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Phenomenology and neural correlates of selflessness

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Experience without self

Phenomenology and neural correlates of selflessness

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Lena Lindström



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DOCTORAL DISSERTATION

Doctoral dissertation for the degree of Doctor of Philosophy (PhD) at the Faculty of Social Sciences at Lund University to be publicly defended on June 20th 2023 at 10.00 in hall Sh128, Department of Psychology, Allhelgona Kyrkogata 8, Lund.

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Abstract: The present dissertation project concerns the relationship between self and consciousness. Specifically, it concerns the phenomenal *sense of self*, and if this is a necessary component of all experience or not. What is it to have a sense of self? This can refer to several things, such as the sense of being a continuous person through time, the sense of having a body, the sense of being in control of your actions, the sense of being located in a specific place, or the sense of being a recipient of experiences. All these aspects have in common a sense of *separation* or *duality* between self and not-self.

In order to answer the overarching question about whether there can be experience without self, I present three papers. For Paper I, I interviewed persons who had undergone self-transcendent experiences – transient episodes of strong alterations of the sense of self that can be induced by, for example, meditation or psychedelic drugs. The aim was to identify which of the various aspects of self that were reported to be changed or lost during the experience. For Paper II, I interviewed persons with varying meditation background about their sense of self in everyday life. Here, the aim was mainly to explore the sense of being a recipient of experiences, what is referred to here as *perspectival ownership of experience*, and how this relates to other aspects of self. Paper III is a brain imaging study, where participants interviewed for Paper II underwent brain scanning (fMRI) while resting and performing two tasks. The aim was to look for neural correlates of various aspects of self.

Paper I showed that the self reported to be altered or lost in self-transcendent experiences can encompass one or several aspects of self in different combinations. One conclusion was that studies that investigate altered self-experiences ought to define better the exact aspect of self that is targeted, as terms such as “ego-dissolution” can refer to many different things. Paper II revealed that perspectival ownership of experience showed a quadratic relation to the general level of selflessness in everyday life, so that participants in the middle range of selflessness described a salient sense of being a recipient of experiences, whereas participants in both the low and high end of selflessness did not. Paper III revealed quadratic relations between brain data and overall selflessness, for example so that connectivity within the brain’s default mode network was higher for participants in either end of selflessness compared to those in between.

In conclusion, this project adds to the understanding of the relationship between self and consciousness through exemplifying experiences lacking one or several aspects of self and clarifying the relationship between these aspects, a relation that – it seems – is not necessarily linear.

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Phenomenology and neural correlates of selflessness

Lena Lindström



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To letting go

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Abstract

The present dissertation project concerns the relationship between self and consciousness. Specifically, it concerns the phenomenal *sense of self* and if this is a necessary component of all experience or not. What is it to have a sense of self? This can refer to several things, such as the sense of being a continuous person through time, the sense of having a body, the sense of being in control of your actions, the sense of being located in a specific place, or the sense of being a recipient of experiences. All these aspects have in common a sense of *separation* or *duality* between self and not-self.

In order to answer the overarching question about whether there can be experience without self, I present three papers. For Paper I, I interviewed persons who had undergone self-transcendent experiences – transient episodes of strong alterations of the sense of self that can be induced by, for example, meditation or psychedelic drugs. The aim was to identify which of the various aspects of self that were reported to be changed or lost during the experience. For Paper II, I interviewed persons with varying meditation background about their sense of self in everyday life. Here, the aim was mainly to explore the sense of being a recipient of experiences, what is referred to here as perspectival ownership of experience, and how this relates to other aspects of self. Paper III is a brain imaging study, where participants interviewed for Paper II underwent brain scanning (fMRI) while resting and performing two tasks. The aim was to look for neural correlates of various aspects of self.

Paper I showed that the self reported to be altered or lost in self-transcendent experiences can encompass one or several aspects of self in different combinations. One conclusion was that studies that investigate altered self-experiences ought to define better the exact aspect of self that is targeted, as terms such as “ego-dissolution” can refer to many different things. Paper II revealed that perspectival ownership of experience showed a quadratic relation to the general level of selflessness in everyday life, so that participants in the middle range of selflessness described a salient sense of being a recipient of experiences, whereas participants in both the low and high end of selflessness did not. Paper III revealed quadratic relations between brain data and overall selflessness, for example so that connectivity within the brain’s default mode network was higher for participants in either end of selflessness compared to those in between.

In conclusion, this project adds to the understanding of the relationship between self and consciousness through exemplifying experiences lacking one or several aspects of self and clarifying the relationship between these aspects, a relation that – it seems – is not necessarily linear.

Sammanfattning

Det här avhandlingsprojektet handlar om självmedvetande och hur det förhåller sig till medvetande i stort. Mer specifikt handlar det om jagupplevelse, *känslan av att vara ett jag*, och om denna känsla med nödvändighet finns med i alla våra upplevelser eller inte. Vad betyder det då att ha en känsla av att vara ett jag? Det kan betyda flera saker, exempelvis känslan av att vara samma person över tid, känslan av att ha en kropp, känslan av att kontrollera sina handlingar, känslan av att befinna sig på en viss plats, eller känslan av att vara en mottagare av upplevelser. Alla dessa aspekter har som gemensam faktor en känsla av *separation* eller *dualitet* mellan jag och icke-jag.

För att svara på den övergripande frågan om det kan finnas upplevelse utan jagupplevelse presenterar jag tre artiklar. För artikel I intervjuade jag personer som haft så kallade självtranscendent upplevelser – kortvariga episoder av kraftigt förändrad jagupplevelse som kan induceras av exempelvis meditation eller psykedeliska droger. Målet var att identifiera vilken eller vilka aspekter av jaget som beskrevs som förändrade eller frånvarande under upplevelsen. För artikel II intervjuade jag personer med varierande erfarenhet av meditation om deras jagupplevelse i vardagen. Här var målet framför allt att undersöka känslan av att vara en mottagare av upplevelser, som i det här projektet kallas *perspectival ownership of experience*, och hur denna känsla förhåller sig till andra aspekter av jagupplevelse. Artikel III är en hjärnavbildningsstudie där deltagare från artikel II scannades med fMRI medan de vilade och utförde två uppgifter. Syftet var att leta efter hjärnkorrelat till olika typer av jagupplevelse.

Artikel I visade att den jagupplevelse som förändras eller försvinner i självtranscendent upplevelser kan omfatta en eller flera aspekter i olika kombinationer. En slutsats blev att studier som undersöker förändrad jagupplevelse bör definiera tydligare vilken aspekt av jagupplevelse de undersöker, eftersom ord som “egodöd” kan referera till många olika saker. Artikel II visade en kvadratisk relation mellan *perspectival ownership of experience* och en övergripande känsla av jaglöshet i vardagen, så att personer i mittspannet av jaglöshet beskrev en tydlig känsla av att vara en mottagare av upplevelser medan personer med låg respektive hög känsla av jaglöshet inte gjorde det. Artikel III visade på kvadratiske relationer mellan hjärndata och övergripande jaglöshet i samma deltagargrupp, exempelvis i att konnektiviteten inom hjärnans standardnätverk var högre för deltagare i respektive ände av jaglöshet än för de i mitten.

Sammanfattningsvis bidrar projektet till förståelsen av relationen mellan självmedvetande och medvetande genom att exemplifiera upplevelser utan en eller flera aspekter av jag och förtydliga relationen dem emellan, en relation som – vad det verkar – inte med nödvändighet är linjär.

List of papers

Paper I

Lindström, L., Kajonius, P. & Cardeña, E. (2022). Dissolution of what? The self lost in self-transcendent experiences. *Journal of Consciousness Studies*, 29:(5–6), 75–101.

Paper II

Lindström, L., Stålhammar, S., Cardeña, E. (manuscript). *The core of me is that which observes: A mixed-methods study of trait-level sense of self.*

Paper III

Lindström, L., Goldin, P., Mårtensson, J. & Cardeña, E. (2023). Nonlinear brain correlates of trait self-boundarylessness. *Neuroscience of Consciousness*, 2023:(1), 1–13.

Additional publications

Cardeña, E. & Lindström, L. (2021). The light and the bulb: The psychology and neurophysiology of mystical experience. In A. Moreira-Almeida, B. Paz Mosquero, & D. Bhugra (Eds.), *Spirituality and Mental Health Across Cultures*. Oxford, UK: Oxford University Press.

Cardeña, E., Lindström, L., Åström, A. & Zimbardo, P. G. (2021). Dispositional self-consciousness and hypnotizability: An empirical study. *International Journal of Clinical and Experimental Hypnosis*, 70 :1, 16–27.

Cardeña, E., Lindström, L., Goldin, P., van Westen, D. & Mårtensson, J. (manuscript). *A neurophenomenological fMRI study of a spontaneous automatic writer and a hypnotic cohort.*

Abbreviations

ACC	<i>Anterior cingulate cortex</i> ; a part of the SLN
BOLD	<i>Blood oxygenation level dependent</i> ; an fMRI signal
DMN	<i>Default mode network</i> ; a brain network
EEG	<i>Electroencephalography</i> ; a brain imaging method
fMRI	<i>Functional magnetic resonance imaging</i> ; a brain imaging method
FPN	<i>Fronto-parietal network</i> ; a brain network
IPL	<i>Inferior parietal lobe</i> ; a part of the DMN
IPS	<i>Intraparietal sulcus</i> ; a brain area involved in attention
MEDEQ	<i>Meditation depth questionnaire</i>
MEG	<i>Magnetoencephalography</i> ; a brain imaging method
MPoD-s	<i>Metacognitive processes of decentering scale, short version</i>
mPFC	<i>Medial prefrontal cortex</i> ; a part of the DMN
NADA	<i>Non-dual awareness dimensional assessment scale</i>
NADA-st	The self-transcendence subscale of NADA
PCC	<i>Posterior cingulate cortex</i> ; a part of the DMN
PMC	<i>Premotor cortex</i> ; a brain area involved in preparing movements
SLN	<i>Salience network</i> ; a brain network
SMA	<i>Supplementary motor area</i> ; a brain area involved in sense of agency
SRP	<i>Self-referential processing</i> ; an experimental task and fMRI session
STE	<i>Self-transcendent experience</i>
TPJ	<i>Temporo-parietal junction</i> ; a part of the DMN

Introduction

Understanding the relationship between consciousness and the self is a longstanding question in philosophy and psychology. Do these two terms refer to the same thing, or can they be separated? My dissertation project aims to explore this question by examining the possibility that experiences can occur without a sense of self. I define consciousness as synonymous with phenomenal experience, and the self as the experience, or *sense*, of self. With the self being experiential, it follows that there can be no sense of self without consciousness. A trickier question is whether there could be consciousness without a sense of self, and that has been the main inquiry guiding my investigation.

Where, if they exist, could occurrences of consciousness without self be found? Claims of such experiences are commonplace in at least two areas: as an effect of meditation and similar mind-altering techniques, and as an effect of certain drugs. Despite an abundance of reports of selflessness derived from such states, the controversy over the possibility of experience without self remains. This is to a large extent due to disagreements on what is meant by self. If the self is, for example, equated with being aware of one's life history and personal identity, it is mundanely shown that we can be conscious without self in cases of severe amnesia. If, on the other extreme, selfhood is equated with experiencing *per se*, it is tautological that there could be no experience without it. To me, the interesting questions dwell in the area between these two extremes, where the self is seen as tightly connected to experience but not identical to it. In this territory, several aspects of self have been identified.

In what follows, I first give an overview of different takes on what the self is, and present some commonly identified aspects of the sense of self. After that, we will look at some examples of experiences that are reported as being without some or all of these aspects. The relationship between such reports and experience is a complicated issue, which I discuss in the third section on first-person science. Finally, I introduce the method of magnetic resonance brain imaging and review what it has been able to tell us of the neural correlates of the sense of self. This provides a background that I hope will serve to frame my own attempts to identify various aspects of self in reports of transient experiences (Paper I), in everyday experience (Paper II), and in the brain (Paper III).

1.1 What is the self?

Although so central to our lives, the concept of self is poorly defined in psychology and is used in a multitude of ways. In this introductory section, I will say a few words on the role of the self in psychology, give a brief overview of some philosophical perspectives on the self, and address the ontological question – is it real? – before discussing various conceptualisations of the self.

1.1.1 The self in psychology and philosophy

A strong sense of self and personal identity has often been considered a central aspect of healthy mental functioning (Engler, 2003; Maslow, 1961; Strawson, 2004). From the perspective of clinical psychology, an important role of therapy is to strengthen the self, particularly in pathologies such as borderline and schizophrenia, but also in general (Engler, 1984). However, there is also an increasing understanding of the problematic aspects of a strong self-focus, as it is seen to be a source of suffering and to play a central part in conditions as diverse as narcissism and depression (Boeker & Kraehenmann, 2018; Davey & Harrison, 2022; Jauk & Kanske, 2021). In parallel to the therapeutic focus on strengthening the self, some authors have therefore emphasised the value of attenuating self-salience for mental well-being (Brown & Leary, 2016).

Viewing the self as a source of suffering is commonplace Eastern philosophy, and the traditional Western ideas of the self have been substantially challenged and influenced by such ideas (e.g., Siderits et al., 2010). The Buddhist standpoint is that there is in fact no self, only an illusion of self, and a goal of meditation practice is to get rid of this illusion through the insight of *anattā*, no-self (Siderits, 2011). In Hinduism there is a self, the *ātman*, but it is non-substantial, as least in nondual traditions such as Advaita Vedanta. It is seen as a universal self without individual distinctions, a pure “witness-consciousness” (Fasching, 2010). These views contrast sharply with the dominant idea in Western thought since Plato of an immortal soul, or a Cartesian thinking substance (Barresi & Martin, 2011). This dualistic, substantial self has come to deeply influence our culture (Taylor, 1989), but in more modern Western philosophy it has not fared well. Famously, Hume (1896) questioned the continuous self and suggested a “bundle theory” in its place, where there are only momentary experiences and no underlying, unifying self. Hume’s take shows an intriguing similarity to some Buddhist thought (Albahari, 2010; Dreyfus, 2010). Hegel, Nietzsche, and James have likewise disputed the substantialist, continuous, unifying self (Barresi & Martin, 2011) and more recently Parfit (1984), Dennett (1993), and Metzinger (2003), among others, have renounced it in different ways. Indeed, the scientific consensus today would have it that there is

no room in the physical explanation of the world for a self-substance, a kind of little person within each person. As Metzinger (2011) states, there is nothing in the brain of the self-conscious organism that could “even remotely count as a substance in any philosophically interesting sense” (p. 283) and, therefore, a no-self assumption ought to be the default position.

Notwithstanding the strong arguments against it, the self-experience for most of us still seems to be aligned with the dualistic view. As Albahari (2010) writes, our usual notion of the self is one of a

. . . unified, unbrokenly persisting subject of experience with personalised boundaries and a perspective on the world. It is a thinker, owner, and agent that stands behind, and is somewhat in charge of, the stream of thoughts and experiences, as opposed to being constructed by them (p. 83).

This intuition, however, does not hold up to a closer look. The *persistence* of the self over time – that we would be the same person today as we were yesterday – is what philosophers call personal identity. This is highly debatable. Parfit (1984) argues, using elaborate thought experiments of teleportation, body copying and mind fusion, that the person you are today and the person you will be tomorrow are not the same. Rather, what these two persons share is a kind of family resemblance that does not suffice for personal identity, as it does not make your relation to your past or future selves very different from your relation to other persons in the present. Further, the idea that we are *bounded* can be questioned on several grounds: for example in terms of how we constantly construct ourselves through language and social interaction, and biophysically, as we are all integrated parts of a world and an ecosystem which we could not even briefly exist without. The sense that the self is not only narrating but also scripting and *somewhat in charge* of our lives relies on an assumption of causal power tied to the self. Such causality is not only made obsolete by a hard deterministic view of the world – as science can predict, describe and explain causal interaction without a mysterious thing called the self – it is also denied by many defenders of free will, who argue that while we are justified to talk of free will, this is not the kind of free will we experience ourselves to have (e.g. Dennett, 2011). As a final point on the faulty nature of our everyday sense of self, we tend to believe that our stories about ourselves are coherent and that they express verifiable truths about matters. This can easily be disproven, e.g., through the Dunning-Kruger effect, according to which people typically overrate their own competence compared to others (Dunning, 2011), or simply through false memories (some even argue that all of our memories are false to some degree; Conway & Loveday, 2015).

So there is good ground to deny the usual sense of self as illusory. But this seems to give rise to a circularity: if the self is only an illusion, to whom is the illusion presented? A Buddhist answer to this objection is that consciousness exists but the self does not. The reason why consciousness does not qualify as a self is that it constantly changes and lacks unity; each momentary sense impression is a separate instance of consciousness (Siderits, 2011). For Buddhist philosophy, the veracity of this claim is a matter of empirical investigation through meditation. For other philosophers, the apparent circularity is rather a case of conceptual confusion that can be unveiled. Bennett and Hacker (2003) exemplify this confusion with the practice in many discussions of the self to introduce a space in terms such as *myself* and *yourself*, yielding the “aberrant expressions” of *my self* and *your self*. They write:

Having opened up an illicit space, we then fall into it. For now it seems as if we have discovered a mysterious object, a self, whose nature must be investigated (p. 332).

These authors maintain that consciousness exists but self is an illusion, and argue that although it is correct to claim that there can be no experience without a subject, the subject in question is not a mysterious self but a living (human) animal, and this subject cannot be said to either *be*, *have*, or *contain* a self. The self understood as the experiencer of experiences is nothing but linguistic malpractice, in their view.

Yet another way to address the circularity is to construe the self as a multi-faceted “cluster concept” rather than a singular thing, wherein several patterns of separable aspects may qualify as a (sense of) self (Gallagher, 2013a; Gallagher & Daly, 2018). Such an approach serves to clarify some of the substantial ambiguity and confusion present in discussions of the self, and we will return to it in Section 1.1.5. Before that, I will introduce some of the aspects suggested to contribute to the self-pattern. A first step is to differentiate between a *narrative* and a *minimal* level of self.

1.1.2 The self as a narrative

The concept *narrative self* (Gallagher, 2000) is closely related to several other concepts, such as the *Me-self* of James (1890), the *self as-object* of Wittgenstein (1958), the *extended* and *conceptual selves* of Neisser (1988), and the *autobiographical self* of Damasio (1998). The narrative self is the *me* of our lives, based in the stories about who we are, and is to a large extent constructed socially through language and culture (Gergen, 2011). The narrative self is extended in time, through memories and plans for the future, and is thereby related to personal identity and personhood (Gallagher, 2011). There are many conceptualisations of different aspects of the broad construct of the narrative self (see Figure 1, p. 24). One useful distinction is that between public

and private self-consciousness, where the public aspect refers to thinking about other people's conception of oneself and one's social identity, while private self-consciousness has to do with introspection and metacognition: being attentive to one's state of mind, emotions, values and reactions (Scheier & Carver, 1985). Another aspect of the narrative self is the inner voice, which narrates the world and our place in it, and takes up about a third of our unconstrained mental activity (Hurlburt et al., 2015).

Dennett (1992, 2003) likens the narrative self to the centre of gravity in physics: there is no such thing as a centre of gravity, it is an abstraction with no real existence, but it is nevertheless useful for explaining and predicting the world. The same goes for the self, as "the centre of narrative gravity": humans generate narratives with selves as their protagonists, and they exist just as much or as little as any other fictional character. In Dennett's view, we tend to confuse this protagonist with the author, who does not exist (Dennett, 1992). Is this kind of self real? If the self is seen only as stories, identities, memories, and plans, all of which exist to us subjectively and can be expressed in words, then surely it must be said to exist – an appearance cannot be dismissed as non-existent if its only claim to reality is that it appears. But the narrative self can rightly be called *illusory* if the term is not taken to mean "does not exist" but "is not as it seems". Interestingly, many Buddhist no-self theories agree that the illusion of being a persisting person can be quite useful (Engler, 2003; Siderits, 2010, 2011). For example, it might help us refrain from instant gratification that would lead to adverse consequences for ourselves in the future, and to take personal development and responsibilities seriously. These theories maintain that the realisation of *anattā* alleviates suffering by making us less egocentric and less worried, but it does not have to make us deny the narratives or lose the sense of identity altogether. The ideal state would be one in which we "behave like persons but cease taking ourselves quite so seriously" (Siderits, 2011, p. 304) as "it is not self *or* no-self, but self *and* no-self" (Engler, 1984, p. 51).

While Dennett argues that the self constitutes itself through narratives, so that narrativity is all there is to the self, many others make the weaker claim that narrative capacity is simply an aspect of being a self (Schechtman, 2011). Either way, the narrative self seems to have an immense significance in our lives: it has been suggested that a substantial part of human action is an answer to the question "what would a person like me do in a situation like this" (March, 1994). On the other hand, experiments on choice blindness have shown that this also works the other way around; stories are confabulated after-the-fact in order to make sense of our own behaviour (e.g., Johansson et al., 2005). Regardless of the direction of the interaction, narratives and identity play a huge role in emotion, mental health and self-esteem. Additionally, personal identity is often assumed to be morally relevant. The separateness of persons has been called "the basic fact for morals" (Findlay, 1961), and according to some, the

possession of a self-concept is crucial for the ethical question of who has the right to life (Farah, 2008).

To me, it seems that narrativity cannot be all there is to the self. The sense of being a *subject of experience* appears not to be dependent on reflection or on an extended, coherent story of a life, but to be much more momentary and direct. Although the narrative self has an undisputable importance for our lives, the minimal self is where things really get interesting.

1.1.3 A more minimal self

In contrast to the narrative self, the *minimal self* suggested by Gallagher (2000) – akin to the *I-self* of James (1890), the *self as-subject* of Wittgenstein (1958), the *ecological self* of Neisser (1988), and the *core self* of Damasio (1998) – is unextended in time, non-linguistic and pre-reflective. It is often, although not always, seen as based in the *embodied* awareness which comes with one's physical presence in the world moment by moment, based on sensory input from our touch senses (pressure, temperature, etc.), interoception and proprioception (Gallagher, 2000). This kind of awareness is rooted in evolutionary ancient mechanisms such as homeostasis and sensorimotor processes (Christoff et al., 2011) and is thus not limited to linguistic creatures. As these inputs only stem from our own body, it distinguishes it from all other matter in the world and thereby lays the ground for a sense of separation between self and world (Gallagher, 2000; Legrand, 2011). Though these sensations – such as the sense of the shape of one's body – and the mechanisms they give rise to – such as maintaining one's balance – are usually not attended to, they contribute to conscious experiences of for example movement and awareness of the location of one's limbs (Bermúdez, 2011). In the concept of bodily awareness, a sense of *spatial location of the self*, a sense of *control or agency*, and a sense of *ownership of the body* are often included or implied (Bermúdez, 2011; De Vignemont, 2007; Legrand, 2011). We will look more closely at these three in turn, along with an additional suggested aspect of the minimal self which I find particularly relevant: *perspectival ownership of experience* (Albahari, 2010).

Spatial self-location is the sense of being located in space, often in or as one's body, or more generally as the sense of having a spatial vantage point to the world. This sense is retained in out-of-body experiences and can be experimentally manipulated to be located outside of the body (Blanke et al., 2002; Guterstam et al., 2015). Often, but not always, people are able to point to a rather specific location where they feel their sense of self to be. In an online study by Limanowski and Hecht (2011), 83 % of participants who were asked to locate their sense of self complied. The participants were asked to locate the "Self" (unspecified) and the "Phenomenal self" (specified as the

centre of experience) on pictures of human bodies. The head was chosen by 67 % of the 87 participants to be the location of the phenomenal self, and by 54 % to be the location of the self. The remainder in both cases chose points ranging from the throat to the solar plexus, with a higher density around the heart. This finding echoes results from several other studies; most people experience themselves to be located in the head, but a big minority chose areas in the torso and a not insignificant proportion chose other places or no place at all. Bertossa et al. (2008), using an elaborate interview method, found that 86 % of 59 participants, including several who were blind from birth, located the “I-that-perceives” to the head. Notably though, 10 % did not feel their self to be located anywhere at all. Hanley et al. (2022) found that when allowed to choose more than one single point, a majority of respondents located their sense of self – defined as the epicentre of knowledge, cognition, experience, and action – to both the head and the chest, and some in additional body regions such as hands and feet. Anglin (2014) found that participants tended to select the head as the location of the self, but the chest as the location of the soul. Interestingly, the location of the *centre* of the experiential self, which was examined in all the above-mentioned studies, seems to differ from the sense of spatial *self-expansion*. In a study asking “How far does your self extend into the world?” over 80 % of participants indicated expanding outside of their body, while only 5 % chose the head. Indeed, a larger proportion (8 %) indicated expanding into the entire universe (Hanley & Garland, 2019).

Agency, in turn, is coupled to bodily awareness in that the body is the only part of the world that is experienced to be, at least in part, directly responsive to the will. However, agency also applies to mental phenomena, as in the felt difference between voluntarily thinking about something and having intrusive or unwelcome thoughts. Agency helps us distinguish between actions caused by us and actions not caused by us, a useful feature if we are not to be constantly surprised by our own movements. This distinction is maintained through reafferent feedback loops in the brain and specifically the so-called efference copy of motor commands, which functions to compare intended actions with the outcome (Christoff et al., 2011; Haggard, 2017). These loops are the reason one cannot tickle oneself – the body part receiving the tickle is “already informed” of the tickling movement through the efference copy. Touching oneself, “double touch”, renders a unique instance of experiencing as-subject and as-object simultaneously, again setting the own body apart from the rest of the world (Legrand, 2011). Experimental manipulation has shown that the subjective sense of agency can be fully dissociated from intentional action: we may feel responsible for actions we did not perform (Wegner & Wheatley, 1999; Wegner et al., 2004), or we can lack this sense for actions that were in fact consciously willed (Blakemore et al., 1999).

Body ownership is the sense that my body *is* me or *belongs to* me, and it has been thoroughly investigated through the rubber hand illusion. In this illusion, a person watches a rubber hand being stroked simultaneously as their own hand, which is out of view. This creates an illusion that the rubber hand is the person's own hand (Botvinick & Cohen, 1998). The illusion can be extended to the entire body with the use of mirrors, cameras and VR-sets to induce a sense of ownership of a body seen from a distance (Blanke & Metzinger, 2009). Phenomenological investigations of this effect indicate that ownership is indeed a subjective dimension of the illusion (Tsakiris, 2011). Additionally, in reports from amputees wearing prostheses, some say they feel the prostheses to be part of their body, while others do not get this feeling (De Vignemont, 2007), again suggesting that body ownership is a distinguishable experience. However, this is contested. Bermúdez (2011) claims that the possibility to feel disownership of body parts, or ownership of non-body parts, fail to show that there is an actual, qualitative feel of body ownership in ordinary experience, and that a sense of ownership only appears as an effect of the explicit *judgement* that my body is mine.

Ownership of experience is quite a different matter from body ownership. It conjures the so-called “principle of immunity to error through misidentification relative to the first-person pronoun” originally brought up by Wittgenstein (1958) and developed by Shoemaker (1968). This “immunity principle” states that although we may be mistaken with regard to the accuracy of our sense impressions or in attributions of agency, we will not be mistaken that the impression or attribution is *ours*. There is no way, the argument goes, that we could mistakenly take our current experience to be someone else's: introspection simply cannot provide information about the ongoing subjective experience of anyone but me. So, for example, regardless of whether the rubber hand in the experiment mentioned above is or is not perceived as my hand, the *sensation of a hand being stroked* and the *sensation of having a hand* are perceived as mine. This is what is meant by ownership of experience (Gallagher, 2013b). Albahari (2010) further distinguishes between *personal* and *perspectival* ownership of experience. Personal ownership occurs when we identify with experiences, such as a thought or an emotion, seeing them as constituting us rather than being perceived by us. The “personal owner” of experience is a *me*, having an identity, and so in my conceptualisation personal ownership belongs to the narrative self. Perspectival ownership, in contrast, only amounts to a sense in which experiences appear to *someone* in a specific manner; the sense that experiences are presented to a *point of view* which is experienced as *unified*. It is a “locus for the first-person perspective”, though not necessarily felt to be a locus in actual space, thereby setting it apart from spatial self-location. While it is an experience of a witnessing taking place, the witness does not have to have any other properties than as being the recipient of the experience: neither a sense of extension in

time, nor sense of agency, embodiment or location of the witness are needed. Importantly, while Albahari maintains that the perspectival owner cannot be the object of its own experience, as it has an inherent elusiveness, it has a “subtle phenomenal character” which can be enhanced through meditation.¹ Most often, perspectival ownership appears in tandem with personal ownership, meaning that we *identify as* the perspectival owner. This identification is not ubiquitous however: according to Albahari (2010), there can be a sense of a perspectival owner without attachment to or identification with either its perceived objects or itself.

I take the notion of perspectival ownership of experience to be virtually synonymous with several other terms, including *pre-reflective self-consciousness* as used by Gallagher and Zahavi (2020), *perspectivalness* as used by Metzinger (2003), *first-person perspective* as used by Nave et al. (2021), *perspectival first-person awareness* as used by Sebastián (2020), *thin subject* as used by Strawson (2011), and *for-me-ness* as used by Zahavi (2014). For most authors, these descriptions have in common the aim to identify the most minimal kind of self. However for others, what these descriptions point at does not qualify as a strain of self. For example, Millière (2020) adheres to a definition of self-consciousness as *consciousness of oneself as oneself*, where the latter *oneself* requires something in addition to a pure witnessing perspective. Even in Albahari’s view, perspectival ownership does not suffice as a self, as “for-me-ness is a dimension of the stream of experiences rather than the subject experiencing the stream” (Albahari, 2010, p. 84). Arguably, it is not as clear as with the other aspects of self that perspectival ownership of experience contributes to a sense of separation, which I take to be the fundamental defining feature of the self (see Section 1.1.5). To the extent that it does, it is through the distinction between observer and observed: Albahari does contend that perspectival ownership bifurcates our experience into subject and object, and Metzinger (2003) similarly sees perspectivalness as constituting a self-world boundary that is not present without it. I believe this feature should qualify perspectival ownership as a sense of self. This is more thoroughly discussed in Section 1.2.2.

1.1.4 Intersubjectivity

In the taxonomy of narrative and minimal self, one major component of our self-experience is left out: non-narrative social aspects, or *intersubjectivity* (Gallagher, 2013a; Gallagher & Zahavi, 2020; Kyselo, 2016). I find this worth mentioning even though I will not engage much more with intersubjectivity here. As pointed out by authors such

¹ This suggested possibility of phenomenal access is however disputed: for example, Sebastián (2022) argues that while perspectivalness is always a part of experience, it cannot be introspected.

as Mead (1934) and Neisser (1988), infants are likely to develop aspects of self-awareness based in their relations to and interactions with others long before they presumably form social identities based in narratives. On a first look, it could be assumed that social interactions belong to the same category as interactions with non-social objects or aspects of the world, and thus form part of the embodied minimal self. There are however convincing reasons to put social aspects of self in a distinct category. Social interaction depends on species-specific, congenital communication and emotion signalling leading to a mode of being that is immediately self-specifying in its own distinct way (Gallagher & Zahavi, 2020; Neisser, 1988). An example is the sense of being seen by others. This renders a kind of self-sense that is not always narrative in nature, as it can be momentary, but that is different from minimal aspects of self in that it depends on interaction with what we take to be other conscious beings, who we take to be approaching us as conscious beings. As an example, imagine that you are alone and caught up in something, when you suddenly find out you are being watched. This can result in a kind of momentary “condensation” into a self in the world, even before you start weaving the narrative of what the other person might think of you – the *specifics* of the self you now have become. The same feeling might ensue if you were being watched by a human, a cat, or a camera, but less likely if your finger was being investigated by an ant who you do not suppose is relating to you as a singular conscious being. I think this idea maps well onto Sartre’s concept *le regard* (1943/1992), and on an ontological level to what Albahari (2019, 2022) describes as subjects being made by other subjects, and perhaps also to Hoffman’s (2019) theory of conscious agents, but that is a whole other story.

1.1.5 A model of the concept of self

The understanding of the multi-faceted concept of self that I have gradually grown into during this dissertation project is depicted in Figure 1 on the following page. As shown, I take the sense of separation, which could also be conceptualised as a sense of boundaries or self-other duality, to be an underlying characteristic of all aspects of self.² I see the narrative self as building upon the minimal self as a non-essential add-on. A selection of the partly separable but often overlapping suggested aspects of each of these constructs is presented in the figure.

² I thank Dan Zahavi for pointing out that it is conceivable that some of these aspects could be experienced without any sense of separation. For example, a psychotic experience of solipsism could co-exist with a sense of perspectival ownership, or a sense of agency could be present without boundaries in the form of omnipotence, or there could be bodily awareness in a nondual experience. In these cases, however, I think the aspect in question ceases to be self-specifying. It is the induced duality that qualifies them as aspects of self (more on this in Section 1.2.2).

As mentioned in 1.1.1, I agree with Gallagher's (2013a) proposal of the self as a cluster concept in what he calls a pattern theory of the self. Seeing the self as a pattern means that we are not out to find one catch-all definition to say what the (sense of) self really is, nor to identify various aspects or characteristics of an independently existing thing called the self. Instead, Gallagher proposes, and I agree, that certain patterns of self-aspects can constitute a self. Thus, it might be that no particular aspect alone is enough to be called a self, and that several distinct combinations are. The pattern comprises various brain processes as well as environmental and social interactions in a dynamic, interrelated and ever-changing process (Gallagher & Daly, 2018).

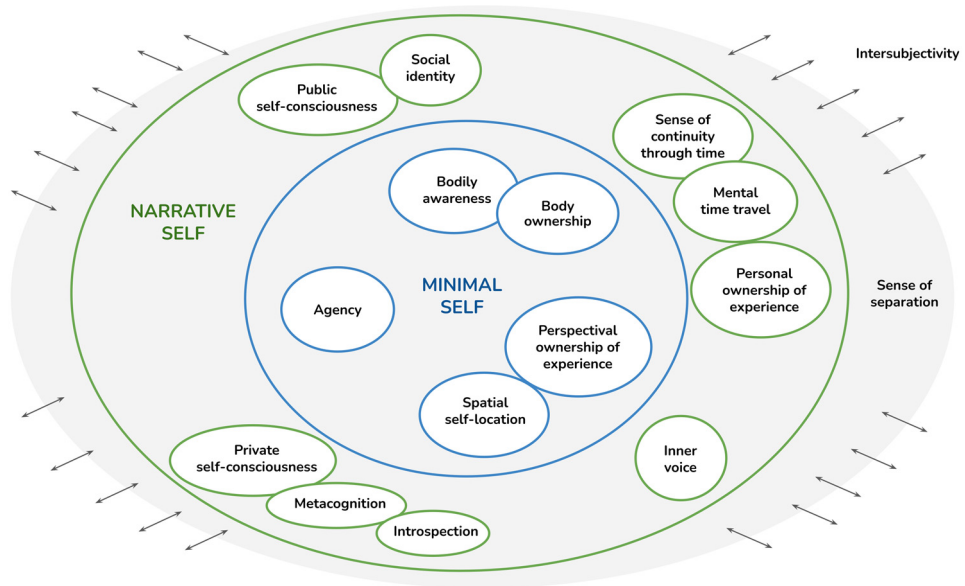


Figure 1. Various aspects of self, with constructs grouped according to similarity. The narrative self is seen as building upon the minimal self, sense of separation is seen as a common feature of all other aspects, and intersubjectivity is seen as a background aspect, constantly interfering with and affecting all other aspects.

On a strict view, an experience should not be seen as selfless if it contained any of these aspects. However, if there can be experience without *either* of these aspects, I think this counts as a strong indication that experience without *any* of them is also possible. Rather than take a stance on which or how many aspects would be needed for something to count as a sense of self, I simply conclude that if an experience would be void of any self-aspects, it would be void of self.

Now moving on to our main topic, we will look at some candidate selfless experiences and try to discern which of the aforementioned aspects seem to be preserved or lost.

1.2 Experience without self

Experiences where there is a decrease in or obliteration of one or several aspects of self can be found in everyday life, in pathologies, in altered states of consciousness, and most distinctly in self-transcendent experiences (STEs) which will be our main focus here. STEs, also known as mystical experiences, are exceptional, transient experiences of reduced self-salience along with a strong sense of interconnectedness, with some or all aspects of self mentioned above altered in drastic ways (Yaden et al., 2017). STEs can occur spontaneously or be triggered by exceptional events, psychedelic drugs, or spiritual practices like meditation (James, 1902/1963; Stace, 1960; Yaden et al., 2017). The temporary and exceptional nature of STEs distinguishes them from trait-level self-transcendence, which denotes an overall reduction in the salience and centrality of the self in favour of a sense of connection and unity in everyday life (Cloninger, 1994; Kitson et al., 2020). I will here present examples from the literature of experiences seemingly lacking one or several aspects of self, and then discuss whether these should be taken to mean that there can be experience that is completely selfless.

1.2.1 Experiences without various aspects of self

As mentioned, the hallmark of STEs is a sharp decrease in the sense of self-salience along with an increased sense of unity (Yaden et al., 2017). This is clearly described by author Sara Maitland (2009) who had a spontaneous STE while alone in the mountains:

- 1) It was so huge. And so wild and so empty and so free... And then quite suddenly and unexpectedly, I slipped a gear or something like that. There was not me and the landscape, but a kind of oneness: a connection as though my skin had been blown off. More than that – as though the molecules and atoms I am made of reunited themselves with the molecules and atoms that the rest of the world is made of. I felt absolutely connected to everything. It was very brief but it was a total moment (p. 63).

The lack of separation described above pertains to an external world, although it is no longer felt to be separable from the self. However, as originally discussed by Stace (1960), STEs can also feature a sense of unity without sensory input. What he calls the *introvertive mystical experience*, in contrast to the extrovertive variant exemplified above, is marked by a decrease of cognitive and sensory content leading to no or almost no awareness of world, time or space. Also known as pure or contentless consciousness, this kind of experience is often described as void or emptiness, or alternatively as a unity with God or with ultimate reality. It is marked by a lack of all the normal contents of

consciousness, while consciousness as such remains. This kind of experience can be exemplified by the following account from deep hypnosis:

- 2) I lose everything in between... there is no room or space or body at all. . . I completely lost all touch with things around me and lost the realization I had of body and of conscious mind... and then sometimes there would be nothing at all. . . It's without most everything... there's no sense of feeling or being alive... you're just there... it's not really thinking (Sherman, 1971, pp. 114-115).

We will return to the pure consciousness experience in the following section (1.2.2), as these are strong candidates for completely selfless experiences. But first, we'll look at examples of experiences where apparently only some aspects of the sense of self are lost.

A loss of *narrative self* is commonly reported from episodes of intoxication by psychedelic drugs. Millière et al. (2018) cite one user of such drugs who reported “forgetting that I was a male, a human, a being on Earth—all gone, just infinite sensations and visions” and another who “didn't remember what a human was” (p. 7). More everyday instances of experience with a decreased or obliterated sense of narrative self are flow or absorption (Csikszentmihalyi, 1975; Yaden et al., 2017). When we “lose ourselves” in a book, or an athletic or artistic activity, we are not engaged in metacognition and can be unaware of our past or future. This can be exemplified by an account from a rock-climber interviewed by Csikszentmihalyi (1975):

- 3) The task at hand is so demanding and rich in its complexity and pull that the conscious subject is really diminished in intensity. Corollary of that is that all the hangups that people have or that I have as an individual person are momentarily obliterated. . . It's one of the few ways I have found to . . . live outside my head (p. 43).

However, during flow or absorption various aspects of the *minimal self* are intact and may even be reinforced; in a flow experience pertaining to a physical task, the sense of embodiment, delineation from the surroundings and spatial position can be very salient, and in a cognitively or physically demanding activity the sense of agency may be reinforced (Christoff et al., 2011; Csikszentmihalyi, 1975; Maslow, 1961). In other instances, however, the sense of bodily awareness can be completely lost. One example comes from so-called disembodied dreams, where the dream is experienced from a perspective of a freely moving centre of awareness (Alcaraz-Sánchez et al., 2022; Windt, 2010). Meanwhile, other aspects of self such as narrative, self-location, agency and ownership of experience can be retained, such as in this account from a lucid dreamer:

- 4) Found myself in the void. My mind was wandering in all kinds of thoughts. Then I noticed that I could 'leave' my body. I flew off through the void. Everything was dark,

kind of somber, and I didn't have a body. I had the desire to be somewhere. (LaBerge & DeGracia, 2000, p. 288).

Descriptions of loss of bodily awareness are likewise common from meditation, sensory deprivation, and drug-induced states (e.g., Kjellgren, 2003; Millière et al., 2018). An example can be found in the following description of a meditation-induced STE:

- 5) I experienced a bang where I was plunged out of everything that I call my self, as by a catapult, and just disappeared, everything disappeared for a while. . . [It was] like being in a vacuum. There was a sense of being in an empty indoor environment which was somehow infinite. It didn't feel like being out where it's windy, where it's cold or warm, where there is a body (Friman, 2014, pp. 26-27; my translation from Swedish).

The sense of self-location, though retained in some of the disembodied experiences described above, has been described as lost in some drug-induced experiences (Millière et al., 2018), in a deaf-blind person taking a bath (Millière, 2019), as well as in dreamless sleep experience:

- 6) Imagine like, just BEING in the point of view of just like being in those colours . . . But I'm IN, I'm in the point of view of like, anywhere I go . . . I'm not like able to like TURN this environment or like OBSERVE it from like different points of view . . . I'm seeing and just like IN, immersed IN these colours (Alcaraz-Sánchez et al., 2022, p. 10).

The sense of agency is often described as sharply decreased or lost during hypnosis (Polito et al., 2015). There are also several symptoms of psychotic disorders where the sense of agency is lost (Parnas & Sass, 2011; Polito et al., 2015), such as alien control, where the normal sense of agency of one's movements is attributed to someone or something else, and in thought insertion, where thoughts are experienced as inserted into one's mind by someone or something else (Mullins & Spence, 2003; Spence, 2002). Meditation can also decrease or obliterate the sense of agency (Lindahl & Britton, 2019). An expert meditator describes how, during meditation:

- 7) The body lives its own life; autonomous. Total absence of control of the body. (Droit-Volet & Dambrun, 2019, p. 58).

With no awareness of the body, there can hardly be any sense of body ownership. The opposite though, with body ownership lost but bodily awareness retained, is quite commonly reported (Ataria et al., 2015; Dor-Ziderman et al., 2013, 2016; Millière et al., 2018). One example comes from this description of a psychedelic episode:

- 8) [I] looked down at my hand and didn't feel anything that would indicate that this was my hand I was looking at (Millière et al., 2018, p. 9).

The sense of body ownership can also be compromised in somatoparaphrenia, a condition resulting from brain damage where a part of one's body is experienced as alien or as belonging to someone else (De Vignemont, 2007). In some such cases though, while the limb is experienced as *not owned* by the person to whom it is attached, sense impressions from it are still experienced as *presented to* the person, thereby retaining perspectival ownership of experience. Likewise in thought insertion, thoughts are experienced as “not mine”, but still as “presented to me” (Gallagher, 2013b).

Perspectival ownership of experience is thus a strong candidate for the most minimal kind of self. In fact, in most of the experiences reviewed above there still seems to be a perspectival owner of the experiences, such as the “seer” that remains in quotes 6 and 8. Quotes 2 and 5 of what appears to be contentless experiences are possible exceptions, but these descriptions are not really fine-grained enough to judge whether the sense of perspectival ownership is retained or not. There are however other descriptions of what presents as a retained sense of perspectival ownership even in contentless experience, such as the following account from a spontaneous STE discussed by Wulff (2014):

- 9) At one level I ceased to exist, was swallowed into light. . . At another level, although I no longer existed as a separate ‘I,’ nonetheless I saw things, thus indicating the duality of ‘I’ and ‘other’ (p. 371).

Likewise, the sense of perspectival ownership is clearly retained, whereas most other aspects of self are described as missing, in this interview transcript from deep meditation:

- 10) It's as if I'm still somewhere an observer or a witness. There's still witnessing happening and that witnessing is what's left of me (Ataria et al., 2015, suppl. material, p. 5).

So far then, there are no strong indications that there can be experience without perspectival ownership. But next we will look at three accounts that might contradict this common conclusion. The first, discussed by Fink (2020), comes from the memoir of psychology professor Elyn Saks who suffers from schizophrenia:

- 11) Consciousness gradually loses its coherence. One's centre gives way. The centre cannot hold. The ‘me’ becomes a haze, and the solid centre from which one experiences reality breaks up like a bad radio signal. There is no longer a sturdy vantage point from which to look out, take things in, assess what's happening. No core holds things together,

providing the lens through which to see the world, to make judgements and comprehend risk. Random moments of time follow one another (Saks, 2007, p. 13).

Another example, discussed at length by Letheby (2020), comes from journalist and author Michael Pollan who describes his experience with the psychedelic drug 5-MeO-DMT:

- 12) I could no longer locate [myself] in my head, because it had exploded that too, expanding to become all that there was. Whatever this was, it was not a hallucination. A hallucination implies a reality and a point of reference and an entity to have it. None of those things remained. . . In fact every touchstone that tells us “I exist” was annihilated, and yet I remained conscious. “Is this what death feels like? Could this be it?” That was the thought, though there was no longer a thinker to have it (Pollan, 2018, pp. 276-277).

The third example comes from a study of forty-six meditators trained in a meditation style devised to dissolve the sense of boundaries (Nave et al., 2021). Of these, seven reported an absence of first-person perspective, exemplified by this account:

- 13) There’s a field of sensuality, and it’s not bounded. . . I’m not located anywhere. I am not. It contributes to the dissolution. There’s no sense of observer. No witness. . . It didn’t lose the sense of being-part-of, not entirely. . . There’s a sense of flow and it is going through something (p. 15).

In my opinion, it is reasonable to take these three examples as descriptions of experiences without perspectival ownership. If so, we have seen examples of experiences without each of the aspects of self outlined above. The question remains if an experience could lack all of these aspects simultaneously, and thereby be called completely selfless.

1.2.2 Can there be experience without *any* aspect of self?

First, let us address a common objection to the possibility of completely selfless experiences. It can be claimed that potentially selfless experiences like those reviewed above are still always experienced by a self, as from an *objective* standpoint there is one specific, embodied person who has them. From an objective standpoint, we can further claim that the fact that a person can remember or recount an experience makes it theirs. This is uncontroversial, but as explicated by both Letheby (2020) and Millière (2020), this level pertains to metaphysics and lacks implications for direct experience. We can concede that there is a subject of experience at this level – third-personally, but also first-personally to the extent that there is identification with the narrative self – without it precluding the possibility of *momentary* experiences that are *phenomenologically*

selfless. Nor does the fact that experiences are usually recounted with the use of first-person pronouns contradict the possibility of them having been selfless as they occurred, something which has been thoroughly expanded on by Fink (2020).

Going back to the main question – can there be experience without any sense of self, even the most minimal kind of witnessing here referred to as perspectival ownership of experience? This is a highly contested issue in the philosophy of the self (Gallagher, 2011; Gallagher & Zahavi, 2020; Siderits et al., 2010) and I will only give a brief overview of some arguments that have been central to my work. The answer relates to two things: (a) how one defines the minimal requirements for something to count as a sense of self, and (b) whether this is taken to be inherent in all experience or not.

As an example of a “thick” self with rather high requirements, Park and Blanke (2019) take bodily self-consciousness, as made up by interoceptive and exteroceptive signals, to be the most minimal kind of self. The embodied self is seen as the basis for identification and for *minimal phenomenal selfhood*, “the conscious experience of being a self or a subject”. In addition to being based in bodily self-consciousness, their minimal phenomenal selfhood includes a sense of agency, of controlled attention directed at contents of experience, body ownership, spatial and temporal self-location, and “the experience of being a distinct, holistic entity” (Blanke & Metzinger, 2009). In their take, being a subject of experience requires all of these aspects. The minimal phenomenal self also includes a “weak first-person perspective”, a visuospatial vantage point or “geometrical origin” of perception which depends on bodily awareness. This conceptualisation of perspective is thicker than Albahari’s perspectival ownership of experience, which does not require bodily awareness, but it is still not regarded by Blanke and Metzinger (2009) as sufficient for being a subject of experience. With such high requirements for something to count as a sense of self, selfless experiences ought to be easier to find. Indeed Metzinger (2020) suggests that there can be experience without minimal phenomenal selfhood – a negative answer to (b). This applies however not only to the *entirety* of this minimal self but also to each its constituent aspects; Metzinger (2003) thus asserts that there can be completely *non-subjective consciousness*, without even the most basic perspectivalness (which is in itself insufficient for a phenomenal self-model, in Metzinger’s view).

Albahari (2010) argues in defence of the psychological possibility to experience nirvana as described in Pali Buddhism, that is, as an absolute liberation from all illusion of self. For such an experience to be possible she asserts that there can be experience without an experiencing self, and so also gives a negative answer to (b). However, in her view, complete lack of *identification* with all experiences – personal but not perspectival ownerlessness – suffices for selflessness to be realised. Albahari’s position is disputed by, for example, Dreyfus (2010), Strawson (2011) and Zahavi (2011, 2014), who argue

that some minimal sense of subjectivity is by necessity inherent in all experience, and thereby give a positive answer to (b). Dreyfus (2010) specifies this subjectivity as also having ownership: experiences *belong* to a minimal I, construed only as a constantly changing stream of experience. This subjectivity does not amount to a substance of any kind, nor does it have any extension in time, or ethical relevance. It is just a necessarily true claim about experience that subjectivity is always part of it. As it is necessarily true, there is no need to argue for it, but if subjectivity is said to be identical to experience there is no real need for the term, he asserts. This subjectivity-equated-with-experience thus fails to provide any insights about the self as it is ordinarily understood, and selfless experience could still occur with regard to all other aspects of self.

So it seems that the disagreement between Albahari (2010) and her critics mostly concerns whether perspectival ownership of experience is to be called a self or not – they agree on the point that it underlies all experience. This proposed inseparability of subjectivity and experience is in fact maintained in some form by most authors on the topic (according to, among others, Bennett & Hacker, 2003; Gallagher & Zahavi, 2020; Lane, 2020; and Siderits et al., 2010). Two notable exceptions to this agreement are Letheby (2020), who defends the possibility of completely selfless experience under very intense drug experiences induced by the psychedelic DMT, and Siderits (2010), who defends variants of Buddhism that deny all inherent reflexivity or ownership of consciousness, even in the normal state.

As mentioned above, Metzinger (2020) also proposes that there can be experience without self. The “minimal phenomenal experience” he suggests can fulfil this criterion is the contentless, pure consciousness event mentioned before. Apart from being well documented in meditation (Forman, 1999; Gamma & Metzinger, 2021; Josipovic, 2019; Woods et al., 2022), pure consciousness has also been described in other situations, including in dreamless lucid sleep (Alcaraz-Sánchez, 2021; Alcaraz-Sánchez et al., 2022; Windt et al., 2016). In this kind of experience there is no object of experience, nor sense of time, space, duality or boundaries. It is also described as lacking a sense of identification (as in “I *am* this”), a sense of perspective and a model of an “epistemic agent” – i.e., a thinker, knower, or controller of attention (Metzinger, 2020). Pure consciousness is often described as consciousness void of any content *except itself*. It is thereby reflexively conscious, “awake to itself”. Is this enough to qualify as a self? I find reflexivity unconvincing as a kind of self (see Sebastián, 2022, for an explication), and focus on the closely related construct perspectival ownership of experience. What is the relation between this sense and contentless experience? Note that in quotes 11-13, which describe potential experiences without perspectival ownership, there is still some content: random moments of time for Saks, a “thought” for Pollan, and a sense of flow for Nave et al.’s meditator. In quotes 9-10, which exemplify experiences with

retained perspectival ownership, there is arguably also some content. However, in the following two accounts, perspectival ownership seems to be missing along with *all* content. First, psychiatrist Philip Sullivan (1995) describes “coming back from nothingness” after suffering head trauma in a car accident:

- 14) There was something, and the *something* was not the nothing. The nearest label for the *something* might possibly be awareness, but that could be misleading, since any awareness I’d ever had before was *my* awareness, my awareness of one thing or another. In contrast, this *something*, if it be called awareness, had no I as its *subject* and no content as its *object*. It just was (p. 53)

The second example is a pure consciousness experience during sleep, disclosed to Alcaraz-Sánchez (2021):

- 15) It’s emptiness. It’s emptiness but awareness of emptiness. But well, when I say awareness you can say, ‘Oh, there’s awareness of emptiness’, but sometimes, it’s like emptiness and awareness are the same, there’s no ‘being’ being aware of emptiness, it’s emptiness is awareness (p. 17).

It does appear to be no self at all present in Sullivan’s description: no witness, no separation, no identification, no ownership. The sleep experience likewise reads as completely void of perspectival ownership. Arguably, though, in experiences like this – as in all experiences – the self-equated-with-experience defended by Dreyfus (2010), Zahavi (2014), and others does survive. Although I agree with these authors that experience *normally* entails a sense of perspectival ownership, I do not take it to be obvious that it is *necessarily* so. It seems to me that perspectival ownership is rather like a shape that experiencing can take. As a shape, it is not separable from the experience – it is no “I-quale”, as put by Zahavi (2014) – nor is it a higher-order add-on, as are aspects of the narrative self. But I find it premature to conclude that this is the *only* shape experiencing can take; the quotations above are viable contestants to such an assumption.

So in reply to the question heading this section, I find it warranted to assume that at least some minimal phenomenal experiences are indeed lacking all aspects of self. As mentioned in Section 1.1.5, I think “self” ought to imply some sense of separation. For this, there has to be an experience of something *other* than the self, i.e. some kind of content.³ I would suggest that in some contentless experiences, such as that in quote 9,

³ A similar suggestion is made by Albahari (2019), who says that the absolute contentlessness of pure consciousness rids experience of all the normal cues leading us to believe we are subjects, including space, time and perspective.

consciousness itself is perspectively owned as a kind of content, while in other experiences, exemplified by quotes 14 and 15, this is not the case.

The view that there could be experiences without even the most minimal self has an advantage in that a self-concept with some explanatory value of its own is preferable to one that is simply taken to be identical to experience. Equating or subsuming selfhood with consciousness seems to make the concept of self superfluous while not really explaining anything. I thus find it more meaningful to talk of consciousness as one thing and self as another. A lingering question is whether the quite cautious verdict that contentless experiences can be selfless could be extended to some experiences *with* content. I will return to this issue in the discussion, after having presented some relevant results of my own studies.

I hope this section has made clear that if we are to make any progress on the issue of experience without self, especially given the complexity and ambiguity of the concept, detailed phenomenological analysis is needed to ascertain just which aspects of self are described as missing in allegedly selfless experiences. This is what I have attempted to do in my interview studies. We further need to address the question of the relationship between such *descriptions* of experience and *actual* experience – if such a distinction is even warranted. This is the topic we will turn to next.

1.3 First-person science: Conquering ineffable territory

The present research is a neurophenomenological project. Neurophenomenology means that objective, third-person measures of brain activity – the *neuro* part – are combined with subjective first-person descriptions of experiences – the *phenomenology* part (Varela, 1996; for an example see Cardena et al., 2013). “Subjective” might sound like the antithesis to “scientific”, but when we are investigating consciousness there is really no way around it: subjective experience is the object of interest.

First-person scientific methods are to a large extent dependent on linguistic reports. Although it is always possible to question to what extent such reports can really convey an experience, when investigating STEs we run into an additional problem. Part of what characterises these experiences is the sense of *ineffability*: they are felt to be impossible to describe in words (Stace, 1960). In spite of this, many books (and some dissertations) have been written with the attempt to describe such experiences. So there is not really a lack of words, only a lack of sense that the words do the experience justice. This problem has a potentially severe consequence: a prerequisite for first-person science is that verbal reports are *honest*. But can a report ever be honest if the one

reporting does not feel that words can convey the experience? And more generally, what kind of insight into the mind of another person can be gained from what they say? Can we really share experiences, understand each other, know what another feels? Are experiences *communicated* through words, or rather *created* by them – is there even an answer to what an experience is really like if the question is never asked? These questions force us into some enthralling territory of philosophy of language.

1.3.1 The relationship between language and experience

Wittgenstein famously wrote that “*the limits of my language mean the limits of my world*” (1922, §5.6). This could be interpreted negatively – words confine us to their limited world – or positively – our world can be endlessly expanded through the expansion of language. Although these two interpretations are compatible, distinguishing between them might help to elucidate the sense of ineffability.

In support of the positive interpretation, it surely seems like words can expand our world by giving us access to new ideas and refine our thinking. This can be demonstrated right away by the employment of some useful terms: the dichotomy between *designatory and instrumental* versus *expressive and constitutional* views on language (Taylor, 1985, 2016). On a designatory view, each word describes something precisely and defined. To Wittgenstein, who takes a designatory stance in the *Tractatus* (1922), this has the severe complication that we can only ever talk about precise and well-defined matters. With such a view on language, the project of describing and comparing STEs looks hopeless – there is no way to agree on definitions of such “invisible” private experience. Relatedly, in instrumental views, language is seen as an instrument to express concepts and a rational thinking that was already present. For an instrumentalist, before the invention of language there were things to say but no words to say them. Now that words are invented, they are a double-edged sword that may also hinder true understanding, thereby limiting our world. For an instrumentalist, ineffability could amount to just not having the right word: perhaps words could in principle do the experience justice, but their seductiveness may tempt us to use them wrongly and put our intended message in a mould where it does not fit. The recognition of this mismatch would be the sense of ineffability.

Later Wittgenstein changed his view on language and became an expressivist, for whom the meaning of a word is not in an exact definition but in the way it is used in language, in what he calls *language games* (Wittgenstein, 1967). On the expressive view, context and interaction are crucial for understanding, and there is no hard-coded meaning in the terms themselves. This challenges the very existence of private experience, which we will return to below. In a similar vein, for the constitutionalist, words are not an

expression of a distinct, underlying meaning which was already there. Instead, the things to say evolved in unison with language. If the instrumentalist views language as an excavation of buried treasures, for the constitutionalist it is more an act of sculpting. This pertains especially to “the existential dimension”, according to Taylor (2016). New ways of feeling or experiencing cannot exist prior to the language describing them; they can only enter our worlds through descriptions. He does allow for some subtle wordless differentiation prior to the acquisition or invention of new language to describe it: for example, the distinction between joy and happiness “emerges from a vaguely felt difference into a recognizably distinct experience when we find the words” (Taylor, 2016, p. 190). Finding these words does not amount to just coining or learning a new term: it has to be done by joint experience, by relating to existing shared language through creative metaphors and other poetic means, or through enactment or art. As a possible example of this, paradoxes are a recurring feature in the language chosen to describe STEs (Stace, 1960). To foreshadow my results a bit and quote some of my interviewees in Paper I: “You experience everything and nothing at once”, “It’s a very strong sensation of a lack of sensation”, “It ends but it goes on somehow”. The use of such “impossible language” can be seen as a creative way of conveying the sense of something that is impossible to describe. According to Taylor, through such a process we do not simply express but effectively *create* new ways of feeling or experiencing – and thereby expand our world. New language leads to clearer distinctions which sharpens our capacity to note even more subtle differences, which in turn can spawn new words in an incremental process. As this expansion is potentially endless, we will have the feeling that there is always more to express; emotions and experiences that could be chiselled out through the right kind of process and hence realised. This ought however to give rise to an *overall* feeling of ineffability, and does not explain the extraordinary intensity of this sense in STEs. I will return to what might set them apart in Section 1.3.3.

These different takes on language do not only give different answers to whether words constitute our experience or just provide a means for expressing it, but also to the question of what kind of access language can grant to the minds of others, which we will look at next. As hinted at above, the expressive and constitutional view even perturbs the very premise of there being experiences exclusive to a specific mind, which could be more or less correctly conveyed by words.

1.3.2 Knowing the minds of others

Taylor (1985), along with many others, argues that modern sciences suffer from what has been called “Galileo’s error” (Goff, 2019) – the exclusion of experience and

subjectivity from the realm of science. Only by this exclusion has it been possible to make the progress in science that we see today, but the price has been a mind-body dualism that makes consciousness an insoluble conundrum. In a large portion of contemporary psychology, cognitive science, and neuroscience, the experiences of others are therefore seen as fundamentally private and inaccessible. This problem is often framed as a gap between first- and third person data, or as the *problem of other minds* (Gallagher & Zahavi, 2020; Leudar & Costall, 2004). On this view, we are all separate containers of subjective experiences that can be *inferred*, but never fully proven, by objective evidence. All we can hope to do is make more or less well-founded assumptions about the minds of others, but we can never really know what it is like – or even if it is like anything at all – to be somebody else. This dualistic way of viewing the world might seem inescapable for a human mind. However, in his 1989 book *Sources of the Self*, Taylor sets out to show that it does not have to be so. He traces the idea of *interiority* – that my thoughts and feelings, my reason and experiences are *in here* as opposed to the world *out there* – to as recent a figure as Descartes. Taylor does concede that humans of all times must have had some way of distinguishing between self and other: for example, when one stone age hunter was attacked by a mammoth, a bystander must have had a sense of relief at not being the one attacked. They had the “familiar sense of themselves as single agents among others” and “must have shared our familiar understanding of the decisions they were called upon to take” (Taylor, 1989, p. 119). Taylor thus grants some minimal self to pre-Cartesian humanity, but states that this kind of self is far from the separateness that we take for granted today and which prompts the problem of other minds:

The modern epistemological tradition from Descartes, and all that has flowed from it in modern culture, has made [the first-person] standpoint fundamental – to the point of aberration, one might think. It has gone as far as generating the view that there is a special domain of ‘inner’ objects available only from this standpoint; or the notion that the vantage point of the ‘I think’ is somehow outside the world of things we experience (Taylor, 1989, p. 131).

In *Philosophical Investigations*, Wittgenstein (1967) firmly contradicts the idea of inner and outer, and of subjective experience as inaccessible to others. To him, it is neither the case that only I can know my experiences, nor that I cannot know the experiences of others: this would be a faulty way of using the term *know*. In what he calls “a whole cloud of philosophy condensed into a drop of grammar”, he writes that “I can know what someone else is thinking, not what I am thinking. It is correct to say ‘I know what you are thinking’, and wrong to say ‘I know what I am thinking’.” (1967, xi). By this he means that the knowledge we have of the experiences of others is direct, not inferential; we do not *judge* or *believe* that others are conscious or have certain feelings,

we take it for granted. “Just try – in a real case – to doubt someone else’s fear or pain” (1967, §303), he writes, and later: “If I see someone writhing in pain with evident cause I do not think: all the same, his feelings are hidden from me.” (1967, xi).

Both Wittgenstein and Taylor here align with much of the phenomenological tradition. In phenomenology, verbal reports are seen as a fundamental, and fruitful, route to understanding the experiential world of others. But not in a detached, analytic way; intersubjectivity is key to the process and one speaks of second-person methods rather than third-person (Gallagher & Zahavi, 2020). Although there is a difference between such second-person knowledge and that of the first person, it is not a gap; the relationship between them is not one of inferring versus certainty. We might *infer* that someone is in pain when seeing a box of painkillers in their room, but not when hearing them scream in pain (Bennett & Hacker, 2003, p. 93). Experience is *embodied*, both for the first- and second person, and this “evens out the playing field” as it is given in a similar manner for both of them; my anger or pain is a matter of experience for you as well, because you too can hear, see and feel it. The perspectives of the first and second person are not identical but rather like two different angles from which to experience a mind, and both have their respective strengths and weaknesses (Froese et al., 2011; Gallagher & Zahavi, 2020). Through the centring of embodiment and intersubjectivity, phenomenology abolishes the separation of inner and outer and the problem of other minds, and offers promise to the prospect of sharing experiences through language and introspection (Bitbol & Petitmengin, 2016). Talking about an experience is, after all, a publicly available embodied behaviour, expressed and developed intersubjectively in our language games. Intersubjectivity is both fundamental for acquiring language and something that expands through language in a lifelong fine-tuning of competence (Gallagher & Zahavi, 2020). In phenomenological methods, honest verbal reports are consequently treated as descriptions of actual subjective experiences, however without any bearing on mind-independent reality. The assumption of such a reality is instead suspended, and absolute reality is seen as “just as valid as a round square” (Husserl, 1913/1972, p. 153): the phenomena under investigation *are* the experiences.

A different view on the interpretation of verbal reports is offered by Dennett, whom I take to also be an expressivist and constitutionalist. He describes a third-person version of the phenomenological method called *heterophenomenology*. This method takes a recount of an experience to be a kind of fiction, which is only ever true in its own fictional world – in the same sense that it is true that Sherlock Holmes lives in London (Dennett, 1993). In Dennett’s view, there are no true accounts of experiences to be found as there is no such thing as actual experience: our conscious life is not a stream of virgin experiences that can be described more or less correctly. All that can be put in

words is a rather arbitrary judgement, only assembled when called for, that could not even in principle be put side by side to the actual experience and deemed more or less correct. To him, language production does not stem from a central intention, such as a wish to convey a certain message: the mind is not unified or centralised in that way. Instead, he views the mind as a pandemonium of parallel processes, shaped in elaborate detail by previous experience and biology. Some such processes will have the potential to result in speech acts. As speech is serial, at each moment only one of the results of these processes “wins the race” and is actually expressed. Which process will win is not decided before the language act is executed; on most occasions, we do not know what we are about to say, or what we mean by it, before we hear ourselves say it. When we do, we – and our listeners – can backtrack and infer a central meaning or a “true experience” as the root cause of the words that were said. But this is a mistake; there is in fact no one true experience at the bottom. There is *something* there, essentially our biology and conditioning, but the experience is simultaneously constructed by the words describing it.

Dennett, Taylor and Wittgenstein thus all see a close connection between, or even identity of, language and experience, saying that experience is in a way realised through/as language rather than existing in its own right and only then put into words. For Wittgenstein and the phenomenologists, we do not have to infer or guess what another feels, as we know it in a direct way. For Taylor, we are not in a privileged position to judge about our own experiences; what we experience is up for discussion as it is constituted by objectively accessible language and interaction. Hence, they are optimistic about the access to other’s minds precisely because it is manifest in their behavioural or linguistic expressions. For Dennett, in contrast, we can only know what someone says but not what they experience, as there is no set answer to this question.

If we listen to the expressive and constitutional language theories and conclude that there is no fundamental distinction between an experience and its expression, then what is the sense of ineffability? Importantly, in the normal course of events, people seldom complain that their experiences are impossible to describe – in defiance of the common philosophical idea of the indescribability of all direct experience (Bennett & Hacker, 2003; Dennett, 1988). We effortlessly use the affordances of the language game, including coining new terms, to say what we need to say and then move on with our lives. The insufficiency of language expressed with regard to STEs is also not common to all experiences that are unusual or not shared by the collocutor. Imagine, for example, being the first person enjoying a balloon flight. It does not seem at all insurmountable to describe roofs and treetops getting smaller, a combination of fear and exultation and a novel feeling in your stomach to someone who has never left the ground. So what, if anything, might set STEs apart? For one thing, the terms used are not commonly

obtained through the joint experience emphasised by Taylor. Instead, they are either learned in anticipation, as for the meditation disciple, or applied in retrospect to a very solitary experience, one that does not relate much to sensory input or embodied presence that could be pointed out and shared. Would then the sense of ineffability disappear in a context where STEs were more collectively encountered, or where terms denoting them were more commonplace? Could such words be learned and used in the same way as any other? Taylor (2016) suggests that when we recognise that language does not do for us what we want it to do – communicate our experiences without any sense of signal loss – we try to solve the problem by inventing more words. Among my informants, terms such as “ego-death“, “kensho”, or “meeting God” were commonly used to denote their experience. But these terms are still not felt as doing the job, and in fact, they sometimes appear to hamper understanding; often, the less imbued a person is in specific lingo, the clearer the explications. Nevertheless, I do believe that a more universal and well-developed language game could aid agreement, and it is conceivable that deficits in our shared language are responsible for some proportion of the sense of ineffability. However, I think the reasons for this unusually strong sense in STEs, which lingers despite hours of description, go deeper, and has as much to do with the nature of language as with the nature of the experience; namely, that it occurs so completely *outside* the world of words.

1.3.3 Experience without words

Not only are STEs described as being impossible to *put in words*, the experience is also often described as itself *being beyond words*. To foreshadow myself again, many of my interviewees spontaneously mentioned, or answered when asked, that there was no thinking in words or conceptualisation during their STE:

It feels like when I reflect on the experience I have shaped these thoughts, but I don't feel like I experienced them meanwhile. . . It has kind of been reduced to a concept so you could say it's a thought. But it didn't feel like a thought. (Participant A, Paper I)

As language is inherently categorising, its absence might be a prerequisite for truly selfless experiences. Language by necessity relies on dichotomies, differences, or contrasts: there is no way to make sense of X without at least an implicit non-X. For this reason, an experience of total lack of dichotomy is *irreconcilable* with language – the words immediately destroy what they were meant to illuminate. As put by Stace (1960):

Mystical experience, during the experience, is wholly unconceptualizable and therefore wholly unspeakable. This must be so. You cannot have a concept of anything within the undifferentiated unity because there are no separate items to be conceptualized. *Concepts are only possible where there is a multiplicity or at least a duality* (p. 297, italics mine).

The common framing of the ineffability of STEs is that there is (a memory of) a private, inner experience that is felt to be impossible to do justice when trying to put into words. Perhaps it should rather be framed as a frustration stemming from an unusually clear view of language as constitutive of our normal world with all its distinctions, including the dichotomy between inner and outer. STEs might offer a glimpse into the confining rather than expanding function of language.

It is clear that there is no simple answer to the relationship between experiences and the language to describe them – in fact, this dichotomy is just another example of the categorising forced by language. But if anything, it is an intricate interplay. Words do not create something out of nothing, dichotomy out of oneness, in one simple stroke. Words create something out of *something*, and this somehow holds all the way down to nothingness: there are no definite “atoms” of experience or meaning to be found at the base. Taylor’s “vaguely felt difference” is one step along this long winding way. Such differences are necessary for acquiring terms for complex emotions, terms that lead to fuller experiences which open up for further differentiation, and on it goes with no endpoint in either direction. What sets STEs apart from the experiences that do not have their distinct aftertaste of ineffability might be a very abrupt move from nothing to something, a lack of intermediate steps between the undifferentiated wordless whole and all the differentiation of the wordworld. When suddenly re-entering the language bubble after experiencing without words, something inevitably has to be left on the other side – and a sense of ineffability remains.

So where does this leave us with regard to the credibility of STE accounts? I have to conclude that these experiences seem to be less accessible to others than is most of our “inner” life, and that the phenomenological researcher focused on STE is in a somewhat dire situation. Still, this is no reason not to try. The fact that Stace (1960) and many others have been able to access, analyse and categorise STEs in a widely accepted manner, and that experiencers of STE are prone to recognise (elements of) their experience in accounts made by others, is encouraging. In addition, words are not all we have: STEs can quite possibly be more successfully conveyed through other expressive means such as music and art.

Given these complications, however, there is a temptation in finding objective, third-person routes of access to others’ minds as a complement to the indispensable first-person method. The dominant approach to this end is that of brain imaging, which has

exploded in the last few decades with the development of magnetic resonance imaging. This method has been put to use for measuring both ordinary self-experience and STEs, and will be the final topic of the introduction.

1.4 Neural correlates of self and selflessness

In this section, I present some of what we know of the neural correlates of various aspects of self and of STEs. I mainly focus on results acquired using the third-person method that I have used, namely functional magnetic resonance imaging (fMRI), and start with a brief explanation of how it functions.

1.4.1 Functional magnetic resonance brain imaging and the BOLD signal

fMRI makes use of a property of atomic nuclei called spin frequency, which differs between different nuclei at a certain energy level and can be detected with the use of magnetic fields. If the frequency of a magnetic field matches the spin frequency of atoms in a particular substance, the energy of the substance will rise. This is what is called magnetic resonance (MR) and what it does to atoms is called excitation. In addition, when atoms are subjected to a strong magnetic field the axes of their spin, the so-called magnetic moment, will align with the field. Such alignment is necessary to detect an effect of excitation, because what excitation does is to change the proportion of atoms that are aligned parallel versus antiparallel to the magnetic field, where the antiparallel orientation reflects a more excited state. Therefore, two kinds of magnetic fields are used to get an MR signal: a strong static primary field that is generated by the main magnet of the scanner to align the atoms, and a second magnetic field that oscillates at the same frequency as the spin of the atoms to be imaged (Huettel et al., 2014).

In order to transform the information of magnetic resonance into an image, some means to determine spatial locations of different types of matter has to be achieved. This is done by applying a third type of magnetic field, fields with a spatial gradient. Each such gradient can give information about the allocation of different matters along one spatial dimension. So in 3D-imaging, at least three perpendicular gradients are used. One is a gradient of field strength, enabling the selection of a slice along the z-axis. The x- and y-dimensions of this slice are defined by gradients changing the phase and frequency, respectively, of the nuclear spin. These fields are generated by so-called gradient coils in the scanner. Together, these three dimensions tell us the signal strength

from each of several thousand tiny cubes called voxels, making up the smallest units of the three-dimensional MR image, called a *volume*.

The atomic nucleus most commonly targeted by fMRI is the hydrogen nucleus that is abundant in water. Different bodily tissues contain different proportions of water and so leave their distinct contrast on the image. Neurons, like other cells, receive the oxygen they need for their metabolism from capillary blood. When activity increase in a certain brain area, more oxygen is used by the neurons. This leads to a lower concentration of oxygen, measured as oxygenated haemoglobin, in the veins. This decrease however only lasts a moment: after that, the neurons signal to nearby arterioles to increase the blood supply by dilation of the vessels that supply nearby tissue. When metabolism and blood flow increases in a brain area, glucose metabolism rises much more steeply than oxygen metabolism. This means that vessels in areas with increased neuronal activity will have a *higher* concentration of oxygenated haemoglobin than when they are less active, possibly as an overcompensation to protect from hypoxia. Therefore, even though neurons consume more oxygen when more active, their nearby blood vessels will contain more oxygen than otherwise. This local increase in oxygenated haemoglobin is what is captured by the blood oxygenation level dependent (BOLD) signal, the functional measure used in most fMRI studies. The more oxygenated haemoglobin in proportion to deoxygenated, the stronger the BOLD signal (Huettel et al., 2014).

BOLD signal is however a somewhat temporally imprecise and indirect measure of neural activity, and is more dependent on the capillary structure than the neuronal. The relationship between BOLD “activation” and the underlying neuronal process is not straightforward, and it is hard to say exactly what an increased BOLD response means in cognitive terms. For example, it is not possible to compare absolute BOLD signal from two different brain areas or from two different persons in order to say which one is the strongest. Instead, the technique is best used to compare effects of different stimuli, such as an experimental task and a control task, in the same brain area (Logothetis & Wandell, 2004).

The BOLD signal is weak, both compared to the intensity of the total MR signal and compared to other sources of variability, such as breathing, temperature changes, scanner hardware issues, and head movement. These interferences are addressed after data acquisition through a number of steps called preprocessing. Although the spatial resolution of fMRI is good compared to other brain imaging methods, there is a constant strive to improve it further. One way to do this is to increase static magnetic field strength. At a high field strength, such as the 7 Tesla that I have used, a larger proportion of the BOLD signal will come from smaller blood vessels, which are closer

to the actual tissue of interest. The main drawback of such strong fields is signal loss, for example in areas close to air (Huettel et al., 2014).

1.4.2 Resting state fMRI and the role of the default mode network

In earlier fMRI research, “rest” was sometimes used as a baseline condition for comparison to tasks. This approach has fallen out of favour as it has become clear that certain brain areas emit stronger BOLD signal specifically during rest. Rest is not a neutral baseline, but rather a specific mental state with its own neural characteristics (Fox & Raichle, 2007; Smith et al., 2009). Resting state fMRI has shown that the brain is organised into several distributed functional networks, consisting of a number of cortical areas that communicate more with each other than with other parts of the brain (Bell & Shine, 2015; Fox & Raichle, 2007). While all of these networks are active during rest, only one of them, the default mode network (DMN) is *more* active during rest than during most tasks – it is “task-negative” (Fox & Raichle, 2007). The DMN is thus anticorrelated to “task-positive” networks, in particular to the fronto-parietal network (FPN, previously called the central executive network), meaning that the networks are usually not active at the same time. A third network, the salience network (SLN) mediates the shift between the DMN and FPN (Fox et al., 2005; Sridharan et al., 2008; Vanhaudenhuyse et al., 2011).

The DMN is active in mind-wandering, daydreaming and other unconstrained mental activity, and is of special interest when it comes to the sense of self. As we will see, this network and its constituent parts surfaces again and again in studies on various aspects of self and selflessness (e.g. Qin & Northoff, 2011; Qin et al., 2020; Whitfield-Gabrieli et al., 2011). In fact, contradicting the label “task-negative”, tasks designed to evoke self-specific processing increase DMN activation (Frewen et al., 2020; Qin et al., 2020). The four main cortex areas, or hubs, that comprise the DMN are the medial prefrontal cortex (mPFC), the medial parietal cortex which includes the precuneus and posterior cingulate cortex (PCC), and the left and right inferior parietal lobes (IPL), which include the temporo-parietal junction (TPJ) and angular gyrus (Andrews-Hanna, 2012).

1.4.3 Neural correlates of trait and state self-transcendence

Several findings suggest that a decreased sense of self, both as a trait and state, relates to *decreased activity* of the DMN together with an *increased connectivity* between its hubs, although this latter finding is less consistent and the opposite has also been found. Another recurring finding is of an increase in connectivity between DMN and FPN

during STEs, i.e. a decrease in the normally seen anticorrelation between them (e.g., Carhart-Harris et al., 2013; Josipovic et al., 2012; Muthukumaraswamy et al., 2013). Even less pronounced instances of decreased self-salience, such as flow and forgiveness, have been linked to changes in DMN-FPN interaction and decreased activity in the mPFC (Farb et al., 2016; Ulrich et al., 2014). Decreased activity in DMN hubs is a common finding across many studies on meditation (Fox et al., 2016; Raffone et al., 2019) and has also been found in studies on psychedelic drugs (e.g., Carhart-Harris et al., 2012, 2016) and hypnosis (Demertzi et al., 2011; see Cardeña & Lindström, 2021, for a review). The role of DMN decrease in trait-level self-transcendence has been corroborated in a study of brain tumour patients (Urgesi et al., 2010), where lesions to left and right IPL corresponded to higher ratings of trait self-transcendence while no other personality traits were affected. Similarly, Bouso et al. (2015) found a negative correlation between PCC cortical thickness and trait self-transcendence. A recent cross-cultural investigation even showed the DMN to be more pronounced in people living in more individualistic societies (Luo et al., 2022).

While not targeting trait self-transcendence per se, a host of previous fMRI studies on meditators during rest have reported increases in both within- and between-network connectivity. For example, Hasenkamp and Barsalou (2012) found that experienced meditators had increased connectivity within the DMN and the FPN and between the mPFC and FPN and SLN regions while resting. Brewer et al. (2011) similarly found stronger coupling between the PCC and central areas of the FPN and SLN, as well as increased connectivity between DMN hubs PCC–precuneus, PCC–TPJ, and mPFC–IPL, in expert meditators compared to controls. Increased resting state connectivity between DMN hubs in meditators compared to controls was also found by Taylor et al. (2013) and Jang et al. (2011). However, findings on resting state alterations in meditators diverge significantly (Mooneyham et al., 2016), and more often than not, phenomenological data is missing in these studies. There is a paucity of fMRI research that directly measures trait-level self-transcendence.

This also applies to state-level self-transcendence, that is, STEs. Of the studies that have targeted meditative STEs, most have used electroencephalography (EEG) or magnetoencephalography (MEG; e.g., Badawi et al., 1984; Berkovich-Ohana, 2017; Berkovich-Ohana et al., 2013; Berman & Stevens, 2015; Dor-Ziderman et al., 2013, 2016; Farrow & Hebert, 1982; Fingelkurts et al., 2020, 2022; Hinterberger et al., 2014; Lehmann et al., 2001; Schoenberg et al., 2018). However, Winter et al. (2020) examined fMRI functional connectivity correlates of an experience of pure consciousness in a single experienced meditator. Their main findings were of decreased connectivity between the posterior parts of the DMN (PCC and IPL). In another case study, Hagerty et al. (2013) investigated the traditional eight jhana states of Buddhist

meditation. Although all jhanas are states of consciousness with decreased self-salience, qualities of STE are more pronounced in jhana 6 and above. In this study, only jhanas 2-5 were investigated using fMRI. Unfortunately, this obscures investigations of STE specifically. The authors hypothesised that activity in somatosensory association cortex would decline during all jhanas as they involve an altered sense of personal boundaries, and indeed this was found in the fMRI data. Finally, Josipovic et al. (2012) studied effects on correlations between brain networks during nondual awareness. Experienced Tibetan Buddhist meditators were scanned by fMRI while performing either a control task, focused attention or nondual awareness meditation. The results showed that the DMN-TPJ anticorrelation was increased during focused attention meditation but decreased during nondual awareness. However, no subjective measure of the achieved state was collected.

The fMRI research of psychedelic states has more often explicitly targeted STE phenomenology. For example, Carhart-Harris et al. (2016) investigated correlations between participant's subjective ratings of "ego-dissolution" under LSD and the activity of twelve different resting-state networks using fMRI and MEG. Of these, only one finding was significant: decreased activity in the DMN correlated with increased ratings of ego-dissolution. In a re-analysis of the fMRI data, Tagliazucchi et al. (2016) found that the rated intensity of the STE correlated to increased connectivity with the rest of the brain for a number of cortex areas including IPL, insula (a part of the SLN) and frontal and parietal areas of the FPN. Likewise, Lebedev et al. (2015) found that post-session ratings of STE induced by psilocybin correlated with decreased within-network connectivity of the SLN. Atasoy et al. (2017) found that ratings of ego-dissolution under LSD correlated with alterations in connectivity between DMN and SLN and between SLN and FPN. However, Müller et al. (2018) were unable to replicate these findings: although the study found pronounced alterations of all ten investigated networks as a result of LSD *per se* – decreased within-network connectivity and increased between-network connectivity – no effects specifically related to their measure of self-transcendence.

In sum, the existing fMRI studies on neural correlates of trait and state self-transcendence are divergent with regard to both study design and results. An additional complication in the studies on drug-induced STEs are that general effects of the drug on brain activity interfere with specific STE correlates and thereby obscure results. A lack of phenomenologically grounded fMRI investigations into non-drug induced self-transcendence can be seen, and this is what I have aimed to address.

1.4.4 Neural correlates of various aspects of self

A comparatively large number of fMRI studies have targeted the narrative aspect of self, and meta-analyses of these studies have resulted in a rather clear picture of the areas and processes involved. We know that our mental processing of ourselves as persons with certain characteristics consistent through time is strongly connected to activity in all DMN hubs, as well as to anterior cingulate cortex (ACC), thalamus, insula, and temporal and prefrontal cortex (Frewen et al., 2020; Qin et al., 2020).

Bodily awareness is likewise well-researched and has been shown to be connected to activity in the insula, ACC, thalamus, and TPJ (Frewen et al., 2020; Qin et al., 2020). These areas partly overlap with those identified for the narrative self, for example in the insula. However, Qin et al. (2020) found that the narrative self-areas are more extended than those involved in bodily awareness. The overlap has been hypothesised to indicate that the sense of self on the narrative level depends on interoceptive signals and integration of information from the body and the external environment (Qin et al., 2020).

In research on the neural correlates of spatial self-location and body ownership, elaborate designs with fake bodies and virtual reality have often been used. For example, Guterstam et al. (2015) found increased activity in the hippocampus, PCC, retrosplenial cortex and intraparietal sulcus (IPS) in the experience of bodily location and vantage point, with a special role for the right IPS. They also identified two areas for the sense of body ownership; premotor cortex (PMC) and the IPS. The PCC was found to integrate the sense of location with the sense of body ownership. The TPJ, specifically in the right hemisphere, has a special role for both body ownership and spatial self-location (Tsakiris, 2011). Ionta et al. (2011, 2014) found that a distortion of bodily self-location was accompanied by decreased activity in left and right TPJ and with altered connectivity between TPJ and insula, supplementary motor area (SMA), ventral PMC, IPS and occipitotemporal cortex. Damage to the right TPJ is also commonly found in neurological patients with persistent out-of-body experiences (Ionta et al., 2011), and electrical stimulation of this area can elicit such experiences (Blanke et al., 2002). In a review, Park and Blanke (2019) propose the PCC, IPS and TPJ to be central for the sense of self-location and the PMC, IPS and insula for body ownership.

Research targeting the sense of agency has identified both higher-level areas in the motor system, such as the SMA and pre-SMA, and lower-level areas such as PMC and the cerebellum, and also areas implemented in selection and monitoring such as dorso-lateral prefrontal cortex, lateral parietal cortex and insula (David et al., 2008; Haggard, 2017; Spence, 2002; Sperduti et al., 2011). As mentioned in Section 1.1.3, the lower-

level aspect of the sense of agency is likely dependent on refference feedback loops through which we can anticipate our own actions and get a kind of *bodily knowledge* that “I did this”, whereas the higher-level areas are implied in *explicit judgement* of agency, the thought that “I did this” (David et al., 2008; Haggard, 2017; Pacherie, 2011). The SMA/pre-SMA is of special interest, as this extensive area seems to be involved in both the explicit and implicit sense of agency (Kühn et al., 2013; Walsh et al., 2015). Temporarily disturbing the pre-SMA with non-invasive techniques results in a reduced sense of agency (Cavazzana et al., 2015; Moore et al., 2010) and lesions to the SMA have been associated with alien hand syndrome, where one’s arm is experienced as acting independently of or even against one’s will (Della Sala et al., 1991). Decreased communication between SMA and other regions has been found in studies on loss of agency under hypnosis (Deeley et al., 2013; Walsh et al., 2015), and increased activity in pre-SMA has been implied in attribution of actions both to oneself and to others (Haggard, 2017; Sperduti et al., 2011). Several findings also point toward a role for the IPL in attribution of agency to an external source (Haggard, 2017; Spence, 2002; Sperduti et al., 2011; Walsh et al., 2015).

To the best of my knowledge, the sense of perspectival ownership of experience has not been directly targeted in any research using fMRI prior to my attempt to do so.⁴ However, a couple of studies using EEG or MEG have investigated something at least very close to this construct. In a study by Dor-Ziderman et al. (2013), 14 skilled meditators underwent MEG scanning while entering pre-defined modes of narrative self, minimal self and selflessness. Minimal self was cued by the instruction “Try to experience what is happening to you at the present moment”, and selflessness by “Try to experience what is happening at the present moment, when you are not in the centre”. When meditators entered the selfless mode from the minimal mode, activity in the areas implicated in minimal self decreased. The level of decrease in right IPL and left dorsomedial thalamus was correlated to phenomenological descriptions of lack of sense of ownership in the selfless state. In a follow-up case study of one of the participants, the sense of self-boundaries was specifically targeted (Dor-Ziderman et al., 2016). Sense of boundaries was defined through nine phenomenological categories, where the two most closely related to perspectival ownership of experience was *centre* and *ownership*. These phenomenological categories were both reported to completely

⁴ A possible exception is an fMRI study by Goldberg et al. (2006) that claims to investigate the sense of being an observer. However, this sense was not targeted by phenomenological data, which only asked for ratings of the very vague “self-awareness”. In my opinion, the findings only amount to the well-known fact that DMN activity is suppressed during task performance, and offer no guidance to the neural correlates of perspectival ownership. In addition, the study is guilty of “reverse inference” of brain data (Poldrack, 2006) by taking an absence of DMN activation as an indication of an absence of self-phenomenology, which is not a warranted conclusion.

disappear when the participant entered a boundaryless state. The study found pronounced decreases in EEG activity in the beta band, a frequency of neuronal oscillation associated with the normal waking state, during boundarylessness in two major areas: bilateral TPJ and the medial parietal cortex. In addition, effects were seen in primary sensory and motor regions, insula, and right SMA. The authors propose that the attenuation of the sense of boundaries comes about through two processes corresponding to these two major areas; disruptions in the normal sense of egocentric location upheld by (predominantly right) lateral parietal areas, and in the normal sense of self upheld by medial parietal areas. In a large-scale follow up study of these findings from the same lab, only presented as a preprint at the time of submission of this thesis, Trautwein et al. (2023) investigated MEG correlates of the sense of boundary dissolution in 46 long-term meditators. They again found a decrease in beta band power in the medial parietal cortex (PCC/precuneus) as a correlate of “full boundary dissolution”, which included a loss of first-person perspective, sense of self-location, and subject-object distinction. An intriguing interpretation of these results relates to the role of beta oscillations in top-down predictions and refference loops, which, as mentioned above, has been related to the sense of agency.

In another series of studies using EEG, Fingelkurts et al. (2016a, 2016b, 2020, 2022) investigated EEG correlates of the sense of perspectival ownership. Fingelkurts et al. (2016a) found a lower overall synchrony of the DMN, but stronger EEG synchrony within the mPFC in novices after four months of meditation training compared to before, and Fingelkurts et al. (2016b) found increased mPFC synchronicity in expert meditators compared to novices. The authors relate the mPFC to an increased sense of being a witnessing observer. Following up on this, Fingelkurts et al. (2020) instructed experienced meditators to downregulate the sense of first-person perspective, called “witnessing agency” (in their terms, agency refers to a sense of ownership of thoughts, perceptions and actions, rather than to a sense of being the controller of actions, and so maps well onto my conception of perspectival ownership of experience). A follow-up investigation of eight altered self-experiences that occurred during the EEG data collection revealed that alterations in the phenomenological dimension “observing”, although small, unequivocally varied in the same direction as mPFC synchrony strength, again indicative of a special role for the mPFC in the sense of observing (Fingelkurts et al., 2022).

The findings from these two series of studies on neural correlates of perspectival ownership are thus contradictory: the studies by Dor-Ziderman et al. point to a role for the *posterior hubs* of the DMN for perspectival ownership, specifically the PCC, whereas the studies by Fingelkurts et al. rather indicate the *frontal hub* of the DMN for this role.

The paucity of fMRI research targeting the sense of perspectival ownership, as well as the divergence between previous studies, prompted me to attempt to access this sense of self through a novel paradigm named the Checking-in task. The design of the task was preceded by two rounds of phenomenological interviews where perspectival ownership of experience was discussed.

Methods

Table 1. Overview of methods and research questions

Paper	Research questions	Methods	<i>N</i>
I	What aspects of ordinary self-experience are reported to be changed or lost during self-transcendent experiences?	Phenomenological interviews	15
II	How is everyday self-experience described by participants with differing meditation experience? How valid are self-report scales for measuring trait-level alterations in self-experience?	Phenomenological interviews, self-report scales	32
III	What are the neural correlates of trait-level sense of self-boundaries and perspectival ownership of experience?	Phenomenological interviews, self-report scales, fMRI	28

N = number of participants in each study (with overlap between studies). Total number of participants was 42.

2.1 Phenomenological interviews

In total, I conducted 42 interviews for this project. All interviews were performed in person and in Swedish, most often in a room at the Department of Psychology at Lund University. The format was semi-structured to make sure that all areas of interest were covered. The interviews were phenomenological in that the focus was on the experience itself: anything apart from the (memory of the) subjective experience was disregarded during the interview, including theoretical understanding and personal beliefs. This intention was explicitly stated to participants beforehand. I also made clear that there were no right or wrong answers, and that the aim was for us to work together in a joint investigation in order to come as close as possible to their experience. I encouraged participants to be mindful of staying true to their phenomenology, for example by not accepting terms I used if they did not feel right for them, and to go back and change previous statements that had not come out the way they wanted. Rather than sticking to pre-defined terminology, each interview resulted in a gradual development of a common language.

Participants were informed of their right to withdraw their participation at any point without having to state a reason, and signed an informed consent form. Exclusion criteria were current serious mental illness, such as major depression, schizophrenia or dissociation, which no prospective participant mentioned suffering from. Interviews were recorded and manually transcribed, with some help of automated transcription, and analysed in NVivo12 Pro. Transcriptions were verbatim with inclusion of some nonverbal communication such as gestures.

2.1.1 Interviews on self-transcendent experiences

A set of 15 interviews on self-transcendent experiences underlies Paper I. The purpose was to obtain fine-grained phenomenological descriptions of particular instances of STE. Participants were recruited through an online form asking for persons who wanted to share an experience of self-transcendence, defined as “a salient, transient change in the sense of self, where identification with the self and the contents of consciousness cease and self-consciousness and self-monitoring dissipates”. As we got replies from many more people than could be contacted, it was decided to primarily recruit persons living in the vicinity of Lund.

Interviews were structured around a pre-set aim to cover the following aspects of self: autobiographical memories, metacognition, sense of continuity through time, bodily awareness, spatial self-location, agency, body ownership, perspectival ownership of experience, and sense of boundaries. Three kinds of contents of consciousness were also targeted: sensory impressions, thoughts, and emotions. First, the interviewee was asked to describe one or several self-transcendent experience(s) in as much detail as possible. After this, clarifying questions were posed, and aspects of self that had not been brought up spontaneously were probed. Example questions (translated from Swedish) were:

- Did you reflect over the experience meanwhile?
- Were you aware of who you were?
- Were you aware of your body?
- Did you experience being in control?
- Did you have the sense that the experience was presented for you/for someone?

The interviews were coded and analysed by me and Dr. Petri Kajonius. For each interview, we chose one episode or moment of an experience described in rich detail, and for this episode we independently decided for each aspect of self and content of

consciousness if it was described as being lost or retained. Our initial agreement in these judgements was 77 %, and in the remaining cases we could easily reach an agreement after deliberation.

2.1.2 Interviews on trait self-transcendence

A set of 32 interviews on trait self-transcendence underlies Papers II and III. In contrast to the previous set of interviews, these interviews were focused on everyday sense of self, not exceptional STEs. Participants were again recruited through an online form, advertised at the Department of Psychology webpage and through its Alumni network. Five participants were also interviewed in the previous round.

These interviews were aimed to gain as clear an understanding as possible of the everyday sense of self of the participant. Example questions (translated from Swedish) were:

- Do you have a sense of being a self? What does that mean to you?
- Do you experience there to be a centre to your experiences? If so, where?
- Would you say that your experiences are *yours*, or that there is someone who *has* the experience?
- Does it feel like your self has any boundaries?

As a preparation for the fMRI task called "Checking-in" (see Section 2.3), all participants were additionally asked about the phenomenology of directing attention toward the centre of their experience with the following question:

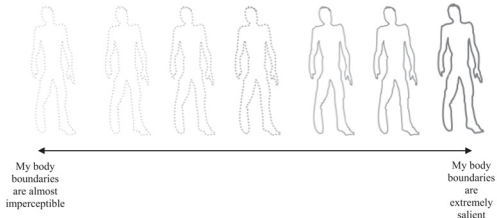
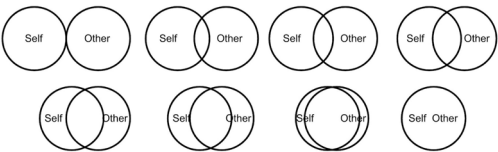
- If I ask you to direct your attention to the centre of your experience, the "experiencer", "observer", or "vantage point", what does this instruction mean to you and what is it like if you follow it?

These interviews were coded by me and Dr. Sanna Stålhammar. We each made a quantitative judgement of the overall degree of selflessness described by the participant on an individually decided, numeric scale. We also coded descriptions relating to perspectival ownership, and participants were grouped according to similarity in their descriptions of this sense through a collaborative process between the coders. Finally, we looked for emerging themes in the interviews. The reduction of rich, qualitative data to simple, quantitative measures were done to allow for comparison with self-report and brain data (see Berkovich-Ohana et al., 2020; Timmermann et al., 2023).

2.2 Self-report scales

After the interviews on trait self-transcendence, participants were asked to complete the six self-report scales presented in Table 2. The four questionnaires were presented in English and rated on Likert-type scales with five intermediate steps (seven for the Metapersonal self scale). The results of the scales were used for Papers II and III. Statistical analysis was done with R and Jamovi.

Table 2. Overview of self-report scales

Scale	<i>N</i>	Example items
Meditation Depth Questionnaire (MEDEQ; Piron, 2001)	30	"I became aware of a centre inside myself" "There was no subject and no object anymore"
Metacognitive Processes of Decentering Scale, short (MPoD-s, Hanley et al., 2020)	3	"My sense of self is separate from my changing thoughts and feelings" "I can watch my thoughts and emotions drift by like leaves on a stream"
Nondual Awareness Dimensional Assessment Scale, ST factor (NADA-st; Hanley et al., 2018)	9	"I have had an experience in which the boundaries of my self dissolved" "It has seemed to me that my environment and I were one"
Metapersonal Self Scale (DeCicco & Stroink, 2007)	10	"My personal existence is very purposeful and meaningful" "I feel a real sense of kinship with all living things"
Perceived Body Boundaries Scale (Dambrun, 2016) <i>Note:</i> This scale, measured in millimetres on a 0-100 interval and inverted, is used in Paper III as the measure of boundarylessness.	1	
Inclusion of Other in The Self Scale (Aron et al., 1992) <i>Note:</i> "Other" was defined as "The rest of the world". The scale was modified by addition of the final circle, and was presented on a single row.	1	

N = number of items in each scale.

2.3 fMRI protocol

MR data acquisition for Paper III consisted of an anatomical image and three functional runs: a resting state and two task runs, where instructions were presented on screen using E-prime. Data were acquired at the Swedish National 7T Facility at Lund University Hospital's Philips MR scanner with a magnetic field strength of seven Tesla.

The participants were first familiarised with the two tasks by testing a demo version on my computer, then screened for MR safety and informed about what to expect. Before scanning, they were fitted with hearing protection, a four-button keypad to respond to tasks, and an emergency contact button. After scanning, a brief recorded interview was performed about the participants' experiences during the resting state and the two tasks.

The anatomical image was a high-resolution, T1-weighted image with voxel size $1 \times 1 \times 1$ mm, which took two minutes to acquire. After that followed the resting state run of about 11 minutes, before which participants were instructed to keep their eyes closed and rest but not fall asleep. All functional runs were obtained using a gradient echo planar image acquisition sequence with $2 \times 2 \times 2$ mm voxel size. Before each functional run, a field map was acquired to correct for inhomogeneities in the magnetic field, and five dummy scans were performed to allow for the signal to reach a steady state before actual data collection.

The first task was a standard self-referential processing (SRP) task for investigating the narrative sense of self. During this task, participants saw a word presented on the screen and were to answer "yes" or "no" using the keypad to one of three questions: "[word] describes me?" (Self condition), "[word] is positive?" (Valence condition), or "[word] is uppercase?" (Case condition). Each question occurred once in conjunction with each of 48 words. Half of the words were positive (such as *rolig*, funny) and the other half negative (such as *nervös*, nervous). Of these 48 words, eight words related to fluidity and eight words to constancy, evenly distributed between positive and negative. Examples of such words were *beständig* (durable; positive-constant), *dynamisk* (dynamic; positive-fluid), *statisk* (static; negative-constant), and *flyktig* (volatile; negative-fluid). Half of the words were presented in uppercase and the other half in lowercase letters. Each word was presented for three seconds, in blocks of seven words of the same valence (positive or negative). The order of these blocks was pseudo-randomised so that no block type was presented two times in a row. The duration of this run was also about 11 minutes.

The second task, called Checking-in, was designed with the intention to target the sense of perspectival ownership of experience. It was also presented on screen and consisted

of simple math questions interspersed with presentations of symbols (circle, square, triangle or arrow). The participants were instructed to “focus on the centre of your experience, the ‘experiencer’ or ‘observer’” whenever the arrow was presented. The duration of math blocks (three questions per block) and arrow blocks were fixed to 12 seconds, whereas the duration of the other symbols was randomised (as a form of jittering) so that the average was 12 seconds per block of two symbols. The order of the three conditions (Math, Arrow, and Symbol) was the same for all participants and pseudo-randomised so that no block type was presented more than twice in a row. The duration of this run was 12 minutes.

I processed and analysed MR data using the SPM12 software and its CONN toolbox on MATLAB. Data visualisation was done using MRICroGL. Preprocessing consisted of realignment, unwarping and susceptibility distortion correction, slice-timing correction, outlier volume scrubbing, segmentation, normalisation, and smoothing.

2.4 Ethical considerations

An ethical challenge during this project has been the sensitive topics discussed in the interviews. Both STEs and everyday sense of self are very personal matters that often connect to spiritual and religious worldviews, and in some cases to illegal drug use. It has been important for me to guard against unwelcome personal intrusion on the part of my interviewees. All participants were prepared beforehand for the topic of the interviews and were informed verbally and in writing of their right to withdraw their participation, along with all collected data, at any point.

Undergoing an MRI procedure has not been shown to have any adverse effects as long as contraindications are lacking. Such contraindications include metal or electromagnetic implants and claustrophobia, and were carefully screened for. As part of the standard procedure at Lund University Bioimaging Centre, all structural brain images were examined for pathologies by a radiologist. This implies an ethical advantage as well as a challenge: an early detection can lead to better treatment, but at the same time, it could be disturbing to learn that one has a previously unknown pathology.

The by far most concerning ethical issue is however the use of brain imaging techniques that have been developed through the use of non-consenting subjects. Such research involves great violence, lifelong incarceration, immense suffering and an unfathomable death toll. Although I am positive that most if not all of the present technology could have been developed without the use of non-consenting subjects, I believe that if some

research result or innovation can only be obtained using violence, we will have to do without it. Accordingly, I would much rather have a world without brain imaging than a world with vivisection, and I do not want my use of brain imaging technology to be interpreted as an approval of the atrocities that lie behind it. For the record, I have taken care to abstain from using any results that have been directly derived from non-consenting subjects.

My determination to steer clear of research without informed consent is also the reason why I have chosen to only study adult, language-competent human beings for this project, even though I deem it likely that experience without self is more abundant in other types of beings.

The project was approved by the Swedish Ethical Review Authority, dnr 2020-00525.

Results

3.1 Results Paper I

Of the 15 interviews on STE, three were excluded as they did not contain sufficient detail of a specific episode. Of the twelve included, two stood out as the sense of separateness and identification with the narrative self, as in feeling continuous through time, were retained. These two experiences were therefore judged as not self-transcendent according to our criteria. For the rest of the analysis, only the remaining ten interviews, denoted A-J, were considered.

These ten interviewees, in addition to reporting no identification with the narrative self, all reported body ownership was lost. All of them also stressed that they lost their sense of separateness, but this effect came about through somewhat different means and pertaining to different aspects of self. Only one participant (D) reported losing all aspects of self. For the remainder, one or several of the six self-aspects metacognition, personal identity, agency, spatial self-location, or perspectival ownership of experience were reported as retained, without much consistency between reports. Interestingly, some participants emphasised the absence of either of these aspects as crucial for their judgement that the experience was self-transcendent: for example, one stressed the absence of agency, another the lack of spatial self-location, and for several, the absence of metacognition was seen as fundamental for making the experience selfless.

With regard to contents of consciousness, most participants retained some kind of emotion, ranging from fear to bliss. Only one experience was described as contentless (Participant B).

Somewhat to my surprise, two participants described a loss of perspectival ownership of experience. For one of them (Participant D), this was momentary but for the other (Participant J), the lack of perspectival ownership had become a part of everyday life. The descriptions of this latter participant helped form the approach I took in the second round of interviews, focused on self-experience in everyday life.

I present a summary of the three interviews mentioned above in Table 3. The resulting coding of them is presented in Table 4 in order to illustrate the analysis process.

Table 3. Summaries of three sample STE interviews

Participant B – Contentless experience

The STE was a brief moment during meditation while also under the influence of the drug psilocybin. The experience is described in terms of a reduction of sensory impressions and spatial dimensions to the point of "almost ceasing". It is hard for the participant to find words to describe the most empty moment, as they say, "my presence from now is in there . . . it's almost like I insert myself into the emptiness", so the preceding moments (of reduction) and the succeeding moments (of reflection on the experience) are used to circumscribe and describe it: "It's like a kind of void, I experienced it afterwards. Meanwhile I'm not sure I experienced anything." Mostly terms such as void or emptiness are used, and the participant says this is because the entry point was through reduction, but that the experience itself could just as well have been described as all-encompassing.

There was no autobiographical knowledge or sense of time, which differs from what meditation is usually like for this person. The ceasing of metacognition is described as a hallmark of the empty moment: "there was a kind of silence in that there was no reflection or observer or what you would call it, in the form of me, until afterwards . . . I remember observing the process of reduction – it's cut down, cut down, cut down – but then the observation itself went quiet and it was empty. Nothing." The contentlessness of the moment is also stressed, and thoughts and sensory impressions are described as completely lacking. Most aspects of minimal self are also unequivocally lost: there is no agency, bodily awareness or body ownership. The lack of spatiality is central: "it feels a bit wrong to call it 'empty' because it kind of implies that there is a room that is empty. But that very room is what disappears." Regarding content, the participant says that there might have been "a feeling of experiencing nothingness": "it was a new sensation, a non-sensation . . . if it was anything, it was a feeling."

A large part of the interview is devoted to the issue of perspectival ownership of experience, where the participant is ambiguous. Whereas the ceasing of evaluatory observation was lost, there might have been some kind of interpretation or interpreter, "a receiver", although much less salient than normally, and possibly lacking completely. "It could be either way. But no, I think it's more plausible that there was something left." This conclusion is arrived at by the fact that the event can be remembered and that the person was not dead, rather than as a remembered element of the experience: "I have some kind of, not really a memory but a kind of feeling of what that emptiness encompasses. So it has to be, it can't be reduced to nothing in that sense. As I'm here talking about it."

Participant D – Experience lacking all aspects of self

The participant is a long-term (10+ years) meditator in a Theravada Buddhist tradition, who recounts several STEs, both during meditation and induced by drugs. For the analysis, we chose one episode after smoking 5MeO-DMT, about six months before the interview, which was described as "the most powerful experience ever". The participant says: "The first five minutes there was definitely no I there. There was only a sensation of this big, rotating, fractal-like body, like a big hexagonal toad or something, very weird and terrifying. It was beauty and fear all at once." There was no sense of control: "There is nothing you can do. The entire idea that you are something is erased in a fraction of a second." As a reply to a question about whether the fear was felt to be somebody's fear, the participant insists that it was not – it was not self-referential in any way and did not have a perspective. However, this was the first thing to come back: "It was as if the one who had the fear had been disconnected from it so that there was only fear, if you see what I mean. Like, take a laser, cut out the fear, disconnect everything else. . . Then 'the one who had the fear', I was about to say, starts to reintegrate again after about ten minutes. So I – it – sees itself as, I don't see that it's a body but I see that there is someone experiencing, so there is some kind of metaperspective, someone who is experiencing this situation." The fear that dominated the experience was described as pure and without a subject: "It's just a pure emotion, it has no biography, it has no 'I'm having this emotion and I'm not supposed to have it'. . . The universe as such is this emotion."

Participant J (included as Participant 9 in papers II and III) – Trait-level selflessness

The participant is a long-term (15+ years) meditator in a Zen Buddhist tradition. They describe several stages of increasingly selfless experiencing over the years, with the last transition occurring a little more than three years ago. This transition is described as a small shift from an already selfless state: *“I was basically one with everything, but there was still someone, at the most subtle level, someone that it happened to. . . It was as if I was peeking into the waking world, someone was peeking in. . . I remember that it was clear that there are no real boundaries, there is no one that this happens to. I would say that the main difference is that this point has dropped away. . . That there would be a point to which these things pour, or occur. That it arrives, enters into a point that is some kind of experiencer. But I remember that even then I couldn’t find a point. . . but still there was a FROM someplace that it happened. And it no longer happens from anywhere. . . There is no one who experiences. There’s only perception.”* Objects are not perceived as existing separately from the experience of them: *“When I touch [this table] it’s myself I’m touching, this is nothing but consciousness.”*

Autobiographical memories are retained but experienced as only existing in the present, and there is no sense of life events happening to someone. However, there are thoughts, including mind wandering, as well as metacognition and reflection on the ongoing experience. The participant mentions being just as often lost in thought as anyone else. For this person, the sense of being an agent is central to the usual sense of self, and the lack of agency is thus cardinal to the selfless experience. In their current experience there is no sense of agency, not even as an illusion: *“Suddenly an idea occurs and then perhaps an intention follows and an action follows. And all of that is nothing but pure perception.”* Distinctions between the body and its surroundings or between objects are also gone, as is body ownership, although sensory impressions are fully retained. The sense of spatial self-location was discussed at some length. The participant insists that there is no experience of either centre or distance. Two sounds are both heard as *“immensely intimate. But I can still hear, this is to my right and this is to my left.”* This is explained by a kind of working model, which allows the person to act normally in the world, while there is no sense of separateness, boundaries, localisation or space.

Table 4. Coding of the sample STE interviews

Aspect of self/phenomenal content	Participant B	Participant D	Participant J
Sense of separateness	<i>Lost</i>	<i>Lost</i>	<i>Lost</i>
Personal identity	<i>Lost</i>	<i>Lost</i>	<i>Retained</i>
Metacognition	<i>Lost</i>	<i>Lost</i>	<i>Retained</i>
Sense of continuity through time	<i>Lost</i>	<i>Lost</i>	<i>Lost</i>
Bodily awareness	<i>Lost</i>	<i>Lost</i>	<i>Retained</i>
Body ownership	<i>Lost</i>	<i>Lost</i>	<i>Lost</i>
Agency	<i>Lost</i>	<i>Lost</i>	<i>Lost</i>
Spatial self-location	<i>Lost</i>	<i>Lost</i>	<i>Lost</i>
Perspectival ownership of experience	<i>Ambiguous</i>	<i>Lost</i>	<i>Lost</i>
Sensory impressions	<i>Lost</i>	<i>Retained</i>	<i>Retained</i>
Thoughts	<i>Lost</i>	<i>Lost</i>	<i>Retained</i>
Emotions	<i>Ambiguous</i>	<i>Retained</i>	<i>Retained</i>

3.2 Results Paper II

For this study, all 32 interviews were included in the analysis. Four participants were non-meditators while the remainder had varying meditation experience, ranging from an estimated 78 to 22 300 hours of lifetime meditation.

The judgement of overall selflessness made by my co-coder and me showed an excellent agreement to one another, with Spearman's $r = .83$. These ratings also correlated strongly (Spearman's r s between $.64$ and $.92$) with three of the self-report measures: NADA-st, Perceived body boundaries scale, and Inclusion of other in the self scale. Correlations to the MPoD-s and MEDEQ scales were weaker (r s between $.27$ and $.42$), and there was no significant correlation to the Metapersonal self scale. The measures of meditation experience, in years, hours per week, and lifetime days on retreat, correlated moderately to strongly (r s between $.28$ and $.63$) to our selflessness judgements, with a stronger correlation for the composite measure of estimated total hours of meditation ($r = .72$ and $.52$ for the two coders). The strongest correlation for both coders was to the Perceived body boundaries scale, with r 's of $.92$ and $.78$, respectively.

When coding for perspectival ownership of experience, we arrived at a categorisation of participants' descriptions into five groups, labelled A to E. These groups can be summarised as follows:

Group A – Does not resonate with terms such as witnessing or being an experiencer.

Group B – Describes two kinds of self, an “observer/witness” on the one hand, and an “ego/thinker” on the other, and alternating between identifying with each of them, but most often being in the ego-state.

Group C – Describes two kinds of self; an “observer/witness” on the one hand, and an “ego/thinker” on the other. Identifies as being the observer/witness always or most of the time, and describes this as a marked difference from previously.

Group D – Does not identify as being an experiencer or similar, but describes fluctuating between a bounded self and a boundaryless or nondual experience.

Group E – Does not identify as being an experiencer or observer, but has had such an experience previously and noticed it falling away.

During coding, it became evident for both coders independently that the described salience of perspectival ownership did not show a simple, linear correlation to our ratings of overall selflessness. Rather, participants in Groups B and C expressed a strong sense of perspectival ownership, while those in Groups A, D and E did not. Generally

speaking, A were unable to identify this sense in their experience, D did so at times, and E never or almost never did so anymore. In order to visualise this insight, we assigned values of “strength of perspectival ownership” to each group, from -1 for Group E to 3 for Group C (see Figure 2). The resulting quadratic relationship was significant for each of the two coders' selflessness ratings and for the Perceived body boundaries scale ($R^2s > .33$, $ps < .01$), but not for any of the other self-report measures.

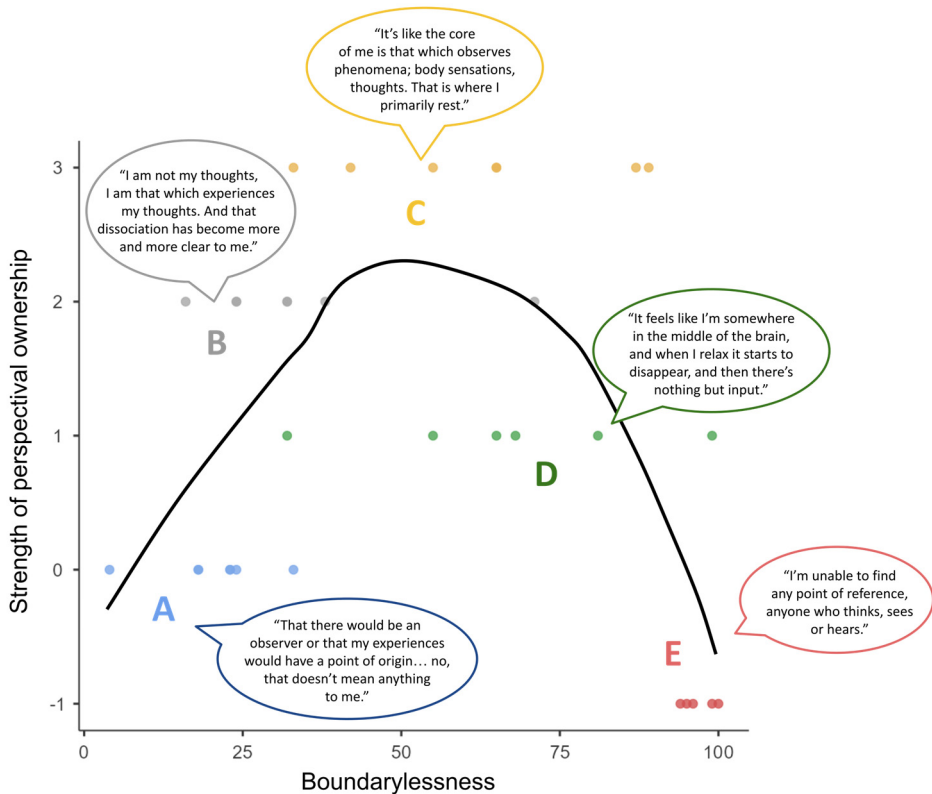


Figure 2. Visualisation of the nonlinear relationship between perspectival ownership of experience and sense of self-boundaries, with example quotes from each perspectival ownership group. *Boundarylessness* is the self-ratings of the Perceived body boundaries scale, inverted and translated to a 0-100 interval.

3.3 Results Paper III

Of the 32 interviewees, 28 could make it to the MR scanning. We obtained complete data for 26 participants in the resting state and SRP task, and for 24 participants in the Checking-in task.

I had originally planned to use the interview-based coder ratings of overall selflessness for brain data correlations, but because of the excellent agreement between these measures and the Perceived body boundaries scale, I decided to instead use this as the independent variable as it had greater variance and reproducibility. Because of the finding in Paper II of a nonlinear relationship between this measure and strength of perspectival ownership (Figure 2), I decided to look for quadratic as well as linear relations to brain data.

I found that the participants' self-rated boundarylessness correlated to brain activity and task responses in the following six ways, depicted in Figure 3:

- a. A positive (U-shaped) quadratic relation to connectivity between default mode network hubs during rest,
- b. A negative (inverted U-shaped) quadratic relation to BOLD signal in the medial prefrontal cortex during processing of self-related words in the SRP task,
- c. A negative linear correlation to BOLD signal in the PCC/precuneus during Symbol (mind-wandering) compared to Arrow (focusing on the centre of experience) in the Checking-in task,
- d. A positive linear correlation to endorsing words relating to fluidity as descriptive of oneself in the SRP task,
- e. A negative quadratic relation to endorsing words relating to constancy as descriptive of oneself in the SRP task, and
- f. A positive linear correlation to response times for the math questions in the Checking-in task.

On a group level, that is, without considering individual differences in sense of self, our findings for the SRP task replicated previous findings in that self-referential processing related to increased BOLD signal in the DMN areas mPFC, PCC/precuneus, and left angular gyrus. For the novel and exploratory Checking-in task, we found that when participants were instructed to focus on the centre of their experience, as compared to passively viewing symbols, the BOLD signal pattern was very similar to previous

findings on brain activity during meditation, and specifically meditation onset (Barentsen et al., 2010). These areas of BOLD signal increase encompassed bilateral anterior prefrontal gyrus (Brodmann area 6, including PMC, SMA, pre-SMA, ACC and the frontal eye fields), anterior insula, supramarginal gyrus, left frontal pole, lateral occipital cortex and caudate nucleus/putamen, several of which have been linked to the sense of agency. At the same time, there were decreases in DMN areas, particularly in the right hemisphere, during the Checking-in task.

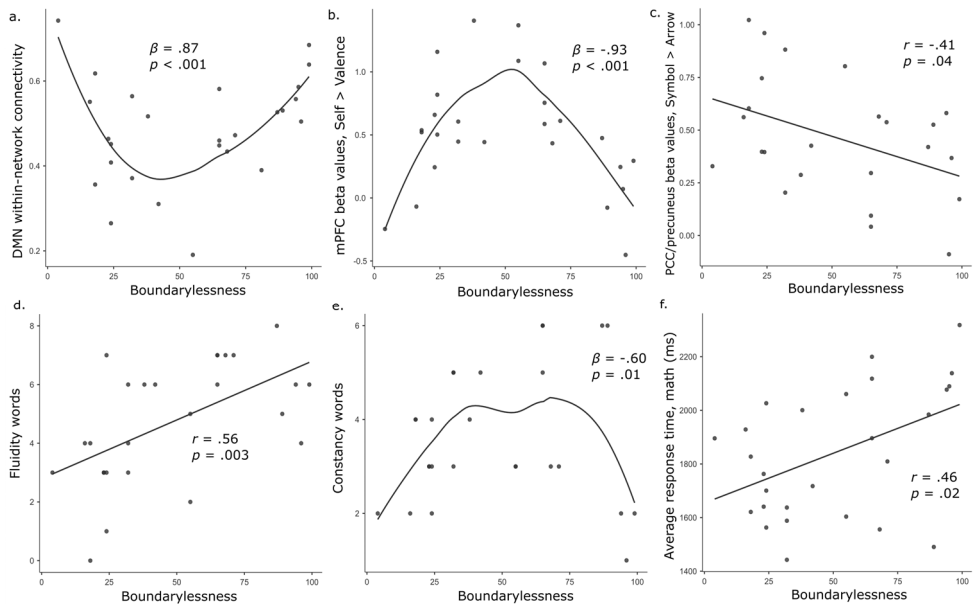


Figure 3. Relations of boundarylessness (inverted Perceived body boundaries scale) to brain (a-c) and behavioural (d-f) outcome measures.

Discussion

In this general discussion, I consider what the accumulated findings from the three empirical studies might mean in the context of the controversies outlined in the introduction, mostly regarding the relation between contentlessness and selflessness outlined in Section 1.2.2, and offer some possible interpretations of the quadratic relationships manifest in Papers II and III. I also briefly discuss the correspondence between self-report measures, meditation background and interview results, and close with some conclusions and limitations of this project.

4.1 Contentlessness and selflessness

According to the taxonomy of self-aspects used, the closest I have come to identifying an experience without any aspect of self is the account of an STE induced by the drug 5MeO-DMT given by Participant D in Paper I (Table 3). This participant describes a lack of all aspects of narrative and minimal self, including perspectival ownership of experience. However, the experience was not contentless. Rather it was completely dominated by two kinds of content: inner imagery and fear. Just as in quotes 11-13 presented in Section 1.2.1, perspectival ownership seems to be missing in the presence of conscious content.

I have encountered only one example of a contentless experience, the psilocybin-induced STE described by Participant B in Paper I (Table 3). This experience was not as confidently deemed to be lacking all aspects of self, as it was given the label “ambiguous” for perspectival ownership of experience (as well as for “emotion”, where the emotion in question was in fact the sense of perspectival ownership: the “feeling of experiencing nothingness”).

This finding, that an experience *with* content was more clearly completely selfless than one *without*, is interesting given the recent focus on contentless experiences as primary candidates for totally selfless states (e.g., Albahari, 2019; Gamma & Metzinger, 2021; Metzinger, 2020; Winter et al., 2020; see Section 1.2.2). The point of disagreement, again, lies in the notoriously elusive perspectival ownership of experience. The absence

of an observer in the absence of anything to be observed indeed seems less demanding than its absence in the presence of content, but it is only the latter that I have encountered with some certainty in my investigations. Participant B was reluctant to conclude one way or the other regarding whether there was a sense of an experiencer in the moment, explaining that it was impossible to decide from the viewpoint of their present self:

My presence from now is in there. . . When I try to think back to it, thinking about how I felt, I put myself back into focus. It's almost like I insert myself into the emptiness. I have some kind of, not really a memory but a kind of feeling of what that emptiness encompasses. So it has to be, it can't be reduced to nothing in that sense. As I'm here talking about it.

Whereas Participant D was adamant that there was, for a while, no experiencer at all:

[The one who had the fear] starts to reintegrate after some ten minutes. So it – I – sees itself like, I don't see that it's a body but I see that there is someone experiencing.

As these are only two cases, individual variation in assertiveness and choice of words – and perhaps in intuitions about the constitution of consciousness – might explain some of the difference. However, the results from my second round of interviews corroborates the finding that perspectival ownership can be denied in the presence of content. I talked to several persons, in particular the five participants assigned to Group E in Paper II, who denied having any sense of perspectival ownership in most of their everyday experience, while they retained all kinds of content:

There are experiences, but there is no experiencer. There is just perception. (Participant J, Paper I; Table 3).

I don't feel that there is a subject who experiences an object. Rather, I always say that it's like the things experience themselves. (Participant 38, Paper II).

Crucially, although these participants retained self-related content in the form of bodily awareness and knowledge of their personal identity, they lacked *identification* with it, so that there was no sense of body ownership or of being continuous through time. Instead, thoughts of their past or future and sensory input from the body were described as among the various fleeting objects of attention. Although they are inherently self-specifying in a way other content is not – by setting the own body apart from other matter and one's own memories and plans apart from that of others – to these participants, identification with the content is what would imbue it with a sense of self. This is likewise Albahari's position: perspectival ownership is not to be called a self

unless there is identification with it, as in personal ownership of the perspectival owner (Albahari, 2010, 2019). So is identification all there is to what my participants describe as perspectival ownership? Do the Group E participants still retain the same direct sense of observing in everyday life? Admittedly, the “strength of perspectival ownership” rating assigned to groups in Paper II was to a large extent, and specifically for Group C, based on the level of identification with the perspectival owner. But crucially, this co-varied with how salient the sense of ownership was described to be. Although Group E participants would grant that experiencing was taking place, they did not sense the experiencing to be in any way personal or owned, in addition to not being identified with (see Table 3, Participant J). The sense of perspectival ownership of experience was however not unknown to them: several participants in Groups D and E mentioned this as another passing sensation that would surface from time to time or that they remembered from earlier in their lives.

Based on these findings, I retain that it is not only identification with the perspectival owner that is missing in the descriptions, it is the very sense of a witnessing standing in a dual relation to its objects. If we accept these results, and accept that perspectival ownership is a sense of self, the takeaway would be that selfless experiencing can be realised in the presence of content, and that it is not imperative in all contentless experience. Selflessness in the presence of content is indeed suggested as a possibility by Albahari (2019), who mentions that it is conceivable that one would never see the world in the same way again after having experienced a perspectival consciousness in a contentless state. As far as I understand though, the opposite suggestion – that perspectival ownership might be retained in contentless experience – disagrees with Albahari (2019) and Metzinger (2020). I do believe their suggestions are well-founded and am open to an interpretation of the caution expressed by Participant B in Paper I as an indication of ineffability and/or failure of memory rather than of perspectival ownership actually being retained in the contentless experience. But as laid out in Section 1.2.2, another possibility is that in some but not all contentless experiences, consciousness itself is taken as an object and perspectively owned. A similar suggestion is made by Josipovic and Miskovic (2020), who maintain that nondual awareness is a unique kind which can be seen as completely selfless even in the presence of content and which might or might not co-occur with contentlessness.

4.2 Interpretations of the quadratic relationships

One of the most thrilling findings of my studies has been the nonlinear pattern that appeared in Papers II and III. To recap, our measure of boundarylessness, which was

derived from self-ratings of the Perceived body boundaries scale (Dambrun, 2016) and validated through interview analysis, showed a quadratic relationship to four other measures: the interview-based judgement of strength of perspectival ownership (Figure 2), self-endorsement of trait adjectives relating to constancy, within-network connectivity of the DMN in rest, and mPFC activation during self-referential processing (Figure 3a, b, and e).

One reasonable interpretation of this pattern is that at least one path to a more persistently selfless mode of being, i.e., of high trait boundarylessness, goes via a stage that differs from the baseline in respects that a more advanced stage does not. The suggestion that this position is indeed a step along the same path rather than in a different direction is supported by the fact that several of the most selfless participants (assigned to Group E) did mention an experience of identification with the perspectival owner, very much like that described by participants in Group C, as a step along the way to their current mode of being. However, some of the Group D participants complicate the picture. They did not claim to have gone through any phase of strengthened perspectival ownership, but nevertheless described a strong sense of boundarylessness. For this reason, I propose that my data indicates two developmental paths to a high degree of trait-level self-transcendence: one that passes through a phase with two distinct layers of self, what I call self/self duality in Paper II, and one that seems to diffuse into a nondual experience without this intermediate stage, exemplified by Group D. I want to stress though that the conception of this as an intermediate stage is not shared by some of the participants assigned to Group C, who described it more as a final destination and a fulfilment of their aspirations with regard to selflessness. This suggestion corresponds well with the results of a detailed investigation comprising 319 in-depth interviews with participants high in trait selflessness (Martin, 2020). Several clearly discernible positions were identified in this dataset, where some referred to an expanded but still centralised and individuated self, and others a complete lack of centre and duality.

The idea of a convergence between initial and advanced stages in meditation is not new. Meditation progress is not seldom described as circular or spiralling (e.g. Ingram, 2018). Schoenberg and Vago (2019) suggest a taxonomy of five progressive stages of meditation, where the initial and final stage has one feature in common that the others lack, namely that of being “concrete”. Concrete means that the experience is body-centred and effable, which is the case in the initial, relaxation-focused stage, and in the final stage, where “the practitioner has developed through the abstract stages and now reintegrates consciousness back into a concrete operation of being” (p. 212). Perhaps, ideas of a convergence is also reflected in Buddhist concepts such as “returning to the marketplace”, “Zen mind, beginner's mind”, or “ordinary mind”. A departure into a

different way of seeing the world before a convergence with the pre-meditation mind is quite clearly expressed in this quote attributed to Zen master Dōgen:

Before one studies Zen, mountains are mountains and waters are waters; after a first glimpse into the truth of Zen, mountains are no longer mountains and waters are no longer waters; after enlightenment, mountains are once again mountains and waters once again waters.

A suggestion of a curved developmental path concerning the sense of self is likewise not new, and was for example expressed by Abraham Maslow in 1961:

The goal of identity (self-actualization, autonomy... etc.) seems to be simultaneously an end-goal in itself, and also a transitional goal, a rite of passage, a step along the path to the transcendence of identity. This is like saying its function is to erase itself. Put the other way about, if our goal is the Eastern one of ego-transcendence and obliteration, of leaving behind self-consciousness and self-observation, . . . then it looks as if the best path to this goal for most people is via achieving identity, a strong real self (p. 260).

This picture maps well onto the sentiments of some Group C participants of their mode of being as a goal in itself. Buddhist psychologist Jack Engler (1984, 2003) similarly states that “you have to be somebody before you can be nobody”, meaning that only after there is a strong, integrated sense of self can the next step of self-transcendence be achieved.

It is to be expected that a phenomenological difference like that between Groups C and E would be reflected in the brain somehow. Indeed, if such a difference is not found, the most likely reason would be that the employed brain imaging method is unable to capture it. Very timely, just as we were about to submit Paper III, a review paper on brain correlates of meditation and nonduality was published that proposed a nonlinear development of brain activation with meditation proficiency (Cooper et al., 2022). In particular, the authors speculated on nonlinear changes in FPN-DMN interaction and SLN activity and connectivity. Although this is not precisely what we found, our results show an intriguing convergence to Cooper et al.’s theoretically based suggestions. In addition, they found that the results from meditation studies on mPFC activity was the most divergent of all the network hubs reviewed, which could be an indication that this area is especially prone to a nonlinear development with meditation practice. This might be reflected in the results from our SRP task of a quadratic relation between boundarylessness and mPFC activation. With the caveat that this pattern occurred during a task meant to activate the narrative sense of self, the finding that mPFC activity shows the same relation to boundarylessness as does the strength of perspectival ownership can be interpreted to support findings by Fingelkurts et al. (2016a, 2016b,

2020, 2022; see Section 1.4.4) that indicate a role for the mPFC in the sense of being an observing witness.

Nonlinear patterns of brain activation and grey matter volume as an effect of practice are well-known in brain plasticity (e.g. Kilgard, 2012; Wenger et al., 2017). When we learn something new, more neurons are engaged and synapses built, but with time, synaptic pruning takes place and neuronal activation stabilises in patterns that can afford the acquired skill more economically. Something similar might underlie the nonlinear patterns revealed here: the phenomenological difference between the high and low scorers could be accounted for by the self-specifying aspect of the DMN having been “pruned away” in the high scorers, so that strong DMN connectivity no longer corresponds to a salient sense of self. Along these lines, Brandmeyer and Delorme (2021) hypothesise that findings of decreased DMN BOLD activity and increased within-DMN connectivity in advanced meditators (reviewed in Section 1.4.3) could be a sign of enhanced cognitive efficiency in this group. While DMN activity has usually been connected to negative mental states such as rumination, depression, inability to stay focused on a task or stay in the moment (Boeker & Kraehenmann, 2018; Fox et al., 2005; Killingsworth & Gilbert, 2010), mind-wandering or day-dreaming can also be a rich source of pleasure and creativity (Andrews-Hanna et al., 2014a; Josipovic, 2013), and there might be downsides to completely eliminating it (Schooler et al., 2014). It is conceivable that advanced meditators can reap some of the benefits of the DMN without its disadvantages. This is suggested by Feruglio et al. (2021), who state that mindfulness and mind-wandering are likely to have a complex and nonlinear relation and that meditation, through increased meta-awareness and acceptance of mind-wandering, could mitigate its detrimental effects while enhancing its creative import. Such an effect likely correlates to decreased baseline activity in DMN hubs. Speculatively, this pertains specifically to the PCC/precuneus, in accordance with our results from the Checking-in task (Figure 3c) as well as many previous studies on self-transcendence and meditation both on state and trait level, where decreased PCC activity is one of the most robust findings (Sections 1.4.3 and 1.4.4; Cooper et al., 2022; Fox et al., 2016). The PCC has been hypothesised to play a role in attachment and identification, for example with our thoughts and our identity (Brewer et al., 2013; Garrison et al., 2013). PCC is also hypothesised to integrate perceptual, attentional and mnemonic information (Andrews-Hanna et al., 2014b; Parvizi et al., 2021), perhaps thereby contributing to a sense of centrality or unity of experience.

My suggestion is thus that the phenomenological *similarity* between groups A and E might correlate to baseline DMN connectivity, and their *disparity* to baseline PCC/precuneus activity.

4.3 Self-report scales and meditation background as a proxy for phenomenology

As a final point, I would like to highlight the finding that many questionnaires intended to capture trait or state self-transcendence are rather unapt to do so. In Paper I, we concluded that terms such as ego-dissolution, which are not seldom used in questionnaires without further clarification, are employed in many different ways by different people and pointing to various aspects of self. These terms are thus unjustifiably ambiguous (see Taves, 2020, for a thorough investigation of this).

In Paper II, me and my co-coder rated the overall level of selflessness described in the interviews to produce a quantitative measure, which was used for the neurophenomenological analysis in Paper III. Although our ratings did correlate strongly with three of the self-report measures, correlations to the three other scales were weak or non-significant, and several participants complained about incomprehensible or contradictory scale questions. As we point out in the discussion in Paper II, most of these scales are developed without any phenomenological backing and only “validated” through correlations to other self-report measures, an approach that can rightly be criticised as overly dependent on logical positivism (Van Dam et al., 2018). Likewise, while the measures of meditation experience in our study correlated moderately to strongly with interview ratings, there was substantial variation between coders, and a post-hoc test revealed that these measures did not replicate the quadratic relation to DMN activation.

These results are important given that unvalidated self-report measures, or hours of meditation practice, are often used as a proxy for phenomenal states. A much better option is to use a phenomenological measure as the independent variable, which is either derived directly from interviews or at least has been validated using actual phenomenological data (see Timmermann et al., 2023, for a discussion). As an example of the latter, I recommend an ungraded visual analogue scale like the Perceived body boundaries scale (Dambrun, 2016) as a quick and intuitive measure with great variance.

4.4 Conclusions and limitations

A tangible limitation in this project, and arguably in all consciousness research, is that the matter of study is so hard to grasp. The conceptual confusion and lack of philosophical consensus on core issues makes for some muddy waters to try to navigate.

It can certainly be questioned whether the contested concept of perspectival ownership of experience can really be targeted by interviews, and even more if it can be imaged in the brain. I do not want to assert that I have been able to do so. There is way too much room for ambiguity regarding how the instruction for the Checking-in task was interpreted by participants, how it was executed, and how this relates to the philosophical meaning of the concept. This ambiguity was clear to me also during the design of the study, and so I never expected anything straightforward or easily interpretable from this task; it was exploratory and truly experimental. Indeed, if the Checking-in task had successfully captured the trait-level sense of perspectival ownership, we would have expected to see a quadratic relation of brain activity to boundarylessness, given the results of the interview analysis. Instead, the only significant result was a linear correlation (Figure 3c). Nevertheless, I find the group results from this task intriguing: the instruction to focus on the centre of experience induced decreases in DMN areas, increases in agency areas, and a neural activation pattern like that in meditation onset also for non-meditators. There is much here that could inform future studies.

When it comes to the interviews, I am reluctant to claim that the denial of a sense of perspectival ownership expressed by participants assigned to Group A in Paper II should be taken to mean that their everyday experience lacks pre-reflective self-consciousness. A more reasonable explanation is that the unusual terminology, and these participants' scarce practice in analysing their experience in such terms, left our interview unable to properly access the "subtle phenomenal character" of this sense (Section 1.3.3; Albahari, 2010). The fact that the participants assigned to Groups B and C expressed a clear such sense in (some) of their experience indicates that the sense of perspectival ownership for them has become opaque rather than transparent. This is in support both of Albahari's (2010) suggestion that the phenomenology of perspectival ownership can be enhanced by meditation, and of Sebastián's (2022) suggestion that it cannot (normally) be accessed through introspection (as mentioned in Section 1.1.3).

However, the brain data does indicate that there is indeed some kind of similarity between Groups A and E, and this might well relate to their similar statements with regard to perspectival ownership. As discussed in Section 4.1, I do believe that the denial of perspectival ownership of experience by the Group E participants, as well as by participants D and J in Paper I, should be taken seriously – implausible as such a way of experiencing may seem for mainstream psychology and philosophy.

It is a common objection to phenomenological research in general, and in particular when it concerns such unusual experiences as those investigated here, that the reports cannot be trusted (Bitbol & Petitmengin, 2016; Høffding et al., 2022). Even if outright bluffing would be rare, participants could be trying to please the researcher,

unknowingly respond to demand characteristics of the study, or be strongly influenced by philosophical or religious worldviews in their understanding of certain experiences. No doubt, these things do affect how an experience is interpreted, both by subject and researcher. I do, however, not see this as a problem but as a necessary and inescapable part of the language game: as examined in Section 1.3, this is how communication works. The contextual complexity of the interview situation and the social world surrounding it is the very fabric that makes it possible to approach and comprehend a targeted experience, rather than a hindrance to it. Consequently, I am not worried that such biases have substantially clouded the understanding of me and my co-coders of the actual experience (if there is such a thing), as I have faith in our capacity as language-users to account for them. In short, I trust both the interviewees and our interpretations.

To conclude, then: far from being able to give any definite answer to the overarching question of this project, I have at least substantially increased my own knowledge on the topic and to some extent, I hope, knowledge in general. My investigations have made clear how the concept of self can refer to many things, and that a sense of self can consist of one or a combination of several phenomenologically separable senses. As was shown in Paper I, these can disappear, and appear, in many different patterns, and as was shown in Papers II and III, they can co-vary in a nonlinear way. That each of the probed self-aspects were reported in some cases as lost is a clear indication that experience without any of them – and thus experience without self – is also possible.

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Can there be experience without a sense of self?

Photo: Lorven



This dissertation addresses the problem how the sense of self relates to consciousness at large. Many researchers and philosophers argue that a basic sense of self is per definition required for experience, and thus that a sense of self is necessary for creatures to be conscious. Others dispute this.

My method for answering the question involves breaking down the concept of self into several aspects and to investigate whether any of them seem to be essential for experience. This resulted in two interview studies and one brain imaging study, and a tentative answer: Yes.

Why does it matter? As this is mostly a philosophical question, its importance lies in creating a common understanding of what is meant by contended concepts such as self and consciousness. Such understanding is a vital step toward a scientific explanation of the underlying phenomena, which can have practical implications regarding how alterations in self-experience contribute to both pathologies and well-being.

