PART IV

Introspection and Consciousness Science

17
INTROSPECTION AND SCIENTIFIC DATA

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17.1 Introduction

The conventional wisdom is that introspection—the capacity by which subjects come to form beliefs about their conscious mental states—is destined to play a crucial role in the scientific study of consciousness. But researchers disagree on what role introspection is supposed to play exactly.

Two broad positions have emerged. Let's baptize them "subjectivism" and "objectivism." Subjectivism is the conjunction of three theses in one wrapper. First, introspection is a reliable capacity that provides subjects with quasi-observational data—*subjective data*—about their conscious experiences (Goldman, 1997; Hatfield, 2005, 2014; Kriegel, 2013). I call this the *subjectivity thesis*. Second, subjective data are *scientific* data—the *scientificity thesis*. Third, a genuine science of consciousness as a subjective phenomenon must rely on subjective data to support its hypotheses (Chalmers, 2013; Varela, 1995). That's the *indispensability thesis*.

All objectivists reject the scientificity thesis. They do so either by denying the existence of subjective data or by arguing that subjective data are not scientific data. From there, objectivists separate into two groups. Pessimistic objectivists hold that scientists cannot study conscious experiences themselves, but only people's beliefs and reports about their experiences (Dennett, 2018, 2025; Frankish, 2016, 2021). Optimistic objectivists reject the indispensability thesis (Piccinini, 2009, 2010). They argue that consciousness researchers shouldn't worry about the fact that there are no subjective scientific data, and that it is possible to study consciousness as a subjective phenomenon with objective data (e.g., Michel, 2023a; Spener, 2024).

This chapter is a general introduction to this debate, but not a neutral one. I am, without apology, an optimistic objectivist: I deny the scientificity thesis and yet hold, with the subjectivists, that science should aim to explain what people actually experience, not merely what they say or think about their experiences.

I start by clarifying what subjective data are (spoiler: whether they exist depends on contentious philosophical assumptions about the nature of introspection). In Section 2, I present some objectivist arguments for believing that even if there are subjective data, they

DOI: 10.4324/9781003393269-22

can't play the role of scientific data. Section 3 provides some arguments for rejecting the indispensability thesis. I show that it stems from a conflation between data and phenomena (Bogen & Woodward, 1988, 2003; Woodward, 2010). Section 4 responds to the main pessimistic objectivist argument, which turns on the alleged impossibility to objectively distinguish between a subject's conscious experiences and their attitudes toward those experiences (Dennett, 2018; Frankish, 2021).

17.2 Subjective Data: Can We Deny Their Existence?

According to subjectivists, the role of introspection in the study of consciousness is to provide a kind of "inner observation" playing the same role as the observation of external phenomena, say, in physics. As Goldman (1997) writes:

> Can it be maintained (…) that *the introspected event is itself treated as a piece of evidence, or datum*, for cognitive science? Is introspection treated as an evidence-conferring method? Yes, I think it is. Consider an analogy from astronomy. Suppose a solitary observer reports seeing a bright flash in the sky. To the extent that astronomers trust the report as sincere and the observation as competent, they may accept that there was such a flash as a datum for astronomy to explain. Similarly, suppose a subject reports experiencing a certain figure/ground organization. To the extent that cognitive scientists trust *the subject's quasi-observation* to disclose a certain mental fact, they treat this fact as a datum for cognitive science to explain, or as evidence that can be used to confirm or disconfirm hypotheses. Since this is just the sort of thing cognitive scientists frequently do, they appear to rely on introspection as an evidence-conferring method. If reliance on introspection violates a cardinal precept of scientific methodology – i.e., the publicity precept – then there is a tension between this precept and the actual practice of working cognitive scientists. Which ought to give way?
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> *(Goldman, 1997, p.533, my emphasis)*

Goldman answers this question by arguing that we should reject the publicity precept. Scientific data don't have to be publicly available. In the same vein, Chalmers (2013) writes:

> First-person data concern the subjective experiences of conscious systems. It is a datum for each of us that such experiences exist: we can gather information about them … *by attending to our own experiences* … These *phenomenological data* provide the distinctive subject for the science of consciousness.
>
> *(Chalmers, 2013, p.25; my emphasis)*[1]

Here's the general idea behind subjectivism. By introspection, I am aware of my experiences and their properties; you aren't. So I can get "quasi-observational" data that you can't get. They're my data, in the strictest sense—hence "subjective data." That's the subjectivity thesis. Add the further claim that such data can be used to confirm or disconfirm scientific hypotheses about consciousness, and you've got the scientificity thesis.

Stated like that, the view seems pretty innocent. Some think it's obvious that there are subjective data (Goff, 2020). But that's not the case. Whether subjective data exist or not depends on particular views about the nature of introspection, which could turn out to be incorrect.

To see why the subjectivity thesis is not obvious, let's start with a claim that *is* obviously correct, and then show why it's different from the subjectivity thesis. We all agree that introspection allows me to be aware *that* I have conscious experiences. But this is not sufficient to establish the subjectivity thesis. My awareness *that* I have an experience as of seeing something red doesn't provide me with any subjective data. Why? Because if I tell you that I'm currently seeing something red, you can be aware *that* I see something red. So you can acquire the same piece of evidence—as long as you have the right concepts to represent the relevant fact. There's nothing private or subjective about that.

Sure, it might sometimes be difficult for you to become aware that I have conscious experiences. But the difficulty of accessing a piece of data doesn't make it *subjective*. Suppose that I run a private experiment, and acquire data about a given phenomenon. I'm the only one to have access to these data: they are encrypted in a computer stored in a secret safe. Do they count as *subjective* data? No. There's nothing *subjective* about them. Here's a quick test for determining whether a datum is subjective. Subjective data are supposed to depend on *subjects*. Now, imagine every subject disappears. If the data survive the apocalypse, they're not subjective. That's the case for the data stored on my computer.

A piece of data doesn't become "subjective" just because it cannot be accessed by anyone but me, or just because it is difficult for anyone but me to access it. It is more difficult for me to become aware that you have a headache than it is for you. But this doesn't imply that I couldn't, in principle, come to acquire the same piece of data, namely, be aware that you have a headache.

Subjectivists need something more. They have to hold that introspection allows me to be aware *of* my experiences, not only aware *that* I have experiences.

Dretske distinguished between awareness of things (awareness *of x*) and awareness of facts (awareness *that p*) (Dretske, 1993). I can be aware *of* the fire in the building, for instance by seeing it. Being aware *that* there is a fire in the building is a different thing. If someone tells me that there's a fire in the building, I can be aware *that* there is a fire in the building without being aware *of* the fire in the building.[2]

If you can be aware *of* your conscious mental states by introspection, and introspection delivers data, then you can acquire data that I cannot acquire, even in principle. Introspection is the only method by which I can be aware *of* my experiences, and I cannot introspect in your mind. So, I can't be aware of your experiences. Only you can.

On the other hand, if I can't be aware *of* my experiences—if there's no sense in which I can "observe," or "attend to" my experiences, then there are no *subjective data*. Subjective data live or die with philosophical views of introspection according to which I can be aware *of* my conscious experiences by introspection.

The problem is that these views are contentious. It is far from clear that I can be aware *of* my conscious experiences by introspection. This is what the "transparency thesis" denies—in at least some of its versions (Byrne, 2005, 2018; Harman, 1990; Tye, 1995). Here's Tye's way of conveying this view:

> When we introspect, we are aware of the external things and their properties but not of any internal experiences, nor any properties of those experiences, nor any related properties of ourselves. The internal stuff is transparent to us. Try as we may to focus our attention on a putative inner experience and its properties, we fail. It is not just that we fail to attend to the inner stuff, we also fail to be aware of it. We cannot help but 'see' right through it, finding ourselves aware only of the stuff outside, perhaps

> attending more closely to it. When we introspect, by being aware of the external entities, we acquire fact awareness—awareness that we are conscious of so-and-so external items.
>
> *(Tye, 2015, p.484)*

If a strong version of the transparency thesis is right, I cannot be aware *of* my experience by introspection. I am aware *that* I have an experience by being aware *of* the intentional object of my experience.

That's a flat-out denial of the existence of subjective data. If you can't be aware *of* your own experiences by introspection, you don't get any data that I couldn't in principle come to acquire. Indeed, I too can be aware *that* you have conscious experiences. If this is true, then there are no subjective data.

Transparency comes in many flavors (Aydede, 2019; Byrne, 2005, 2018; Gow, 2019; Harman, 1990; Ryle, 1949; Tye, 1995; Weksler et al. 2021; see Bordini's chapter on transparency in this volume). I won't sort them out here. The point is simpler: the existence of subjective data stands or falls with controversial claims about introspection.

Still, even if it's an open question whether subjective data exist, a subjectivist might gamble on the assumption if the payoff is big enough. I now tackle a different question: if introspection delivers subjective data, does it deliver *scientific* data?

17.3 If There Are Subjective Data, Are They Scientific Data?

My grandmother has, over the years, compiled what she regards as a formidable body of data showing that Cognac is a reliable cure for the common cold. (It isn't.) Grandma's data are not scientific data. So: not all data are scientific data.

It's difficult to know what exactly separates grandma's data from *scientific* data (Santana, 2018). I'm not betting on finding necessary and sufficient conditions for something to count as scientific data; philosophical projects like that tend to go the way of perpetual motion machines. Still, we can identify *features* that scientific data generally have and that non-scientific data (grandma's data, or a conspiracy theorist's, or a snake oil merchant's) generally don't have—features that make them fit for the aims of science (Leonelli, 2015).

Objectivists argue that subjective data lack several features that scientific data usually have. I explain why not having those features makes subjective data incompatible with some of the aims of science. For this reason, objectivists argue that subjective data can't play the role of *scientific* data. Instead, they're more like my grandmother's data. The first two arguments listed here are classical objectivist arguments. The three other arguments are new.

17.3.1 Problem 1: Intersubjective Validation

Scientists use data for intersubjective validation of hypotheses. They cannot use subjective data in this way, or so Piccinini (2009) argues. How could we agree that a given piece of evidence supports a hypothesis if we do not have access to one another's data?

Solving this puzzle requires finding "a correlation between the private first-person data and some type of public data, such as the subject's verbal reports" (Piccinini, 2009, p.5). To find those correlations, one would have to compare the publicly available data with the

private data itself, which is impossible because I can't access your subjective data. For this reason, I cannot know whether your subjective data confirm or falsify a given hypothesis. All I have is your report, but I cannot verify whether this report reflects your private data or not.

An obvious subjectivist answer is that there is no reason to believe that reports are not faithful representations of introspective beliefs. But at this point the subjectivist view collapses into the (optimistic) objectivist view (see Section 3). According to optimistic objectivists, scientists test hypotheses about subjective mental phenomena by interpreting introspective reports as *measurement indicators*[3] (Irvine, 2012; Michel, 2023a; Piccinini, 2009; Spener, 2020). That is, subjective data do not *directly* support scientific hypotheses. Instead, a hypothesis is supported (or rejected) based on the scientist's interpretation of a given *indicator*—the introspective report—as indicating something about a subjective mental state.

Hence, subjective data, *in and of themselves*, cannot be used to confirm or falsify hypotheses within the scientific community. But allowing the scientific community to confirm or falsify scientific hypotheses is important for something to qualify as scientific data. For this reason, if there are subjective data, they do not qualify as scientific data.

17.3.2 Problem 2: Settling Disagreements

Scientists use data to settle scientific disagreements. As both Piccinini (2009) and Schwitzgebel (2012) note, subjective data can't resolve scientific disagreements. Since I cannot check your data, I have no reason to accept your claims if we disagree. If my subjective data lead me to accept a hypothesis H, while your subjective data lead you to accept non-H, the only way for me to convince you is by using some set of publicly available data.

There's another problem. Scientific data also allow scientists to understand *why* they disagree. Suppose you and I disagree about whether minimum wage laws increase unemployment or not. To convince you, I can point to a given set of data, say, unemployment records in Seattle before and after the minimum wage increased. You and I might still disagree about whether this data is *good* evidence, but at least we can identify the *source* of our disagreement.

That's not the case with subjective data. Since we cannot share our data, all that's left is for each of us to tell the other to introspect harder. If we still disagree, I'm left guessing: maybe you're biased; maybe I am; maybe you're not introspecting properly; maybe I'm not; maybe our private data differ; maybe they're the same but we interpret them differently. Without access to each other's data, there's no way to choose among these possibilities.

In sum, scientific data typically allow scientists to *settle disagreements*, to locate the *source* of their disagreement, and thus *inspire further investigations* by analyzing the limitations of current datasets. Subjective data lack these features.

17.3.3 Problem 3: Data Robustness

Subjective data also cannot acquire an essential feature of scientific data: robustness. Philosophers of science have argued that evidence for a hypothesis is more robust when several independent tests yield convergent results (Basso, 2017; Hacking, 1983; Staley, 2004; Trout, 1993).

As Staley (2004) argues, robustness is crucial for science because it allows scientists to "secure" evidence claims through the use of "second-order evidence." Second-order evidence is evidence that a piece of evidence supports a given hypothesis. An evidence claim (i.e., a claim that *e* is evidence for *h*) is more secure to the extent that it is less susceptible to defeat from the failure of an auxiliary assumption. In the same way, the claim that a piece of subjective data is evidence for a hypothesis might be more or less secure.

Now think about subjective data. The list of things that could go wrong is long and depressing: confabulation, delusion, malfunctioning introspection, motivated reasoning, confirmation bias, background theory contamination, the possibility that introspection changes the very experience it's meant to report on, and so on. So, subjective data can count as good evidence only under a broad set of auxiliary assumptions. For example, that I am not subject to motivated reasoning.

Some of these auxiliary assumptions could be wrong. How could I make sure that's not the case? A good method to secure evidence claims is to compare data obtained through one method, let's call it M1, with data obtained through a different method, M2, relying on a different set of auxiliary assumptions (Michel, 2023a; Staley, 2004). If I get convergent results, the results of M2 thereby provide second-order evidence in favor of the evidence claim, namely, that results of M1 support a given hypothesis. Given that M1 and M2 rely on independent assumptions, agreement between M1 and M2 would be a "preposterous coincidence" if the underlying assumptions on which M1 is based were completely wrong (Hacking, 1981).

Since we cannot share subjective data, we cannot compare them with data obtained with publicly available methods. For this reason, we cannot secure evidence claims based on subjective data (Irvine, 2012, 2019). But the possibility to acquire more robust data and to secure evidence claims is crucial in science. You don't want all your evidence to depend on unsecured assumptions. Hence, it seems like subjective data lack another important feature of scientific data.

17.3.4 Problem 4: Subjective Data Depend on Your Own Epistemic Situation

Achinstein (2001) writes:

> The usual interest of scientists is not historical, *nor is it restricted to particular or types of epistemic situation, not even their own*. To be sure, when a scientist claims that *e* is evidence that *h*, he believes and hopes that, given his knowledge, he is justified in believing *h* on the basis of *e*. But he believes and hopes for something much more.
>
> *(Achinstein, 2001, p.37, my emphasis)*

That is, the scientist hopes that *e* is evidence for *h*, independently of their own epistemic situation—the situation in which they happen to obtain the relevant evidence and draw the relevant inference. In particular, scientists do not aim to gather evidence relativized to a person or group: "*e* is evidence that *h for me*." They want to make evidence claims that can be evaluated and accepted by any competent scientist (or member of the public), such that everyone should be able to see that *e* is evidence that *h*. Scientific data should constitute reasons to accept a given hypothesis for any competent scientist (or member of the public), and not only for some individuals in the right epistemic situation.

By definition, a piece of subjective data cannot support a hypothesis independently of one's own epistemic situation. One has to be in the right epistemic situation to appreciate how a given piece of subjective data supports a given hypothesis. Take a colorblind scientist studying color vision. If the crucial evidence for a certain hypothesis comes in the form of subjective color experiences, she's permanently shut out from assessing it. She can't evaluate some of her field's core evidence claims and won't see why her colleagues think certain phenomena are established. If you believe, as Achinstein (2001), that one of the aims of science is to provide support for hypotheses that holds independently of one's own epistemic situation, this means that subjective data are not in line with the aims of science.

The problem runs deeper. If hypotheses are confirmed by subjective data, that also means that you can't fully understand why a given hypothesis is regarded as well confirmed within the scientific community unless you are in the epistemic situation that's required for you to get access to the relevant subjective data. As a descriptive claim about the scientific study of consciousness, that sounds deeply wrong. I must confess that I have never experienced para-contrast masking—a method for making stimuli invisible in which the onset of the mask precedes the onset of the target. Subjectivism would imply that I don't grasp *why* this phenomenon is well established in the literature, since I don't have access to the relevant subjective evidence. Now, I don't want to brag, but I know quite a bit about para-contrast masking. It would seem strange to insist that I'm missing a crucial piece of evidence just because I've never experienced it myself. In fact, to the best of my knowledge, there's simply no established scientific phenomenon where your personal access to a type of experience is required to understand the evidential basis for it.

In sum, scientific data typically provide evidence that holds independently of one's own epistemic situation. Subjective data don't. This leads to the counter-intuitive conclusion that some individuals who aren't in the right epistemic situation cannot fully grasp why some scientific hypotheses are supported—even if they have perfect knowledge of the relevant (third-person) scientific literature.

17.3.5 Problem 5: Scientific Data Have a Prospective Role

Science isn't just about the here and now. As Leonelli (2015) points out, data are collected with the expectation that they'll be useful to future scientists, perhaps working on hypotheses we haven't even imagined: "what matters is that observations or measurements are collected with the expectation that they may be used as evidence for claims about the world in the future" (p.817). The prospective role of data, according to Leonelli, implies that something cannot count as a scientific datum if it is impossible to "circulate it among individuals" (p.817). That's impossible in the case of subjective data.

A related worry is that subjective data are fundamentally unstable. Let me explain. Scientific data usually remain stable over time. Data interpreted as indicating that *Tyrannosaurus Rex* existed 67 million years ago isn't likely to vanish overnight. It sits in computers and museum drawers, ready to be re-examined in light of new theories. Because of this stability, science can accumulate evidence over time.

If all the publicly available data about the existence of *T. Rex* suddenly disappeared, some could start doubting that it ever really existed. Over time, this hypothesis wouldn't have the level of evidential support it once had. Fortunately, scientific data don't disappear so easily. That's not the case for subjective data, for the simple reason that the owners of subjective data can eventually forget about them, lose interest, or—unfortunately for data archiving—die.

Let's imagine that Titchener's hypothesis that there are no imageless thoughts was well confirmed by his and his students' subjective data (Danziger, 1980). Shortly after Titchener, behaviorism became dominant in psychology. Nobody cared much about the existence of imageless thoughts anymore, and researchers probably didn't have the same amount of subjective data as Titchener and his students. All objective data remaining equal, did the degree of confirmation of the hypothesis that there are no imageless thoughts change when the debate went out of fashion? Although not impossible, the fact that a hypothesis could become less confirmed just because some people stop caring about a particular issue seems counter-intuitive. That would be an odd way for evidential support to work. For what it's worth, my intuition is that the evidential standing of the hypothesis depends on the publicly available data Titchener left behind, not on the number of surviving owners of the relevant subjective experiences

If that's correct, this case indicates that subjective data do not directly confirm scientific hypotheses. Even if they did, subjective data would still lack important features that scientific data usually have, namely, transferability and stability.

17.3.6 Summary

I have given five objectivist reasons to hold that subjective data lack features that scientific data typically have—features that are important for some of the central aims of science. Because they lack these features, objectivists argue that subjective data are closer to non-scientific data—like my grandmother's anecdotal data, than typical scientific data.

Of course, subjectivists can bite the bullet. They can say that the study of consciousness should still be conducted with subjective data, even if that means doing something quite unlike standard scientific practice. They might even say the sacrifices are worth it if we want to study consciousness as a subjective phenomenon (but see Section 3).

Let me conclude this section with some good news for subjectivists. Sure, grandma's data won't get her published in *Nature* journals. But her data are not necessarily good for nothing. I focused here on the role of subjective data in the *justification* of scientific hypotheses. But subjective data could have other roles. In particular, they could have a role to play in scientific discovery, as Kriegel (2013) argues. For instance, psychophysicists often run pilot experiments on themselves, using their own first-person impressions to tweak the design. They use first-person impressions about the experiment to determine what should be done. This could be an important role for subjective data. But that doesn't make them scientific data. Non-scientific data can be involved in scientific discovery. Kekulé's famous dream of a snake biting its tail—if it happened at all—may have inspired the discovery of the structure of benzene, but that doesn't make the dream a scientific datum (Kekulé, 1865). An objectivist can happily grant subjective data a place in the creative business of discovery, while denying them a role in the sober business of justification (Dennett, 2005, p.147).

You might worry that rejecting subjective scientific data amounts to denying the possibility of a genuinely scientific study of consciousness—understood as a subjective phenomenon. The remainder of this article looks at the possible objectivist responses to that worry.

17.4 Are Subjective Scientific Data Indispensable?

Here is the indispensability thesis: subjective data are the subject matter of consciousness science. A genuine science of (phenomenal) consciousness must rely on subjective data to confirm (or falsify) its hypotheses.

The indispensability thesis has probably played a significant role in the acceptance of subjectivism. For instance, Levine (1994) writes: "conscious experiences themselves, not merely our verbal judgments about them, are the primary data to which a theory must answer" (p.117). Similarly, Chalmers (2013) argues: "third-person data alone provide an incomplete catalogue of the data that need explaining: if we explain only third-person data, we have not explained everything" (p.26). He continues:

> One class of views holds that the only phenomena that need explaining are those that concern objective functioning. The most extreme version of this view says that there are no first-person data about consciousness at all. A less extreme version of this view says that all first-person data are equivalent to third-person data (e.g., about verbal reports), so that explaining these third-person data explains everything. Another class of views accepts that first-person data need further explanation, but holds that they might be reductively explained by future neuroscience.
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> *(Chalmers, 2013, p.27, my emphasis)*

The thought, as Chalmers implies, is that without subjective data, the "science of consciousness" becomes the science of something else: brain processes, verbal reports, reaction times—whatever you like, so long as it's publicly accessible. In this picture, subjective data are indispensable for a genuine science of consciousness.

On the other side of the theoretical spectrum, pessimistic objectivists are willing to take that implication and run with it. They hold that there are no subjective data, and—sure enough—that cognitive science isn't in the business of explaining phenomenal consciousness at all. What cognitive science should aim to explain, according to pessimistic objectivists, are people's *beliefs* about consciousness, how they come to provide subjective reports, and why they have "problem intuitions" (Chalmers, 2019; Frankish, 2019). Dennett (2018) writes: "what has to be explained by theory is not the conscious experience, but your belief in it (or your sincere verbal judgment, etc.)" (p.459). In the same way, Frankish (2019) writes that the main task of the science of consciousness "is essentially that of explaining what Daniel Dennett calls the hetero-phenomenological data—our introspective reports about experience" and "there isn't "anything further to be explained beyond the hetero-phenomenological data" (Frankish, 2019, p.84).

Both pessimistic objectivists and (probably) most subjectivists thus seem to agree on a conditional: if there are no subjective data, then the only things explained by consciousness science are the public phenomena, such as verbal reports, for example. Pessimistic objectivists raise the following dilemma: either accept subjective data, and there's consciousness but no science; or reject subjective data, and there's science but no consciousness.

Optimistic objectivists hold that this is a false dichotomy. They deny the existence of subjective scientific data and also hold that science can study phenomenal consciousness. In a seminal article, Bogen and Woodward (1988; see also Woodward, 1989, 2010) introduce a distinction between phenomena and data. The indispensability thesis might stem from a failure to distinguish between the two.

In a nutshell, *phenomena* are what scientists aim to study: the melting point of lead, volcanic activity during the Jurassic period, the development of color categories in children, recency effects in short-term memory, the fall of the Roman Empire, differences in personality between individuals, and so forth. Phenomena are detected and measured

using *data*: reports of temperature readings, bubble-chamber photographs, archeological evidence, single-cell recordings, records of event-related potentials, personality test results, and so on.

The most important aspect of the distinction between *phenomena* and *data* is that scientists do not typically explain and predict *data*. Instead, they want to explain and predict *phenomena*.

For example, neuroscientists studying action potentials do not usually want to explain *recordings* of action potentials—the *data*. Instead, they use those recordings to detect action potentials—the relevant *phenomenon*, with the goal of explaining this phenomenon. Similarly, personality scientists do not want to explain responses on personality tests—the *data*. Instead, they use these tests to study *personality*—the target *phenomenon*.

The take-home message is that scientists rarely attempt to explain data themselves. A historian of science studying how scientists came to understand the mechanism of action potentials in neurons could study early records of action potentials, and thereby, study data themselves. However, aside from these rare cases, scientists, by and large, do not want to predict, explain, or understand data. They want to understand phenomena.

In the same way, consciousness scientists using publicly available *data*, such as verbal reports, do not necessarily aim to study these data. Instead, they can use reports as *data* to learn more about subjective, private experiences—the target *phenomenon*.

This is common practice in cognitive science, and in science in general: scientists use *publicly available data* to learn more about *phenomena* that are *not* directly observable. No one has ever observed a very short-term visual memory buffer, the phonological loop component of working memory, or even a subject's personality. Still, scientists can use publicly available data to learn more about very short-term visual memory, the visuospatial sketchpad, or personality.

In addition, scientists do not typically *test* theories against data themselves. As argued by Bogen and Woodward (2003):

> scientific theories are tested against phenomena rather than data. For example Einstein's theory of general relativity was tested against a value for the deflection of starlight, rather than the photographs from which the deflection was calculated. The electro-weak theory devised by Weinberg and Salam was tested against claims about a phenomenon (the occurrence of neutral currents) rather than against the bubble chamber and spark detector data on which those claims were based. The testing of Newton's theory of universal gravitation involved such phenomena claims as Kepler's and Galileo's laws rather than the data used to investigate these phenomena (e.g., descriptions of pendulum and inclined plane experiments, astronomical records of the movement of the moon, etc.). (p.224)

If this analysis is correct, one cannot claim that "if we explain only third-person data, we have not explained everything" (Chalmers, 2013, p.26), since scientists do not typically aim to explain data. It is also incorrect to claim, as Levine (1994) does, that "conscious experiences themselves, not merely our verbal judgments about them, are the primary data to which a theory must answer" (p.117), since scientists do not test theories directly against data.

On the other hand, pessimistic objectivists might also be wrong to hold that, if there are no subjective data, "what has to be explained by theory is not the conscious experience,

but your belief in it (or your sincere verbal judgment, etc.)" (Dennett, 2018, p.459) or that there isn't "anything further to be explained beyond the hetero-phenomenological data" (Frankish, 2019, p.84). One can maintain that consciousness is a subjective phenomenon, unobservable from the third-person perspective, while also claiming that scientists can learn more about it using objective data.

To conclude, optimistic objectivists argue that there's nothing wrong with denying the existence of subjective scientific data. Doing so does not imply that consciousness is not a subjective phenomenon. And it does not imply that it cannot be studied *as a subjective phenomenon*. The only thing that one denies by claiming that there are no subjective scientific data is that scientists confirm their hypotheses about consciousness using private, subjective data, instead of publicly available data. Optimistic objectivists thus believe they can preserve the main motivation for subjectivism while avoiding its commitment to subjective scientific data. Whether they've really pulled that off is another question that I address now.

17.5 Escaping Pessimism: Knowing What People Feel

Pessimistic objectivists raise the following challenge: "Introspective reports do not tell us about conscious experiences themselves. They reveal what people *think*, or *believe* they are experiencing. How could you ever isolate what people *experience* from their *attitudes* toward those experiences? You can't go past the attitudes."

This rhetoric is familiar. It is the moral of several "intuition pumps" in Dennett's "Quining Qualia" (1988). Take the case of Mr Chase & Mr Sanborn, for instance. As the story goes, their job is to make sure that the taste of Maxwell House coffee stays constant. But as years go by, both of them start disliking it. Chase believes that it tastes just the way it always did, but he doesn't like that taste anymore. This is a change in *attitude* toward an unchanged *experience*. Sanborn believes that the taste has changed, which is why he grew to dislike it—a change in *experience*. The question is: how does Chase know that he is not in Sanborn's situation, and vice versa? While optimistic objectivists might agree with Dennett (1988) that introspection alone does not answer that question, they want to resist Dennett's claim that "empirical methods would fall short of distinguishing what seem to be such different claims about qualia" (p.235).

Frankish (2021) plays a similar tune: "It is impossible to directly identify correlations between neural states and phenomenal states, since phenomenal states are not publicly detectable." (p.59) Here is his own example to make this point:

> Suppose scans reveal that a certain brain region is active when people are tickled on the back of their neck. We test this further by using trans-cranial magnetic stimulation to stimulate and disrupt activity in this region (a harmless non-invasive procedure). When we stimulate the region, the patient reports a tickling sensation even when they are not being tickled, and when we disrupt it, they do not report a tickling sensation even when they are being tickled. Would this establish that activity in the region is the neural correlate of the phenomenal feel of being tickled? No. Maybe stimulating the region causes a person to react as if they are being tickled but does not produce the phenomenal feel of being tickled, and disrupting it blocks the reactions but does not suppress the feel. How could we tell? It wouldn't help to ask the subject. Maybe the brain region we stimulated also produces the belief that one is being tickled and memories of having been tickled (which are just further responses). Then the subject

> would sincerely believe that they had felt a tickle even if they hadn't. (Similarly, disrupting activity in the region may prevent the formation of memories of having felt a tickle, even if one was felt.) Again, we cannot get past the reactions to the feel itself. (p.59–60)

So, pessimists say: science stops at the attitudes. The feel is off-limits.

But over the years experimental psychologists have developed experimental techniques to decide whether changes in response patterns (and neuronal activity) reflect changes in *perceptual experience*, or changes in the tendency to *think* (and report) having an experience.[4] My claim is not that those methods are always available or successful. But arguing that we "cannot get past the reactions to the feel itself" underestimates scientific creativity. Let me give a few examples across different areas of psychology and neuroscience to illustrate.

When viewing a display with two disks moving toward (and then past) one another along linear trajectories, subjects either report seeing the disks as bouncing off each other, or as streaming through each other. Pessimistic objectivists might raise two challenges. Challenge 1: when subjects report seeing the disks as bouncing off each other instead of streaming through each other, how can we know whether this report reflects a difference in conscious perceptual experience, or a difference in attitude toward an ambiguous experience? Challenge 2: suppose that a "click" added at the moment when the disks overlap leads subjects to report seeing a collision (Sekuler, 1997), how do we know the click actually changes the experience, rather than just the tendency to judge "bounce"? Optimists believe that we can answer these two challenges by identifying typical signatures of perception (Block, 2022).

We can answer the first challenge by relying on visual adaptation—a phenomenon in which perceiving a given feature biases perception away from it, as when looking at a green object causes a reddish afterimage. Adaptation effects also tend to be retinotopic: your afterimage only occupies a certain part of your visual field. Thoughts don't seem to lead to similar adaptation effects—certainly not retinotopically specific effects. In the case of the stream-bounce effect, Rolfs et al. (2013) have demonstrated that it can lead to retinotopically specific visual adaptation: seeing collision events in one part of the visual field lead participants to report seeing ambiguous events as instances of the disks streaming through one another in that part of the visual field (but not other parts). This is good evidence that subjects consciously experience collisions, instead of simply having a post-perceptual judgment that what they just saw was a collision.

Another possible signature of perception is a direct influence on other perceptual processes, such as the perceived amount of overlap between the disks. We can use it to answer the second challenge. Meyerhoff and Scholl (2018) reasoned that if hearing a "click" when the disks overlap changes the participants' *experience* of the disks—they now experience them as colliding, that should create the perceptual illusion that the disks never totally overlapped, since experiencing a collision is incompatible with experiencing a total overlap between the disks. This is what they found in an experiment where participants never had to report bouncing vs. streaming, but instead estimated the amount of overlap between the disks. Meyerhoff and Scholl (2018) argue that this vindicates the view that hearing the "click" changes what participants consciously experience, and not just their judgments:

> [A]ll we asked [the participants] to do was to indicate (by visual matching) precisely how much the discs seemed to have overlapped on each trial. This sort of

> dependent measure seems much less susceptible to a "decisional" interpretation, even in principle. In the first place, the causality (or lack thereof) in any given display was entirely task-irrelevant. And whereas launching/bouncing vs. passing/streaming is just the sort of categorical distinction that observers may make decisions about, the precise amount of overlap between two discs seems much more clearly (and solely) visual. (It wouldn't be so surprising to have an observer reason: "Well, that event must have been bouncing, given the noise." But it doesn't seem so natural to reason: "Well, that event must have overlapped by 77% instead of 80%, given the noise.") Finally, any "decisional" interpretation would presumably have to appeal to the perceived causality (or lack thereof) as the source of the decisions—but when we carefully asked about this in post-experiment debriefing questions, no observer identified a link between causality and degree of overlap.

Optimistic objectivists do not need to hold that this particular issue is settled. My claim is much weaker. These empirical efforts demonstrate that trying to decide whether an effect reported by participants reflects what they *consciously experienced* or just what they *think* they experienced is not a hopeless project. We could imagine scientists coming up with similarly creative experiments to decide whether Mr. Chase's experience of coffee has changed, or whether his attitude has changed.

Moving on to Frankish's (2021) challenge: can we distinguish the neural correlates of conscious experiences from the neural correlates of reactions to and attitudes toward conscious experiences? I think so. No single experiment is ever going to constitute a silver bullet. What we can do, however, is control for confounding factors one by one and then "triangulate" on the neural correlates of consciousness (Morales, 2022).

Many experiments trying to identify the neural correlates of consciousness contrast conditions in which participants perceive stimuli unconsciously to conditions in which they perceive them consciously—a method called "contrastive analysis" (Baars, 1988). This experimental setup already gets rid of several confounding factors. Notably, we already know that whatever neuronal activity we find in the conscious condition is not a correlate of the act of reporting, or of introspection itself, since participants also have to introspect and provide reports in the *unconscious* condition (Michel & Morales, 2019). Some experiments have also successfully controlled for the *decision* to report by using no-report paradigms (e.g., Sergent, 2021). Others have controlled for the maintenance of the identity of the stimulus in working memory before the report (e.g., De Lafuente & Romo, 2005). Yet, others have attempted to control for differences in discrimination performance between the conscious and unconscious conditions (e.g., Lau & Passingham, 2006).

The short history of the research on the neural correlates of consciousness teaches a moral: name a confound and sooner or later someone will design a way to control it. It's not perfect. But there is no reason to think that neuroscientists "cannot get past the reactions to the feel itself." Optimistic objectivists hold that there is nothing so special about studying consciousness. The science of consciousness faces many challenges. But those challenges are not so different from those faced in other scientific fields attempting to study phenomena that are not directly observable. They are *de facto*, methodological challenges, not *a priori* challenges that would question the very possibility of a science of consciousness relying on (objective) data from introspection.

17.6 Conclusion

What role should introspection play in consciousness research? Subjectivists believe that it delivers a special kind of scientific data, without which scientists cannot really study consciousness. The objectivist line is that there's no such thing as subjective data; or if there is, it's not the kind of thing science can run on. For the pessimists, that's the end of the story: no subjective data, no scientific study of consciousness *as a subjective phenomenon*. All that's left is what people think about their experiences and what they say about them. The optimists, on the other hand, clearly distinguish between data and phenomena. For them, whether subjective data exist or not makes no difference for the prospects of studying consciousness scientifically as a subjective phenomenon. It's entirely possible to use objective data to study a subjective phenomenon. Optimists further argue that, while the science of consciousness faces many challenges, none of those challenges force us to give up on the project of studying consciousness as a subjective phenomenon. There's nothing so special about studying consciousness scientifically by using data from introspection.

Notes

1 Verbal reports are not subjective data (Chalmers, 2013; Goldman, 1997). Chalmers (2013) is explicit on this: "If we observe someone listening to music, relevant third-person data include those concerning the nature of the auditory stimulus, its effects on the ear and the auditory cortex of the subject, various behavioral responses by the subject, and *any verbal reports the subject might produce*." (p.26, my emphasis). Reports, verbal or otherwise, don't have anything "subjective" to them: they're publicly available, we can record and share them.

2 Dretske was mostly concerned with the fact that awareness of facts requires the deployment of concepts while, on his view, awareness of things doesn't. I can be aware of the fire in the building without possessing the concept "fire," but I can't be aware that there is a fire in the building without having that concept. Tye (2014, 2015) has emphasized the importance of the distinction between awareness *of* and awareness *that* with respect to introspection.

3 A measurement, or detection indicator, is the output of a measurement or detection apparatus. For instance, the height of a column of mercury in a thermometer is a measurement indicator that one can interpret as indicating a given temperature value.

4 I cannot cover all those methods here. I limit myself to some salient examples. Block (2022) provides a book-length treatment of the various methods by which we can tell whether a psychological effect is perceptual or post-perceptual in nature. Michel (2023a, 2023b) explains how this can be done with the tools of signal detection theory.

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