thus, if either *Infinitism* or *Circularity* is correct, there are multiple candidate structures for facts—each compatible with the Principle of Sufficient Reason. Because the *PSR* does not determine which structure obtains, the rationalist may hold that it is contingent which obtains.

The Principle of Sufficient Reason is often rejected on the grounds that it entails necessitarianism. However, the path to modal collapse depends on assumptions other than the *PSR*. Several of these are open to doubt, and one—the claim that sufficient reasons distribute over conjunctions—is particularly implausible. Moreover, the rationalist has positive grounds for maintaining that the *PSR* allows for contingency: namely, that there is contingent factual structure. There may be a reason for absolutely everything—and yet the world could have differed from how it actually is.

[52]Several philosophers have raised the same objection in conversation—so it is worth addressing directly. On either *Infinitism* or *Circularity*, contingency arises from factual structure; for instance, it may be contingent that there is a single infinite explanatory chain—or that there is a single circular explanation. But if the *PSR* is true, these facts must themselves hold for a sufficient reason. (That is to say, there must be a sufficient reason for why there is a single explanatory chain—or reason for why there is a single circular explanation). What could explain such facts, and wouldn't any such explanation lead to necessitarianism?

In one respect, this demand is somewhat unfair to the rationalist. Rationalists do not claim to be able to *personally provide* the sufficient reason for every fact; they merely hold that such reasons exist (though they cannot always articulate them). Even if a rationalist is unsure what precisely explains factual structure, that uncertainty need not motivate rejecting the *PSR*.

But the rationalist need not respond with quietism. There are several replies compatible with the Principle of Sufficient Reason. The most natural view, I think, is that structural facts are included among all the rest.[53] An infinitist who maintains that there is a single chain holds that *all* facts fall somewhere within it—where 'all' is unrestricted. Because every fact falls within this chain—and because there exists a fact that *there is a single chain*—this structural fact is explained by other facts within the chain. Similarly, a circularist might hold that a single fact is the sufficient reason for itself, and the ancestral sufficient reason for all others. Because this fact is the ancestral sufficient reason for *every* fact, it is the ancestral sufficient reason for the fact that *a single fact is the sufficient reason for itself*.

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