Applying the Neurophenomenological Approach to the Study of Trauma: Theory and Practice

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> Context • Although trauma research has advanced immensely, the struggle to find effective treatment for posttraumatic survivors continues. It seems reasonable to say that, at present, our ability to treat those suffering from posttraumatic stress disorder (PTSD) is, at the very least, limited. > Problem • We argue that in order to confront the current crisis in the study of trauma — evidenced by our limited ability to offer successful treatment for those who develop PTSD — we must return to the subjective experience. Our claim is that only by applying a rigorous method to study the subjective experience will we be able to understand the meaning of neuronal activity associated with PTSD. > Method • The neurophenomenological research program (NRP) is a working plan that enables us to create a solid and reliable link between the subjective experience and neuronal activity. Thus, the NRP allows us to (a) delve deeply (and rigorously) into the subjective experience and, by so doing, (b) extract the cognitive mechanism that constitutes the building blocks bridging between the subjective experience and neuronal activity. Following this, we will be able to (c) identify the relevant neuronal activity for the phenomenon under examination. > Results • Based on previous studies among posttraumatic survivors, we suggest that two cognitive mechanisms are especially relevant for the study of trauma: the sense of body ownership (i.e., the sense that this is our own body) and the sense of agency (the sense that we control our body). The trade-off between these closely related, yet independent mechanisms is highly significant. We conclude the article with the presentation of a detailed working plan for the study of trauma — one that begins with the subject and returns to the subject. > Implications • This article summarizes our struggle to conduct a phenomenological research in the study of trauma and our methodological efforts of the last ten years. It should help the beginner to avoid some mistakes that have been made in this long journey, yet obviously, each one must build their own route. Likewise, we suggest that phenomenologists, brain scientists and clinicians should find a way to cooperate. This shared effort might allow us to improve our understanding of the traumatic experience and its long-term implications; as such, we believe that in this process a better treatment could be developed. That being said, the limitation of our proposal is the difficulty of creating a shared language that bridges these different worlds. > Constructivist content • We strongly embrace phenomenological approach together with enactivist/embodied theories. > Key words • Trauma, PTSD, treatment, neurophenomenology, subjective experience, introspection cognitive bridges, brain activity.
the success of psychotherapies in treating PTSD among military and veteran populations noted that

“first-line trauma-focused interventions [cognitive processing therapy] and prolonged exposure have shown clinically meaningful improvements for many patients with PTSD. However, nonresponse rates have been high, many patients continue to have symptoms, and trauma-focused interventions show marginally superior results compared with active control conditions.” (Steenkamp et al. 2015: 489)

The same paper further concludes that “there is a need for improvement in existing PTSD treatments” (ibid). Furthermore,

“Current research on empirically supported treatments for PTSD, including cognitive behavioral therapy (CBT) and eye movement desensitization and reprocessing (EMDR), shows large dropout and nonresponse rates.” (Schottenbauer et al. 2008: 148)

That being said, it should be stressed that “dropping out of care is clearly the most important predictor of treatment failure” (Hoge et al. 2014). Continuing this line of thought, a naturalistic examination (such as front-line studies with patients in randomized controlled trials) of both Prolonged Exposure and Cognitive Processing Therapy, which are considered gold-standard therapies for PTSD and have yielded positive outcomes, discards a substantial dropout (Najavits 2015). In addition, a paper examining the effectiveness of pharmacological treatment for PTSD argues that “for most drugs there is inadequate evidence regarding efficacy for PTSD” (Hoskins et al. 2015: 93). Thus, in general, it seems reasonable to say that, at present, our ability to treat those suffering from PTSD is, at the very least, limited.

“4” We suggest that we can apply Francisco Varela’s neurophenomenology research program (NRP) to confront the current crisis, which is evidenced by the current lack of successful (or, at the very least, limited) treatment for those suffering from PTSD. In short, the NRP is a pragmatic methodological working plan that attempts to construct a meaningful bridge between the subjective experience and brain activity — the building blocks of this bridge are the cognitive mechanisms.

“5” Our target article first presents the neurophenomenology research program. It is important to understand the NRP in the wider context of the phenomenological approach (PhA): only in this context can we begin to understand the exact meaning of the subjective experience. In the next section we suggest that, especially with regard to the study of trauma, the PhA possesses a number of advantages over other methodological approaches. Essentially, the present discussion is not restricted to theoretical aspects but rather presents a manual guide for application (see Box 1). Whereas in the first step we apply the PhA in order to create a reliable report of the subjective experience, in the second stage we should build this bridge. Hence, in the following section we present the cognitive mechanisms that can improve our understanding of the victim’s ability to function during trauma. More specifically, therein we outline the trade-off model between the sense of agency, that is, the sense that we control our body, on the one hand, and, on the other, the sense of body ownership – the sense that this is my body. Yet, since it is crucial to shift from theory to practice, we will demonstrate how this model can be applied in clinical treatments. To that end, we present, as a case study, the SEE FAR CBT protocol. Once we have accomplished the aim of the NRP — bridging between the subjective experience and brain activity – it is possible to present the neuronal side of the bridge. Thus, in the penultimate section we discuss the current perspective regarding neural mechanisms associated with traumatic events, self-agency and their possible pathological results. We suggest that by adopting a somewhat different approach to the brain activities that occur in victims, it may be possible to broaden our understanding of the underlying mechanisms of pathological states. Finally, we conclude our article with a working plan that is based on the NRP (see Box 2).

“6” Before moving ahead, however, let us put this article in the right context. In the last ten years we have struggled to conduct phenomenological research in the study of trauma (Ataria 2014, 2015b; Ataria & Neria 2013; Ataria & Somer 2013; Somer & Ataria 2013).
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2015) – our goal was to improve our understanding of the subjective experience. This article summarizes the methodological efforts of the last ten years and highlights some possible future directions. It should help the beginner to avoid some mistakes that have been made in this long journey, yet obviously each one must build their own route.

The neurophenomenology research program

The phenomenological approach in brief

« 7 » To understand how psychological phenomenology differs from “ordinary” psychology (empirical-psychophysical), we must first highlight the differences between psychological introspection and phenomenological reflection. When the first psychological laboratories were established in Germany at the end of the 19th century, researchers such as Wilhelm Wundt began employing introspection as a tool to understand consciousness. Simply put,

“Introspection refers to an observation and, sometimes, a description of the contents of one’s own consciousness. Introspection is believed to be a reflexive, metacognitive process, attending to or thinking about oneself or what is currently being experienced by oneself.” (Oversgaard 2008)

After receiving training, subjects practiced reporting their inner thoughts (Rieber & Robinson 2001). Yet, from the very outset, there was no clear agreement concerning how these inner observations should be arranged and organized, making it difficult to relate to introspection as a scientific tool (Boring 1953). One critic highlighted that the very act of introspection changes the nature of the experience, while others claimed that subjects do not genuinely know what they feel and therefore cannot provide a reliable and trustworthy account of their inner world. These and other criticisms diminished the method’s value, and today introspection is generally not considered a reliable scientific tool in the context of psychology (Benjamin 2007).

« 8 » Phenomenological reflection is not the same as psychological introspection and, as we will see, differs fundamentally from psychophysical psychology. The latter was deeply influenced by methodologies of the natural sciences, in which natural objects are observed from “nowhere,” that is from a purely objective perspective (Husserl 1970). According to the phenomenological approach (PhA), engaging in introspection by adopting a third-person perspective (3PP) on one’s inner world is, in its very essence, erroneous (Vermersch 2009): we cannot observe our psyche as though it were an ordinary research object. Indeed, introspection within the framework of psychophysical psychology fails precisely in this respect: despite being a qualitative methodology that ostensibly addresses the subject, it does not relate to the subjective experience as a unique phenomenon but rather as an object like any other in nature (Jennings 1986). Thus, introspection is used only because at a given time this is the only (and, as such, the optimal) available tool to provide information about the subject’s inner world. Yet by applying this (3PP) tool we give up on the notion within the framework of psychophysical psychology: the subjective experience, which must include our particular and unique perspective (Nagel 1974, 1986; Searle 1992, 1997).

« 9 » In his seminal article “Phenomenology as Rigorous Science,” Edmund Husserl (1970) claimed that phenomenology, on the one hand, and empirical/psychophysical psychology (today all branches of cognitive brain sciences), on the other, are closely related because both are concerned with the subjective experience. Husserl identified the reciprocal relations between two fields that address the same issues, yet from totally different perspectives: while empirical psychology in its broadest sense adopts the third-person perspective, phenomenological psychology focuses on the human experience from the perspective of the individual (first-person perspective, 1PP).

« 10 » Husserl offered an alternative to the naturalistic psychology approach, which turned human beings into collections of “facts” – a central feature of the technological age (Postman 1993). The phenomenological approach does not pretend to investigate the world as it is. Nor does it relate to human beings or consciousness as a research object that can be examined using the ordinary methods of natural sciences. The turning point proposed by Husserl is the use of phenomenological reduction: concentrating on the subject as a subject, namely, from within. Yet, at the same time, Husserl did not abrogate the importance of psychophysical psychology. He believed that all progress necessitates complementary and ongoing dialogue between phenomenological psychology and psychophysical psychology.

The neurophenomenology research program

« 11 » As we saw, at the beginning of the twentieth century Husserl offered an in-depth understanding of the limits of psychophysical psychology in its broadest sense. In addition, he argued that understanding the subjective experience requires us not only to adopt the phenomenological approach but also to create a fertile dialogue between psychophysical psychology and phenomenological psychology. In his neurophenomenology research program (NRP), Varela took this project one step further.

« 12 » The NRP was designed to present “a model that can account for both the phenomenological and neurobiology of consciousness in an integrated and coherent way” (Thompson, Lutz & Cosmelli 2005: 87). The NRP does not seek to close the gap between the subjective experience and brain activity but rather to bridge it, creating “meaningful bridges between two irreducible phenomenal domains” (Varela 1996: 340, our emphasis). In practice this means bridging, and not merely showing correlations, between first-person subjective accounts and brain activity (Lutz 2007; Lutz & Thompson 2003; Varela 1996).

« 13 » In order to embark upon the NRP, it is first necessary to create reliable first-person accounts. The second step involves using “these original first-person data to uncover new third-person data about the neurophysiological processes crucial for consciousness” (Thompson, Lutz & Cosmelli 2005: 46). In the third stage of the NRP, the first-person data should be revised and re-analyzed according to the phenomenologically enriched (during the second stage) neuroscientific findings. In practice, this means utilizing (enriched) 3PP data to

http://constructivist.info/14/2/197.ataria
improve our understanding of 1PP. The following study pins down this notion.

« 14 » Claire Petitmening, Vincent Navarro and Michel Le Van Quyen (2007) conducted phenomenological interviews with nine patients suffering from pharmaco-resistant temporal lobe focal seizure epilepsy over the course of eighteen months. The interviews were used to generate phenomenological clusters of pre-ictal state experiences, which were subsequently employed to interpret EEG readings in a novel manner. The results suggested that pre-ictal experiences are manifest in epileptic patients much earlier than neuroscientists had expected. While a questionnaire may have provided quantitative data that could make some generalizations about pre-ictal experiences, the phenomenological interview seeks to delve much deeper. The interviews focused on a small number of experiences, yielding high levels of unique detail. Essentially, the subjects in the study were able to become aware of subtle experiential symptoms that predicted the onset of a seizure and consequently take countermeasures to interrupt them and avoid the seizure. More specifically, the first step in this study was to help the interviewee become aware of the pre-reflective bodily experience preceding the seizure. Following this, the researchers analyzed each description, extracting the micro-structure of each patient's experience. In this process, the study detected a more generic structure. A careful dialogue subsequently ensued between the subjective experience and cerebral activity. Specifically, a correlation between a neurodynamic structure and a pheno-dynamic structure consists of establishing temporal coincidence between the recorded cerebral activity and the described subjective experience, as well as correspondence between the neuro-dynamic structure (a succession of neuronal configurations) and the pheno-dynamic structure (a succession of subjective events) that corresponds to the former in time. The footbridges between neurobiological (3PP) and phenomenological (1PP) data enable fruitful interactions between the two which, in turn, improve the ability to anticipate seizures and understand pre-ictal dynamics. The discovery that an epileptic seizure may be anticipated opens up an unexpected line of research towards a non-pharmacological, cognitive therapy for epilepsy. The key to this therapy is the awareness of usually pre-reflective warning symptoms that offer a temporal interval during which the patient can take some countermeasures to avoid the seizure, stop it, or at least to protect herself from it. The earlier the awareness of the warning symptom, the more efficient the countermeasure seems to be.

« 15 » As this study demonstrates, it is not enough to understand, even in a limited fashion, the subjective experience; we need to bridge between the subjective experience and localized brain activity. Following the successful application of the NRP in the case of epilepsy seizures, we suggest that, considering the hard problems in the study of trauma, we also need to apply the NRP to the study of trauma. Essentially, one of the most basic principles of the NRP is that we should begin with the subjective experience. In practice, this means that we need to apply the PhA as a method. Indeed, as we will see in the next section, with regard to the traumatic experience, the naïve kind of introspection is insufficient.

Phenomenology as a method in the study of trauma

Why is the naïve kind of introspection insufficient in the case of trauma?

« 16 » A significant question concerns how it is possible to reflect upon the past experience of an event that is fragmented and outside the autobiographical self. One of the most serious problems regarding the "story" spontaneously related by the interviewee in a semi-structured interview can be illustrated by the test case of the Structured Clinical Interview for DSM-IV Dissociative Disorders (SCID-D). For instance, Pamela Hall and Marlene Steinberg claimed that

“although the SCID-D is not a trauma questionnaire, its ability to elicit spontaneous descriptions of trauma from patients without the use of leading or intrusive questions makes it a valuable instrument.” (Hall & Steinberg 1994: 112)

However, on occasion this spontaneous description hides more than it reveals (Ataria 2014). In turn, patients suffering from persistent PTSD seem often to

“have difficulty in intentionally retrieving a complete memory of the traumatic event. Their intentional recall is fragmented and poorly organized, details may be missing and they have difficulty recalling the exact temporal order of events.” (Ehlers & Clark 2000: 324)

Accordingly, we argue that due to the following reasons, applying a naïve type of introspection cannot provide access to the subjective experience during trauma:

a) This "spontaneous story" is often a ready-made story. The tale has been told repeatedly in various situations (to family, friends, social services, and more) and is recounted on "automatic pilot." Obviously, the person telling this story withholds some, perhaps even most, of the details. Indeed, survivors are "often unaware of gaps in their memory" (Brewin 2007: 230) for a number of possible reasons:

- Many find it difficult to reiterate the traumatic experience, because in so doing they experience it all over again;
- Trauma survivors sometimes seek to protect surrounding society/family by hiding parts of the story;
- Sadly, in our society it is only natural to feel embarrassed and hence omit parts of the story;
- The survivor may fear over-exposure.

We are autobiographical creatures. Indeed, our stories define us (Damasio 1999), and in many cases the story of traumatic events is simply too difficult to impart. Thus, survivors construct a story

2] In the last few years the bridge between 1PP and 3PP has been strengthened immensely by relying on the micro-phenomenological interview technique (Bitbol & Petitmening 2017); in particular, the cardiophenomenological approach (Deprez & Desmidt 2018) seems promising. We decided, however, to limit ourselves to a more basic neurophenomenological working plan for two main reasons: (a) since this article serves as a guide for beginners it would be too complicated to present such details; (b) we limit ourselves to our own scientific experience. Given that we have not conducted any research using the micro-phenomenological approach yet, we cannot include this important development in the current article.
that they can live with: the “spontaneous story” may function as a mechanism of defense for the autobiographical self.

Occasionally the traumatic experience is stored bodily and not conceptually (van der Kolk & Fisler 1995). For this reason, the “spontaneous story” is one part of the entire story. Consequently, when asked to tell the story, or when doing so ‘spontaneously,’ the survivor of trauma is usually unaware of the bodily level of experience.

The body keeps the score

Many theorists have characterized the traumatic experience as taking place on the bodily level and, accordingly, as “stored as sensory fragments without a coherent semantic component” (van der Kolk & Fisler 1995: 12). Indeed, many scholars recognize “the importance of working somatically in the treatment of traumatic stress” (Langmuir, Kirsh & Classen 2012: 214), understanding the significance of the body’s experience from within. For instance, as some have argued,

This phenomenon is sometimes explained in the following manner: “With nonverbal expressions, clients end up more often in the primitive layers of their experience” (ibid: 139). Although such statements – which can eventually be reduced to the well-known slogan, “The body keeps the score” – sometimes appear too vague, the link between severe trauma, self-injurious behavior (SIB) and silence can help clarify this issue, at least to some degree.

Tuppett Yates suggested that to a certain extent SIB constitutes a “bodily based emotion regulation in the absence of adaptive integrative, symbolic and reflective capacities” (Yates 2009: 124). Severe and prolonged trauma, especially during childhood, “may leave affect to be symbolized through the body rather than language” (ibid: 125). This can result in various bodily expressions, among them SIB. As Janice McLane (1996: 107) notes, SIB is the “voice on the skin”; yet note that it is not only a voice on the skin, but thus also the voice of the skin.

It is well recognized (Ataria 2016, 2017; Felman & Laub 1992; Laub 1995) that, in the case of severe trauma, silence is not a by-product. Rather, it is at the heart of the traumatic experience: “Speech is precisely what has been nullified for the abuse victim. Even more, enforced silence has created what we might call an unreal unity to the victim’s body, life, and voice” (McLane 1996: 110). Consequently, victims cannot express their feelings; breaking this deadly silence demands the creation of a new language – a bodily kind of language. Essentially, bodily language does not necessitate any intermediary signs because it is pre-reflectively and directly linked to the moment of trauma. McLane offered the following example:

When hidden pain starts to speak, it will speak silently. Its voice may appear as a cut on the leg, a burn on the arm, skin ripped and scratched repeatedly. There will be no sound, not any, only unfelt and silent pain which makes its appearance in another pain, self-inflicted, and when that second, collateral pain emerges, it will articulate in blood or blisters the open definition you desire, although it may not be in a language you care to see. This, it says, is pain, and this is real in any language you care to speak.** (Ibid: 111, emphasis added)

SIB appears to constitute a unique way not only to express the silence but also to talk (thus, maybe to scream) from within it, without breaking it:

This hand is silent in a way that even the wounded flesh is not. It is silent because it is whole, it has not even a mark that could stand for a voice or a word. But it speaks: in action, not in being acted upon. Though it is silent, action is its voice, just as the diaphragm lungs larynx sinuses tongue palate are in their own way silent, yet are the speaking itself. They are not the voice emerging from the mouth, the carnal sound, but push pulse curve expand contract; they are the ripple of flesh culminating in noise. This hand holding the knife is silent in action, loud in the voice it produces.** (Ibid: 112f, emphasis added).

SIB can be defined as bodily language (Nock 2008). Thus, although it is considered a maladaptive mechanism, it nevertheless functions as a tool to reduce stress in the short term and enable communication (Nock 2010; Nock & Prinstein 2004). SIB indicates that trauma is sometimes stored bodily and, moreover, that it also expresses itself through the body. Whereas in most cases this unique feature makes trauma symptoms resistant to various kinds of treatment, we hope that by utilizing the right methodology, we can employ it to further our understanding of the traumatic experience and its long-term effects, importing this knowledge into laboratories and clinics.

Keeping in mind the example of SIB, let us now return to the traumatic experience in general. As we saw, the traumatic experience is unique from a methodological perspective for two main reasons:

- It is coded and stored bodily. Thus, years after a traumatic event intrusive traumatic memories frequently entail strong physical responses (van der Kolk & van der Hart 1991), for example, Mia Leijssen’s case of a woman who “had forgotten the events but her body kept carrying them” (Leijssen 2006: 129);
- The traumatic experience remains, in some cases, frozen in time. According to Anke Ehlers and David Clark (2000), this can be explained in the following manner: sensory/somatic information (data-driven) is retrieved from the memory without any time perspective and thus remains frozen in time. Furthermore, according to Ehlers, Ann Hackmann and Tanja Michael (2004), in subjects suffering from PTSD intrusive memories remain fixed over time; flashbacks therefore provide the only source of information concerning the traumatic event itself. Consequently, memories remain “highly consistent years after their occurrence” (Porter & Peace 2007: 439) for subjects suffering from PTSD.

Phenomenology of the body – theory and practice

Recognizing that the traumatic experience is processed at the bodily level, it is essential to find a method that can reveal this bodily dimension of the experience – as is accomplished naturally by phenomenology (Depraz, Varela & Vernmersch 2003; Petitmengin 2006). In contrast to Cartesian thought, the body stands at the very core of the phenomenological discourse. In this regard, Maurice Merleau-Ponty is without doubt the most salient figure.
According to Merleau-Ponty, the body, which is us, is a unique instrument with particular capabilities and limitations. We are present in the world as active agents via this instrument—“It is through my body that I understand other people, just as it is through my body that I perceive ‘things’” (Merleau-Ponty 2002: 216). The body, consequently, is a unique instrument: it is constantly with us and never leaves us.

During perception, the body becomes transparent. We feel that we are seeing the “real world.” Yet, in fact, “perception is indirect – bodily sensations mediate touch” (Richardson 2013: 134): we perceive the world through the body. This is not to suggest that what we perceive is our body. Rather, in Jean-Paul Sartre’s (1956: 324) words, “The body is lived and not known.” We can best understand the twofold structure of our perceptual field through the sense of touch:

“Tactile experience […] adheres to the surface of our body; we cannot unfold it before us, and it never quite becomes an object. Corresponsibly, as the subject of touch, I cannot flatten myself that I am everywhere and nowhere; I cannot forget in this case that it is through my body that I go to the world, and tactile experience occurs ‘ahead’ of me, and is not centered in me. It is not I who touch, it is my body; when I touch I do not think of diversity, but my hands rediscover a certain style which is part of their motor potentiality, and this is what we mean when we speak of a perceptual field.” (Merleau-Ponty 2002: 369, emphasis added)

Continuing this line of thought, let us present the sensorimotor approach to perception. Alva Noé argued that “perception is not something that happens to us, or in us. It is something we do.” Thus, “[i]n the world makes itself available to the perceiver through physical movement and interaction” (Noé 2004: 1). Specifically, perception is the exercise of sensorimotor knowledge—knowing how or practical knowledge—which is explained in terms of mastering a skillful activity. When one “master[s]” a skillful activity, one is “attuned” to the ways in which one’s movements will affect the character of input” (O’Regan & Noé 2001: 84).

In order to perceive, we need the pre-reflective ability to master our movements and predict the world’s “reactions” based upon a set of sensorimotor laws. If we cannot achieve this, our ability to perceive is negatively affected: we do not know what to do or how to do it. Furthermore, when unable to predict the outcomes of our actions, our ability to master a situation is reduced and our practical knowledge damaged: we cannot tune into sensorimotor contingencies or act on the basis of sensorimotor laws. This consequently impairs our ability to perceive and engage with the world, minimizing our grip on the world: the body is no longer a knowing body.

The collapse of practical knowledge can be compared somewhat to the experience of wearing inverting (left/right-up/down) glasses (Stratton 1896). Scholars argue that humans can adapt to wearing inverting glasses, learning how to deal with the world suitably. However, during the initial period we are beset by a feeling that everything is left-right inverted; the disruption of our normal capacities for engagement results in the impossibility of certain actions (Degenaar 2013). Unable to master our actions, the sensorimotor loop breaks—we have minimal grip on the world—in extreme cases leading to a total inability to function (Noé 2004). Indeed, even after a few days of practice, Jan Degenaar remained unable to perform simple tasks:

“I often reached in the wrong direction, even where I knew where objects in my room were located. Vision tends to overrule knowledge, and to a certain extent, even habits are cancelled or transformed. A notable behavioral impairment expressed itself when I attempted to reposition a cup that was standing too close to the edge of a table. It was almost impossible to find the right direction. Trying to correct the movement, I instead altered it in the wrong way. Even days later, cutting tomatoes still had a similar effect: the appropriate orientation of the knife was almost impossible to bring about.” (Degenaar 2013: 379, emphasis added)

In extreme instances, the individual loses the knowledge necessary for perception due to the breakdown of the knowing-how structure. The action-perception circuit is broken, fundamentally affecting our ability to predict; this may also distort perception. As was noted, according to sensorimotor theory, perception is based on the knowing-how structure, a set of laws or sensorimotor contingencies that allow us to perceive, enabling us to remain tuned into our environment. Thus, damage to this sensorimotor circuit negatively affects our ability to perceive.

In perceptual terms only, trauma might be akin to the experience of watching a Ping-Pong game on a wide screen while wearing inverting glasses for the first time (without any possibility of removing them): the individual needs to follow the movement of the ball by moving his head. Indeed, trauma may be similar to Degenaar’s feeling when first wearing the inverting glasses: “On the first day of wearing the glasses I got sick” (Degenaar 2012: 151). However, trauma cannot be “removed.” Indeed, no period of adjustment can teach the individual how to see the world through the “glasses” of trauma. Severe trauma fundamentally damages the ability to perceive because the individual lacks the knowing-how and cannot adapt, making the feeling of nausea—as Degenaar portrays it—an intolerable experience.

Amos Arieli and Ataria (2018) have argued that the system’s incapacity to update itself and the collapse of the knowing-how structure constitute the heart of the traumatic experience. Indeed, in cases of prolonged and ongoing trauma, the victim’s sensorimotor loops are likely to undergo radical changes and, in view of this, the victim must build a new system connecting expectations and possible outcomes in order to survive, altering the knowing-how structure. The very structure of the sensorimotor loops has become saturated with trauma; devastating, long-term ramifications may ensue (Ataria 2015a). Someone who has undergone a traumatic experience perceives the world through the trauma, not only during the traumatic event but also after it has ended. Hence, to say that The Body Keeps the Score (Van der Kolk 2014) or that The Body Bears the Burden (Scaer 2007) indicates that the sensorimotor loops are saturated with trauma and cannot release themselves from that moment.
tion of the traumatic experience. Yet, in order to reveal the bodily level of experience, and subsequently reconstruct the memory of the traumatic experience step by step, the survivor requires guidance. This process obviously necessitates appropriate caution. Although “people can be led to mistakenly recall entire experiences through misleading interviews” (Porter & Peace 2007: 435), we should not be afraid of asking what Hall and Steinberg (1994) call leading questions. By asking how and avoiding why it is possible to guide the traumatized individual, yet avoid interfering with the content of the story. Let us introduce, in brief, some phenomenological principles that should be applied when interviewing posttraumatic survivors.

“33” As we saw, the PhA to the subjective experience differs fundamentally from introspection. According to PhA, reflection can be defined as an attempt to understand the experience from within, from a subjective perspective; this process, known as phenomenological reduction, requires training. In turn, studies have shown that this can “bring a person, who may not even have been trained, to become aware of his or her subjective experience, and describe it with great precision” (Petitmengin 2006: 229). Phenomenological reduction – Husserl’s epoché or “bracketing,” a suspension of judgment about the “natural world” and a return to things themselves – requires the redrawing of old beliefs, conceptions and opinions. In addition, it emphasizes not goals themselves but the processes that enable their achievement. The method focuses on how (the pre-reflective level) rather than why. Yet this principle remains somewhat vague, hence in Box 1 (see next two pages) we present a protocol, based on our previous work in this field (Ataria 2010; 2015d; Ataria, Dor-Ziderman & Berkovich-Ohana 2015), which can serve as a more practical guide for applying the PhA in the study of trauma.

3] Obviously, every researcher must make the necessary adjustments according to her background, field of interest, research questions and group of respondents.

Meaningful bridges in the study of trauma – some cognitive mechanisms: Ownership vs. agency

The trade-off model between ownership and agency

“34” As we saw, if we embrace the NRP, it is first necessary to create reliable first-person accounts. Yet, in order to bridge between the subjective experience, on the one hand, and brain activity, on the other, we must create a meaningful bridge: a cognitive bridge. Based on a wide range of interviews, in accordance with the phenomenological approach (Ataria 2015c; Ataria & Neria 2013; Ataria & Somer 2013; Somer & Ataria 2015), two cognitive mechanisms have been identified: sense of body ownership (SBo) and sense of agency (SA).

“35” Shaun Gallagher describes the sense of ownership as “the sense that I am the one who is undergoing an experience” (Gallagher 2000: 15). Here we focus on the sense of body ownership (SBO) – the sense that this body is mine. Essentially, as Figure 1 indicates, the SBO is a flexible mechanism. While the sense of ownership is the sense that I am the one who is moving, the sense of agency (SA) is the experience of causing or generating an action (ibid). Thus, in the case of involuntary movement, the SA is weakened, yet this does not necessarily apply to the SBO: “It is possible to say that I am moving, and therefore that it is my movement, and thus have a sense of ownership for it, in cases where there is no sense of agency for the movement” (Gallagher 2007: 347).

“36” Although SBO and SA can be dissociated neurologically and experimentally – indeed, “these sensations represent independent processes of the human brain” (Kalckert & Ehrsson 2012: 9) – from the phenomenological perspective, in our daily lives SBO and SA are intimately connected. Simply put, we control our own body – SA : SBO = 1. To clarify this notion, let us examine prostheses and tools: SBO and SA are both weaker with respect to tools than prostheses; likewise, they are weaker for prostheses than for the biological body itself. If a strong sense of ownership could somehow be projected onto an uncontrolled tool, this would lead to a strange feeling. Similarly, if, for some reason, the SA towards a biological limb weakened, the individual would probably also feel uncomfortable. In both cases, SA : SBO < 1. By contrast, if one was able to exert perfect control over a prosthesis, yet at the same time feel that the prosthesis was not one’s own, one would feel uneasy and awkward: SA : SBO > 1.

Figure 1 • Flexibility of sense of body ownership: Schematic and simplified (it is not necessarily linear, as in this representation) presentation of the relationship between a weakening sense of ownership and a sense of dissociation from the world. This graph demonstrates the progression from everyday experience to the experience of an “unreal” world, to an out-of-body experience (OBE), to depersonalization, and finally to a total lack of sense of body ownership.
Box 1. Guide for applying the PhA in the study of trauma

A. Background and preparation for interview. a
   A.1 The interview should be conducted in a pleasant environment, one in which the interviewee feels comfortable.
   A.2 The discussion with the interviewee should be as intimate and open as possible. It is likewise essential to create a safety net for the interviewee.
   A.3 It is vital to clarify that no answers are "right" or "wrong"; any answer is acceptable. Moreover, the interviewee must be aware that it is possible to stop the interview at any juncture and that she is not obligated to answer any question.
   A.4 The interviewee should be informed about the objectives of the research; it must be explained that the interviewee is not some kind of "research object." b
   A.5 The interviewee must understand that this is a shared journey: together with the interviewer, the interviewee will attempt to understand the subjective experience.

B. Training: The interviewee must understand the significance of describing the bodily experience and thus must be trained prior to the interview.
   B.1 Breathing: Concentrating on breathing constitutes the core of the interview for several reasons:
      B.1.1 Breathing is a well-known, simple and common technique for relaxing the system during times of stress. This is particularly important in interviews with trauma survivors, because this type of interview is liable to arouse disturbing content, raising the interviewee’s stress and anxiety levels.
      B.1.2 Breathing serves as an anchor to which the interviewee can return at any point during the interview and constitutes part of the interviewee’s safety net.
      B.1.3 By concentrating on breathing, the interviewee can practice paying attention to the physical experience.
      B.1.4 Loss of attention: During the interviews, concentration often wavers. Both interviewer and interviewee tend to lose attention and drift into a narrative that deviates from the simple physical experience of being in the world. Every time the interviewer feels this is happening, practice breathing for a minute (or longer, if necessary). This increases the level of concentration, returning the focus to the body.
      B.1.5 Intimacy and empathy: The act of sitting together and breathing creates intimate relations between interviewer and interviewee on the pre-reflective level. Breathing together places them on the same level and breaks the pattern of subject-object, interviewer-interviewee. This process is critical in reducing the interviewee’s tendency towards self-judgement.

   B.2 Cognitive exercise: In most cases, interviewees are convinced they are seeing the world as it is. They are in a naïve-realistic state, yet unaware of this fact. Using several exercises that employ optical/visual illusions (such as Kanizsa’s Triangle, the Ponzo illusion, the Ebbinghaus illusion, the figure-ground illusion, etc.) we help interviewees understand that often we think we see the world as it is, yet there are other ways to interpret what we see. This type of exercise should help interviewees moderate their preconceived notions and encourage them to leave the comfort zone in which they are, in a certain sense, imprisoned.
   B.3 Focus our attention on the body (from within).
      B.3.1 Describing the bodily experience from the inside is not so simple. The interviewer must possess a good understanding of what it means to listen to the body from the inside. c
      B.3.1.1 In preparation for the interview, the interviewer and interviewee should perform mindfulness exercises together for several minutes. There are many ways to do this. Here are some suggestions:
      B.3.1.2 Start with relatively simple exercises. For example, eat a raisin and describe the process from the point of smelling the raisin, through placing it in the mouth to the experience of tasting and swallowing it. Another exercise is to close your eyes, feel an object and focus on your feelings as you touch it, while attempting to disregard the object you are touching.
      B.3.1.3 After this, proceed to describe the experience of breathing, for example by focusing on the feeling of inhaling air through the nose.
      B.3.1.4 In the third stage, advance further and focus on the bodily experience at the moment of sitting down.

C. The interview.
   C.1 Opening the interview.
      C.1.1 The interview begins with the “standard automatic” narrative.
      C.1.2 At this stage we ask interviewees to focus on one or two important moments from the narrative. They often choose the moment directly preceding the trauma itself.
      C.1.2.1 Note: if interviewees find it difficult to choose a meaningful moment, instruct them to tell the story again, while focusing on the bodily experience, thus enabling them to identify a meaningful moment in the narrative.
   C.2 Focusing merely on the body: At this stage it is important to avoid any question that leads to explanation or interpretation, to avoid describing the content of the experience itself and focus only on the bodily experience at the current moment. In the event that physical stress is aroused, use the breathing techniques to reduce this.
      C.2.1 Ask interviewees to focus solely on their bodily experience.

a] These attributes are not unique to the phenomenological approach.

b] Since the research does not seek to corroborate or refute a specific hypothesis, there is no danger that the interviewees will seek to “please” the interviewer.

c] The interviewer does not need to be an “expert” in meditation but should practice attaining a certain degree of experience in mindfulness or similar methods, such as yoga.
Box 1. (continued)

in the moment, in the here-and-now, as they remember the event, but not on the event itself.

C.2.2 If interviewees “drift” beyond the bodily experience at the current moment, return them to the present. It is important to let them know that they have deviated from the bodily experience, although not in a judgmental manner. It should merely be mentioned.

C.2.3 While interviewees are describing the bodily experience in the current moment (during the recall), several difficulties may arise:

C.2.3.1 Silence: an interviewee cannot find the words. Silence is not a problem in the interview. Indeed, the contrary applies. We must enable the interviewee to remain within the comfort of silence. After some time passes, we can ask the interviewee to describe the bodily experience while he or she remained silent. It is important to be sure not to ask about the content of the experience and, of course, not to ask the interviewee to explain the silence.

C.2.3.2 Impasse: In many interviews, interviewees feel distant from the description of the bodily experience – it is vague and superficial. Such moments of crisis present an opportunity for a breakthrough in the interview. Here are some methods for coping with such an impasse:

a A relatively effective solution is to ask interviewees to concentrate on a sensory experience in one sensory channel, for example sound, sight or smell. Our own experience indicates that the sense of smell often provides a direct channel to the traumatic experience.

b Ask interviewees to reenact the position of their bodies during the limited time period of the traumatic experience.

c Ask interviewees to continue with the vague and superficial description. It often becomes evident that interviewees are still relying upon defense mechanisms; providing an opportunity to continue with this ostensibly superficial description can lead to a breakthrough. Be sure to limit the time of the bodily description to the here-and-now.

d If none of these methods is effective in breaking through the impasse, choose a different moment from the narrative and begin the process again.

C.3 Moving from the here-and-now to what happened there-and-then, and creating a bridge between the here-and-now and the there-and-then.

C.3.1 After focusing on the current experience, consult with the interviewees to determine whether the bodily experience while remembering the given moment arouses bodily experiences from the traumatic experience itself. This is the crucial moment in an interview. In most cases, this process occurs spontaneously. During the description, interviewees naturally proceed to describe the traumatic experience itself. Prior to this stage, it is important for the interviewees to transform their breathing into a stable anchor in the here-and-now.

C.3.2 In guiding the interviewees to the traumatic experience, the interviewer must first return to breathing exercises in order to strengthen the anchor and the link to the physical experience. If the interviewees do not manage to move on to the traumatic experience, there are two main alternatives:

C.3.2.1 Choose another moment from the narrative.

C.3.2.2 Continue to describe the bodily experience in the current moment. Note that many cases are marked by barriers and, therefore, being “stuck” signifies a traumatic experience that appears to be burned into another body. In other words, dissociative individuals often have difficulty “generating” a breakthrough in the interview. Indeed, because they are dissociative, their defense mechanisms are stronger, their barriers are more difficult to cross, and thus reaching the traumatic experience itself is more difficult. At the same time, there is a risk that such a breakthrough, when it does occur, will be uncontrolled and unstoppable. Hence, in cases of individuals suffering from dissociation, the process must be particularly controlled and slow, with frequent stops at safe transition points. Experience indicates that in some cases this is simply a matter of time and concentration, while in other cases the traumatic experience is too threatening. In such instances, do not to continue with the interview before clarifying whether the interviewee can return to breathing as an anchor. Only then can the interview continue, and often a totally new image will emerge.

C.3.2.3 Limit the time span: In many cases, this state of being “stuck” is the result of focusing on a time span that is too broad. The more the interviewer can focus the interviewee on shorter periods of time, the greater the chances of arouses the traumatic experience burned into the body.

C.3.3 While the interview begins in the here-and-now, during its course, an interviewee may begin to feel fluctuations between the here-and-now and the there-and-then. This is manifested in a shift to the first-person present tense in describing the traumatic experience itself: “I see an arm detached from a body. I hear the screams, I smell the burning bodies.” At this juncture, it is important to allow the interviewee to move between two points in time: the here-and-now, anchored in the breathing, and the encounter with the interviewer, and the then-and-there. Often, an interviewee begins a sentence in the here-and-now and ends it by shifting to the then-and-there.

C.3.3.1 It is important to draw the interviewee’s attention to this and ask for a description of the bodily experience during these transitional points.

C.3.3.2 At this juncture, the interviewer must avoid all questions relating to the content of the experience and direct the interviewee’s attention to small and ostensibly unimportant details by concentrating on the bodily experience.

C.3.3.3 If interviewees try to explain why these things happened or why they are describing them in this way, allow them to finish the explanation. However, indicate that they are drifting towards cognitive explanations while the interview seeks to concentrate on the pre-reflective experience.

http://constructivist.info/14/2/197.ataria
A phenomenological investigation of SBO and SA in the context of trauma allows us to confront Richard McNally’s important question: How can we differentiate “acute reactions to trauma arising from properly functioning mechanisms from those arising from dysfunction in these mechanisms?” (McNally 2003: 779). In essence, the relations between these independent yet closely connected mechanisms determine whether or not a victim will be able to function during trauma. Specifically, the relations between SBO and SA are responsible for the nature of the dissociative response rather than the absolute value of either mechanism. Previous studies (Ataria 2015b, 2015c; Ataria & Neria 2013; Ataria & Somer 2013), all employing the PhA, have suggested that, in order to gain at least a limited sense of control during traumatic situations, the victim must become emotionally detached, to some degree. In this sense, a weakening of the SBO appears to act as a defense mechanism: the dissociative mechanism allows the victim to retain control over the body – see Figure 2. When the SBO is weakened, the individual will be unable to gain, or better put, regain control; in such a situation: SBO > SA. In other instances, the SBO decreases too much, causing the ratio between the SA and the SBO to veer towards the SA, in that case SBO < SA. In this situation too, the victim cannot function.

Based on the SA-SBO trade-off model – and considering that during trauma the individual loses control (in cognitive terms, the SA is weakened) – it seems that, to enable the individual to continue functioning during trauma, the SBO must similarly decline. If not, the SBO will become too strong: SA : SBO < 1. Indeed, if the SA and SBO are somewhat equivalent (SA : SBO = 1), the individual can function. However, if the SBO is not sufficiently weakened or becomes too weak, the victim cannot function.

Thus, we can now confront, at least to some degree, McNally’s question. Based upon the above analysis, it appears that the most significant factor in answering this is the ratio between SA and SBO: While SA : SBO = 1, the dissociative mechanism permits the individual to function. By contrast, as the SA : SBO ratio approaches either zero or infinity, the dissociative mechanism becomes dysfunctional.

The trade-off model in practice: The case study of SEE FAR CBT

In the previous section we saw how, by applying the phenomenological approach, we can generate a cognitive model – a trade-off model between SBO and SA. Yet this model is not merely theoretical. Rather, as we will see, it can be applied to a clinical treatment programs.

Flashbacks, which by their very nature are uncontrollable, stand at the very core of posttraumatic symptoms. In a sense, flashbacks involuntarily return survivors to the moment of trauma. However, this process can also be described from the opposite perspective: During flashbacks the traumatic moment occupies the here and now. Flashbacks involve a loss of control – a weakening of the SA. It is also recognized that flashbacks are experienced on a bodily level; the body is thrown into the moment of trauma once again. In this situation, the SBO grows stronger and we may even say that it becomes too strong (Ataria 2018). The SA-SBO trade-off model predicts this result: in order to gain control, the SBO must become weaker, yet if the SBO remains at the same level, one loses any sense of control; that is, the SA decreases. During a flashback the ratio is SA : SBO < 1. We could likewise examine avoidance, a tool for gaining control or altering the ratio between SA and SBO. In this sense, avoidance is a mirror image of flashbacks: SA : SBO > 1.

At this juncture we seek to demonstrate how the therapeutic approach known as SEE FAR CBT reduces these symptoms, from the perspective of the reciprocal relations between SA and SBO. Clearly, we do not claim that this is the best or most effective therapeutic approach and understand that we are still a long way from a therapeutic breakthrough. However, we are interested in indicating how this project can be implemented in a therapeutic context; to be more accurate, we seek to show how the cognitive bridge between 1PP and 3PP improves our understanding of how different therapeutic approaches work and, more importantly, how they can be improved.

It has been suggested (Lahad & Doron 2010) that people suffering from PTSD stop playing; being playful may put them at risk, because in such a state they cannot remain on guard or maintain a watchful position. Indeed, while fully engaged (and immersed) in playing, one can easily forget oneself. Based on a scrupulous search of existing evidence-based treatments for PTSD, researchers have concluded that the existing methods lack a clear reference to imagination and fantasy. They specifically refer to the role of imagination manifesting itself through playfulness, which is a multidimensional concept directed by internal motivation, oriented toward processes with goals stemming from within, non-compliance with external laws and active involvement (Barnett 2007). Considering this, let us explore how SEE FAR CBT can be explained in terms of the SA-SBO trade-off model: whereas in the imaginary world SA increases and SBO decreases, during play (as in children’s play), the SA decreases while SBO increases. Let us elaborate on this issue.

Previous research among former prisoners of war (Ataria & Neria 2013) suggested that prisoners can gain control over more precisely, create a new dimension of time and space in which they can exist by shifting into an inner world. Specifically, in this inner dimension the prisoner can gain at least a limited sense of control. Fundamentally, in such a situation one loses control over the body in order to gain control over the inner world. This observation is at the
very core of the SA-SBO trade-off model. Shifting to the field of imagination is a way to gain control within the inner dimension. It simultaneously allows detachment from the body in cognitive terms: SBo↓. Thus, clearly, the imagination alters the ratio between SBO and SA.

While playing, as children play, we forget ourselves, shifting into a dimension in which almost anything is possible. Moreover, during play one can be simultaneously oneself and play the role that one assumes in the game (Lahad & Doron 2010). As Robert Landy stated:

“It is possible that the most significant aspect of the dramatic paradox has to do with the fact that the actor and the role are at the same time separate and united and the reality of the existence of the actor lies in his coexistence with the fictitious reality of the role he is playing.” (Landy 1993: 11)

The posttraumatic survivor can no longer play because she must constantly be ready for fight or flight, always on guard. It is well known that in some cases this need for constant readiness leads to avoidance. The joy of playing dissolves, at least to some extent, the need to be on guard. As a result, the posttraumatic survivor’s need for avoidance weakens (Lahad et al. 2010). In terms of SA, we may say that one relinquishes the need for control, thus leading to a decrease in SA. At the same time, during play our body is fully engaged within the world. While we are totally engaged within the world, our sense of belonging increases and we feel once again at home within our body. Simply put, this means that we are no longer terrified of our own bodily feelings but rather allow our body to explore the environment. The body thus becomes more a lived body; our grip on the world increases and we feel part of the world. In cognitive terms, this process can be defined as strengthening the SBO (to a certain extent, beyond which other problems may ensue). Indeed, playing allows the survivor to change the ratio between SBO and SA: SA decreases and SBO increases.

Imagination and playing, each in its own way, change the ratio between SA and SBO. With this in mind, we can define the process that one undergoes in the course of SEE FAR CBT in cognitive terms.

Interim summary

As was noted earlier, the aim of the NRP is to create a meaningful bridge between the subjective and neuronal activity: this is necessary in order to turn the neuronal activity into meaningful data. The building blocks of this bridge are the cognitive mechanisms. As we saw, by applying the PhA as a methodological tool in the study of trauma, we have been able to detect two different cognitive mechanisms that stand at the very core of the traumatic experience: SBO and SA. Thus, we have suggested that not only is the trade-off between these mechanisms responsible, at least to some extent, for the individual’s ability to function during trauma; moreover, the relations between these close, yet independent mechanisms, stand at the heart of the long-term reaction to trauma. In the previous section we focused mainly on flashbacks, yet it goes without saying that avoidance emerges due to the need to gain control and detach oneself from the world. In terms of the SBO-SA trade-off model, avoidance is a situation in which the survivor tries to gain control (SA+) at the price of detachment from the world (SBO–).

Whereas until now we have focused on the subjective experience and cognitive mechanisms, we now present the neuronal side of the equation.

Brain activity

Research in recent years identified brain regions that are involved in anxiety, fear and trauma in both human and non-human animals. Among these coinciding regions are the thalamus, amygdala, dorsal anterior cingulate cortex (dACC), the insula, the bed nucleus of the stria terminals (BNST), medial prefrontal cortex (mPFC) and hippocampus (Cha et al. 2016; Kim et al. 2011; Shankman et al. 2014; Shin & Liberzon 2010; Stein et al. 2007; Taughter et al. 2014). One possible perspective for relating specific brain regions to the etiology of PTSD is dividing them into sensory processing areas, emotion generating/processing areas and emotion modulation areas. Of course, the connectivity between these regions is also pivotal and vital.

As for sensory processing areas, studies report an increased thalamic activation when PTSD patients respond to threat stimuli (Patel et al. 2012). Structural studies report that a decreased amygdala and insular volume is evident in PTSD patients compared with controls (Chao, Weiner & Neylan 2013; Kroes et al. 2011; Morey et al. 2012; Rosso et al. 2010), with symptom severity predicting smaller amygdala volume (Fisler et al. 2013). In a similar manner, decreased gray and white matter was found in the dACC (Kühn & Gallinat 2013; Zhang et al. 2011). Functional studies report a decreased amygdala hyper-activation in response to threat in pre- to post-treatment PTSD patients compared with controls (Zantvoord, Diehle & Lindauer 2013). Similar hyper-activation in response to threat was also evident in the insula (Garrett et al. 2012; Rougemont-Bücking et al. 2011) and dACC (Ramage et al. 2013; Sartory et al. 2013).

As for emotion modulation regions, studies highlight the significance of the medial prefrontal cortex and the hippocampus, with a decreased volume reported for both regions in PTSD patients compared with controls (Chao, Weiner & Neylan 2013; Morey et al. 2012; Nardo et al. 2013; Woon, Sood & Hedges 2010). Moreover, the decreased volume in the medial prefrontal cortex was associated with PTSD symptom severity (Chen et al. 2012; Weber et al. 2013). Functional research reveals that findings regarding medial prefrontal cortex activation in PTSD are somewhat mixed; while most report a decreased activation (Jovanovic & Norrholm 2011; Rougemont-Bücking et al. 2011), others report increased activation under certain conditions (e.g., in response to fearful faces) (Fonzo et al. 2010). As for the hippocampus, most functional studies report an increased activation of the region in response to threat (Flemingh et al. 2010; Garrett et al. 2012; Patel et al. 2012). The improved understanding of the brain regions involved in PTSD may lead to the assumption that there should be similar progress in treating the disorder. Indeed, some advances in the pharmacological research...
interventions for treating PTSD have been achieved. Yet, as noted previously, currently FDA-approved treatments have demonstrated only mild-to-moderate success in treating the disorder and there is insufficient evidence about most to facilitate meaningful conclusions regarding their efficacy (Kelmendi et al. 2016).

Notably, despite the above, no great progress has been achieved. There are several reasons for this. First, patients usually avoid actively seeking care. Thus, their illness deteriorates. This also serves as a breeding ground for the co-occurrence of other mental and physical illnesses, at the same time making pharmacological interventions more complex and less effective (Ghaffarzadegan & Larson 2015). Further, as PTSD progresses, it becomes increasingly difficult to provide such individuals with social and familial support, in turn affecting the extent of the PTSD (Boscarino 1995). These social aspects play a significant role in the etiology and course of the disease. Indeed, “stigma,” guilt, and shame worsen the victims condition while also banishing the surrounding support (Ghaffarzadegan & Larson 2015). Thus, these difficulties may call for us to reconsider our perspective on PTSD entirely. It may be necessary to re-think our theoretical, practical and scientific frameworks regarding the disorder.

Hence, recent years indeed witnessed a change in how researchers view exposure to trauma and its associated consequences on brain activities. Traditionally, the study of trauma and its impact on brain activities was entangled with the employment of models relating to fear and anxiety, in both humans and animals (Anderzhanova, Kirmieier & Wojtak 2017; Lonsdorf et al. 2017). Thus, it was assumed that exposure to trauma relates to changes and modifications in neural circuits linked to the experience of fear, and its possible manifestations as pathological anxiety alone. As such, research outlined the brain circuits shared across species. Examples that apply this perspective range from early suggestions by some researchers (e.g., LeDoux 1992) up to more recent collective findings summarized by others (e.g., Toyota, Fadok & Lülthi 2015). This line of studies, on the one hand, reveals the shared and common brain mechanisms underlying basic activities during the acquisition, consolidation and retrieval of simple fears and their hormonal, immunological and behavioral consequences. Yet, on the other, such a cross-species perspective narrows the individual differences that seem to exist in the manifestation of trauma, as often observed in different human victims, such as in the case of PTSD. Indeed, it was recently suggested that self-reports still serve as the gold standard in studying conscious aversive subjective experiences, because they enable the assessment of content associated with immediate experiences rather than memorized experiences (LeDoux & Hofmann 2018). Since non-verbal measures are the only frequent and possible way of studying non-human organisms, assessing conscious, subjective experiences in other animals remains impossible at present. Accordingly, emotional subjective experiences are the essence of emotions, and their objective behavioral manifestations can at best serve as indirect indicators of these inner experiences. Thus, the most direct way to assess conscious emotional feelings is through verbal self-reports – and, as has been argued in this article, at least when it comes to trauma, the PhA has some unique advantages over other tools. LeDoux and Hofmann’s claim can be viewed as a model divided into two distinct branches: a fear generator that includes the subjective experience of fear and trauma, and thus is primarily devoted to the human self-reported experience, and a defensive generator that entails the physiological and behavioral manifestations that are frequently associated with cross-species responses to aversive stimuli (LeDoux & Hofmann 2018). This model separates most of the research conducted in humans and animal models by creating a self-reported subjective research in humans and parallel defensive objective research in non-human animals. Yet, others criticized the above claim, countering that the subjective experience, physiological and behavioral responses of organisms are inseparable and all ought to be considered under the terms fear and trauma (for example, see: Fanselow & Pennington 2018). Such a standpoint is closely related to the one presented herein. Indeed, it is becoming evident that some major brain mechanisms relating to fear and trauma are shared across species; others may be more vivid in humans and ought to be studied as such. This relates particularly to the subjective self-oriented reports of subjects regarding their personal, cognitive and emotional experiences of fear and trauma. Yet, to fully understand the wide spectrum of symptoms associated with fear and trauma we require a multi-dimensional research perspective that considers all the fear manifestations mentioned above (i.e., subjective self-report, physiology and behavior). Instead of the strict differentiation proposed by LeDoux and Hofmann (2018), we suggest that a merger of the different branches studying fear and trauma is needed. Literally, we suggest that applying the neuro-physiological tools existing in the field to study subjective experiences is critical in broadening our understanding of fear and trauma in victims suffering from disorders such as PTSD. Furthermore, such a viewpoint would also extend the development of models being used in animals by identifying novel brain circuits devoted to subjective experiences in humans that might also be recognized in non-human animals. Although, initially, such a study would identify the subjective experience in a single subject, over time this data would accumulate across individuals, and the identification of shared self-subjective mechanisms would start to emerge.

Taking the subjective experience as seriously as possible, we embrace the PhA as a unique methodological tool in the study of trauma. It has been suggested that sense of body ownership (SBO) and sense of agency (SA) are crucial for both our ability to understand our short-term reaction to the traumatic experience as well as the long-term possible outcomes. Indeed, there is a growing interest in these cognitive mechanisms (Rabellino et al. 2018).

In line with the above recent meta-analysis study of brain regions, processing multisensory bodily signals for SBO reported that body ownership is comprised of a network including the posterior parietal cortex (right intraparietal sulcus, IPS; and left IPS and superior parietal lobule, SPL), the right ventral premotor cortex, and the left anterior insula (Griaz, Blanke & Serino 2017). Another study reported that activity in the premotor-intraparietal region is also associated with SBO (Guterstam et al. 2015). Finally, a PET study reported that body ownership relates to activity in the right posterior insula and the right frontal
Less popular. In turn, even leading scholars of some kind of a brain in a vat, has become anist approach, according to which we are thought. It seems that the naïve reductionist approach is indisputable. The importance of broadening the phenomenological perspective and with respect to local brain activity. To improve our ability to provide therapy, we should consider implementing the following protocol: (1) identify localized brain activity; (2) fine-tune the phenomenological investigations; (3) adjust the treatment protocol in accordance with steps 1 and 2; (4) continue this 1–3 loop until the process reaches fruition.

Box 2. Working plan for the study of trauma

A. Phenomenological description on the individual level (according to the principles outlined in Box 1):
   A.1 Creating a phenomenological database to map the subjective experience during trauma. Initial mapping at the level of the individual subject.
   A.2 Creating a phenomenological database to map long-term responses to traumatic events (the initial mapping occurs at the level of the individual subject and is not dependent on the DSM).

B. First-order phenomenological analysis – from individual to group:
   B.1 Analyzing interviews describing the subjective experience during trauma; mapping similarities and differences relative to variables such as traumatic incident, victim characteristics and more.
   B.2 Analyzing interviews describing long-term reactions to traumatic incidents; mapping similarities and differences relative to variables such as traumatic incident, victim characteristics, and more.

C. Second-order phenomenological analysis:
   C.1 Analyzing cognitive mechanisms active in the different groups, based on first-order analysis of the traumatic experience.
   C.2 Analyzing cognitive mechanisms active in the different groups, based on first-order analysis of the various responses to the traumatic experience.

D. Third-order phenomenological analysis:
   D.1 Applying existing knowledge concerning cognitive mechanisms in certain brain areas to identify specific damage to these regions among trauma victims.
   D.2 This process remains on the individual level: each subject must undergo this process in accordance with the active cognitive mechanisms identified in the particular subject.
   D.3 Repetition of steps A–E until we can identify cognitive dysfunctions in the SBO and SA overlap and involve regions often attributed to consciousness, diverse functions associated with emotions, and the regulation of the body. Among others, and of particular interest in light of the current article, are functions including compassion and empathy, perception, motor control, self-awareness, cognitive functioning and interpersonal experience (Craig 2009; Gallese et al. 1996; Grivaz, Blanke & Serino 2017; Haggard 2017; Lindquist et al. 2012; Rizzolatti et al. 1996). Moreover, it seems that many of the brain regions implicated in the SBO and SA are also implicated in the case of PTSD; especially prominent in this regard is the insular formation. In addition, the sensory experiences often described in the symptoms observed in PTSD victims make the inclusion of these brain regions in the study of PTSD more relevant and necessary. Finally, to date, considering the significant contribution of the phenomenological investigation to the understanding of PTSD, the importance of broadening the phenomenological inquiry to include the study of related brain regions seems indisputable.

Conclusion

We would like to close this article by presenting a working plan that can be applied in the study of trauma, see Box 2.

There are also some optimistic thoughts. It seems that the naïve reductionist approach, according to which we are some kind of a brain in a vat, has become less popular. In turn, even leading scholars are “discovering” what most of us knew all along: in order to understand the subject, we must examine the subjective experience from within. Objective measurements are important, but they cannot tell the whole story. Although it goes without saying that much phenomenological and empirical work remains to be done, we hope that these are first steps in the right direction.
References


Back to the Subject of Pathological Experience
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Abstract • The return to the subject can be understood in two senses: as the bearer of lived experience or as the transcendental instance that gives meaning to this experience. The methodological commitment of phenomenology to the sense of experience poses a problem for its access to the subjective origins of a pathological experience whose meaning eludes reflection. A rigorous application of the phenomenological method requires a reminder of the outline of the solution to this problem at the transcendental level of constitution of the world of life.


Open Peer Commentaries on Yochai Ataria et al.’s “Applying the Neurophenomenological Approach to the Study of Trauma: Theory and Practice”

1 The main motivation of Yochai Ataria, Mooli Lahad and Omer Horovitz’s target article is clearly practical: it is to break the current deadlock in the clinical treatment of psychosomatic ailments attributable to posttraumatic stress disorder (PTSD) by intervening on the following three levels:

- By rallying a more reliable method than classic introspection as a record of the experience lived by patients;
- By proposing a theoretical model of the cognitive mechanism involved in the formation of PTSD symptoms;
- By identifying the brain networks whose dysfunction is causally responsible for the disorder and could be a potential target for medication.

Once the validity of the grouping of symptoms under the nosological category approved by the medical profession (DSM-IV) is presupposed, as it is without discussion by the authors, their scientific program calls for a technical implementation rather than a philosophical discussion.

2 However, on the side-line of their therapeutic project, the authors seem to intend to “return to the subjective experience” in a sense that might be more ambitious than merely identifying pathological traits to be explained by the dysfunction of an underlying mechanism. What they want, indeed, is in their own words, to “enhance our understanding of the subjective experience during trauma,” (§3) a subjective experience of which “the exact meaning” can be understood, they insist, only in the context of the phenomenological approach (§5). Let us stress that they do not hesitate to assume some commitment to phenomenology in its original form by favorably mentioning the characteristic reductive method of its founder: “The turning point proposed by Husserl is the use of phenomenological reduction: concentrating on the subject as a subject, namely, from within” (§10).
Thus, the call addressed to phenomenology proper from the horizon of the therapists poses a serious challenge: does phenomenology, brought back to its original core (Husserl 1976), remain an adequate mode of approaching the subjective experience when this experience is pathological? On the assumption that the subject has the necessary resources to give meaning to things and, more generally, to all the configurations of her lifeworld (Lebenswelt), would not an unjustified privilege be granted in phenomenology to normal experience, i.e., the experience the meaning of which is, as expected, transparent to the subject itself? In its latest formulation, Edmund Husserl’s theory of transcendental constitution invests kinaesthesia, the intimate sense of “I move” of one’s own body, with the role of main operator of meaning-giving, a decisive move toward the incarnation of subjectivity (Husserl 2008). But, precisely, does it not remain dependent on Cartesian transcendental idealism, insofar as it supposes that the subject always enjoys optimal control over the use of her body, as if she could not be affected by disability? Instead of internalizing the gaze of phenomenological description to the experience of the patient, the phenomenologist would move covertly to the position of the ego that refers the anomaly to itself as a standard of intelligibility.

The answer lies, in part, in clarifying the relationship between the phenomenon of phenomenology and the symptom of psychopathology. The phenomenon is the appearance of the world for me, the perceiving and acting subject. In the circular relation between me and the world everything makes sense: the forms of objects in a room, the face of a relative, a familiar melody, a sentence displayed on TV, the purpose of an action being performed, they all provide me with a meaning that is directly evident. By contrast, the symptom is ambiguous for the very subject who has the experience. The traumatic event may be far from me, to the point that I am struggling to recover the exact circumstances, but notwithstanding that it is not over because I may never stop reliving it, not only in nightmares but also as intruding into my daily life. And everything that goes back to it: situations, conversations, people or objects, may plunge me into the agony and desperation of the very first time. Although, perhaps, in a continuous de-spondency, where nothing motivates me or interests me anymore, the slightest annoyance may cause an uncontrollable fit of anger in me, and so forth. The symptom makes sense only in the etiological perspective of the therapist who claims to be able sooner or later to explain the patient’s story in terms of causal mechanisms. Sufficient to it to start with the official designation of the disorder in question: to talk about posttraumatic stress is to cling to the most obvious triggering event in absence of enough scientific knowledge of the root causes. Each symptom individually taken could be attributed to normal stress in the wake of traumatic events; and if it is eventually ascribed to the pathological condition, it is because of its incidental grouping with other symptoms in the context of a posttraumatic syndrome, without any other unifying principle than that of being recurrently cited in reported cases. To illustrate the vagueness of PTSD diagnosis, it suffices to note that depending on the persons, the circumstances or the duration of exposure to the traumatic event, the same symptoms can be alternatively classified as normal stress, PTSD, or C (complex) PTSD – the most debilitating category, where the sense of self is compromised.

The comparison of phenomenon and symptom allows us at least to measure the extent of the gap between two possible senses of the “return to the subject”: that of transcendental phenomenology and that of psychopathology. The former performs a reduction to release a field of subjective experience whose evidence owes nothing to assumptions about the functioning (or dysfunction) of the organism. The latter questions the patient’s unique experience in order to better assess the severity of the psychological impact of a traumatic event. On the one hand, the temptation is to impose a transcendental subject, so defined as sole bearer of meaning-giving, on the normal psychological subject. On the other hand, in the lack of any foundation of the diagnosis on a well-recognized dysfunction of brain circuits, an empirical adjustment to the case of the customary therapeutic strategies serves as a classificatory palliative. Either the transparency of meaning to reflection is conquered by bracketing the unknown material substrate or our persistent ignorance of the substratum leaves the lived experience to its opacity. Annoying as it might be to acknowledge it, in contrast to normal experience, pathological experience does not contain the resources necessary for self-understanding: that is the challenge for any proposal to apply the phenomenological method beyond the limits of normal experience (Petit 2017: 398–417).

At first view a trivial prejudice of Husserl, the privilege granted to normal experience needs to be rescued as due recognition of the circumstance that our horizon of understanding is no less finite and perspective-laden than our visual field. While the visual field is organized in a foreground, a background and a remote horizon, our understanding has a foreground of normal experience, where we feel at home, and, departing from it, a multiply nested structure of stratified horizons of stranger and stranger abnormalities. So, understanding one’s experience of trauma might imply prior acquaintance with childhood and development on a backcloth of empathy for the animality of any living being, in order to grasp how vulnerable human control over emotions is. Completing and correcting the transcendental theory of the constitution of subjective experience, the equally transcendental theory of the constitution of lifeworld has on its agenda a fully principled display of the meaning structure of horizons of possible understanding, offering the prospect of a satisfactory alternative to the scientific objectivism of a clinical treatment insensitive to subjective experience.

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http://constructivist.info/14/2/197
The Constitution of a Pathological World: Phenomenology as an Experiential and Constitutive Approach

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>Abstract< • Linking phenomenology with natural sciences, in this case experimental psychology, is a major ambition, but is methodologically difficult. My goal here is to grasp (a) whether the design proposed by Ataria et al. may renew the studies related to neurophenomenology, and (b) whether it may help the researcher to apprehend what a trauma is from a first-person perspective and a third-person perspective. I argue that rather than being an auxiliary science that is only supposed to give an experiential underpinning to natural sciences, neurophenomenology must instead be phenomenological. In this perspective I suggest returning to Husserl’s teaching and innovative approaches such as micro- and cardiophenomenology in order to develop a non-reductionist approach to subjective life.

«1» The purpose of Yochai Ataria, Mooli Lahad and Omer Horovitz’s target article is ambitious as it extends research into the naturalization of phenomenology to the extent that it tackles boundary problems such as disease and neurodegeneration. Yet phenomenology is clearly distinguished from any form of etiological or therapeutic approach (§2 and §4) in that its sole purpose is to be a descriptive science. It is based on a first-person perspective that claims to be universal insofar as, following the phenomenological reduction, it gives us access to the domain of eidetic invariants perceived by all reasoning beings. Indeed, the phenomenological reduction permits us to apprehend things themselves as ideal objects obtained by an eidetic variation, which determines the characteristics that are invariant. Things are then perceived as pure phenomena and noematic correlates, which are universal as they refer to their essence (eidos). Therefore, the problem that motivates the authors may seem awkward, for both phenomenology and its variant neurophenomenology deal with the question of the constitution of sense, which depends on the activity of consciousness. As Robert Sokolowski put it, ***If reality cannot be conceived apart from correlation to the mind, this implies at least that consciousness is a condition sine qua non for the real. Consciousness is a fundament for the world in the sense that the world cannot become ‘real’ (verum) unless there is a consciousness.*** (Sokolowski 1970: 137)

«2» In their article, Ataria et al. develop their point by focusing on the experience of subjects suffering from posttraumatic stress. Their design is then calling for a sort of “phenomenological psychology” (§9).

«3» Phenomenological psychology takes into account the inner and experiential dimensions of egological life without resorting to any form of naïve psychological or neurophysiological reductionism:

***Psychology is the mind’s self-knowledge first in the form of phenomenologically purified original self-seeing of its own hidden self-being and self-living and then in the form of the rigorous science grounded upon this experience.*** (Husserl 1977: 148)

«4» So, rather than taking up the motive of neurophenomenology, would it not be more fertile to use the methodology presented by Edmund Husserl himself, for it is primarily phenomenological, whereas neurophenomenology remains problematic because of its presuppositions? (Q1) One may argue with Jean-Luc Petit that neurophenomenology only allows us to correlate two objective time measurements: the neuronal time of synchronizations of a phase of cerebral electrical oscillations and the psychological time of the alternation of perceptions during the presentation of ambiguous figures, for example (Thumser 2018: 14f). The use of the neurophenomenological motif seems to be compromised to the extent that experiential and eidetic dimensions are reduced to what they are not, i.e., an empirical study that excludes them from the outset. As Paul Ricoeur put it (in a discussion with Jean-Pierre Changeux), the aim of bridging a neurophysiological study with phenomenology is distorted because the brain “will definitely remain an object of knowledge, and will never belong to the sphere of the lived body,” i.e., the Leib (Changeux & Ricoeur 1998: 60, my translation). Therefore, using “psychological phenomenology” instead of phenomenological psychology may seem the wrong choice, for it perpetuates the methodological difficulties of apprehending the constitutive part of the egological life. Moreover, we may underline that such an approach would make phenomenology an auxiliary science while psychology remains problematic when it comes to apprehending transcendental life. Thus, working on what 1 would call the constitution of a pathological world seems difficult.

«5» More recent practices such as micro- and cardiophenomenology (Footnote 24) tend to apprehend the two-sided dimensions of life by accessing inner experiences with very detailed and structured interviews and by promoting an experiential suture with cardiophenomenology between measurable data and inner experience. What matters during an explanatory interview or for microphenomenology

***[...]*is the finality pursued, namely that of describing and elucidating what happened as it happened, by verbalizing increasingly detailed data such as the recording of information during ac-

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tion, in order to reconstruct the structure of the action." [Martinez 1997: 2, my translation]1

In this context, pathologies may be studied in a phenomenological and non-reductionist way. Thus, Ataria et al’s method is genuinely phenomenological because they use this kind of approach and because they follow a new form of phenomenological psychology that is based on interviews and experiential life (§33). They also clearly distinguish a native kind of introspection from a more immanent one, a phenomenological one.

« 6 » However, as pointed out in Thumser (2018), there is also another way to understand subjectivity in its manifold (empirical, psychological and transcendental) sides: a phenomenological naturalism based on a renewed reading of Husserl’s late work. Husserl dedicated his last investigations to the study of the ego’s life in its various forms. From this perspective, the constituent pure ego and the psychological and mundane ego are one and the same. Studying Grenzprobleme such as birth, empathy, death, and the Lebenswelt addresses the issue of the vital, biological and social background of the ego. In this sense, Husserl’s late phenomenology may be used as a guide to nurture and complete cognitive science. To a certain extent, one could even suggest that phenomenology is a prefiguration of cognitive science as it defines itself as a theory of knowledge. So even if Ataria et al. promote a psychological phenomenology, their way is still phenomenological as they claim that phenomenological questions coincide with psychology (§10). However, the authors may take inspiration from Husserl’s corpus in order to extend their research, because there is a gap between what Petit called an extrinsic naturalization of phenomenology that arises from an interdisciplinary dialogue and an intrinsic naturalization of phenomenology that arises from an internal reading of the late corpus (Thumser 2018).

« 7 » I use the expression “the constitution of a pathological world” to highlight that people suffering from psychological, physical, or neurological pathologies may be regarded as subjects suffering from an anomaly (Anomalität): their perception of the world and their agency differs from that of a person who is at her optimum, or as Husserl put it:

"If my Leib becomes anomalous, then the appearance of all natural objects as I experienced them as a physically normal person will change. And I could become so anomalous that this would be the case not only in certain sensory functions, but in all of them, and eventually in such a way that I could not bring about an Anschauung of a world at all. At the same time, I might gain a consistent experiential world, but a completely different world from the one I had otherwise." (Husserl 2008: 651, my translation)2

« 8 » Therefore, people suffering from such anomalies passively constitute a world that is also pathological, for instance, for people suffering from neuropsychopathologies, anxiety or depression. Such a pathway to anomaly is well described in the target article (e.g., in §35). Still, I claim that one major problem that remains in this and every other approach such as cardio- or micro-phenomenology is the distinction between passivity and activity in the subject suffering from pathologies. Indeed, pathologies always lie beyond the comprehension of the subject, they have to do with the Körper, whereas the subject feels passive and profound modifications of her relation to herself in her Leib while the pathology is occurring. In contrast to what Husserl originally claimed, the ego does not reign over its own life in the sense of having control over it. This issue has only been briefly developed by Husserl (1932) when he pondered about plurivocal constitution insofar as the Other is of crucial importance as regards the constitution of sense:

"Is the constitution not plurivocal? Does this I have a concrete existence and does it exist as the I of its primordial world? Is there already an I? Is it not rather ‘the I with the other’ that comes into existence [. . .]?” (Husserl 1932: 13f, my translation)3

« 9 » The mention of the “Other” is relative to what is not of the order of the reign of the ego, for instance, neurophysiological processes or otherwise in general. Suffering from posttraumatic stress disorder or from depression highlights the limits of the reign of the ego insofar as the suffering person is submitted to processes that are related to her own consciousness. Anomalous persons constitute and live in a world made of passivity and can only express this passivity. With contemporary research and a renewed reading of Husserl’s late corpus, we can take into account a new kind of passivity that denies any naïve primacy given to the ego, which was first described as an active and constituting ego, even when it comes to passive synthesis, which is an underlying process that permits the ego to always apprehend objects in its environment. Jean-Luc Petit described this modification of one’s relation to her own body, a passivity related to anomaly:

"Depressed, apathetic, nothing motivates me anymore. Immobile in my chair, the world, having ceased to be the locus of my intervention, ceases even to interest me as a spectacle. [...] the symptom is ambiguous even for the subject whose symptom is in question. ‘What’s happening to me?’, loss of control over my hand, reluctance to extend my hand towards an object, difficulty in bringing my hand to my face, [...]. The symptoms only make sense within the etiological perspective of the doctor, who explains what the patient says in terms of underlying causal mechanisms." (Petit 2017: 4066)4

« 10 » Therefore, I wonder: Rather than creating a meaningful bridge between phe-

1) "[...] c’est la finalité poursuivie, à savoir décrire et élucider ce qui s’est passé tel que cela s’est passé, en faisant verbaliser des données de plus en plus fines telles que les prises d’informations dans l’action, dans le but de reconstituer la structure de l’action.”


4) http://constructivist.info/14/2/197.ataria
nomenology and the natural sciences, is it possible to create such a bridge between activity and passivity in the sense that the subject is studied from the perspective of a neurophenomenology of trauma rather than by focusing on brain “activity” (Q2)? Furthermore, would phenomenology be a way to change the pathological world? (Q3)

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Multiple First-Person Perspectives in PTSD
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>Abstract • Ataria, Lahad and Horowitz propose that a neurophenomenological study of Posttraumatic Stress Disorder (PTSD) may inspire efficacious treatment interventions. Their proposal is promising but overlooks that patients with PTSD enact and reenact more than one phenomenal self, lifeworld, and coupling of this self and this world. An integrated phenomenological, neurophysiological, physiological, environmental and historical analysis of PTSD must take this multiplicity into account.

Introduction
« 1 » Yochai Ataria, Mooli Lahad and Omer Horowitz indicate that the efficacy of treatment for posttraumatic stress disorder (PTSD) is wanting. They feel that neurophenomenological study of the disorder may help to ameliorate the situation. Their admirable and important proposal sounds promising. It largely fits my suggestion (Nijenhuis 2015a, 2015b) that all trauma-related disorders can be studied neurophenomenologically or, more precisely, in a methodological frame that couples the powers of phenomenological, neurophysiological and physiology, along with a consideration of environmental and historical conditions.

« 2 » This said, Ataria, Lahad and Horowitz’s proposal includes several problems. These pertain to
• the definition of “trauma” and the conceived relationship of subjects and objects,
• the idea that there are “cognitive mechanisms” and that these can bridge the mind and the brain,
• the existence in trauma-related disor- ders of more than one phenomenal self, lifeworld, and coupling of this self and this world and its implications for measures-
• the power of the proposal to increase therapeutic efficacy, and
• the strong similarity between the proposed neurophenomenological ap- proach and state-of-the-art psychotherapy for trauma-related disorders.

A general concern is that while the authors state that they strongly embrace enactivist theories, some of their suggestions and terms do not seem to fit the enactive approach.

Trauma and the subject–object relationship
« 3 » The authors define trauma as a response to a dreadful event. But should “events” be considered “stimuli” that exist separately from an experiencing, knowing and acting individual? Are particular events inherently “dreadful”?

« 4 » In a realist conception, living organ- isms “respond” to objectively existing, subject-independent “stimuli” and constel- lations of “stimuli,” i.e., “events.” In contrast to that, the enactive approach is grounded in the idea that living organisms are in many contexts best seen as organism–environment systems (e.g., Di Paolo, Buhrmann & Barandiaran 2017; Gallagher 2017; see also Järvelähti 1998a, 1998b). For example, as Diego Cosmelli and Evan Thompson sug- gest,

“[t]he brain isn’t a reflex machine whose activity is externally controllable through input instruc- tions. Rather, it’s a highly nonlinear and self-orga- nizing dynamical system [...] Inputs perturb such complex systems but don’t specify particular out- comes. Furthermore, most inputs arise as a con- sequence of the system’s own intrinsic activity.”

(Mind, brain, body, and environment, then, are co-occurring, co-dependent, and co-constitutive (e.g., Gallagher 2017; Northoff 2003; Schopenhauer 1958; Spinoza 1996). We must act before anything becomes a stimulus or informative for us. As Baruch Spinoza (1996: Corollary I and II to Proposition XVI, Part II) contended, the human mind perceives the nature of a variety of bodies, along with the nature of its own. Hence, our ideas of external bodies indi- cate the constitution of our own body rather than the nature of external bodies. Arthur Schopenhauer similarly contended that...
The second way in which, according to Schopenhauer, the object is conditioned by the subject is that: •...
Behavioral features must be assessed concurrently. Measurements is critical. Patients’ phenomenal, meaningful proximity to the measurement, memories and other ideas during or in ample, an assessment of the patient’s sensory nature of the brain and the mind, it serves no purpose to assess neural activity to one another. For example, given the dyadic, dissociative parts of interest according to experimental demands. This work is relevant for PTSD, because DID is a complex form of PTSD (Nijenhuis 2015a). There are many similarities between PTSD and DID, indeed, that include structural and functional properties of the brain, functional physiology, psychiatric symptoms, and phenomenology (reviewed in Nijenhuis 2015b; see also Chalavi et al. 2015; Vissia et al. 2016). The biopsychosocial study of DID is therefore most relevant for an understanding of PTSD, particularly when in functional DID studies prototypical dissociative parts are studied that also manifest in PTSD.

We have shown that different kinds of prototypical dissociative parts in DID are associated with very different patterns of neural, physiological, and behavioral activation in experimental conditions in which such differences were theoretically predicted. The experimental conditions included listening to auditory memory scripts (Reinders et al. 2016), instructions to rest (Schlumpf et al. 2014), subliminal exposure to neutral and angry facial expressions (Schlumpf et al. 2013), and eye movements (Seidmann, Schlumpf & Jäncke 2014). Different kinds of prototypical parts that patients with dissociative disorders – PTSD included – bring forth thus involve their own kinds of mental and (neuro)physical properties. Since the physiophenomenological study of PTSD cannot be restricted to an examination of one prototypical part, must it not consider this multiplicity including multiple senses of agency and body ownership? (Q2).

Therapeutic efficacy

It is not self-evident that a better description of neural activity in traumatized individuals promotes more efficient therapy. This presumed (potential) effect must be detailed, not just assumed. I may have missed their point, but in my reading, Ataria, Lahad and Horowitz have not described how their neurophenomenological approach may offer therapeutic interventions. For example, how does it help clinicians to know what patterns of brain activation in individuals with PTSD are associated with excessive emotionality? (Q3) Knowing that portions of the prefrontal cortex are not activated much during re-enactment of traumatic memories does not tell them more than they already know and need to know. They knew beforehand that reenacting patients among other actions do not or do not sufficiently engage in the actions of synthesizing the third-person present.

Phenomenological analysis (PhA)

Ataria, Lahad and Horowitz provide a fine and detailed description of their PhA. Since the method strongly resembles state-of-the-art psychotherapy for trauma-related disorders, I wonder how PhA and state-of-the-art psychotherapy differ? (Q4)

Since patients and psychotherapists influence one another, it seems that PhA affects the patient's 1PP. The implication is that neurophenomenology involves more than an assessment of the patient's original 1PP and the implied neural activity in the 3PP. PhA also involves two second-person perspectives (2PPs):

- the phenomenal experience, relationship and judgment of the individual who conducts the PhA regarding the traumatized patient, and
- the phenomenal experience, relationship and judgment of the traumatized patient regarding the interviewer/psychotherapist.

These reciprocal phenomenal "I–You" relationships will influence the patient's and the therapist's 1PP, and may thereby also influence their respective 3PPs. In other words, PhA and neurophenomenology involve co-enactment of phenomenal selves and lifeworlds.

Conclusion

While Ataria, Lahad and Horowitz's proposal is important and rich, it would greatly benefit from further extensions to take into account subject-object relativity, consistently use enactive concepts, and consider the timing of the various mind, brain, body and environmental measurements. Most of all, it may profit from considering plural first-person perspectives in PTSD.

References

Subjective Experiences are Relational: Implications for Trauma Research and Therapy

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Abstract • While I applaud Ataria and colleagues’ emphasis on the importance of “returning” to the phenomenology of disrupted subjective experiences, here I draw attention to the importance of second-person body-based dynamic engagements with others in bridging the gap between first- and third-person approaches in understanding traumatic experiences. To put it in a provocative slogan: the second person comes first. I will conclude by briefly outlining some implications for therapeutic interventions based on dynamic body-based engagements with others complementing the static, interview-based approaches.

«1» Defining subjective experiences has long been a complex issue and a preoccupation of philosophers and scientists alike across all traditions and disciplines. It is thus challenging to provide an interdisciplinary definition that combines this wide range of interpretations. However, perhaps the most intuitive approach is to note that the problem has been addressed mostly under the form of perceptual awareness as the fundamental point of contact of an experiencing subject with the environment (or objects). The subject–object relation constitutes, indeed, a paradigmatic structural relation of a perceptual experience, whereby the experiencing subject relates to an object in her environment. 1 The neurophenomenological program endorsed by Yochai Ataria, Mooli Lahad and Omer Horovitz

1 | For example, Tim Crane and Craig French note that “[p]erceptual experience, in its character, involves the presentation (as) of ordinary mind-independent objects to a subject, and such objects are experienced as present or there such that the character of experience is immediately responsive to the character of its objects” (Crane & French 2015: Section 1.1).
aims at providing a solid and rigorous bridge connecting first-person subjective experiences and the third-person examination of neuronal activity in trauma. In their target article, they argue that one needs to apply a rigorous investigation into subjective experience in order to

- better understand the mechanisms underlying posttraumatic stress disorder (PTSD), and
- thereby enable adequate therapeutic interventions.

1 As Ataria and colleagues point out, unlike introspection, the phenomenological reflection does not adopt a third-person perspective (3PP) on one’s inner world; rather it focuses on the “human experience from the perspective of the individual (first-person perspective, 1PP)” (§9).

2 Recent years have seen a resurgence of philosophical and scientific interest in the foundations of subjective experiences and perceptual awareness with a particular focus on their bodily basis (e.g., Gallagher 2000; Legrand 2006; Blanke & Metzinger 2009; Zahavi 2005; Haggard, Taylor-Clarke & Kennett 2003). Indeed, there is widespread agreement that perceptual awareness – the fundamental point of contact of an experiencing subject with the “external” environment (or objects) – does not occur in a vacuum, rather it is given to her through her body. Perceptual awareness is embodied. However, not only do my perceptions not occur in a vacuum, but more crucially, they emerge, from the outset, within a constantly changing environment (De Jaegher & Di Paolo 2007). Perceptual awareness is thus not only embodied, but also embedded in a wider context. Some contemporary philosophers recently drew on the classical phenomenological tradition in order to defend the idea that at the core of all our perceptual experiences there is a pre-reflective form of self-consciousness that ontologically constitutes the very mode of being of any experience (Legrand 2006; Zahavi 2005).

3 The neurophenomenology research program endorsed by Ataria and colleagues can prove particularly useful in addressing the crucial and urgent problem of understanding and treating PTSD. Specifically, it tackled the question of how the cognitive bridge between 1PP and 3PP improves our understanding of how different therapeutic approaches work and, more importantly, how they can be improved. The solution, Ataria and colleagues argue, lies in taking the subjective experience as seriously as possible, and in embracing the phenomenological approach as a unique methodological tool in the study of trauma. I agree with the authors that the phenomenological approach provides us with useful and unique tools in tackling the crucial and urgent problem of traumatic experiences. However, in the remainder of this commentary I will highlight the fundamentally relational nature of our experiences, which are not only embodied but also shared from the outset of our inner life (Ciaunica & Fotopoulou 2017; Ciaunica 2017; Ciaunica & Crucianelli in press). In other words, the second person comes first! I briefly turn to this discussion now.

4 Recent work in contemporary philosophy and cognitive neuroscience suggests that the implicit and pre-reflective experience of the being someone, a self, is related to processing of bodily signals in multisensory brain systems (see Blanke 2012). Perceptual experiences thus emerge from the organism’s processing of, integration of and responsiveness to the multisensory information detected both within and outside the body in order to keep the homeostatic balance within the required limits necessary for survival purposes. This emphasis is adopted and developed by recent influential models of brain function in theoretical neuroscience such as Predictive Processing (PP) (Friston 2005; Clark 2013). According to this model, the dynamic interplay between contact of an experiencing subject seeks to access an “external” environment (or objects) “out there.” However, these approaches tacitly endorse a visuospatial model of characterizing perceptual experiences. There is growing awareness both in contemporary philosophy of mind and cognitive science that perceptual experiences are multimodal in nature (Fayr et al. 2017; Ciaunica & Fotopoulou 2017)

5 For example, according to a recent reclassification of the senses, the range of perceptual experiences has been expanded in order to include:

- proprioceptive, vestibular and kinesthetic input providing information about the movement and location of the body in space (Blanke & Metzinger 2009; Craig 2010; Critchley et al. 2004); and, more importantly,
- interoception, which refers to the perception of the physiological condition of the body, involving modalities such as temperature, itching, pain, cardiac signals, respiration, hunger, thirst, pleasure from sensual touch, and other bodily feelings relating to homeostasis (Craig 2010; Critchley et al. 2004).

6 Information coming from outside our body (exteroceptive stimuli) needs to be integrated with information from inside our body (interoceptive stimuli). Recent research has shown how important it is to
successfully integrate these two aspects in order to develop a coherent sense of self. Indeed, a significant body of work illustrated that the integration of different sensory modalities (see Maravita, Spence & Driver 2003 for a review) is a key component of bodily self-awareness and perceptual experiences (Tsakiris et al. 2007). Given the richness of information provided by tactile interactions, it has been hypothesized that social touch might represent a fundamental step in the development of both self- and other-awareness, as well as the self-other distinction (see McGlone, Wessberg & Olausson 2014 for a review).

« 8 » Against this background, several theorists recently put forward the radical claim that interpersonal, proximal interactions are necessary in shaping all interocceptive modalities from the onset, and thereby in constituting (at least partly) minimal forms of self-awareness (Ciaunica & Fotopoulou 2017; Fotopoulou & Tsakiris 2017). While I cannot do justice to this thesis in length in this commentary, let me, in closing, briefly outline the main argument in favour of the idea that perceptual awareness is not only embodied, but also relational. The basic idea is that in early infancy, when the human motor system is not yet developed, interocceptive function and homeostasis are wholly dependent on embodied interactions with other bodies. Indeed, human infants are born without a fully matured motor system. Consequently, given that they cannot regulate their own homeostasis unaided, the actions of their caregivers necessarily determine how they experience all their sensations. The progressive integration and organization of sensory and motor signals constitute the foundations of minimal selfhood, a process termed “mentalization” of the body (Fotopoulou 2015). Given the embodied, multimodal and dynamic nature of our perceptual experiences, we need to regard early tactile experiences and interactions (starting in the womb and in early life) as basic ways through which we become aware of ourselves and the environment. Crucially, as some of these primitive modalities are specialized to respond to experiences both “within” and “on” the physical boundaries of the body (e.g., the skin), an experiencing subject should not be primarily understood as being “here” and facing a perceptual object or subject “there,” i.e., in a separate physical location, as the traditional models of perceptual experiences claim.

« 9 » With these elements in place, let me now return to the target article and the problem of traumatic experiences. Substantial disruption of organization and modulation of sensory and movement differences in the lived experiences of PTSD individuals trigger not only atypical bodily self-awareness and self-representation, but more importantly, a significant “mismatched” bodily coupling with others, leading to higher-order deficits and consequent difficulties in social encounters. There are at least two basic yet overlooked aspects of the embodied roots of our perceptual awareness, i.e.,

- the emergence of our perceptual subjective experiences from the outset within another person’s experiencing body;
- the developmental primacy of tactile over visual experiences as the most primitive way of becoming perceptually aware of both oneself and environment.

« 10 » This bottom-up approach provides us with an ecological viewpoint not only on how we experience ourselves inside an acting body that dynamically interacts with a constantly changing environment, but more importantly, on what is basic or fundamental in constituting subjective experiences. Indeed, our perception of the environment is not confined exclusively to the inputs that reach our sensory organs from our current (first-person) perspective on the world. Rather, our prior experiences define how we perceive the world in any given time and space. If this is so, then one important consequence is that any explanatory model of perceptual experience should take into account the idea that our primitive experiential world is both embodied and shared. Indeed, the body is not only a representational structure that predicts and integrates multisensory information, generates and receives internal input via its different intero- and proprioceptive systems, but also a structure that enables experiential sharing and bodily coupling with others. This approach echoes Maurice Merleau-Ponty’s view, according to which one must consider “the relation with others not only as one of the contents of our experience but as an actual structure in its own right” (Merleau-Ponty 1964: 140, my italics). If this is so, then the bridge linking first-person subjective experiences and the third-person study of neural activity needs to be complemented by this fundamental relational and dynamic aspect of our embodied engagements with others.

« 11 » Complex psychological phenomena (such as disrupted subjective experiences in trauma) are indeed best tackled from a highly interdisciplinary perspective. Humans are dynamic embodied beings designed to move, and more importantly, to move with others. Empirical and theoretical work taking into account the importance of second-person embodied engagements with others has the potential to pave the way for more ecologically valid forms of research capturing the way (a) our experience of the environment and (b) our sense of internal bodily states interact with each other to interface with the environment and generate the bodily foundation of phenomenal selfhood, both in health and disease. Research along these lines may thus provide new methods for characterizing subjective experiences and may also, in the long run, help to fruitfully combine scientific approaches in health, social and personality psychology.

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http://constructivist.info/14/2/197.ataria
Rubber Hands in the Brain – Feeling It, Moving It, Owning It
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Abstract • In their target article the authors link brain areas related to the sense of ownership and agency with trauma. In my comment I discuss some of the experimental and neuroimaging evidence on the sense of ownership and sense of agency, with particular emphasis on the proposed role of the insula.

1 In their target article Yochai Ataria, Mooli Lahad and Omer Horovitz propose a framework focusing on the experience of the body, and the role of this bodily experience in trauma. This is a welcome attempt and highlights the recent progress made in the research of bodily awareness. Philosophers, psychologists, and neuroscientists alike started to investigate the experience of the body itself with questions such as: How do we come to experience the body itself, and how do we reach awareness of it? As the authors point out in §35, the framework provided by Shaun Gallagher (2000) suggests that two complementary experiences, the sense of body ownership (SBO) and the sense of agency (SA), are at the core of bodily awareness.

2 Ataria, Lahad and Horovitz use this framework to gain a better understanding of experience in trauma. In §41, they propose that in trauma the orderly relationship of ownership and agency may break down, which eventually results in symptoms like flashbacks as a “loss of control – a weakening of the SA” (sense of agency). Thus, elucidating the mechanisms of ownership and agency can contribute to our understanding of conditions such as trauma, and their potential remedies. To this end, it is essential to understand how both these experiences are structured in terms of cognitive/perceptual and neural processes in non-pathological conditions.

3 In the past 20 years there has been a growing literature on SBO and SA. In particular the introduction of the so-called
rubber-hand illusion (RHI) by Matthew Botvinick and Jonathan Cohen (1998) led
to an increasing interest in experience of the body. Here, under controlled experi-
mental conditions, participants can experi-
ence an illusory sense of ownership of a
fake model hand. Thus, by simple visual and
tactile stimulation experimenters can
induce an illusory experience of ownership.
Since its introduction a plethora of studies
have investigated under which conditions
the illusion can be induced and have also
extended this paradigm to new bodily il-
lusions (for an overview see Kilteni et al.
2015). The illusion has been measured with
simple questionnaires referring to the expe-
rience of ownership, but also more behav-
iouroly quantifiable measures such as the
proproceptive drift (Botvinick & Cohen
1998) and skin conductance response after
threat (Armel & Ramachandran 2003).

« 4 » Experimental studies have shown
that it is possible to induce the RHI by
movements, in the absence of visuotact-
ile stimulation (Caspar, Cleeremans &
Haggard 2015; Jenkinson & Preston 2015;
Kalcott & Ehrsson 2012; Tsakiris, Prabhoo &
Haggard 2006). The inclusion of active
movements in this paradigm involves an
intention to move and re-afferent feedback
from these movements, components criti-
cal for the SA (Haggard 2017). By inducing
ownership under moving conditions this
paradigm allows researchers to investigate
the SA (Kalcott & Ehrsson 2012). There-
therefore, the moving RHI paradigm is a useful
tool to understand the relationship of SBO
and SA.

« 5 » A critical question here is wheth-
er and, if so, how the SA alters the experi-
ence of ownership (at least in the context of
the experimental setting). Is the experience
of ownership different during moving con-
ditions as compared to static conditions?
For example, some studies reported that
the ownership illusion is stronger in mov-
ing conditions, whereas others reported
the illusion to be equally strong. Thus, the
interaction between ownership and agency
is not yet clear in this regard. Further in-
vestigations are needed to reconcile the
trade-off model by Ataria and colleagues
with experimental evidence demonstrating
this particular type of interaction. The
trade-off model, as introduced in §40, may
be specific to pathological conditions such as
trauma.

« 6 » What are the neural correlates of
the ownership illusion, in static and mov-
ing conditions? Ataria and colleagues high-
light several structures like the posterior
parietal cortex, premotor cortex, and in-
insula for ownership (see Ehrsson, Spence &
Passingham 2004; Grivaz, Blanke & Serino
2017; Tsakiris et al. 2007). When looking at
agency in §§57ff, they refer to the posterior
parietal cortex, cerebellum, prefrontal cor-
text, superior temporal sulcus, and insula, as
well (e.g., David, Newen & Vogele 2008).
The authors emphasize the role of the in-
sula, “especially prominent in this regard
($)58) to link the processes of ownership and
agency with trauma. The insula has received
increasing attention in recent years, and has
been implicated in a variety of functions
related to emotional and physiological as-
pects of bodily awareness, or more broadly
speaking in functions related to interoce-
ptive awareness (Craig 2003).

« 7 » Although several imaging stud-
ies showed activation of the insula, besides
other areas, they differed in their exact lo-
calization: the first study to highlight the
insula, by Manos Tsakiris et al. (2007),
found involvement of the right posterior
insula, whereas some later studies observed
activations in the (left or bilateral) anterior
portion (Brozzoli, Gentile & Ehrsson 2012;
Limanowski, Lutti & Blankenburg 2014);
compare also the meta-analysis by Petr
Grivaz et al. (2017). The anterior and post-
erior insula have been implicated in dif-
ferent aspects of interoceptive awareness,
potentially even with an asymmetrical or-
ganization (e.g., Craig 2011). Accordingly,
more experiments are needed to disentan-
gle the role of the insula and that of other
areas like the premotor and parietal cortex,
in the RHI, and for body awareness more
generally. The significance of the insula
may receive further support, however, by
observations of brain-damaged patients
suffering from disorders of body own-
ership after lesions to this region (e.g.,
Baier & Karnath 2008).

« 8 » Additionally, it should not be ig-
nored that virtually all these imaging stud-
ies used a rubber-hand-illusion paradigm
in which the experience of ownership is a
result of visuotactile and not sensorimo-
tor integration (Brozzoli, Gentile & Ehr-
sson 2012; Ehrsson et al. 2004; Tsakiris et
al. 2007). Thus, the illusion in this case is a
result of different somatosensory feedback.
An SA is in fact absent here as participants
never actively move. Further, it is known
that these effector mechanisms in active
movements change perceptual processes,
for example by modulating somatosensory
input like touch (Shergill et al. 2003). This
raises the question of whether the moving
RHI is a result of different perceptual and
neural processes, as compared to a static
RHI.

« 9 » An important puzzle piece in an-
swering these questions lies in a functional
imaging study revealing the neural activa-
tions related to the moving RHI. This has
not been conclusively demonstrated yet
(but see also Tsakiris, Longo & Haggard
2010). If similar or identical brain areas
are activated in the moving RHI (e.g.,
the premotor-posterior parietal cortex for own-
ership), then we may conclude that under
moving conditions, the experience of own-
ership is a result of the same neural mecha-
nisms as in the static RHI. Understanding
the SBO under moving conditions is an im-
portant step to understanding the way own-
ership and agency interact. This will allow
us to re-approach pathological conditions
such as trauma and frame it in new terms,
as proposed by Ataria and colleagues.

« 10 » In the light of these challenges
the target article contributes to the ongoing
discussions on ownership and agency. It is a
thought-provoking framework highlighting
the need to look at both these experiences
and examine how they interact. In return,
insights from conditions like trauma equal-
ly inform basic research, and open up new
discussions on how these processes consti-
tute the experience of our own body.

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Authors’ Response

Whatever Works instead of All or Nothing

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Abstract• This response confronts some crucial questions raised by the reviewers: (a) Can the phenomenological approach be applied to the study of trauma? (b) What is the exact meaning of the term “traumatic event”? (c) Is our phenomenological approach too thin? (d) What is the nature of the proposed cognitive bridge – what else is needed? (e) Is the shared world indeed lacking? (f) Is it possible to control patients with posttraumatic stress disorder in the lab? (g) How is our proposal innovative?

1. We thank the reviewers for their insightful comments. Instead of addressing the comments separately, we decided to focus on some of the key points raised by them. We hope that in so doing we will be able to refine some issues that did not receive appropriate attention in the target article.

Can the phenomenological approach be applied to the study of trauma?

2. Jean-Luc Petit worries that “in contrast to normal experience, pathological experience does not contain the resources necessary for self-understanding” ($^{5}$, our emphasis). Indeed, this is a concern that ought to be considered. Yet, one should note that we do not ask the interviewee to understand herself but rather, simply, to describe her own subjective experience. Thus, we agree with Jean-Daniel Thomser, who stresses that the sole purpose of phenomenology is to serve as a descriptive science ($^{1}$). Leav-
ing aside the philosophical debate, as we stressed in our target article, our experience indicates that the phenomenological approach can be applied quite successfully to the case of trauma in general, and posttraumatic stress disorder (PTSD) in particular.

**Event versus situation**

« 3 » When dealing with traumatic experiences or traumatic events, or more accurately events that can potentially become traumatic experiences, we consider a “situated individual” (Dreyfus 2017). Such an individual acts as an active agent that is “thrown” into the world. We thank Ellert Nijenhuis for the opportunity to clarify this notion. Fundamentally, we embrace the enactive approach; when using the word “event,” we are thinking about a situated individual and not about some kind of passive brain-in-a-vat Cartesian entity that receives stimulus from the outside and simply reacts to it. In other words, it goes without saying that PTSD should be understood in terms of being a whole subject, a bodily agent, who is immersed within the world. With this in mind, treatments that treat the subject qua subject, completely ignoring our coupling with the world, will offer partial solutions at best. For this reason, our working plan (Box 2) ends (I) with the notion that any cognitive approach should be applied in the context of “more holistic treatments.” By that we mean that the subject always acts within a context; hence, in order to help the patient, one must understand this whole context and operate within it.

« 4 » To add another thought to the brain-in-a-vat scenario, predictive coding (PC) says nothing new. Indeed, in simple terms, according to the PC theory of cognition, the brain is constantly involved in prediction-error minimization, that is, in minimizing the mismatch between internally-generated, top-down sensory signals and bottom-up sensory signals caused by the external environment.** (Gładzięwski 2015: 560)

« 5 » Yet by reading carefully the agenda of the PC approach one discovers that “the core flow of information is top-down, not bottom-up, and the forward flow of sensory information is replaced by the forward flow of prediction error” (Clark 2015: 1). Thus, in a way it is the same old representative approach. Indeed, according to the PC theory of cognition, the brain “is thought to owe its ability to minimize prediction error to its being equipped with a rich internal representation of the causal structure of the external world” (ibid). Thus, it “isn’t simply that our access to the external world is mediated by neural representations, but rather that the world of experience is itself a representational construct” (Zahavi 2018: 48), or as Chris Frith (2007: 132) put it, “My Perception Is Not of the World, But of My Brain’s Model of the World.” That being said we find it hard to accept Anna Ciaianca’s presumptions about the structure of the self:

**“It has been proposed that the basic pre-reflective experience of being a self is the result of an ongoing and dynamic predictive coding process within a generative model that is centered on the organism.”** (§4)

**Micro/cardio-phenomenology**

« 6 » We agree with Thumser’s comment in §5 that the micro-phenomenological tool (MPT) seems promising. Yet, a as was said in our target article (Footnote 2), we cannot recommend a tool that we have not used; b given that our article’s goal is to help novices, we deem the MPT too complex in this instance.

« 7 » Essentially, however, the quest for MPT masks a much deeper problem. In a way, some of the reviewers (in particular, Petit and Thumser in his Q1) are worried that we do not take the phenomenological approach seriously enough, i.e., we are not sufficiently Husserlian. This may indeed be the case, yet the article’s goal is not to explore Hazel’s phenomenology but rather to apply it. This comes at a price, yet it is one that we are willing to pay, especially because our own experience (Ataria, Dor-Ziderman & Berkovich-Ohana 2015; Dor-Ziderman et al. 2016) has revealed that it is worthwhile. It indicates that going deeper into the phenomenology will not further our dialogue with neuroscientists – rather the opposite. Note that Francisco Varela’s well-known study (Lutz et al. 2002) is quite slender in terms of phenomenology (Ataria 2017). So, to reply to Thumser’s Q2, our article attempts to create a place for dialogue and bridges between fields rather than within a field. In order to achieve this, one must be ready to compromise; indeed our pragmatic approach is replete with compromises. Considering this line of thought, we are fully aware of the difficulties in forming the definition of PTSD. Hence, as we note in Box 2, A.2, our phenomenology is independent of the Diagnostic and Statistical Manual of Mental Disorders (DSM). Yet, once again, if the goal is to create a dialogue, one must find the way to enable it; the DSM is simply a tool that allows us to develop a shared language, nothing more.

**The cognitive bridge**

« 8 » Some of the reviewers (in particular Nijenhuis in his Q1) raise concerns regarding the nature of the cognitive bridge that we proposed. Let us address these concerns in the following three points.

- We cannot ignore that, at least on certain levels, brain activity is localized, meaning that specific functions are associated with certain brain areas (Cleghon et al. 2017; Zelisese & Gaebel 2008). No doubt, this so-called localized activity should be examined not only in terms of the whole brain (Goldstein 1939) but rather as an active agent that is absorbed within the world (Varela, Thompson & Rosch 1991). The debate regarding whether psychic phenomena rely solely on “localized” brain regions or instead result from an integrated functional network connectivity in the brain as a whole is not novel. The progress in developing newer and more sophisticated research methods to study the brain enabled the recognition of both perspectives. Consequently, some studies dealing with brain localization led to a progress in our understanding of brain functions in certain cases (Frisch 2016; Mahon & Cantlon 2011). In this regard, the localization of a specific brain region to a certain subjective aspect of behavior might assist clinicians in determining its nature, whether, for example, it is a more cognitive-/executive-based, memory-related, purely emotional one or a mix of several regions.

- Even if cognitive activity is not the most promising direction, as criticized
Neurophenomenology is not a doctrine and we are not uncritical believers. Our goal is to help those who suffer, and in that sense our motto is a pragmatic "whatever works." Incidentally, this motto fits Varela’s own words perfectly. He defined neurophenomenology as a "new pragmatic tool" (Varela 1996: 330); in this sense we are in perfect agreement with Varela. That being said, we are fine with physiophenomenology. Moreover, if longing (as proposed by Nijenhuis §11) turns out to be a better bridge between the subjective experience and brain activity, so much the better.

The tradeoff model: SBO vs. SA

« 9 » With regard to Andreas Kalckert’s commentary, we could not agree more. The interaction between sense of body ownership (SBO) and the sense of agency (SA) is yet to be fully understood, and hence the trade-off model should be approached with caution and requires empirical examination. This applies in particular to pathological conditions such as trauma and PTSD. Likewise, we agree with Nijenhuis’s comment (as it echoes from Q2, §§13–17) that more studies should take into account a more nuanced trade-off model should be approached with caution and requires empirical examination. This applies in particular to pathological conditions such as trauma and PTSD. Likewise, we agree with Nijenhuis’s comment (as it echoes from Q2, §§13–17) that more studies should take into account a more nuanced

The second person comes first

« 10 » As beautifully put by Claudia in §3, the second person comes first, since the world is first of all a shared world:

** [...] Dasein is with equal originality being-with others and being-amidst intraworldly beings. The world, within which these latter beings are encountered, is [...] always already world which one shares with the others.** (Heidegger 1988: 297, our emphasis)

However, more specifically, it is through our body that we become familiar not only with the world of objects but also with the social world: “The body works as a tacitly ‘felt mirror’ of the other” (Fuchs 2005: 98).

With this in mind, Heidegger’s approach clearly redefines the very notion of empathy altogether:

**Philosophers come up with explanations such as the theory of empathy (a variation of which was held by Scheler and by Husserl), which tries to account for how we get to know another person’s conscious experiences ‘behind’ his behavior.** (ibid)

Yet, “Heidegger argues that such problems, based on reflection and on private experiences, always presuppose the public world as background” (ibid, our emphasis). Using Heidegger’s own words: “Empathy’ does not first constitute being-with; but is first possible on its basis, and is motivated by the prevailing modes of being-with in their inevitability” (Heidegger 1996: 117). Note that, in this sense, Heidegger does not exactly solve the problem of other minds: “[T]he question of other minds, rather than remaining a basic philosophical problem, as it is for Descartes, Husserl, and Sartre, is dissolved by Heidegger” (Dreyfus 1991: 151, our emphasis). Considering this, it should be clear that when we think about therapy we think about shared space. That said, if one returns to our original target article, one can note that our guide for applying the phenomenological approach in the study of trauma (Box 1) begins by creating such an empathic shared environment (section A).

**Controlled activation of PTSD-related traits in the lab**

« 12 » As stressed by Nijenhuis (§16), “it is hard to activate the different parts of the personality in PTSD in the lab in a controlled way.” Keeping this in mind, as practitioners working with patients suffering from PTSD, well informed of the state of affairs in PTSD treatment, we suggest addressing at least three aspects of human demeanors activated and affected by an extreme traumatic incident:

• the physiology (arousal, hypervigilance, etc.);
• the mind, calling it cognition (mainly negative cognitions); and
• the imaginal, the intruding, disturbing images that freeze the ability to be playful.

« 13 » The patterns of brain activation in individuals suffering PTSD may serve as an important marker for the severity of PTSD and serve as a physiological indicator of the treatment outcome, thus helping clinicians.

**So, what is new?**

« 14 » Addressing Nijenhuis’s Q4, our protocol differs from state-of-the-art psychotherapy in various respects:

• psychotherapy does not exactly (clearly, not always) begin with the subjective experience, thus in many cases, the so-called subjective experience turns out to
be a naïve kind of introspection and for us this kind of tool does not expose the bodily subjective experience;

b we use the subjective experience not only to learn about the brain but to return, once more, to the subjective experience in order to help the survivor deal with her everyday life she is struggling with; and

c our phenomenological approach treats the subject not as some kind of brain-in-a-vat but rather as a situated agent.

As such, it redefines the very notions of “problem” and “solution.” In that sense, even if the protocol looks familiar, it is situated in an entirely different philosophical environment: indeed, the context is of the utmost importance.

« 15 » To summarize, we do hope that by embracing a phenomenological approach, we may improve our understanding of the pathological world, and maybe, to be even more (some would say too) optimistic, by redefining the philosophical context to change the way we think about pathologies.

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