

Prospects for a Naturalized Phenomenology

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Abstract: I review the historical relationship between phenomenology and the natural sciences, survey the contemporary literature on naturalized phenomenology, and defend a position whereby phenomenology is an ‘equal partner’ in the pluralist enterprise of consciousness studies. On this view, phenomenology does not have the kind of methodological priority Husserl and his early followers attributed to it. Nor, I argue, does it have any insights or methods to offer that are not available, at least in principle, from other sources. On the other hand, phenomenology does have a great deal to offer *de facto* to the naturalization project—namely, a set of detailed accounts of experience in particular domains. I conclude by describing an approach to naturalized phenomenology that emphasizes visualization of neuro-phenomenological processes.

Though Husserl and his successors were officially opposed to naturalism, phenomenologists have always drawn on empirical sources to some extent. This trend has increased in the last few decades, and it is now common for phenomenologists to draw on psychology, neuroscience, and other cognitive sciences.¹ What is now called ‘naturalized phenomenology’ dates to the 1990’s, when Francisco Varela published “Neuro-phenomenology, a methodological remedy for the Hard problem” (Varela 1996), and a multi-authored volume entitled *Naturalized Phenomenology* appeared (Petitot et al. 1999).² In the late 1990’s the journal *Phenomenology and the Cognitive Sciences* was launched, and has been active to the present day. Today, ‘naturalized phenomenology’ is a standard phrase, occurring in over 200 journal articles and book-chapters to date³, and the primary subject of several subsequent anthologies (Embree 2004, Gallagher & Schmicking 2010), and special issues of journals (Carel & Meacham 2013, Hasenkamp & Thomson 2013).

¹ Some terminological notes. I take ‘cognitive science’ to refer to cognitive sciences besides phenomenology, e.g. neuroscience, behavioral psychology, and linguistics (though of course phenomenology can, and I think should, be considered one of the cognitive sciences). I take ‘phenomenology’ to refer either generically to the study of consciousness, or more specifically to the tradition of philosophical research that originates in Husserl’s work. Where context does not make my meaning clear I add suitable qualifiers (e.g. ‘phenomenology as a philosophical discipline.’) By ‘introspection’ I simply mean reflection, and unless otherwise stated do not intend to refer to the historical form of introspectionist psychology that Husserl explicitly distanced himself from.

² In addition to the forms of naturalized phenomenology described here, several other lines of inquiry should be mentioned. (1) A handful of earlier papers in the Husserlian tradition connecting it with psychology and the cognitive sciences (e.g., Chokr 1992, Ihde 1986, McIntyre 1986). (2) A separate thematic line that begins roughly with (Dreyfus & Hall 1982), which draws more on Heidegger and Merleau-Ponty than Husserl, and that has engaged closely with research in cognitive science, initially critically, but recently in a richer variety of ways. Some anthologies that overview work in this area are (Kiverstein & Wheeler 2012, Wrathall & Malpas 2000). (3) Some research in the social sciences, where phenomenology has long been considered to be one of five main ‘traditions’ of qualitative research (Creswell 2012), and also in psychology (see, in particular, the *Journal of Phenomenological Psychology*, which was founded in 1970).

³ As of September 2014.

A similar process has occurred in psychology and the cognitive sciences. While it was common in the 19th century to consider introspective results alongside physiology and experimental psychology⁴, introspectionist approaches to psychology fell out of favor ~~in the~~ during the behaviorist period.⁵ After the cognitive revolution of the 1950's, psychologists began to take internal states seriously again, though consciousness remained largely off limits. In the 1990's some philosophers and psychologists persuasively argued that subjectivity was a legitimate and essential topic for naturalistic study (Baars 1988, Chalmers 1995, Mangan 1991, Searle 1994). Perhaps the defining moment of this period was the first Tucson conference, 'Towards a Science of Consciousness' in 1994. Today consciousness-studies is a full-fledged interdisciplinary research area, with several dedicated journals (*Journal of Consciousness Studies* and *Consciousness and Cognition*) and active professional organizations (*Association for the Scientific Study of Consciousness* and the *Center of Consciousness Studies*).

Many questions arise in connection with these developments. Why did Husserl oppose naturalism to begin with? Were his arguments sound? If interactions between phenomenology and the cognitive sciences are allowed, what form or forms should they take? Does phenomenology (as a discipline) have any special status vis-à-vis the cognitive sciences, and consciousness studies in particular? Does it have anything unique to contribute? In what follows I provide an overview of these issues, offer my prognosis on some of the key questions, and briefly suggest a specific direction naturalized phenomenology might take.

In section 1 I give an overview of Husserl's attitude towards the natural sciences and psychology in particular. As we will see, his view is fairly subtle, and develops in interesting ways over the course of his career. In section 2 I review developments in phenomenological psychology after Husserl. I gather evidence that phenomenologists in this period regarded phenomenology as having methodological priority over other sciences. In section 3 I describe the kind of approach to naturalized phenomenology that has taken form in recent years, whereby phenomenology is an 'equal partner' in an interdisciplinary matrix of approaches. In section 4 I offer my prognosis of these various forms of naturalized phenomenology. Though much of my argument is deflationary (I believe Husserl's anti-naturalist arguments largely fail, and that phenomenology as a historical movement has not produced any fundamentally novel methodological insights), I do believe phenomenology has something important to offer: a rich source of theories of and approaches to consciousness. In section 5 I describe a specific and I believe promising form of naturalized phenomenology.

1. Husserl on psychology

Husserl had a complex view of the relationship between phenomenology and psychology, which he developed over the entire course of his professional career, from *Philosophy of Arithmetic* (Hua XII) to *Crisis* (Hua VI). The most relevant texts are *Phenomenological*

⁴ For the 19th century background see (Baars 1986, Boring 1957), as well as (Gurwitsch 2010), which considers this history from a Husserlian perspective. Baars also considers developments in the 20th century, and includes useful interviews with prominent cognitive psychologists.

⁵ To get a sense of the original impulses behind behaviorism (e.g., animal psychologists being asked to speculate about the experiences of rats and birds), see Watson 1913.

Psychology (Hua XIV), *Ideas II* (Hua IX), *Ideas III* (“Studies in the Foundations of Science,” Hua V), The Encyclopedia articles (Husserl 1997), *Crisis* (Hua VI), *The Prolegomenon to the Logical Investigations* (Hua XVIII), and the article *Philosophie als strenge Wissenschaft* (Husserl, 1965). In these texts Husserl develops a sophisticated view of the relationship between his own phenomenological program and empirical psychology, as he understood it.⁶

Since Husserl’s main critique of psychology (which also contains interesting discussions of psychology in its own right) is based on his transcendental, constitutive program, we begin with a review of these aspects of his theory.

1.1 Transcendental phenomenology and the constitution of psychology

The goal of transcendental phenomenology is to study how reality is constituted in flowing streams of conscious experience. The project is (at least on one interpretation) broadly idealist: to describe a metaphysical picture in which all categories of being are ultimately founded on subjective conscious processes.⁷ From this standpoint, consciousness plays a fundamental epistemic role. Transcendental consciousness, and more specifically the transcendental ego or ‘I’, is the sole basis of all being. Chairs, tables, mathematical theories, works of fiction, suits of armor, passing breezes—each of these is real insofar as it is a kind of unity or stable nexus in the flux of conscious experience. Since the emphasis of this project is on how entities are constructed or ‘constituted’ in the flow experience, transcendental phenomenology is sometimes also referred to as ‘constitutive phenomenology.’

It is crucial to bear in mind how seriously Husserl took this project (especially after 1905) when reading his comments on psychology. For Husserl, all the entities and relations posited by all the sciences, from physics through psychology and sociology, are part of reality as we know it, and are thus constituted by transcendental consciousness. Electro-magnetic fields, action potentials in the brain, social structures, and crucially, what we take to be the mental states of ourselves and others (desires, beliefs, pains, etc.), as well as their neural bases, are all the proper subject matter of transcendental phenomenology. Insofar as scientific entities are stable unities in the flux of, for example, a scientist’s consciousness, they are proper topics of constitutive phenomenology.

Ideas 2 and *3* (Hua IV and V) contain Husserl’s most detailed discussion of the constitution of scientific entities. Towards the end of *Ideas 2*, Husserl focuses on the constitution of psychological entities.⁸ For example, he considers how we experience mental states in relation to bodily states. We clearly have some sense of this relation in everyday experience. For example, I know that if I move an object over my arm, a determinate sequence of sensations will result, which can be repeated:

⁶ For additional discussion see Moran 2008, Zahavi 2004 and 2010, and Ramstead 2014.

⁷ The question whether Husserl was a realist or idealist is one of the most controversial in Husserl scholarship, though most commentators agree that Husserl was some kind of an idealist by the time of *Cartesian Meditations* (Hua I). For an overview of the scholarly debate see Yoshimi (forthcoming), and Drummond (1990), 250.

⁸ For more detailed discussion of these texts see Yoshimi 2010. Of particular note here is that Husserl gives a specific argument against the possibility of deriving psychological laws from neurological or physical laws. I evaluate this argument in Yoshimi 2010.

If an object moves mechanically over the surface of my skin, touching it, then I obviously have a succession of sensings ordered in a determinate way. If it always moves in the same way, with the same pressure, touching the same parts of the body at the same pace, then the result is obviously always the same... (*Ideas* 2, 161-162)

So we have some sense of what Husserl calls “psycho-physical conditionality” (*psychophysichen Konditionalität*), a relation between our bodily states and our conscious states (cf. Hua IV, 64ff). To develop the constitutive phenomenology of psycho-physical conditionality is to develop a kind of phenomenology of the mind-body relation, an account of how we experience bodies in their relation to sensory and conscious states.

1.2 Transcendental phenomenology cannot be naturalized

Transcendental phenomenology is practiced in a special frame of mind or ‘attitude,’ an attitude of philosophical reflection where all assumptions about reality are bracketed and the phenomenologist focuses on the way entities are disclosed in the flux of experience. This is the famous Husserlian method of *epoché*. The transcendental attitude of the phenomenologist is contrasted with the ‘natural attitude’ of everyday life, within which we do not ask about the constitution of reality, but simply take for granted that physical reality exists and is the way we believe it to be.

If transcendental consciousness is the sole basis of reality, it is a mistake to assume that the physical world is the basis of reality. In a similar way it is a mistake to assume that any science of the natural attitude has epistemic priority over transcendental phenomenology.⁹ Perhaps Husserl’s most detailed reasoning along these lines is in the article, “Philosophy as Rigorous Science” (Husserl 1965). The article contains several arguments, but the main argument is that phenomenology studies “being as the correlate of [pure] consciousness” (89), while sciences of the natural attitude like empirical psychology simply assume that conscious states are natural events occurring in space-time, and so are in no position to address fundamental questions about being. Efforts to “naturalize pure consciousness” are thus “victims [of a]... facile confusion between pure and empirical consciousness” (92).¹⁰ Consciousness *qua* fundamental constituting medium is not just one more type of real thing to be studied using empirical methods. It is more than that: it is the very basis of reality as we know it, and must be studied in an appropriate way.¹²

Husserl is not anti-scientific; indeed, one can draw on the sciences and admire their results (they fill Husserl with “wondering admiration”). His point is that they cannot

⁹ These ideas are the basis of a wide range of critical analyses in Husserl, and are closely related to his well-known early critique of psychologism (the view that logical laws are psychological laws; Hua XVIII; also see Kusch 2011).

¹⁰ As Gurwitsch puts it: “Since the clarification and justification of the procedures of positive science and of their concepts are two of the tasks of phenomenology, it would be obviously be circular reasoning if clarification and justification were attempted in terms of the very concepts and procedures to be clarified and justified” (Gurwitsch 1964, 168).

¹² This is related to Husserl’s claim that phenomenology is a source of apodictic insight, which raises numerous questions and interpretive issues (given that Husserl admits his own fallibility and develops a kind of phenomenological account of human fallibility). For more on this issue see Hopp 2009.

form the basis of a foundational, transcendental study of being. In the language of *Ideas*, all the results of natural science must be “bracketed” or “disconnected” from phenomenological consideration:

[Even though] all sciences which relate to this natural world... fill me with wondering admiration... I disconnect them all, I make absolutely no use of their standards, I do not appropriate a single one of the propositions that enter into their systems.... I take none of them, no one of them serves me for a foundation.
(Husserl 1962,100)

1.2 Phenomenological psychology

Assuming the naturalistic errors described above are avoided, and we are good transcendental phenomenologists, then Husserl thinks the natural sciences, and psychology in particular, have an important role to play. In fact, for the most part, they can simply remain as they are. Phenomenologists can study the foundations of psychology and other natural sciences, and the scientists, for their part, can simply go about their business.

However, in the particular case of psychology, some reform is possible—Gurwitsch went so far as to call it a “radical reform” (Gurwitsch 1964, 159)—insofar as phenomenology provides methods and insights that can be of direct use to psychology. For example, Husserl’s theory of the structure of intentional acts, of sensory or hyletic data, and of the structure of time consciousness, are all relevant to psychology. Husserl’s most detailed discussion of these issues is in lectures he gave in 1925 on ‘Phenomenological Psychology’, later collected as Hua IX.¹³ The lectures begin with a detailed discussion of the psychology of Husserl’s time, and are followed by an overview of those features of phenomenology that Husserl thought could inform psychology. There is very little sustained consideration of specific psychological experiments or results in the book. But by his choice of topics it is clear that Husserl took himself to be exemplifying the kind of work he envisioned, whereby some psychological topics could be analyzed in new ways using the methods and tools of phenomenology. For example, his overview of intentionality (Hua IX, 118) seems to be intended as a supplement and guide to psychological analyses of sensation and perception.

2. Generic phenomenological psychology

Husserl’s mature position with respect to psychology is twofold: (1) don’t allow it to influence one’s transcendental inquiry, but (2) having left the transcendental attitude and entered the natural attitude, one can pursue psychology and can even do so using phenomenological tools. Among Husserl’s immediate successors in the

¹³ Though the concepts are also discussed in other places, in particular in the *Encyclopedia* article and in *Ideas* 2 and 3. In the *Encyclopedia* article Husserl seems to distinguish psychology, pure psychology, phenomenological psychology, and pure phenomenological psychology. So there is more work to be done clearly differentiating these subtypes of phenomenological psychology (and even further related concepts, e.g. intentional psychology and eidetic psychology).

phenomenological movement, a kind of watered-down variant of this approach persisted, usually without the transcendental overtones. I will refer to this as ‘generic phenomenological psychology.’

The methodology of generic phenomenological psychology can be characterized by a single proposition, what I will call the ‘priority claim’:

Priority Claim: Phenomenology has methodological priority over all other disciplines.¹⁴

Intuitively, this asserts that phenomenological claims should be established solely on the basis of phenomenological methods. More concretely (but somewhat imperfectly), we can understand this is an asymmetric revisability claim: phenomenology has methodological priority in the sense that it can lead to revision of ideas in other disciplines, but its claims *cannot* be revised on their basis. Thus it is ok for phenomenology to correct psychological mistakes (and to draw on psychology in various ways), but it is *not* ok for phenomenological claims to be ‘corrected’ on the basis of empirical data. Phenomenologists can draw on and be influenced by empirical results, but those results must subsequently be checked using phenomenological methods. Phenomenology is the final court of epistemic appeals for resolving phenomenological questions. This is my observation of how phenomenology’s priority was understood by the first few generations of phenomenologists after Husserl. There may be counterexamples but I am not aware of them.

Perhaps the clearest examples are in Gurwitsch, who wrote his dissertation on the relation between Gestalt psychology and phenomenology, and who published several book length treatments on the relation between psychology (and science more generally) and phenomenology (Gurwitsch 1979a and 1979b). He considers a wide range of psychologists and neurologists in his work, and in every case abides by the priority claim. For example, Gurwitsch considers the neurologists Gelb and Goldstein, and in particular their patient T, who suffered from color amnesia: the patient could match color samples by hue and saturation but could not name the colors of samples. He used this case to ‘corroborate’ Husserl’s theory of universals and particulars, and more specifically a phenomenological distinction between categorial equality (two things are seen to fall under the same category) and qualitative homogeneity (two things are seen to have similar sensory properties). Gurwitsch describes this as a case where “essential ideas which Husserl developed...have been fully confirmed by the result to which Gelb and Goldstein have been led in their studies of brain injuries” (Gurwitsch 1979b, 359).

Gurwitsch also uses phenomenology to revise psychological claims. This is prominent in his critique of the ‘constancy hypothesis,’ according to which any particular pattern of sensory stimuli should produce the same sensations. Gurwitsch links this idea with a dualistic theory of perception (associated with psychologists from Stump to the school of Graz¹⁵) which posit two parts of perception: a raw sensory part that is determined solely by external stimulations, and an interpretive part that can vary even as stimuli remain the same. However, according to Gurwitsch, phenomenological reflection

¹⁴ Compare what Murray 2002 calls phenomenology’s “anteriority complex” (31).

¹⁵ The dualistic view is also associated with Husserl; hence this is an instance where Gurwitsch is critical of Husserl’s phenomenology.

and Gestalt theory (which for Gurwitsch is implicitly phenomenological) show that the constancy hypothesis and the dualistic perceptual theory it motivates are false: the most basic perceptual structure is an organized theme or Gestalt, which is a total form that cannot be decomposed into perceptual and interpretive elements. Thus, as Gurwitsch says, “Immediate experience does not bear out the dualistic account” (Gurwitsch 1964, 88).

Merleau-Ponty (who attended Gurwitsch’s lectures in France) also drew extensively on psychology, and in fact held a chair of child psychology at the Sorbonne from 1949-1952. Like Gurwitsch, Merleau-Ponty is critical of psychology on phenomenological grounds, for example in his critique of Pavlovian learning theory (animals do not just respond reflexively to stimuli but take in whole situations as fields of significance). Also like Gurwitsch, he draws on neurological cases—most famously Schneider, another Gelb and Goldstein patient, who suffered from apperceptive visual agnosia (an inability to recognize objects despite intact elementary visual functions).¹⁶ Schneider could make ‘concrete movements’ like removing his handkerchief from his pocket, but could not smoothly perform ‘abstract movements’ like moving his hand in a circle in front of him. Merleau-Ponty takes this to confirm his phenomenological account of the fundamental status of concrete embodied action (e.g. removing a handkerchief), and his critique of intellectualism (doing abstract things according to rules, like moving your hand in a circle).

In French phenomenology Sartre and De Beauvoir also drew heavily on empirical sources, and seem to abide by the priority claim. De Beauvoir is especially notable for the variety of sources she draws on. For example, in her phenomenology of marriage, she draws on historical data, autobiography, literary depictions, philosophical sources, the Kinsey report, several psycho-analytic and psychological studies (of nervous anxiety, frigidity, and amorous jealousy), and “a survey of Belgian bourgeois, about the problem of matrimonial choice” (De Beauvoir 2012, 445). This rich variety of data, much of it empirical, is used to inform a detailed account of the first-person experiences involved in marriage. The data inform and corroborate De Beauvoir’s account, but no phenomenological features of the account are ever explicitly altered on the basis of empirical data, as far as I can tell.

3. Naturalized phenomenology since the 1980’s

Since the late 1980’s, two main forms of ‘naturalized phenomenology’ have emerged, as noted in the introduction. A first group of theorists explicitly draws on the phenomenological tradition, from a naturalistic perspective. A second group includes theorists who do not draw on phenomenology explicitly, but who nonetheless take consciousness seriously and attempt to understand it in a broadly naturalistic framework. In this section I describe the kind of pluralist methodology that has emerged in both types of naturalized phenomenology, and give a provisional taxonomy of interactions between phenomenology and the cognitive sciences.

3.1. Methodology

¹⁶ For discussion see Jensen 2009.

Naturalized phenomenology and consciousness studies have developed a more or less standard methodology, whereby phenomenology, experimental psychology, neuroscience, and other disciplines are all taken to have equal methodological status, in the sense that results in each area can suggest revisions, corrections, and confirmations of results in any of the others. The hope is that over time these different methodologies and data will interact and ‘co-evolve’ to produce an increasingly accurate picture of consciousness and its neural basis. This kind of approach has been described in many ways: as “Convergent phenomenology” (Mangan 1991, ch. 5; also see Mangan 2014), a system of “reciprocal constraints” (Varela 1996, 343), the “Natural Method” (Flanagan 1992, 11), and “Mutual Enlightenment” (Gallagher 1997, 195).¹⁷ Here are some illustrative quotes:

The Working Hypothesis of Neurophenomenology: Phenomenological accounts of the structure of experience and their counterparts in cognitive science relate to each other through reciprocal constraints... by emphasizing a co-determination of both accounts one can explore the bridges, challenges, insights and contradictions between them. This means that both domains of phenomena have equal status in demanding a full attention and respect for their specificity. (Varela 1996, 343)

Start by treating three different lines of analysis with equal respect. Give *phenomenology* its due. Listen carefully to what individuals have to say about how things seem. Also, let the psychologists and cognitive scientists have their say. Listen carefully to their descriptions about how mental life works, and what jobs, if any, consciousness has in its overall economy... Finally, listen carefully to what the neuroscientists say about how conscious mental events of different sorts are realized, and examine the fit between their stories and the phenomenological and psychological stories. The object of the natural method is to see whether and to what extent the three stories can be rendered coherent, meshed, and brought into reflective equilibrium, into a state where theory and data fit coherently together... As theory develops analyses at each level are subject to refinement, revision, or rejection. (Flanagan 1997, 101–102)

We propose a rethinking of the standard cognitive mapping paradigm, which would render the mental processes studied in cognitive activation experiments subject to a methodological triangulation in which objective behavioural measurement, recordings of brain activity and introspective evidence can be related to each other. (Jack & Roepstorff 2002, 5)

I refer to these as ‘mixed approaches.’ As noted in the opening of the paper, mixed approaches were at least implicitly present during the introspectionist era, so that to some extent this method represents a rediscovery of earlier patterns of research (cf. Mangan 2007).

¹⁷ Wilson’s concept of ‘consilience’ (Wilson 1999) and Patricia Churchland’s “co-evolutionary research ideology” (Churchland 1989, 362) are similar, though they do not emphasize phenomenology. Also compare discussions of explanatory pluralism, e.g., Dale et al. 2009.

Variants on mixed methods are possible, whereby, even if all disciplines are taken to have equal status (in the sense of being able to revise one another), some disciplines are given more weight than others. In other cases the nature of specific interdisciplinary interactions can be spelled out in more detail. Neuro-phenomenology (Varela 1996), for example, can be understood as a specific form of naturalized phenomenology that emphasizes links between Husserlian phenomenology and neuroscience by way of dynamical systems theory.¹⁸

Mixed approaches are opposed to views that prioritize specific methodologies over others. According to a mixed approach radical behaviorism is just as mistaken in its method as phenomenology. Radical behaviorism denies the value of introspection altogether, and thus leaves consciousness out of consideration. Generic phenomenological psychology did not see empirical methods as having an equal status with phenomenological methods, and in particular did not allow empirical results to revise phenomenological insights.

3.2 Types of interaction between phenomenology and cognitive science

We have seen that naturalized phenomenology involves a kind of pluralist, mixed method, a ‘co-evolutionary’ or ‘reflective equilibrium’ approach, where data and methods from different domains interact over time to become increasingly coherent with one another. This overall pattern of interaction can, at least to some extent, be broken down in to particular forms of interaction, e.g. phenomenology suggesting ways to frame experiments, or neuroscience predicting phenomenological results. In this section I give a provisional taxonomy. I first consider cases where phenomenology informs cognitive science, and then cases where cognitive science informs phenomenology.

Perhaps the most basic way phenomenology can influence cognitive science is by providing data to be explained. As Kelly puts it in the case of neuroscience, “the right relation between phenomenology and brain science is that of data to model... it provides the most complete and accurate presentation of the data that ultimately must be accounted for by models of brain function” (Kelly 2001, 152). When subjects are asked to report on what they perceive in an experiment (for example), they are introspecting. Gallagher (2010) calls this “second order reflective access” (second order because the subject is reporting on a first-order experience), and says that such reports are based on “quick and minimal introspection” (22) (missing Page references). Even if the subject is only pressing a button or clicking a mouse, some introspection is arguably involved:

If one instructs a subject to push a button, or say “now” when they see the light come on, then the subject is reporting about the light, but also about their visual experience. Even if one instructs the subject in a way that carefully avoids mention of an experiential state: “Push the button when the light comes on,” the only access that the subject has to the fact of the light coming on is by way of her experience of the light coming on. In this sense the first-person perspective is inherent in experiments that depend on subjective reports. (Gallagher & Brøsted Sørensen 2006, 22)

¹⁸ Another variant, spelled out in detail, is Thompson 2007.

These considerations suggest that a large amount of the human psychology literature, even in the behaviorist tradition, is implicitly phenomenological.¹⁹ The degree to which ‘minimal’ phenomenological reflection is involved in behavioral experimentation is an open question, but it is clear that to some degree it is.

A more robust role for phenomenology is in influencing the design of experiments. Gallagher calls this “front loading phenomenology”, where “phenomenological insights (concepts, distinctions) developed in separate phenomenological analyses... are used to inform the design of experiments” (Gallagher, 2010, 27). [missing page references]²⁰ Gallagher and others have applied this method in a series of experiments seeking to understand the neural basis of the phenomenology of agency.²¹ Gallagher, drawing on Husserl and Sartre, makes a phenomenological distinction between a sense of ownership (my body is being moved) and a sense of agency (I am moving my body). The two can come apart, for example, if someone moves your arm for you (sense of ownership, but no sense of agency).²² The investigation is ongoing and reciprocal: phenomenological insights have motivated experiments, the results of the experiments have motivated further phenomenological studies, new follow-up experiments have been conducted, etc. Gallagher describes “a dialectical movement between previous insights gained in phenomenology and preliminary trials that will specify or extend these insights” (Gallagher 2010, 27).

Phenomenology can sometimes generate testable predictions. For example, in the realm of color science:

Mach discovered lateral inhibition by noting the purely subjective experience of intensity variations in the objectively homogeneous stripes now called Mach Bands in his honor. Helmholtz based his theory of tri-chromatic receptors on phenomenological evidence. (Mangan 2007, 673)

Mach bands are shown in Figure 1. By carefully attending to the figure one can see that the vertical bands appear darker at their boundaries, though they are physically uniform in their luminance. Mach painstakingly developed numerous stimuli to study this phenomenon, and concluded: “...there can be no doubt about its subjectivity. Its cause is not in the object, but in the visual organ...It appears to me that the phenomena discussed can only be explained on the basis of a reciprocal action of neighboring areas of the

¹⁹ One might even be tempted to say *all* behavioral experiments have an implicit phenomenological component. On the other hand, psychologists often try to minimize the involvement of subject’s introspective interpretations, for instance, by studying unconscious responses irrelevant to a task (sometimes a fake distractor task) the subject is asked to engaged in.

²⁰ This does not directly involve the subjects in the experiments at all, and in fact, as Gallagher notes, “there may or may not be any phenomenological method, or even introspection ...used in the experiment itself (Gallagher & Sørensen 2006, 125).

²¹ There are other examples as well. See, e.g., Zahavi 2010 on the mirror-recognition task in relation to the phenomenology of self.

²² Additional distinctions have been made. Our ‘pre-reflective’ immediate sense of agency and ownership can be distinguished from more reflective (in Husserlian terms ‘active’) processes of attributing agency or ownership to ourselves or others. It’s also notable that in the course of the back and forth various issues in experimental design arose, and that there are applications in this research to (for example) schizophrenia, where the sense of agency is disturbed in a complex way that could benefit from more refined distinctions.

retina” (Ratliff 1965, 266–267). Mach’s prediction was confirmed 80 years later in the horseshoe crab, and subsequently in humans (Pojman 2011, Ratliff 1965).

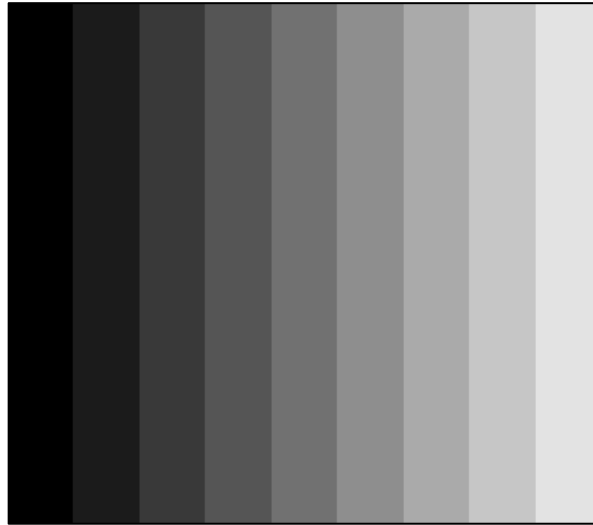


Figure 1. A neurological prediction based on phenomenological evidence. In the figure the boundaries between the vertical bands of color appear to be darker than their surrounds, though the bands are actually of uniform luminance. The neural circuitry underlying this phenomenon was correctly predicted by Mach on the basis of phenomenological evidence.

Phenomenology can also enrich our understanding of empirical results by embedding them in a coherent theoretical framework. Many examples of generic phenomenological psychology belong here: by utilizing a phenomenological approach, we gain a fuller understanding of schizophrenia, marriage, and motherhood (to list just a few). In each case the relevant empirical results are not taken individually, but are placed together into a coherent account of the relevant lived experience. In this mode the phenomenologist is a kind of higher level meta-theorist, drawing both on phenomenological and non-phenomenological sources in putting together an account of some kind of experiential process or pattern. Empirical psychologists, when they step back to discuss their results, or write more theoretical pieces, often engage in this type of phenomenological theorizing.

These kinds of enrichments sometimes involve ‘re-interpreting’ psychological results, what might even be thought of as cases of phenomenology *correcting* results from the empirical sciences. Here is how Gallagher describes Merleau-Ponty, who sometimes took this kind of approach:

Merleau-Ponty frequently used phenomenological insights to reinterpret experimental results. In such cases, phenomenology can take on a critical function, offering correctives to various theoretical interpretations of the empirical data. Although this kind of after-the-fact phenomenological reinterpretation can

be theoretically productive, in that it develops alternative interpretations, unless these interpretations are subject to further empirical testing, they remain unverified. (Gallagher 2010, 6)²³

Whether full-fledged corrections of empirical results from phenomenology ever happen is not entirely clear. What does happen (as Gallagher suggests) is that phenomenological reflection and theorizing sometimes suggests new experiments. These new experiments may suggest new phenomenological theorizing, etc., and the whole process continues via the kinds of co-evolutionary feedback loops described in the opening of this section.

Let us now consider ways in which cognitive science can inform phenomenology. In this direction, the most prominent form of interaction occurs when cognitive science corrects phenomenological results. In fact, phenomenology appears to be far less reliable than its practitioners assumed it was. As Schwitzgebel puts it:

We are prone to gross error, even in favorable circumstances of extended reflection, about our own ongoing conscious experience, our current phenomenology. Even in this apparently privileged domain, our self-knowledge is faulty and untrustworthy. We are not simply fallible at the margins but broadly inept (Schwitzgebel 2008). [missing page references]

Schwitzgebel defends his claim on the basis of a broad survey of cases, from our intuitions about why we do things (where the errors are quite surprising, and a mainstay of social psychology), to the phenomenology of thought (does it proceed in images or not; a controversy that goes back the imageless thought debate between Wundt in Leipzig and Külpe and his colleagues at Würzburg).²⁴ In each case the phenomenological method led to divergent insights that remain unresolved to this day, suggesting that at least some phenomenologists are getting things wrong.²⁵ Another example is the idea (prominent in Gurwitsch) that the visual field extends beyond a focus of clear attention to include a periphery of inattention: I am focally aware of this computer and peripherally aware of the windows and walls around me. However, a series of striking experiments in recent decades has shown that we seem to be *unaware* of some objects in the visual periphery, and even of objects almost at the center of the visual field.²⁶ These and related results suggest that Gurwitsch's development of Husserlian phenomenology is in need of correction, based on empirical results.

²³ This passage (and others, e.g., in Schwitzgebel) makes empirical confirmation the final court of appeals, a kind of symmetrical counterpart to the 'priority claim' described in section 2 (where any empirically-motivated revision of phenomenology must be checked against our phenomenological intuitions before being accepted). Whether either method should have ultimate epistemic authority is not clear to me, but I will not take the issue up here.

²⁴ On the imageless thought controversy see Beenfeldt 2013.

²⁵ This objection was prominent in the introspectionist era. A detailed consideration of this and related arguments, with an introspectionist response, is in Titchener 1912.

²⁶ The most famous example is probably the case of a gorilla walking through a scene without some subjects noticing (Simons et al. 1999). The experiments are controversial, and it is not clear how they should be interpreted (Mole 2013, Simons 2000), but they strongly suggest that we have less peripheral awareness than we intuitively believe ourselves to have.

Just as phenomenological insights can generate neural predictions, so too can neuroscience make phenomenological predictions. The best example of this that I am aware of is in Paul Churchland's paper, "Chimerical Colors: Some Phenomenological Predictions from Cognitive Neuroscience" (Churchland 2005). Churchland begins by describing a 3-node neural network simulation of human color vision. Patterns of activity across the three nodes tend to occur inside a subset of the network's 3-dimensional state space, which has the shape of a spindle. Points on the spindle correspond to the colors a person experiences when the relevant sensory inputs occur. Churchland then notes that by exposing oneself to color stimuli in a particular way, after-images occur whose color corresponds to a specific displacement away from a source point in the color spindle. In this way we can force the visual system in to states that are not in the color spindle, and can thereby generate what new kinds of color experiences, for example an "impossibly dark blue" (Churchland 2005, 555). [Are you citing Churchland here? If so, could you provide us with the page reference?] This can easily be tested (I encourage you to get Churchland's article and try it!). Thus Churchland was able to use his knowledge of color vision in the brain to successfully predict the existence of a new class of color sensations, sensations "that normal people have almost certainly never had before... whose accurate descriptions in ordinary language appear semantically ill-formed" (Churchland 2005, 527).

4. Prospects for a naturalized phenomenology

Based on my survey of the literature I believe prospects are good for contemporary styles of naturalized phenomenology, which draw on phenomenology and the cognitive sciences without giving any particular discipline priority. However, questions remain. For example, what role should phenomenology—as an explicit discipline tracing its origins to Husserl—play? Moreover, what is the status of Husserl's own arguments about naturalism, relative to the current discussion? Here my conclusions are more deflationary. I do not think Husserl's anti-naturalist arguments are sound, nor do I find the priority claim compelling. In fact, I do not even think phenomenology as a discipline has anything distinctive to contribute to the cognitive sciences. However, all is not lost. I do think that, *de facto*, philosophical phenomenology has a lot to offer, both in terms of content and methods.

My reasoning can be summarized by the flowchart in Figure 2. The flowchart lays out a main-argument: each node and outgoing arrow in the flowchart corresponds to a sub-argument concerning a particular approach to naturalized phenomenology. The final node corresponds to my considered position with respect to naturalized phenomenology.

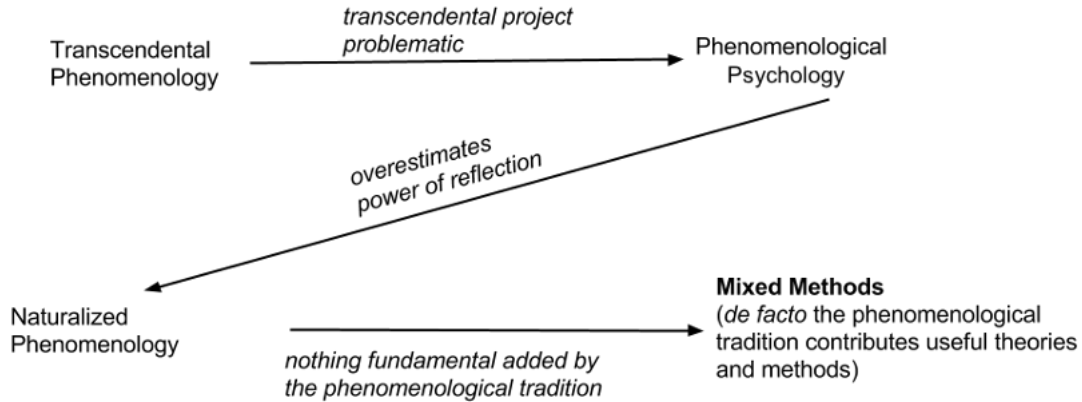


Figure 2: Flowchart of the main argument.

The first sub-argument concerns Husserl's conception of the relation between psychology and transcendental phenomenology. According to this conception, consciousness plays a fundamental role as the constitutive basis of reality, so that any attempt to make any other discipline fundamental (e.g. psychology or physics) is problematic. The problem here is that I am unconvinced by Husserl's transcendental arguments. Fully unpacking my reasons for this is a separate project (see Yoshimi, forthcoming), but I can briefly elaborate. While I find the concept of 'world constitution' compelling (and in fact, that is what I emphasize in my own efforts to naturalize phenomenology), I do not think it has the metaphysical implications Husserl takes it to. The world *as we experience it* may well be disclosed in flowing streams of awareness, but this has no implications at all about the world *as it really is*. In particular, it is neutral with respect to the realism/idealism debate. Husserl's entire phenomenological program is compatible with realism, idealism, and even (suitably construed) physicalism. If I'm right, the idea that all being is a correlate of consciousness (section 1) is unsupported. According to certain metaphysical systems, that are compatible with Husserl's phenomenology of world-constitution, entities can exist independently of their being constituted by any consciousness. I therefore believe that Husserl's transcendentially based arguments against naturalizing consciousness are unsupported.

Whether or not I'm right, transcendental idealism is hardly a widespread project today, even among phenomenologists. In fact, as we saw, most subsequent phenomenologists endorsed something weaker, like the priority claim, which simply says that phenomenology has methodological priority over other sciences. This takes us the second node of the flowchart, and my second-sub-argument.

I do not agree with the priority claim. In particular, I disagree with the idea that phenomenological claims should *not* be revised on the basis of empirical evidence. The best arguments here are provided by (Schwitzgebel 2008), who, as we saw, has documented cases where introspective techniques lead to contradictory conclusions. The relevant issues seem impossible to resolve using introspective resources alone. If Schwitzgebel is right, phenomenological claims not only *can* be revised by facts from

other disciplines, they *should* be, given how unreliable they are. Recall the example of the visual field, which empirical evidence suggests is much less rich and expansive than some phenomenologists, like Gurwitsch, thought. So it's just not clear that phenomenology should have the kind of priority Gurwitsch, Merleau-Ponty, and most others in that era gave to it. The upshot is that phenomenological techniques are just as error-prone as other types of inquiry (if not more so), and should be an 'equal partner' in the cognitive sciences.²⁷

This takes us to the third node of Figure 2, corresponding to naturalized phenomenology (or a particular form of it that still privileges phenomenology in a certain way). At this point I am mostly ok with things. As I said above, prospects for an 'equal partners' approach to naturalized phenomenology are good. However, the question remains whether phenomenology has anything *distinctive* to contribute (i.e. any method or approach that has not been independently developed elsewhere). Some have suggested it does, e.g. Varela. Though Varela accepts a mixed approach to naturalized phenomenology, where phenomenology and other disciplines can mutually constrain one another, he also suggests that phenomenology has distinctive methods (e.g., the method of *epoché*), which are essential to making progress on certain fundamental questions in cognitive science. He believes, for example, that phenomenology will provide for a full-blown Copernican revolution that will make the 'hard problem' of consciousness²⁸ disappear:

...my claim is that neurophenomenology is a natural solution that can allow us to move beyond the hard problem in the study of consciousness... like all solutions in science which radically reframe an outstanding problem rather than trying to solve it within its original setting it has a revolutionary potential. (Varela 1996, 340)

In a similar way one might claim that eidetic variation or some other idea in phenomenology that is seemingly absent in the cognitive sciences, is essential to our making progress in consciousness studies.

The problem here is that phenomenological methods either do not live up to the status Husserl attributed to them, or else correspond to existing and independently developed methods in consciousness studies. For example, the *epoché* and phenomenological reduction can either be taken to secure apodictic insight into consciousness, which we already saw to be problematic, or can be regarded as tools that help reduce bias, by bracketing potentially misleading sources of evidence during reflection. But one does not need to read hundreds of pages of Husserl to know that one must be on guard against subjective bias when studying consciousness. Indeed, finding ways to get around subjective bias is a key feature of experimental design in consciousness studies and in psychology generally. Eidetic variation, for its part, is

²⁷ The claim here is that at least sometimes, and to some extent, each of a set of constituent disciplines is allowed to influence the other. How often this should happen, or to what extent, is left as an open question, and in fact this varies from one researcher to another.

²⁸ The 'hard problem' is to understand how seemingly inert physical matter can give rise to subjective experience. The phrase is due to Chalmers (1995), but perhaps the earliest detailed statement of the problem is (Levine 1983).

arguably just a form of conceptual analysis (Yoshimi 2010). Moreover, it's not at all clear that it secures the kind of absolute truths Husserl sometimes seems to think it does (Mohanty 1991, Zaner, 1973). Thus it is not clear that phenomenology provides any distinctive methodological tools to consciousness studies. As Bayne puts it:

I can discern little evidence of any of the “technical developments of Husserlian phenomenology” (Roy et al. 1999, p. 21) at work in neurophenomenology. It seems to me that the methods for collecting first person data employed by neurophenomenologists are much the same as those employed elsewhere in the study of consciousness. (Bayne 2004, 353)

Of course, I could be wrong at any of steps 1-3, in which case phenomenology does have something essential to offer: a transcendental method, an epistemically superior source of insight, or some technical method that has not been developed elsewhere. Given my love for phenomenology, some part of me wants to be wrong in one of these ways (or some other way I have not anticipated), but as it stands I think we end up in the final node of Figure 2, of mixed methods for naturalized phenomenology. Here the idea is that we should treat phenomenology as an equal partner among the cognitive sciences, with no special or privileged status.

I do not think this is bad news for phenomenology. Even if I'm right that phenomenology has nothing *distinctive* to offer to the cognitive sciences, I do think phenomenology has, *de facto*, several core contributions to make.

First, phenomenology contains what is perhaps the most detailed repository of phenomenological observation in existence. Thousands of pages of phenomenological analysis were written by each of Husserl, Heidegger, Merleau-Ponty, de Beauvoir, and Sartre, not to mention their many successors. This is a vast body of research to draw on. Moreover, I think much of it is quite compelling. I am particularly drawn to Husserl's theory of world-constitution, and Gurwitsch's field theory of consciousness. Neither theory is based on infallible insight, and both are in need of revision, but they are extremely detailed and could serve as the basis of a more integrated, coherent story about how our conscious experience of the world is related to the dynamics of neural activity. I believe that many other phenomenological theories are plausible as well, and that they ought to co-evolve with other cognitive sciences to produce richer theories of human experience in relation to their physical underpinnings. Indeed, that is exactly what is happening in most naturalized phenomenology today.

Phenomenology can also offer (again *de facto*) a style of work, a kind of holistic, interpretive attitude that can serve as a good model for research in consciousness studies. For example, Merleau-Ponty had an overarching vision of embodied existence whereby we live in a world structured by our bodies and our overall concerns. He uses this point of view as a kind of template for connecting together all the various strands of psychological data he draws on. In this way individual results in the empirical sciences are woven together into a single coherent story about human experience. I believe this kind of approach to be valuable. Someone needs to be out there thinking about what different empirical results mean, and weaving them together in to coherent systems. I don't think

this attitude is proprietary to phenomenology, but nonetheless as a matter of historical fact, the phenomenologists have done a good job of exemplifying this style of work.²⁹

5. Future directions

I end by describing a specific form of naturalized phenomenology, a variant on the pluralist approach described above. I focus on a core set of ideas in Husserl concerning world-constitution. Interestingly enough, the ideas which I aim to naturalize are themselves the basis of Husserl's transcendental critique of naturalism (section 1).³⁰

Husserl's theory of constitution concerns the way we develop our sense of reality over time, in flowing streams of experience. I have argued that part of this theory can be formalized in terms of dynamical laws that relate perceptions and bodily movements to adumbrations, which are subsequently fulfilled or frustrated by incoming visual experiences (Yoshimi, 2012). On the basis of dynamical rules like this we incrementally build up or 'constitute' a sense of the world we live in. This story can be linked with a structurally parallel theory in the cognitive sciences about how animals learn to navigate environments. According to this parallel theory, animals develop internal models of their environments on the basis of comparisons between what they expect at a given moment, and what they subsequently see.³¹ These comparisons or 'errors' are used to update synapses in the brain, and produce increasingly successful predictive models for guiding behavior. Andy Clark, summarizing recent research in this area, has said that expectation and prediction are the essential hallmarks of brain function:

Brains... are essentially prediction machines. They are bundles of cells that support perception and action by constantly attempting to match incoming sensory inputs with top-down expectations or predictions. This is achieved using a hierarchical generative model that aims to minimize prediction error within a bidirectional cascade of cortical processing. Such accounts offer a unifying model of perception and action. (Clark 2013, 1)

These parallels between Husserl's theory of constitution and contemporary theories of the brain as a prediction machine can be visualized using computer simulations of agents in virtual environments (Yoshimi, 2014). When this type of simulation is run, a literal picture of an agent's model of its environment takes form. This

²⁹ The more specific methodological innovations of phenomenology could also enrich the cognitive sciences. For example, I think eidetic variation could be reconceived as a kind of 'geometric' form of conceptual analysis, and idea I hope to pursue in future work.

³⁰ Compare the discussion of 'sciences of constitution' in Ramstead (2014).

³¹ Reference to an agent's model of its environment are suggestive of internalist, representational approaches to cognitive science, which have been subject to extensive critique in recent years by advocates of embodied approaches to cognition, which are associated with phenomenology (Wilson and Foglia, 2011). Thus my claim that an agent's internal model of its environment can be associated with the phenomenology of world constitution is, at least on the face of it, surprising. This and related tensions are addressed in (Hotton and Yoshimi, 2010; Yoshimi 2011). We argue that one can maintain a concept of internal representation in an 'open' dynamical framework that acknowledges the radical ways environmental couplings can affect an agent's behavior. I believe these arguments show how one can accept the main features of embodied cognition (including those that are phenomenologically motivated) in a neurophenomenological framework that emphasizes internal models and internal agent states.

picture plots the states the agent has previously been in as points in a 2d or 3d ‘state space’ diagram. States that the agent predicts it will be in relative to its current sensory state and movement are drawn in a distinctive color, e.g., red. As a simulation like this runs, a manifold of points takes form in the state space, and a moving ‘halo’ of predictions can be observed moving across the surface of the manifold. These manifolds have specific shapes, e.g. sets of arcs (or loops, or other shapes) connected at a common point, where each arc corresponds to perceiving a specific object, and the common intersection point between the arcs corresponds to perceiving no object. These manifolds can be simultaneously interpreted as sets of brain states that model an agent’s environment, and as sets of experiences, or ‘manifolds’ in Husserl’s own technical sense (a structured set of possible experiences, something like what he also calls a ‘horizon’). The moving halo of neural state predictions can be interpreted as a set of ‘protentions’ or ‘adumbrations’ in Husserl’s sense. The error-based rules by which the neural model learns about its environment can be understood in terms of Husserl’s theory of fulfillment and frustration.

Because these visualizations are simultaneously interpretable as (1) an agent’s internal model of its environment and (2) an agent’s way of constituting its sense of reality, they can serve as ‘bridge metaphors,’ which provide an intuitive link between our understanding of dynamics in these two very different domains. We can use the simulation to visualize the neuroscience, the phenomenology, and thereby the neuro-phenomenology. I believe that by developing and expanding on this type of visualization procedure, we can begin to develop a detailed sense of how the dynamics of consciousness, as described by Husserl, is related to the dynamics of neural activity, as described by contemporary cognitive science. In pursuing this project Husserlian phenomenology can be treated as a source of detailed, fallible insights in to the structure and dynamics of consciousness.

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