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## Degrees of Consciousness

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### ABSTRACT:

Does consciousness come in degrees? If the answer is 'yes', then it makes sense to say that some creatures (or mental states) are *more* conscious than others. If the answer is 'no', then such claims are either false or incoherent. The main philosophical argument against degrees of consciousness appeals to the idea that every entity is either determinately conscious or determinately non-conscious. This paper explains why this argument conflates questions about determinacy (can it be a matter of degree whether some entity is F?) with questions about degrees (does F come in degrees?), examines the semantics of 'more conscious than' expressions, and develops a general analysis of what it is for consciousness to come in degrees. The guiding idea behind the analysis is that what it is for  $x$  to be more conscious is for  $x$  to have more of whatever consciousness is. I argue that most theories of consciousness imply that consciousness comes in degrees, though what exactly degrees of consciousness are varies across different theories. This means that claims about degrees of consciousness should be treated as substantive hypotheses open to confirmation and falsification, rather than as obvious truths or conceptual confusions.

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## Introduction

Does consciousness come in degrees? If the answer is ‘yes’, then some creatures (or mental states) are *more* conscious than others. If the answer is ‘no’, then such claims are either false or incoherent.

One perspective takes the idea that consciousness comes in degrees to be an obvious datum.<sup>1</sup> Here are the sorts of claims that tend to be expressed by those who favor this view:

- (a) A human is more conscious than a fish.
- (b) A walrus is more conscious than a rock.
- (c) A fully awake person is more conscious than a drowsy person.
- (d) An intense pain is more conscious than a mild pain.
- (e) A clear perception is more conscious than a fuzzy mental image.
- (f) A rich multimodal experience is more conscious than a sparse unimodal experience.

Another perspective takes the idea of degrees of consciousness to be conceptually confused.<sup>2</sup> Here’s the argument that convinces many to adopt this view:

**The Determinacy Objection:** If consciousness comes in degrees, then one can be conscious to a greater or lesser extent. But what it is to be conscious is to have a subjective point of view, and one cannot have a subjective point of view to a greater or lesser extent. One either has a subjective point of view, or one doesn’t: there is no middle ground. Even if there is barely something it’s like to be an entity, that entity still counts as conscious. Therefore, it doesn’t make sense to say that consciousness comes in degrees.

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<sup>1</sup> This includes Searle [1992: 83], Lycan [1996: 39], Morin [2006], Oizumi, Albantakis, & Tononi [2014], Tononi & Koch [2015], Fazekas & Overgaard [2016], Jonkisz, Wierzchoń, & Binder [2017], Latham *et al* [2017]. Others who more cautiously express sympathy for degrees of consciousness include van Gulick [2007], Rosenthal [2018], and Godfrey-Smith [2020].

<sup>2</sup> This includes Bayne, Hohwy, & Owen [2016], Carruthers [2019], Birch, Schnell, & Clayton [2020], and Birch [2020]. Others who more cautiously express skepticism about degrees of consciousness include Pautz [2019] and Lee [2020].

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I believe the idea that consciousness comes in degrees is neither an obvious datum nor a conceptual confusion. Instead, claims about degrees of consciousness ought to be treated as substantive hypotheses open to confirmation and falsification. No simple empirical observation proves them true, but no simple philosophical argument proves them false. On my view, whether it's possible for  $x$  to be more conscious than  $y$ —and which of  $a$ – $f$  is true, if any—depends on which theory of consciousness turns out to be correct.

The first task of this paper is to argue that the idea of degrees of consciousness is conceptually coherent. I'll argue that the determinacy objection articulated above is fallacious: questions about degrees are distinct from questions about determinacy. To disentangle the two questions, we need to appreciate the distinction between (1) it being a matter of degree whether some entity is conscious, vs. (2) consciousness coming in degrees. I'll also examine the semantics of 'more conscious than' expressions, and argue that the term 'conscious' exhibits the same characteristics as graded adjectives such as 'tall' or 'round'.

The second task of this paper is to develop an analysis of what it is for consciousness to come in degrees. A guiding idea is that for  $x$  to be more conscious is for  $x$  to have more of whatever consciousness is. More precisely, I'll argue that in order for a degreed property  $\phi$  to count as degrees of consciousness, it must be the case that (1) what it is for  $x$  to be conscious is for  $x$  to have a positive  $\phi$ -value, (2) any two entities that differ in their  $\phi$ -values differ phenomenologically, and (3) degrees of  $\phi$  measure a dimension of phenomenal similarity.

Towards the end of the paper, I'll argue that most theories of consciousness imply that consciousness comes in degrees. Yet what exactly degrees of consciousness are varies across different theories. Therefore, the most interesting question might not be *whether* consciousness comes in degrees (it probably does), but instead *which* degreed properties of consciousness count as degrees of consciousness.

Here's the structure of the paper. §1 draws some basic distinctions; §2 disentangles questions about degrees from questions about indeterminacy; §3 examines the semantics of 'more conscious than' expressions; §4 develops an analysis of what it is for a degreed property to count as degrees of consciousness; §5 applies the analysis to various theories of consciousness.

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## §1: Basic Distinctions

Let's give a name to the view that consciousness comes in degrees:

**The Degrees Thesis:** Consciousness comes in degrees.

The relevant notion of consciousness is phenomenal consciousness. I'll take the degrees thesis to be equivalent to the following claims (listed from the more ordinary to the more theoretical): (a) some entities are more conscious than others, (b) consciousness comes in greater or lesser extents, (c) there are levels of consciousness, (d) consciousness is graded, (e) there are magnitudes of consciousness, and (f) consciousness is a naturally orderable determinable. I'll focus mainly on the idea that some *creatures* are more conscious than others, though I'll also at times address the idea that some *mental states* are more conscious than others.

I'll assume that it's properties (rather than some other metaphysical kind) that come in degrees. As some examples of degreed properties, consider mass, size, height, temperature, warmth, wealth, and number of prime factors. As some examples of non-degreed properties, consider nationality, blood type, species, and hue.

### §

It's worth briefly disentangling the degrees thesis from other claims that are often confused with it. The main conceptual clarification I wish to focus on (between degrees and determinacy) will come in the next section.

**Features.** Some authors defend the degrees thesis by noting that certain features of consciousness, such as intensity, vivacity, precision, and complexity, come in degrees. *Example:* Jonkisz, Wierzchoń, & Binder [2017: 3] say that phenomenal consciousness is graded because "experiences are more or less vivid, sharp, intense, clear, rich, detailed, etc." However, it's not obvious that such observations indicate that consciousness itself comes in degrees, rather than merely that certain features of consciousness come in degrees.<sup>3</sup> As an analogy, some features of quarks come in

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<sup>3</sup> This issue often arises when authors invoke the Perceptual Awareness Scale as a measure of degrees of consciousness (see, as examples, Overgaard *et al* [2006], Windey & Cleeremans [2015], and Fazekas & Overgaard [2016]). For a compelling criticism, see Michel [2018].

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degrees (such as mass and charge) even though quarkhood itself doesn't come in degrees. In §4, I'll explain how to disentangle degreed features of consciousness from degrees of consciousness itself.

**Polysemy.** Some authors defend the degrees thesis by appealing to observations that don't disentangle phenomenal consciousness from other senses of 'consciousness', such as wakefulness. *Example:* Latham et al. [2017: 1] say that "a fully awake, engaged person has a high level of consciousness, a tired dazed person a moderate level, and a sleeping person a low level." However, the fact that wakefulness comes in degrees doesn't yet establish that phenomenal consciousness comes in degrees. At best, these authors may be taking for granted the substantive background assumption that degrees of wakefulness correspond to degrees of phenomenal consciousness. That assumption may turn out to be correct, but it's certainly not obvious. Analogous considerations apply to other senses of 'consciousness', such as access consciousness.<sup>4</sup>

**Dimensionality.** Some authors assume the degrees thesis entails that global states of consciousness, or states that characterize a creature's "overall conscious condition,"<sup>5</sup> vary along only a single dimension. *Example:* Birch, Schnell, & Clayton [2020: 790] say that it "barely makes sense" to ask whether a human is more conscious than an octopus because "any single scale for evaluating questions such as these would end up neglecting important dimensions of variation." However, the degrees thesis doesn't commit one to holding that degree of consciousness is the only important phenomenological dimension of variation. As an analogy, it's fallacious to conclude that it barely makes sense to ask whether a human is bigger than an octopus on the grounds that any such unidimensional comparison (say, in terms of width) would elide other important dimensions (such as height and depth). And as I discuss next (and later, in §4 and §5), one might reasonably think that degrees of consciousness are themselves determined by multiple dimensions of variation.

**Comparability:** Some authors assume the degrees thesis entails that degrees of consciousness satisfy comparability, where a degreed property *F* is *comparable* just in case for any two entities that are *F*, one is greater than the other (or they are equal) with respect to *F*. *Example:* Bayne, Hohwy, & Owen [2016: 407] argue against the idea

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<sup>4</sup> See Block [1995] on other notions of consciousness.

<sup>5</sup> See Mckilliam [2020] on the notion of global states of consciousness.

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of degrees of consciousness by expressing doubt that “all global states can be assigned a determinate ordering relative to each other.”<sup>6</sup> However, not all degreed properties satisfy comparability. Size comes in degrees (Jupiter is bigger than Earth) but arguably doesn’t satisfy comparability (is an apple bigger than a banana?). Logical strength comes in degrees (if  $P \models Q$  but  $Q \not\models P$ , then  $P$  is stronger than  $Q$ ) and definitely doesn’t satisfy comparability ( $P \not\models Q$  and  $Q \not\models P$ , then neither is stronger than the other). Therefore, anyone who claims that degrees of consciousness *must* satisfy comparability needs justification for that claim.<sup>7</sup>

**Continuity.** Some authors use the term ‘continuous’ to characterize the idea that consciousness comes in degrees. *Examples:* Doerig, Schurger, & Herzog [2021: 43] suggest that “[t]here is a continuum from death, to coma, anaesthesia, drowsiness, and fully alert states” and Overgaard *et al* [2006: 707] claim that “conscious perception is a continuous phenomenon” (as opposed to all-or-nothing). However, not all continuous properties are degreed and not all degreed properties are continuous. Hue may be continuous, but it’s certainly not degreed ( $x$  cannot be greater in hue than  $y$ ). Number of prime factors is degreed, but it’s not continuous (the number must be an integer). What it is for a property  $F$  to be continuous is for there to be no breaks or jumps between the values of  $F$ ;<sup>8</sup> what it is for  $F$  to be degreed is for some values of  $F$  to be greater than others.

There is more that could be said about each of the distinctions above, but they are all relatively straightforward. Let’s now turn to a more subtle distinction.

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<sup>6</sup> Bayne, Hohwy, & Owen [2016: 408] make this case by comparing consciousness to economic health: since economic health varies along multiple dimensions, there may be no fact of the matter as to whether one nation’s economy is healthier than another’s. Yet, ironically, if degree of consciousness is in fact analogous to economic health, then the degrees thesis is true (since economic health still comes in degrees).

<sup>7</sup> Dorr, Nebel, & Zuehl [manuscript] argue that all gradable expressions (such as ‘tall’ or ‘big’) satisfy comparability. But these authors still take comparability to be a substantive claim that requires argument, rather than as an obvious claim that may be taken for granted.

<sup>8</sup> See Spivak [2008: 115] for a more precise definition of continuity.

## §2: The Determinacy Objection

I began the paper by presenting the determinacy objection, the most common argument against the coherence of the degrees thesis. Here it is again:

**The Determinacy Objection:** If consciousness comes in degrees, then one can be conscious to a greater or lesser extent. But what it is to be conscious is to have a subjective point of view, and one cannot have a subjective point of view to a greater or lesser extent. One either has a subjective point of view, or one doesn't: there is no middle ground. Even if there is just barely something it's like to be an entity, that entity still counts as conscious. Therefore, it doesn't make sense to say that consciousness comes in degrees.

The determinacy objection can be found in many places across the philosophical and scientific literature on consciousness. Let's focus on the example of Bayne, Hohwy, & Owen [2016], which has been the most substantive and widely-cited discussion of degrees of consciousness in recent years. These authors characterize the target of their argument as follows:

This idea [that consciousness comes in degrees] is frequently expressed in consciousness science. For example, consciousness is described as involving 'a scale ranging from total unconsciousness (e.g., death and coma) to vivid wakefulness'; as a 'continuous variable'; and as 'being graded' rather than being an 'all-or-none property'. Are these claims plausible? Can individuals be ordered on the basis of how conscious they are, just as they can be ordered on the basis of their age, height, or blood pressure? (p. 406)

They go on to present a version of the determinacy objection:

[T]he notion of degrees of consciousness is of dubious coherence. According to the standard conception of consciousness, a creature is conscious if and only if it possesses a subjective point of view. Arguably, the property of having a subjective point of view is not gradable—it cannot come in degrees. (p. 407)

Though the determinacy objection may initially feel compelling, the core reasoning is fallacious. Consider a structurally analogous argument:

# **An Obviously Bad Version of the Determinacy Objection:** If size comes in degrees, then size comes in greater or lesser extents. But what it is to have a size is to be spatially located, and one cannot be spatially located to a greater or lesser extent. One either is spatially located, or one isn't: there is no middle ground. Even if an entity occupies only a tiny region of space, that entity still has size. Therefore, it doesn't make sense to say that size comes in degrees.

Since the conclusion is false but each preceding sentence is true, the inferential structure of the argument is fallacious. It's also easy to see that many other degreed properties—mass, velocity, height, temperature—could likewise be used to generate structurally analogous arguments with false conclusions. Therefore, we should reject the determinacy objection against degrees of consciousness.

### §

Here's my diagnosis of what went wrong. The fallacy arose from conflating the following two questions:

DETERMINACY:	Can it be a matter of degree whether some entity is F?
DEGREES:	Does F come in degrees?

If it can be a matter of degree whether some  $x$  is F, then F allows for *indeterminacy*; if not, then F is always *determinate*.<sup>9</sup> If F comes in degrees, then F is *degreed*; if not, then F is *dichotomous*. The independence of these questions is illustrated by the following examples:

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<sup>9</sup> It's arguably more perspicuous to ascribe determinacy to propositions than to properties. But for brevity, I'll simply say 'F allows for indeterminacy' instead of 'it's metaphysically possible that there exists an  $x$  such that the proposition that  $x$  is F is indeterminate'.

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- Determinate + Degreed:* It's not a matter of degree whether  $x$  **has mass** ( $x$  either has mass or doesn't), but **mass** comes in degrees ( $x$  can have more mass than  $y$ ).
- Determinate + Dichotomous:* It's not a matter of degree whether  $x$  **is a quark** ( $x$  either is or is not a quark) and **quarkhood** doesn't come in degrees ( $x$  cannot be greater with respect to quarkhood than  $y$ ).
- Indeterminate + Dichotomous:* It's a matter of degree whether  $x$  **is a walrus** (consider the gradual nature of evolution) but **walrusness** doesn't come in degrees ( $x$  cannot be greater in walrusness than  $y$ ).<sup>10</sup>
- Indeterminate + Degreed:* It's a matter of degree whether  $x$  **is warm** (lukewarm is borderline warm) and **warmness** comes in degrees ( $x$  can be warmer than  $y$ ).

Suppose  $F$  is a degreed property. Then we can distinguish the property *being*  $F$  (or *having*  $F$ ), which I'll specify using gerund-phrases ('having mass', 'being warm'), from the property  $F$  itself, which I'll specify using the corresponding noun-phrases ('mass', 'warmness'). The determinacy objection draws upon the intuition that *being conscious* doesn't come in degrees, but that's compatible with *consciousness* coming in degrees. Consider how *having mass* doesn't come in degrees, even though *mass* itself comes in degrees.<sup>11</sup> Notice also that if  $F$  is dichotomous, then ordinary language usually lacks a grammatical distinction of the form described above (hence the awkwardness of terms such as 'quarkhood' and 'walrusness').

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<sup>10</sup> For many dichotomous properties, one could say ' $x$  is more of an  $F$  than  $y$ ' (for example: 'William Howard Taft is more of a walrus than Woodrow Wilson'). But this is arguably shorthand for saying that  $x$  more closely resembles  $F$ 's than  $y$ , or that  $x$  is a more prototypical example of an  $F$  than  $y$ , rather than that  $x$  has a higher degree of  $F$  than  $y$ .

<sup>11</sup> See Engel [1989] on what it is for something to be a matter of degree (though note that Engel seems to assume that  $F$  coming in degrees implies that  $F$  allows for indeterminacy).

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Questions about determinacy concern membership within categories. Questions about degrees concern values of magnitudes. If membership within a category itself has a degreed structure, then both kinds of questions concern degree structures.<sup>12</sup> But in cases of determinacy, the degrees characterize the extent to which something has a property, whereas in cases of degrees, the degrees characterize the structure of the property itself. If it can be a matter of degree whether an entity is *F*, then perhaps the property of *being F* comes in degrees, but that doesn't mean that *F* itself comes in degrees. Hence, the claim that it can be a matter of degree whether an entity is *F* doesn't entail the claim that *F* comes in degrees.

The conflation between whether consciousness can be indeterminate and whether consciousness comes in degrees generates a great deal of confusion. Some work that talks of 'degrees of consciousness' focuses on the former. Other work that talks of 'degrees of consciousness' focuses on the latter. Now, this would be harmless if the literatures themselves were appropriately divided, with one literature on determinacy and another on degrees. But that isn't the case: articles on one issue draw upon or criticize arguments concerning the other, usually with no indication that the issues are distinct.<sup>13</sup> In most cases, degrees and determinacy are treated interchangeably, leaving it unclear which issue is really at stake and unobvious which arguments are relevant.<sup>14</sup>

Let's look at one more example to illustrate the point. A central claim in Carruthers [2019] is that "consciousness is all-or-nothing," (20), meaning that "either a

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<sup>12</sup> Is indeterminacy best explained by appealing to some kind of degreed structure? That's an open question. One might think that indeterminacy is best explained by an epistemicist or a supervaluationist theory of vagueness, which don't require invoking any notion of degreed membership. But for a recent analysis of degreed membership, see Decock & Douven [2014].

<sup>13</sup> There are exceptions. Rosenthal [2018: 260] and Schwitzgebel [2020: 19] are careful to disentangle determinacy from degrees. And most articles on whether 'consciousness' is vague, such as Simon [2017], are clearly concerned with the determinacy question.

<sup>14</sup> For some discussions that seem to conflate the issues, see Lycan [1996: 39], Overgaard *et al* [2006: 700], Windey & Cleeremans [2015: 2], Carruthers [2019: 20], Godfrey-Smith [2020: 12], and the quoted passages from Bayne, Hohwy, & Owen [2016]. For some discussions where it's unobvious which issue is at stake, see Johanson *et al.* [2003: 280], Sergent & Dehaene [2004], Van Gulick [2007: 528], Nani & Cavanna [2014: 3], Doerig, Schurger, & Herzog [2021: 43], and Anzulewicz *et al* [2015: 7].

mental state is like something for its subject to undergo, or it is not" (27), that "phenomenal consciousness is either categorically present or categorically absent" (74), and that "phenomenal concepts are sharp" (155) rather than vague. Yet Carruthers takes this conclusion to invalidate any theory that takes consciousness to come in degrees. He takes the claim above as grounds for thinking that "we can't make sense of degrees of phenomenal consciousness," (23), that it's incoherent to say that a bee is "to some small degree phenomenally conscious" or conscious "to some small extent" (77), and that theories that entail the degrees thesis are philosophically untenable (23, 74, 142). Now, Carruthers may very well be right that it's never a matter of degree whether  $x$  is conscious. But that conclusion doesn't provide a basis for dismissing theories that favor the degrees thesis.<sup>15</sup>

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At this point, some might be tempted by the following objection:

**The Ambiguity Objection:** If there are borderline cases of Fs, then it can be a matter of degree whether an entity is F. If it can be a matter of degree whether an entity is F, then F comes in degrees. Therefore, the sentence 'F comes in degrees' is ambiguous: one interpretation is that F comes in greater or lesser extents, but another interpretation is that it can be indeterminate whether an entity is F. Those who have invoked the determinacy objection are merely saying the latter.

I'll say three things in response.

First, the ambiguity objection is arguably wrong about the semantics. If the objection were correct, then there should be felicitous readings of sentences of the form 'F comes in degrees and F does not come in greater or lesser extents'. But

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<sup>15</sup> A sidenote: Carruthers [2019] takes the claim that "any given mental state (in humans, at any rate) is either categorically conscious or definitely unconscious" (142) to be compatible with the claim that there is "no fact of the matter whether another animal has phenomenally conscious experiences" (155). I'm skeptical that these claims can be reconciled, but I won't discuss that here. See Birch [2020] for a critical discussion.

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sentences of this form sound defective. Moreover, the objection has the unappealing result that even the obviously bad version of the determinacy objection (against the coherence of degrees of size) has an inferentially valid reading, and that even paradigmatic examples of degreed properties—mass, height, etc.—don't come in degrees (in the relevant sense).

Second, and more importantly, the intuitions driving the ambiguity objection can arguably be explained away. It's unsurprising that (a) claims of the form 'it can be a matter of degree whether an entity is F' (which concern whether F allows for indeterminacy) are sometimes confused with claims of the form 'F comes in degrees' (which concern whether F comes in degrees), that (b) the property *being conscious* is sometimes confused with the property *consciousness*, and that (c) degrees of membership within the extension of a property are sometimes confused with degrees of the property itself. However, just as we shouldn't equate the (obviously false) sentence 'having mass comes in degrees' with the (obviously true) sentence 'mass comes in degrees', we shouldn't equate the (arguably false) sentence 'being conscious comes in degrees' with the sentence 'consciousness comes in degrees'.

Third, and most importantly, while some authors may be charitably read in the manner described by the ambiguity objection, many authors explicitly claim that those who invoke the idea of degrees of consciousness are conceptually confused. The intended conclusion of the determinacy objection isn't merely that there exists a true reading of the sentence 'consciousness doesn't come in degrees'; instead, the conclusion is that there are no true readings of the sentence 'consciousness comes in degrees'. Notice, moreover, that even if the ambiguity objection were correct about the semantics, the determinacy argument would still be fallacious, since it's indisputable that the sentence 'consciousness comes in degrees' may be interpreted as saying that consciousness comes in greater or lesser extents.

### §3: Semantic Arguments

Before moving to the metaphysical analysis of degrees of consciousness, it's worth taking an interlude to examine the semantics of the term 'conscious'. If we are uncertain whether F comes in degrees, then one relevant consideration is whether our terms for F behave like our terms for degreed properties. The semantic correlates

of degreed properties are *gradable adjectives*, such as ‘tall’ or ‘round’.<sup>16</sup> Therefore, we might wonder whether ‘conscious’ is a gradable adjective.

There are two main markers of gradable adjectives.<sup>17</sup> The first is that gradable adjectives can be modified by gradable adverbs (such as ‘a little’, ‘very’, or ‘extremely’). The second is that gradable adjectives have comparative and superlative forms (‘tall’, ‘taller’, ‘tallest’). The fact that ‘round’ and ‘smart’ are gradable adjectives is illustrated by the following examples:

- (1a) Baba is very round.
- (1b) Baba is the smartest creature in the room.

By contrast, if an adjective is non-gradable, then gradable adverbial modifications and comparative and superlative forms sound odd:

- ? (2a) Baba is very digital.
- ? (2b) Baba is the most quadrupedal creature in the room.

If we apply these tests, we find that ‘conscious’ behaves like a gradable adjective:

- (3a) Baba is very conscious.
- (3b) Baba is the most conscious creature in the room.

To my ears, 3a and 3b remain felicitous even if we substitute in the term ‘phenomenally conscious’. The sentences from p.1 involving ‘more conscious than’ constructions also sounded fine, at least if we focus on linguistic felicity (rather than

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<sup>16</sup> Halliday [2007: 390] says a “term is [gradable] if it may be predicated of two objects, such that there is a higher degree of its applicability to one object than to the other.” Qing & Franke [2014: 23] say “the denotation of a gradable adjective...is a function that maps individuals to degrees on an abstract scale structure.” See Cresswell [1976] for a canonical analysis of gradable adjectives, and Castroviejo, McNally, & Sassoon [2018] for a general discussion.

<sup>17</sup> Jackson [2002: 66] says: “Adjectives fall into [the gradable and non-gradable] subclasses according to two criteria: (1) whether the adjective can have a ‘comparative’ and a ‘superlative’ form; (2) whether the adjective can be modified by an intensifying adverb.”

truth values). And if we look at other syntactic constructions, we find that ‘conscious’ continues to behave like a gradable adjective:

- (4a) Baba is far more conscious than Keke.
- (4b) Baba is at least as conscious as a crab.
- (4c) Baba is as conscious as me.
- (4d) How conscious is Baba?

What should we make of these results? Well, one approach would be to resist their relevance. Perhaps we should be wary of drawing metaphysical conclusions from observations about natural language: after all, the semantic structures of our adjectival terms need not reflect the metaphysical structures of the properties they denote. The skeptic could still ask: “But what does it *mean* for consciousness to come in degrees?” And at this point, I think that remains a fair question.

Nevertheless, the evidence that ‘conscious’ is a gradable adjective surely carries some dialectical weight. Gradable adjectives tend to correspond to degreed properties. While ‘conscious’ might turn out to be an exception to the rule, exceptions to rules demand explanation. And whether or not the observations above are reasons to think that the degrees thesis is in fact true, it’s plausible that they are reasons to think that the degrees thesis is conceptually coherent.

## §

Those skeptical of the coherence of degrees of consciousness might try to turn the tables with the following objection:

**The What-it’s-like Objection:** For  $x$  to be conscious is for there to be something it’s like to be  $x$ . But one cannot say ‘There’s something it’s like to be  $x$  more than there’s something it’s like to be  $y$ ’ or ‘What it’s like to be  $x$  is more than what it’s like to be  $y$ ’. Even ‘There’s more it’s like to be  $x$  than there is to be  $y$ ’ sounds peculiar. Therefore, it doesn’t make sense to say that consciousness comes in degrees.

Let’s consider each of the sentences invoked by the what-it’s-like objection.

**1:** *'There's something it's like to be x more than there's something it's like to be y'.* The phrase 'there's something it's like to be x' attributes the property *being conscious* to x. But, as we saw previously, the kinds of properties denoted by gerund=phrases ('being conscious') are distinct from the kinds of properties denoted by the corresponding noun-phrases ('consciousness'). The fact that being conscious doesn't come in degrees isn't evidence that consciousness doesn't come in degrees, for the same reason that the fact that having mass doesn't come in degrees isn't evidence that mass doesn't come in degrees. Compare 5a with 5b:

- # (5a) There's something it's like to be Baba more than there's something it's like to be Keke.
- # (5b) Baba has mass more than Keke has mass.

**2:** *'What it's like to be x is more than what it's like to be y'.* The phrase 'what it's like to be x' stands to the phrase 'x is conscious' as the phrase 'the shape of x' stands to the phrase 'x has size'. That is, the phrase 'what it's like to be x' denotes the character of x's conscious experiences, or the specific *way* in which x is conscious.<sup>18</sup> Similarly, the phrase 'shape of x' denotes the "character" of x's size, or the specific *way* in which x has size. But, in general, the fact that F comes in degrees doesn't entail that the way in which something is F comes in degrees. Compare 6a with 6b:

- # (6a) What it's like to be Baba is more than what it's like to be Keke.
- # (6b) The shape of Baba is more than the shape of Keke.

**3:** *'There's more it's like to be x than to be y'.* This sentence admits of multiple readings, some of which sound off, but some of which sound fine. Here are some sentences designed to elicit the bad readings:

- # (7a) There's more of a way it feels to be Baba than a way it feels to be Keke.
- ? (7b) There are more ways it feels to be Baba than ways it feels to be Keke.

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<sup>18</sup> See Stoljar [2016]'s recent analysis of 'what it's like' expressions.

? (7c) Baba has more feelings than Keke does.<sup>19</sup>

In 7a, the degreed modifier specifies the extent to which there is a way it feels to be  $x$ . Since that doesn't come in degrees, this sentence sounds defective. In 7b, the degreed modifier specifies the number of ways that it feels to be  $x$ , and in 7c the degreed modifier specifies the number of feelings that  $x$  has. Since it may seem dubious to quantify over ways it feels to be  $x$  or feelings of  $x$ , these sentences may strike some as peculiar. Since these bad readings of 'There's more it's like to be  $x$  than to be  $y$ ' exist, it's unsurprising that the sentence can sound odd. But, I think that alongside the bad readings, there is also a good reading:

(7d) Baba feels to a greater extent than Keke does.

This sentence most closely matches the intended interpretation of sentences that involve degreed modifications of ' $x$  is conscious'. And this sentence strikes me as clearly felicitous. It's not obvious whether it's in fact true that some creatures feel to a greater extent than others; it seems at least conceptually possible that all creatures that feel at all feel to an equal extent; and there may be many different ways of precisifying what it would be for  $x$  to feel to a greater extent than  $y$ . But all that merely indicates that the truth value of the sentence is unknown, rather than that the sentence is linguistically defective. This aligns with the view I favor: the degrees thesis may turn out to be true or may turn out to be false—but it's not incoherent.

These observations undercut the what-it's-like objection. The fact that certain what-it's-like locutions cannot take on degreed modifiers is compatible with the fact that 'conscious' behaves like a gradable adjective. Even if we take 'There's something it's like to be  $x$ ' to be equivalent to ' $x$  is conscious', the oddness of the sentences invoked by the what-it's-like objection don't impugn the felicity of the sentence ' $x$  is more conscious than  $y$ '.

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<sup>19</sup> There is a narrow sense of 'feelings' that covers only emotions and bodily sensations. But obviously 'feelings' is to be understood here in a broader sense, where it's roughly synonymous with 'conscious experiences' or 'phenomenal characters' or 'qualia'.

#### §4: The Analysis of Degrees

We are now ready to face the central question: what exactly does it take for consciousness to come in degrees?

One strategy for answering that question would be to look at the abstract question of what it takes for any property to come in degrees. But that strategy risks getting entangled in more general issues in metaphysics and philosophy of science, and it's not clear that answering that abstract question will yield any clear verdict on our target question.<sup>20</sup> Fortunately, there is another strategy that is more promising. Instead of asking what it takes for any property to come in degrees, we should ask what it takes for a given degreed property to count as degree of consciousness. The goal of this section is to answer that question.

A note on terminology. In the remainder of the paper, I'll use ' $F(x)$ ' and ' $F$ -value of  $x$ ' to denote the degree of  $x$  with respect to  $F$ . Whenever I talk about degreed properties in general, I'll use the predicate ' $F$ '. But whenever I talk about a degreed property that is a candidate for degrees of consciousness, I'll use the predicate ' $\phi$ '.

#### §

Let's start with a basic observation. If consciousness comes in degrees, then differences in degrees of consciousness should entail differences in phenomenology. Suppose then that  $\phi$  is a degreed property, and that we wish to know whether  $\phi$  is degree of consciousness. If it's possible for  $x$  and  $y$  to be phenomenal duplicates yet differ in their  $\phi$ -values, then we can rule out  $\phi$  as a candidate for degree of consciousness. This idea follows from a more general principle—if  $F(x) \neq F(y)$ , then  $x$  differs from  $y$  (with respect to  $F$ )—alongside the natural assumption that what it is for  $x$  and  $y$  to differ with respect to consciousness is for what it's like to be  $x$  to differ

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<sup>20</sup> For some discussions of the nature of quantities and magnitudes, see Armstrong [1978], Mundy [1987], Bigelow and Pargetter [1988], Mitchell [2006], Peacocke [2015], and Dees [2018]. As far as I can tell, none of these discussions has any straightforward implications for whether consciousness comes in degrees. In general, figuring out whether  $F$  comes in degrees tends to require looking at the nature of  $F$  (rather than at the nature of degrees).

from what it's like to be  $y$ . With this observation, we can construct our first criterion for what it is for a degreed property  $\phi$  to count as degree of consciousness:

### **The Difference Criterion**

If  $\phi(x) \neq \phi(y)$ , then what it's like to be  $x$  differs from what it's like to be  $y$ .

Here's a second observation. If consciousness comes in degrees, then greater differences in degrees of consciousness should make for greater degrees of dissimilarity with respect to some phenomenal dimension. If  $x$ 's  $\phi$ -value is greater than  $y$ 's  $\phi$ -value and  $y$ 's  $\phi$ -value is greater than  $z$ 's  $\phi$ -value yet there is no respect in which what it's like to be  $x$  is more similar to what it's like to be  $y$  than what it's like to be  $z$ , then we can rule out  $\phi$  as a candidate for degree of consciousness. As before, this observation is related to a more general principle: if  $F(x) > F(y) > F(z)$ , then  $x$  is more similar (with respect to  $F$ ) to  $y$  than to  $z$ .<sup>21</sup> Here's a statement of this second principle:

### **The Similarity Criterion**

If  $\phi(x) > \phi(y) > \phi(z)$ , then what it's like to be  $x$  is more similar (along some phenomenal dimension) to what it's like to be  $y$  than what it's like to be  $z$ .

One technical remark. The above formulation of the similarity criterion appeals only to ordinal structure. But there are cases where  $\phi$  might have a richer structure. Suppose, for example, that  $\phi$  has ratio structure, meaning we can make sense of (say) one  $\phi$ -value being twice another  $\phi$ -value. Then it's plausible that the ratio structure of  $\phi$  must match the ratio structure of the relevant dimension of phenomenal similarity. More generally, whatever structure one takes  $\phi$  to have, it's plausible that the corresponding dimension of phenomenal similarity must have the same structure. For simplicity, though, I'll focus only on ordinal structure.

The similarity criterion is formulated as an existential claim: all that's required is that there is *some* dimension of phenomenal similarity that is measured by

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<sup>21</sup> In the case of consciousness, similarity with respect to  $F$  should be interpreted as similarity with respect to degrees of consciousness (rather than similarity with respect to all aspects of consciousness). Otherwise, the criterion would generate the incorrect result that similarity in degree of consciousness always outweighs all other aspects of phenomenal similarity.

$\phi$ . This may initially strike some as too permissive. For now, I'll make two brief remarks in response. First, the similarity criterion still places substantive constraints on which degreed properties may count as degree of consciousness. Most degreed properties won't satisfy the similarity criterion, since most degreed properties don't measure any dimension of phenomenal similarity whatsoever. Second, it's not clear what a more specific version of the similarity criterion would look like. There are many ways of understanding degrees of consciousness, and the relevant dimension of phenomenal similarity will vary across different cases. I've stated both these points in abstract terms, but they will become more concrete when we later look at specific theories of consciousness.

The difference criterion and the similarity criterion are relatively straightforward to identify. There is only one more criterion that we need, but crafting it will take a bit more work.

### §

For every degreed property  $F$ , there is a dichotomous counterpart: namely, the property *being F*. What is the relationship between being  $F$  and degrees of  $F$ ? In other words, how high of a degree of  $F$  must  $x$  possess in order to pass the threshold for being  $F$  simpliciter? Well, the answer varies across different cases. Consider the following options (let ' $max_F$ ' denote the maximum value of  $F$ , if there is one):

- MINIMAL:  $x$  is  $F \leftrightarrow F(x) > 0$ .
- MEDIAL:  $x$  is  $F \leftrightarrow F(x) > n$  (where  $0 < n < max_F$ ).
- MAXIMAL:  $x$  is  $F \leftrightarrow F(x) = max_F$ .
- UNIVERSAL:  $x$  is  $F \leftrightarrow \exists n F(x) = n$ .

Mass is a property with a minimal threshold (anything with a positive mass value has mass). Warmness is a property with a medial threshold (10°C is warmer than 0°C, but is not warm; 30°C is warm, but still less warm than 40°C). Straightness is (arguably) a property with a maximal threshold (some things are more straight—meaning less bent—than other things, but only perfectly straight things are straight simpliciter). Charge is (arguably) a property with a universal threshold (anything with a charge value—positive, negative, or zero—has charge).

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If consciousness comes in degrees, then is it minimal, medial, maximal, or universal? It's plausible that anything with a positive degree of consciousness is conscious: recall the common idea that even if there is barely something it's like to be an entity, that entity still counts as conscious. We can thus rule out the medial and maximal options. Since the idea of negative degrees of consciousness is dubious, the question turns on whether an entity that is conscious to degree zero is conscious simpliciter. It's natural to think that anything with zero degrees of consciousness is not conscious at all; it's not clear what it would mean for a conscious entity to have degree of consciousness zero. We can thus rule out the universal option. The only remaining candidate is the minimal option: if  $\phi$  is degree of consciousness, then  $x$  is conscious just in case  $\phi(x) > 0$ .

We are nearly done. But we need to address one more issue before constructing our last criterion.

### §

One of the principal difficulties for assessing whether consciousness comes in degrees is how to disentangle degrees of consciousness from degreed features of consciousness. We know that properties of experiences such as intensity, precision, vivacity, and complexity come in degrees. But are any of these degrees of consciousness? Or are they all merely degreed features of consciousness? The problem is particularly difficult because some degreed properties, including the ones mentioned above, may very well be instantiated by every conscious experience. But unless one is willing to say that any degreed phenomenal property that is necessarily co-instantiated with consciousness counts as degree of consciousness, we need a way of disentangling degreed features of consciousness from degrees of consciousness itself.

We can solve this problem by appealing to the following idea: what it is for  $x$ 's F-value to be greater than  $y$ 's F-value is for  $x$  to have more of whatever F is than  $y$ . Now, this principle may strike some as close to trivial, at least when stated abstractly. But the principle provides the basis for disentangling degreed features of consciousness from degrees of consciousness itself. The principle entails that what it is for  $x$  to be more conscious than  $y$  is for  $x$  to have more of whatever consciousness is than  $y$ . Therefore, even if it's the case that differences in  $\phi$ -values entail differences in phenomenology, and that  $\phi$  measures a dimension of phenomenal similarity, and

that  $x$  is conscious just in case  $x$  has a positive  $\phi$ -value, it doesn't yet follow that  $\phi$  is degree of consciousness. We need the further condition that to have a greater degree of  $\phi$  is to have more of whatever consciousness is.

We can substantiate this idea by invoking the notion of a *metaphysical analysis*. This is a metaphysical claim of the form 'for  $x$  to be  $F$  just is for  $x$  to be  $G$ ' that is intended to capture what it is for something to be an  $F$ . As examples, (a) for  $x$  to be water just is for  $x$  to be  $H_2O$ , (b) for  $x$  to be a bachelor just is for  $x$  to be an unmarried male, and (c) for  $x$  to be an even number just is for  $x$  to be a natural number divisible by 2. An important point is that even if it's necessarily the case that  $x$  is  $F$  just in case  $x$  is  $G$ , it need not follow that for  $x$  to be  $F$  just is for  $x$  to be  $G$ . It's necessarily the case that (d)  $2 + 2 = 4$  just in case everything is self-identical, (e)  $x$  is green just in case  $x$  is grue-and-observed-before-time- $t$  or bleen-and-observed-after-time- $t$ , and (f) Oslo is north of Paris just in case Oslo is north of Paris and Fermat's Last Theorem is true. But it's standardly denied, for these sorts of examples, that for the lefthand statement to obtain just is for the righthand statement to obtain.<sup>22</sup>

Now we are in position to develop the last criterion in the analysis of degrees of consciousness. This criterion combines the minimality requirement discussed earlier with the metaphysical analysis claim discussed above. Let ' $\equiv$ ' be a metaphysical analysis operator (where ' $P \equiv Q$ ' should be read 'for it to be the case that  $P$  is for it to be the case that  $Q$ '). Then we have our final criterion:

### **The Threshold Criterion**

$x$  is conscious  $\equiv \phi(x) > 0$ .

With the threshold, difference, and similarity criteria now identified, we are ready for my analysis of what it is for  $\phi$  to be degree of consciousness:<sup>23</sup>

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<sup>22</sup> What I'm calling 'metaphysical analyses' are sometimes called 'real definitions', 'just-is statements', or 'generalized identities'. The differences won't matter for our purposes. For more discussion, including on why these claims are finer than what may be captured in merely modal terms, see Rosen [2015: 190], Dorr [2016: 70], and Correia & Skiles [2019: 6],

<sup>23</sup> Here I'll include the relevant modal operators and quantifiers. Elsewhere I'll omit them.

$\phi$  is **degree of consciousness**  $\equiv$

- (1)  $\square \forall x: x \text{ is conscious} \equiv \phi(x) > 0$ .
- (2)  $\square \forall x \forall y: \phi(x) \neq \phi(y) \rightarrow \text{what it's like to be } x \neq \text{what it's like to be } y$ .
- (3)  $\square \forall x \forall y \forall z: \phi(x) > \phi(y) > \phi(z) \rightarrow \text{what it's like to be } x \text{ is more similar with respect to some dimension of phenomenal similarity to what it's like to be } y \text{ than what it's like to be } z$ .

I admit I'm more confident in the necessity of each individual criterion than in the sufficiency of the whole set. But I've found no compelling counterexamples. Therefore, in the spirit of making philosophical claims that are bold and interesting (and, we may hope, true), I'll advance these criteria as an analysis (rather than as merely a set of necessary conditions). In §5, I'll apply the analysis to various theories of consciousness. But first, I'll address some objections.

## §

**Objection: Multidimensionality.** Suppose there are multiple properties that satisfy the analysis. Then there will be multiple ways of measuring degree of consciousness. But this would yield the result that  $x$  is more conscious than  $y$  on some measures while  $y$  is more conscious than  $x$  on other measures. **Response:** There are many cases where degrees of F are determined multidimensionally by degrees of a set of properties  $G_1, \dots, G_n$ . Take size as an example. An entity's size is determined by its values along the three dimensions of physical space. In some cases, it may turn out that  $x$  is bigger than  $y$  with respect to one dimension yet  $y$  is bigger than  $x$  with respect to another dimension, even though both  $x$  and  $y$  are bigger (simpliciter) than some uniformly small object  $z$  or smaller (simpliciter) than some uniformly large object  $Z$ . Similarly, it may turn out that humans are more conscious than octopuses on some dimensions while octopuses are more conscious than humans on other dimensions, even though both are more conscious (simpliciter) than fish and less conscious (simpliciter) than Alpha Centaurians.

**Objection: Confounds.** To establish that  $\phi$  is degree of consciousness, one must isolate the phenomenological contribution made by degrees of consciousness. This requires identifying a minimal pair, meaning a pair of conscious subjects who differ with respect to their  $\phi$ -values but who are otherwise phenomenologically

indistinguishable. Otherwise, we will be unable to know whether the phenomenological differences that result from differences in  $\phi$ -values are differences in degrees of consciousness (rather than differences in some other feature of consciousness).

**Response:** This objection makes an unreasonable demand. If consciousness comes in degrees, then it's natural to think that differences in degrees of consciousness will entail differences in other aspects of phenomenology. As analogies, consider how differences in number of prime factors always come with differences in cardinality, or how differences in healthiness always come with differences in bodily function.

**Objection: Primitivism.** Suppose there is no true sentence of the form 'for  $x$  to be conscious is for  $x$  to be  $\phi$ '. In other words, suppose there is no reductive analysis of consciousness in more primitive terms, as some philosophers believe. Then it may seem that it's impossible to satisfy the threshold criterion. Yet clearly primitivists about consciousness can still think that consciousness comes in degrees. **Response:** In a metaphysical analysis of the form ' $x$  is conscious  $\equiv \phi(x) > 0$ ', we need not assume that ' $\phi$ ' denotes a non-phenomenal property. Consider, as examples, the claim ' $x$  is conscious  $\equiv x$  has a unified collection of atomic experiences', or ' $x$  is conscious  $\equiv x$  phenomenally represents a proposition'. In the next section, I'll say more to show how the analysis of degrees of consciousness allows even primitivists about consciousness to accept the degrees thesis.

## §5: Theories of Consciousness

A good test of any analysis is to check that it yields plausible results across a variety of cases. In what follows, I'll apply the analysis of degrees of consciousness to several classes of theories of consciousness. A caveat: I won't cover all major theories of consciousness. I've chosen to focus on a selection of theories that yield interesting or illustrative results.

### CASE 1: Atomism

Let a *total experience* be an experience that completely characterizes what it's like to be a subject at a time. Your current total experience consists of your visual experiences, auditory experiences, emotional experiences, and so forth. Let *atomism* be the view that every total experience is composed from a finite number of atomic

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experiences, where an *atomic experience* is an experience that isn't composed from any other experiences.<sup>24</sup>

Though 'atomism' isn't a widely-used term in the contemporary consciousness literature, there are many theories that can be reasonably construed as atomistic. Consider (a) an intentionalist who thinks that ordinary subjects phenomenally represent many propositions (rather than a single complex proposition), (b) a relationalist who thinks that ordinary subjects are perceptually aware of many external objects (rather than a single complex state of affairs), (c) a higher-order theorist who thinks that ordinary subjects have many higher-order thoughts about many first-order mental states, or (d) a dual-aspect monist who thinks that the macroexperiences of ordinary subjects are composed from microexperiences of fundamental particles.

It's natural for atomists to say that if  $x$ 's total experience is composed from a greater number of atomic experiences than  $y$ 's total experience, then  $x$  is more conscious than  $y$ . If we check the analysis of degrees of consciousness, we will see that all the conditions—the threshold, difference, and similarity criteria—are satisfied. More precisely, if we interpret  $\phi$  as number of atomic experiences, then it's plausible (given any atomist theory) that what it is for  $x$  to be conscious is for  $x$  to have at least one atomic experience, that what it's like to be  $x$  differs from what it's like to be  $y$  whenever  $x$  and  $y$  have a distinct number of atomic experiences, and that if  $x > y > z$  with respect to number of atomic experiences, then  $x$  is more similar to  $y$  than to  $z$  with respect to some dimension of phenomenal similarity. Therefore, the analysis of degrees yields the intuitively correct verdict for atomist theories.

Let *holism* be the view that every total experience *is* an atomic experience, meaning that total experiences are not composed from more basic experiences. For each of the atomist theories described above, there is a holist analogue. Consider (a) an intentionalist who thinks that every conscious subject phenomenally represents one complex proposition, (b) a relationalist who thinks that every conscious subject is perceptually aware of a single complex state of affairs, (c) a higher-order theorist who thinks that what it's like to be a subject is determined by a single higher-order thought about a single first-order mental state, or (d) a cosmopsychist who thinks

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<sup>24</sup> For discussions of atomism and holism, see Sprigge [1983: Ch.5], Searle [2000], Tye [2003: 25], Bayne [2007: 7], Dainton [2010], Chudnoff [2013].

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that the macroexperiences of ordinary subjects are abstractions from the cosmic experience of the universe.

Does holism entail that consciousness doesn't come in degrees? Well, if holism is true, then every conscious creature has exactly one atomic experience at any given time. Therefore, the basis for saying that atomists are committed to degrees of consciousness doesn't apply to holists. But there remains the question, for any particular holist theory, of whether there is some other degreed property that satisfies the threshold, difference, and similarity criterions. We will turn next to one way for that to be the case.

### CASE 2: Degreed Awareness

According to some philosophers, whenever one is conscious, there is something of which one is aware. This basic idea has been developed in a number of different ways. Some think that the relevant object of awareness is a mental state, and that what it is for a mental state  $m$  to be conscious is for its subject to be aware of  $m$ . Others think that what it is for a subject  $x$  to be conscious is for  $x$  to be aware of something external. Let *degreed-awareness* be the conjunctive claim that (1) consciousness is a matter of standing in a certain kind of awareness relation to a relevant kind of object, and (2) the awareness relation comes in degrees.<sup>25</sup>

As examples of awareness theories, consider (a) a higher-order theorist who takes consciousness to be a matter of higher-order awareness of first-order mental states, (b) an attentional theorist who takes consciousness to be a matter of mental states occupying one's attention, (c) a self-representationalist who takes consciousness to be a matter of subjective awareness of qualitative states, (d) a relationalist who takes consciousness to be a matter of awareness of external objects, (e) an intentionalist who takes consciousness to be a matter of awareness of universals, or (f) a sense-datum theorist who takes consciousness to be a matter of awareness of sense-data. For each of these cases, we could consider versions of the view that take the relevant awareness relation to come in degrees.

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<sup>25</sup> As examples, Rosenthal [2018: 260] suggests that subjective awareness might be "a graded phenomenon, not simply present or absent but admitting of degrees," and Kriegel [2003: 372] says that the kind of awareness constitutive of conscious mental states can be either peripheral or focal.

It's natural for degreed-awareness theorists who take the objects of awareness to be mental states to say that if a subject  $x$  is more aware of  $m_1$  than  $m_2$ , then  $m_1$  is more conscious than  $m_2$ . It's also natural for any degreed-awareness theorist to say that if subject  $x$  is more aware of every object it's aware of than subject  $y$  is aware of every object it's aware of, then  $x$  is more conscious than  $y$ . These conclusions align with the results yielded by the analysis of degrees of consciousness. At least, I suspect most degreed-awareness theorists will accept that what it is for  $x$  to be conscious of  $m$  is for  $x$ 's degree of awareness of  $m$  to be greater than zero, that differences in degrees of awareness entail differences in phenomenology, and that degree of awareness corresponds to a dimension of phenomenal similarity.

Notice that one could endorse both atomism and degreed-awareness. Amongst the examples that were listed, versions of higher-order theory, intention-ism, and relationalism may fall under both categories. If one accepts both atomism and degreed-awareness, then there will be multiple degreed properties that satisfy the criteria for degrees of consciousness. If a theory of this kind is correct, then in some instances it may be correct to say that  $x$  is more conscious than  $y$  with respect to number of atomic experiences, but that  $y$  is more conscious than  $x$  with respect to degree of awareness.

### CASE 3: Integrated Information & Global Workspace

According to integrated information theory, what it is for  $x$  to be conscious is for  $x$  to have a maximal  $\phi$ -value, where  $x$ 's  $\phi$ -value (in the context of integrated information theory) is a matter of "the amount of information generated by a complex of elements, above and beyond the information generated by its parts."<sup>26</sup> Integrated information theory explicitly endorses the degrees thesis, taking a system's  $\phi$ -value to be a measure of its degree of consciousness.<sup>27</sup> Does the analysis of degrees of consciousness aligns with this verdict? Well, it's clear that if integrated

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<sup>26</sup> Tononi [2008: 216]. See Tononi & Koch [2015] and Oizumi, Albantakis, & Tononi [2014] for more recent developments of integrated information theory.

<sup>27</sup> More precisely, integrated information theory is best interpreted as saying that what it is for  $x$  to be conscious is for  $\phi_{\max}(x) > 0$ , where only "maximally irreducible" subsystems have  $\phi_{\max}$ -values. See Albantakis & Tononi [2014: 3] on the "Axiom of Exclusion."

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information theory is true, then  $\phi$  would satisfy the threshold criterion and the difference criterion. But what about the similarity criterion?

One noteworthy discussion of this issue is Pautz [2019], who argues that it's not clear what it means to say that the "level of a system's consciousness is determined by its  $\phi$ -value" and who questions whether there is any phenomenal dimension that can be reasonably identified with degree of  $\phi$ . Now, integrated information theorists might respond by characterizing the relevant phenomenal dimension (or by defending the claim that such a dimension exists, even if we can't identify it). If such a response is viable, then Pautz's challenge can be answered, and the criteria for degrees of consciousness will be satisfied. On the other hand, suppose Pautz is correct. Would that mean that integrated information theory doesn't actually entail that consciousness comes in degrees? Well, I think a more natural conclusion would be to hold that integrated information theory would simply be false. After all, the idea that  $\phi$  measures degree of consciousness is a core component of integrated information theory. Therefore, a fruitful line of inquiry (for both proponents and skeptics of integrated information theory) is to examine whether  $\phi$  satisfies the similarity criterion.

Let's now turn to global workspace theory, according to which what it is for a content  $m$  to be conscious is for  $m$  to be broadcast to a wide range of cognitive systems, such as those involved in reporting, planning, reasoning, decision-making, and remembering. It's sometimes claimed that global workspace theories entail that consciousness doesn't come in degrees because global broadcasting is all-or-nothing. However, the evidence that is cited indicates only that it's never a matter of degree whether a given content is globally broadcast.<sup>28</sup> That leaves open whether global workspace theory allows for consciousness to come in degrees. To assess that, we need to ask: is there any property that will satisfy (for global workspace theories) the criteria for degrees of consciousness?

The answer may depend on the philosophical details. Consider, for example, a global workspace theory that says that what it is for content  $m$  to be conscious is for  $m$  to be broadcast to a wide range of cognitive systems. The righthand-side of that analysis clearly denotes a degreed property. If it turns out to also be the case

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<sup>28</sup> See Sergent & Dehaene [2004] and Carruthers [2019: 99] for examples of this claim. See Dehaene & Naccache [2001] and van Vugt *et al* [2018] for examples of the cited evidence.

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that the number of cognitive systems that  $m$  is broadcast to measures a dimension of phenomenal similarity, and that differences in that number entail differences in phenomenology, then it would be natural for such a theorist to endorse the degrees thesis. On the other hand, consider a global workspace theory that says that what it is for  $m$  to be conscious is for  $m$  to be in working memory. It's not clear that one mental state cannot be more in working memory than another mental state. But even on this latter view, one might still think that what it is for a subject  $x$  to be conscious is for  $x$  to have some contents in working memory, which then suggests that a subject with more contents in working memory is more conscious than a subject with fewer contents in working memory.

#### CASE 4: Souls

I've provided examples of theories that entail that consciousness comes in degrees. I've considered contrasting theories that don't generate the same reasons for positing degrees of consciousness. Yet I've also argued that for each contrasting theory, it could still turn out to be the case that consciousness comes in degrees. As a result, I haven't yet identified any theory that clearly *negates* the degrees thesis. What would such a theory look like?

The clearest example I can think of is the *soul theory*. Suppose that what it is to be conscious is to have a soul. Every subject has exactly one soul, and souls don't come in degrees.<sup>29</sup> And none of the justifications for the degrees thesis discussed above—atomism, degreed awareness, reductions to degreed properties—apply in this case. Therefore, anyone who favors the soul theory probably should deny the degrees thesis. Of course, few philosophers and scientists do favor the soul theory, so this conclusion won't have much impact on contemporary views about consciousness. But this example illustrates a more general point: it's hard to show that the degrees thesis must be false.

If consciousness comes in degrees, then there must be some property that satisfies the threshold, difference, and similarity criteria. But if consciousness *doesn't* come in degrees, then there must be *no* property that satisfies those principles. Since it's easier to demonstrate the existential claim than the universal negation, it's easier to identify theories that confirm the degrees thesis than ones that

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<sup>29</sup> Or do they? Maybe we need more investigation into the structures of souls.

negate it. And while I've focused on illustrative examples rather than on carving the theoretical space at its joints, I think the considerations in this section suggest that most theories of consciousness will support degrees of consciousness, in some form or another.

Therefore, it's probably the case that consciousness comes in degrees.

## Conclusion

At the beginning of this paper, I articulated two opposing perspectives on degrees of consciousness. One perspective took degrees of consciousness to be a conceptual confusion. But I've argued that the main philosophical argument in favor of this perspective conflates questions about determinacy (can it be a matter of degree whether an entity is conscious?) with questions about degrees (does consciousness come in degrees?). And I've argued that when we look at the semantics of 'more conscious than' expressions, we find some support for the degrees thesis and no good reasons against it.

The other perspective took certain claims about degrees of consciousness to be obvious truths. I've argued that such claims ought to instead be treated as substantive hypotheses open to confirmation and falsification. Whether humans are more conscious than fish, fully awake people more conscious than drowsy people, intense pains more conscious than mild pains, or clear perceptions more conscious than fuzzy mental images depends on whether the former cases instantiate more of whatever consciousness is than the latter cases. To find the answers to those questions, we need further investigation into what consciousness is.<sup>30</sup>

According to my analysis, whether consciousness comes in degrees depends on whether there is some degreed property  $\phi$  that satisfies the following criteria:

- Threshold:**  $x$  is conscious  $\equiv \phi(x) > 0$ .
- Difference:**  $\phi(x) \neq \phi(y) \rightarrow$  what it's like to be  $x \neq$  what it's like to be  $y$ .
- Similarity:**  $\phi$  corresponds to a dimension of phenomenal similarity.

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<sup>30</sup> I think many of the arguments in this paper generalize to analogous debates, such as debates about degrees of moral status, belief, survival, and other kinds. But, for limits of space, I won't attempt to develop those generalizations here.

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But at the end of the day, I think it's quite likely that consciousness comes in degrees. As long as some degreed property satisfies the threshold, difference, and similarity constraints, the degrees thesis is true. Therefore, the most interesting question may be not *whether* consciousness comes in degrees, but instead *which* degreed properties of consciousness count as degrees of consciousness.

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