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THE PHENOMENOLOGY OF ABSTRACT AWE: A QUALITATIVE STUDY OF LIVED EXPERIENCES IN PSYCHEDELIC VIRTUAL REALITY

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BY

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ABSTRACT

This thesis investigates individuals' experiences with SoundSelf, a virtual reality (VR) program inspired by psychedelic experience, focusing on its capacity to evoke awe and other self-transcendent experiences. Conducted with fifteen participants, the study involved a single VR session followed by in-depth phenomenological interviews. Through a thematic analysis, three primary themes were constructed: (a) *emotions and feelings, the good and the bad*; (b) *non-reflective engagements, directly living experience*; and (c) *reflective engagements, exploring curiosity and wonder*. The findings indicate that while SoundSelf can elicit a wide array of emotions and self-transcendent experiences, it does not consistently induce awe. This research contributes to understanding VR as a tool for complex emotional exploration and sheds light on the phenomenology of awe related experiences in abstract virtual environments. Limitations of the study include the single-session and specific participant selection. Future research should further explore VR-induced self-transcendent experiences along with the influence of individual dispositions.

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INTRODUCTION

Awe is an emotion that has fascinated scholars and philosophers for centuries. Both Edmund Burke and Immanuel Kant, for example, wrote about awe in relation to the sublime; this involved ideas of pain and danger, with awe being "a sort of tranquility shadowed with horror" (Burke, 1909, p. 15) or an "astonishment amounting almost to terror" (Kant, 1914, p. 68) and requiring displays of "magnitude or might" (Ivanhoe, 1997; Kant, 1914; Keltner & Haidt, 2003). Abraham Heschel construed awe and wonder as "radical amazement" (Heschel, 1955, p. 45) but deviated from Kant in positing that this can occur by noticing the mystery of the universe through everyday objects, such as a single drop of water or a flower in the summer (Ivanhoe, 1997). William James wrote about awe as an "organic thrill" akin to experiences with the overwhelming beauty of nature but more specific to religious experiences and thoughts of supernatural relations (James, 1902, pg. 27). Several components of Abraham Maslow's conceptualization of peak experiences can also be attributed to awe (along with awe being a component of peak experiences), such as perceiving oneself as inherently a part of the universe as a unified whole; "tremendous concentration" (Maslow, 1964, see appendix A.) often talked about as presence or immersion; and the experience of being profoundly and intrinsically valuable.

Despite longstanding conceptual speculation, empirical work on awe has only recently flourished, inspired largely by a conceptual framework first introduced by Keltner and Haidt in 2003. In Keltner and Haidt's conceptualization, awe consists of two primary appraisals: vastness and need for accommodation. Vastness concerns any large stimulus or phenomena that expands beyond one's current frame of reference; this can mean physical vastness (such as a panoramic nature view), or something conceptually vast (a grand theory

that has far reaching implications). Need for accommodation concerns the process involved in updating one's cognitive schemes when faced with novelty, akin to the Piagetian sense of the term. When a person experiences something that doesn't fit into their framework of representing and understand the world, their cognitive schemes must be altered for such novelty to then be assimilated into the transformed scheme (Gelman & Baillargeon, 1983). Keltner and Haidt (2003) note that when experiencing awe, the need for accommodation may or may not be fulfilled, suggesting that such processing will not always take place in these experiences.

Empirical work, relying both on recollections and inductions of awe experience (mostly through looking at a series of awe inspiring nature images or watching short clips of BBC's Planet Earth), has largely validated Keltner and Haidt's (2003) structural account of awe and investigated specific aspects of awe such as shifts in self-construal, altered time perception, and spiritual beliefs (Bai et al., 2017; Danvers & Shiota, 2017; Piff et al., 2015; Rudd et al., 2012; Shiota et al., 2007; Valdesolo & Graham, 2014; Van Cappellen & Saroglou, 2012). Much of this work has explored prosociality and social cohesion as a functional consequence of experiencing awe, leading to awe's construal as a collective emotion oriented toward group rather than individual concerns (Bai et al., 2017). The idea of the "small self"—feelings of smallness in reference to that what constitutes the object of an awe experience—has been posited as a mediator for such prosociality (Piff et al., 2015). Conceptualization and measurement of the small self has expanded beyond feelings of smallness and relative insignificance to include shifts in perspective away from personal concerns; feelings of being in the presence of something much greater than oneself (often feeling as if one is a part of some greater entity); feelings of connectedness; not wanting the

experience to end; and awareness of personal values (Bai et al., 2017; Campos et al., 2013; Piff et al., 2015; Shiota et al., 2007).

Most investigations of awe have been quantitative in nature. While this work is clearly valuable, some emotion researchers have raised questions over whether quantitative methodologies and analyses alone do adequate justice to the nuance and complexity of awe experiences, citing the extent to which forced choice questionnaires bypass the complexity of experience by having participants frame their experience in terms of thematic conceptualizations imposed by researchers (e.g., Gallagher et al., 2018; Schneider, 2017). Qualitative (including phenomenological) approaches, in contrast, work toward an understanding of lived experience, on participants' own terms. In the awe literature, a handful of studies have utilized a qualitative approach (Bonner & Friedman, 2011; Darbor et al., 2016; Quesnel & Riecke, 2018; Schneider, 2009; Stepanova et al., 2019). Several themes have emerged from this qualitative and phenomenological inquiry into awe, both extending and contradicting findings from quantitative research. These themes revolve around what induces the experience, the nature of the experience itself, and functional consequences that follow from the experience. Qualitative and phenomenological investigations have also highlighted potential variations within awe experiences as well as critical distinctions between awe and similarly valanced emotions, such as wonder or curiosity.

Variations and Distinctions

Participants' descriptions of awe experiences (including both induced and recalled experiences) often include more than the emotion of awe itself, such as the related but qualitatively distinct experiences of wonder, curiosity, and humility. Some qualitative research and conceptual work have sought to capture the nuance of each of these emotions

(Darbor et al., 2016; Gallagher et al., 2018; Reinerman-Jones et al., 2013). Nonetheless, throughout both the quantitative and qualitative literatures on awe, wonder is typically conflated with awe such that both are characterized as experiences that require a phenomenon profound enough to overwhelm cognitive capacities and are accompanied by attempts to comprehend the phenomenon (Reinerman-Jones et al., 2013). Both are marked by a sense of expansion, experiencing something beyond our notions of how the world works and how we belong in it (Weger & Wagemann, 2021). Conflation of awe and wonder has often extended to curiosity, characterized as a deep engagement in becoming more aware of and exploring novelty (Schneider, 2009; Stepanova et al., 2019). Whether they conflate awe and wonder or not, awe researchers generally concede that the two are interrelated and are often experienced together (Gallagher et al., 2018; Schneider, 2009).

Accounts that clearly distinguish between awe and wonder have defined awe as "a direct and initial feeling when faced with something incomprehensible or sublime" and wonder as "a more reflective feeling one has when unable to put things back into a familiar conceptual framework" (Reinerman-Jones et al., 2013, p. 298). In their later book, Gallagher et al. (2018) also defined curiosity as "wanting to know, see, experience, and/or understand more" and humility as "a sense one has about one's relation to one's surroundings or of one's significance" (p. 30) Thematic analysis of descriptions of experiences that included awe have revealed further specifications for each of these experiences, listed below (taken from Gallagher et al., 2018, pp. 29-30):

- Awe: Captured by view/ drawn to phenomenon; elation; experience-hungry, overwhelmed, scale effects, sublime, surprise.

- Wonder: Inspired; Perspectival shift; Nostalgia; Unity with whole; Unity of external; Responsibility.
- Curiosity: Interest/inquisitiveness; Experience-hungry; Intellectual appreciation.
- Humility: Responsibility; Unity with whole; scale effects.

Note the paradoxical nature of awe. Awe can be both overwhelming and alluring by encouraging further engagement. This makes these types of experiences difficult to strictly categorize, given concurrence of both positive and negative qualities, such as "terror yet wonder, uncertainties yet majesties" (Schneider, 2009, p. 4).

Generally, though, awe and its related emotions tend to be construed as positively valanced experiences. Findings from qualitative research suggest that terror or fear can be constitutive of awe but not necessarily so (Bonner & Friedman, 2011). Stepanova et al. (2019) found that a portion of their participants reported feeling scared, anxious or uncomfortable in the context of a virtual lake environment designed to induce experiences of awe. Such feelings, however, seemed to revolve around perceived lack of control, with the sense of discomfort arising through being led down into the depths of the lake without being able to move freely.

Despite conceptually distinguishing awe and wonder, Gallagher et al. (2018) analytically subsumed both emotions under one form of experience, AW (awe and wonder). Other qualitative work has demonstrated clear experiential differences in line with Reinerman-Jones et al.'s (2013) definitions. Retrospective reports inquiring into how people conceptualize the two have shown that descriptions of awe revolve more around perception of novelty in the environment, whereas wonder has more to do with attempting to understand such novelty (Darbor et al., 2016). In other words, awe tends to be thought of as a pre-

reflective experience of being faced with something profound, incomprehensible, or sublime, whereas wonder is thought of as a reflective experience, deliberate thinking about and aiming to understand whatever the phenomena may be.

Objects of Awe

Many objects and/or events inspire awe. An object of awe can be something physically vast, such as seeing the Earth from space (Reinerman-Jones et al., 2013). However, recognizing the complexity, intricacy, or beauty of seemingly mundane or small things can also provide the context for experiences of awe. In other words, triggers of awe are eclectic:

> ….some are macro, such as the Apollo picture of the blue earth hanging alone in space, or the giant trees in Muir Woods or the towering cliffs of Yosemite. It could be a sweeping vista of valleys and hills or on a micro level, a leaf or insect or flower (Scheider, 2009, p. 125).

Qualitative and phenomenological examinations of awe call into question vastness as a necessary constituent of the emotion, given that eliciting phenomena can be small relative to the individual (Weger & Wagemann, 2021). People tend to experience awe when they open themselves to the intricacy and mystery of the world; this suggests that we experience awe when in the presence of something we perceive to be *profound*, rather than merely vast (Bonner & Friedman, 2011). Such profundity can be elicited by objects ranging from more concrete phenomena such as scenes of the natural world to more abstract imagery (Fredericks, 2018; Keltner & Haidt, 2003). Examples of abstract imagery could include mathematically formalized geometric shapes, as well as various forms of artwork from more realistic to highly stylized depictions.

The Nature of the Experience

Presence, Heightened Perceptions and Aesthetic Appreciation

Experiences of awe tend to be immersive; whether individuals lose themselves in the experience or not, they report a strong sense of presence (Bonner & Friedman, 2011). Personal concerns and typical patterns of thought seem to diminish as more of the individual's attention is drawn to objects of awe (Gallagher et al., 2018). This sense of presence leaves individuals more open to the world. Feeling awe can entail an attitude of receptivity, relaxing preconceptions and expectations about oneself and the natural world (Schneider, 2009). What one perceives in an experience of awe typically does not fit into orthodox ways of conceptualizing the world. It instead is marked by a sense of legitimate novelty that captivates one's attention (Darbor et al., 2016). This can arise from but is not limited to aesthetic appreciation, such as viewing the grandeur of nature after reaching the top of a hike, noticing the complex patterning on a leaf, or resonating thoroughly with a work of art (which can be visual or auditory).

Common to the structure of this experience is a sense of being captivated by whatever the phenomena may be, not wanting to look away or think about personal or day to day concerns. This shift of attention and awareness has the potential to change the way in which one sees the world. Reports from participants, for example, frequently include being more in tune with the environment:

> With this new level of awareness colors can appear brighter, sounds sweeter, light more luminous, and life somehow lifted to a different plane and improved' (Schneider, 2009, p. 125).

Ineffability, Expansion and Connectedness

Awe inspiring experiences can induce abstract feelings, making them dreamlike and very difficult to describe (Bonner & Friedman, 2011; Gallagher et al., 2018; Quesnel & Riecke, 2018). In the words of one interviewee, “Try as I might, the full-bodied richness of awe eludes cerebral definition; it simply bursts the seams of intellectualization” (Schneider, 2009, p. 63). This often revolves around feelings of novelty, being opened up to something mysterious, something that seems beyond conceptualization. Common reports also include feelings of connectedness to what individuals find mysterious. This can manifest, for example, as connectedness to nature, the world around oneself, super-natural entities, or the universe as a whole and is usually construed as an overwhelmingly positive experience, leaving the individual with a profound sense of appreciation, a “wish not to interfere with it, the experience of bliss, the sense of expansion” (Weger & Wagemann, 2021).

Within the qualitative and phenomenological literature, some variation exists in how connectedness has been conceptualized. Gallagher et al. (2018) argue that awe occurs simultaneously with a sense of distinctness, suggesting a subject/object divide in which the boundary between oneself and the world is present with a feeling of separateness. This implies some form of reflective experience, as distinctness suggests that individuals are adopting an observer standpoint, thematically viewing the phenomena relative to themselves.

Schneider (2009), however, suggests that connectedness involves a felt sense of expansion and lack of separation between oneself and the world. In awe, rather than observing something outside of oneself, the boundary between self and object dissolves:

> I am caught up in experiencing being a part of something larger than myself and larger than my previous experience. Others have described this as an “oceanic” feeling; others have said that this is an experience of love in the world. Whatever it is,

> it is getting outside of the usual level of experience into another dimension of reality (Schneider, 2009, p. 125).

Connectedness in this sense entails no separation between oneself and the object of experience (however abstract that object may be). The experiencer loses themselves in the experience, becoming the world as the world becomes them, a kind of "self-transcendent" awe. Such a construal has deep historical significance, rooted in longstanding religious and philosophical traditions. Buddhists, for example (especially in the Mahamudra tradition) talked about it as non-duality (Dunne, 2011) and geared much of their meditation practice towards noticing non-separation between self and world. Several prominent thinkers in the 20th century referred to this as unitive or mystical experiences within the context of religious experience, along with being a component of peak experiences (James, 1902; Maslow, 1964; Stace, 1960). In modern psychological discourse, it has been referred to as self-transcendent experience, defined as "transient mental states marked by decreased self-salience and increased feelings of connectedness" which include states of awe, but also mindfulness, flow, love, peak and mystical experiences (Yaden et al., 2017, p. 143). Thus, such interpenetration and indissociable unity of self and world is not specific to awe and can arise through several modes of engagement with the world, including losing oneself in conversation with a loved one (Adams, 1999). In fact, several lines of phenomenological thought argue that lack of separation and distinction between self and world constitutes our most immediate, pre-reflective conscious engagement with the world (e.g., Adams, 1999; Dunne, 2011; Petitmengin, 2007).

Functional Consequences: Shifts in Perspective, Uncertainty and Acceptance

Being in the presence of something awesome has the potential to transform the way that individuals think about themselves and the world they live in. In awe, one removes oneself from typical, habitual modes of existence and gains new ways of feeling and perceiving everything, often leading to moments of insight:

> Tantalizing yet fleeting, hints of enlightenment often accompany awe. In these moments, I feel a shift in knowing; it is as if I have suddenly awakened, with perception expanded and heart lights ablaze. I think to myself, "What a wonderful world!" (Schneider, 2009, p. 63).

Experiences of awe have the potential to help individuals transcend their routine modes of engagement with the world, orienting them away from personally relevant (meaning individual, day-to-day) concerns toward more broadly relevant experiential content and thought, such as the nature of the universe and their place within it.

Besides gaining an appreciation for the complexity and intricacy of nature and works of art, most of the perspectival shifts that have emerged from the qualitative literature on awe have been in the context of the Overview Effect. Gallgher et al.'s (2018) hermeneutical investigation into astronauts' accounts provides a good example of this:

> There you suddenly get the feeling that, hey, this is just one small planet which is lost in the middle of space. ... a very important feeling about the fact that we're just drifting through an immense universe. ... you become a little more conscious about the fact that we shouldn't be doing silly things on Earth like fighting and killing each other (Gallagher et al., 2018, p.6).

Seeing the planet floating in space (in real life or through virtual reality) lends itself to gaining the sorts of insights inaccessible to those who are terrestrially (or atmospherically)

bound. Things such as borders and the conflicts that arise between groups on different sides of these imagined lines can seem trivial in the grand scheme of things. This very often leads to the recognition that everyone and everything on the planet are intimately interconnected in profound ways. It can also facilitate other perspective shifts such as seeing day and night occurring simultaneously or seeing how vast the ocean really is (Stepanova et al., 2019).

Though new ways of thinking and new insights can be achieved, Keltner and Haidt (2003) have argued that in the experience of awe there is always a need for accommodation (which may or may not be adequately fulfilled) because what is being experienced cannot be assimilated to existing cognitive schema. Qualitative work on awe-related experiences, however, suggests that this may be too simple a conceptualization of the awe process. Schneider (2017), for example, has argued that the mystery of such experiences absolutely precludes both assimilation *and* accommodation. Instead, the experience of awe promotes an attitude of acceptance and appreciation towards mystery, novelty and uncertainty. Awe inducing phenomena, in other words, are awe inducing precisely because individuals cannot ever legitimately understand them. As one of Schneider's (2009) participants aptly noted:

> That sense of acceptance, and not—"OK, well now we understand!" [To the contrary,] I felt fucked and I still feel fucked and I'm OK with that, for the moment (p. 99).

Methodological Considerations

Methodologically speaking, qualitative and phenomenological research on the experience of awe has thus far consisted of asking what awe means to people (Schneider, 2009); of having people recall and elaborate on previous experiences of awe (Bonner & Friedman, 2011; Darbor et al., 2016; Schneider, 2009); and of utilizing previously recorded

accounts (journals and interviews) of astronauts' experiences of being in space (Gallagher et al., 2018). Resultant texts (usually transcripts) have been analyzed in terms of word usage or emergent themes, both within and across individual accounts. In the case of awe and other emotions, themes have typically included what induces the experience, characteristics of the experience itself, and how people conceptualize the experience. Also worthy of mention, there have been first person phenomenological reflections published on awe and wonder (Weger & Wagemann, 2021). These reflections have involved a team of researchers initially doing a literature review on awe and wonder, followed by a three-week period taking note of their own experiences of these emotions then re-convening to see how their own experiences compared/contrasted with existing conceptualizations and empirical work.

Some qualitative work, however, has experimentally induced awe and followed such experimental induction with open-ended, qualitative interviews. Thus far, the most promising avenue for inducing awe in the lab is through virtual reality, or VR (Chirico et al., 2016; Gallagher et al., 2018; Quesnel & Riecke, 2018; Reinerman-Jones et al., 2013; Stepanova et al., 2019). Much of this work has also included (neuro)physiological measures and psychological questionnaires, but my focus is specifically on the qualitative dimensions of this research. In these studies, participants viewed and/or navigated through virtual or mixed reality environments, mostly resembling the overview effect (White, 2014)—that is, seeing vast and sweeping nature scenes or the Earth from space. One series of studies had participants experience a VR simulated space flight in a room of mixed reality depicting the inside of a space station (Gallagher et al., 2018; Reinerman-Jones et al., 2013). Each of these experiences included seeing the Earth from space; the mixed reality included a narrative along with tactile components (such as the walls vibrating), whereas the full VR was purely

visual (utilizing a 7ft wrapping screen). Importantly, these simulated space flights involved relatively passive engagement in that participants simply viewed what went on. Other studies, however, have had participants use a head mounted display VR system, enabling them to explore interactive environments. Quesnel and Riecke (2018) used Google Earth VR in which participants spent a total of 20 minutes in four virtual environments: a color tour in which participants viewed what was going on (different colorful scenes around the globe), followed by active and free exploration of Vancouver (the city where the study was based), the Himalayas, and a place of their own choosing. In these virtual worlds, participants could interact with the environment by moving their heads to reveal more sights and use the controllers to navigate around the VR environment. Another study by the same group utilized a new VR experience designed specifically for the study (Stepanova et al., 2019). Their VR program had a narrative component and was thoroughly interactive. Participants entered a tent and sat in an office chair equipped with pressure sensitive transducers so that their leaning movements in the chair served to direct their navigation through a virtual world consisting of a forest, a lake and space (see http://ispace.iat.sfu.ca/project/awe/ for an overview of what it looked like).

These studies have been able to effectively immerse participants in simulated environments and induce awe. Gallagher et al. (2018) went about such immersion through very impressive (and expensive) equipment to effectively simulate spaceflight. Quesnel and Riecke (2018) as well as Stepanova et al. (2019) effected immersion by having participants actively engage a virtual world, mimicking to a degree everyday perception-action contingencies. Participants would move in some fashion—either by moving their heads, shifting their weights in a pressure sensitive chair, or by pointing and clicking with

controllers—and such movements would have direct, contingent consequences for their perception in the VR world. However the immersion was achieved, these programs simulated natural scenes and the overview effect, presenting participants with real world environments that commonly induce awe.

Objects of awe, however, are far more eclectic and diverse than what this research has captured. As previously discussed, objects of awe can range from the concrete and realistic to the abstract, inchoate, and supernatural (Fredericks, 2018; Keltner & Haidt, 2003). Fredericks (2018), for example, has argued that awe, as an emotion, can be about events or circumstances that are purely abstract. Within the experimentally-induced awe literature, no research to date has investigated the potential of abstract virtual displays for enacting these kinds of experiences. This raises the question: can abstract stimuli in VR elicit awe, related emotions such as curiosity and wonder, and other related self-transcendent experiences? If so, will the nature of participants' lived experiences correspond to the thematic structure constructed by prior research? Or will the participants' experiences vary from previous accounts? In this investigation, I sought to address these questions. More specifically, this study was approached with two main research questions:

- What is the nature of peoples' lived experiences in a psychedelic VR program?
- How does this correspond to experiences of awe, along with other emotions and related self-transcendent experiences?

CURRENT STUDY

In this research study I sought to investigate these research questions by having participants engage in a more abstract VR program and follow the experience with open-ended phenomenological interviews, inspired both by interpretative phenomenological

analysis (IPA) and micro-phenomenology (MP). The VR program of interest (SoundSelf) was inspired by psychedelic experience and has the user engage the program with their voice to interact with abstract fields of shapes, patterns, and colors. Users of the program, either seated or lying down, start off in the virtual world looking up at the night sky from the base of a tree. A female voice guides users through the initial phase, with instruction to take some deep breaths. The voice then instructs users to develop a rhythm of deep inhalations followed by tonal utterances during exhalation. Any tone can be employed, but the user's audio input is required to move the program forward. As users develop this rhythm, they begin to visually move up the tree (being pulled up in between tonal utterances). Users reach a spiral at the top and begin to see abstract patterns just behind. Then users are pulled into an entirely abstract world. With each tonal utterance, the visual and auditory world changes for the user, with specific temporal and structural parameters of the visual and auditory change contingent on the acoustical qualities of the tonal utterances (i.e., changes in tones will correspond to different moving patterns and colors along with different audio feedback). It is important to note that there is not a direct correspondence between toning and visual/auditory feedback. At the end of the experience, users are brought back to the tree where they started and encouraged to close their eyes for a few minutes, breathe and integrate the experience they just had.

Interpretive Phenomenological Analysis

Following the experimental induction, I qualitatively interviewed participants, guided by both interpretive phenomenological analysis (IPA) and micro-phenomenology (MP). IPA serves as one well-established method to address such issues discussed above. Developed specifically to inform in-depth questions of meaning within psychological experimental

research, IPA has become an increasingly established and versatile method of qualitative inquiry. The focus of IPA is to make sense of phenomena by means of participants' lived experience with comparatively few theoretical and methodological constraints. Following grounded theory and phenomenological philosophy, this method recognizes that ideas surrounding a phenomenon are experientially grounded. Thus, IPA focuses on first gaining a deep sense of a participant's experiential perspective by which phenomena may be better conceptualized. IPA aims to access how people interpret their personal world, rooted in the meanings that specific experiences, events, or states hold for the person (Smith, 2015). This method does not produce objective statements about the topic, nor does it confirm or disconfirm theoretical hypotheses; instead, it aims to see things as they are as expressed by the participant, in their own terms (Smith, 2015). IPA emphasizes that both the researcher and the participant hold active and dynamic roles and work together to make sense of a phenomenon. The participants drive the conversation towards what is meaningfully significant to them with few preconceived assumptions made by researchers, thereby limiting constraints on participants (Braun & Clarke, 2006; Smith, 2015; Smith et al., 2009). On the other hand, the researcher is attempting to gain an insider's perspective by interpreting what is expressed by the participant and ultimately presenting the interpreted data as objectively as possible. This method takes seriously the notion that researchers cannot be objective; rather their social temporal situations bear influence on how they interpret data (Smith, 2015).

Micro-phenomenology

MP is an interview technique that focuses on single moments of experience, with the objective of reaching precise descriptions of the pre-reflective structures of experience (Petitmengin, 2006). The term pre-reflective refers to our directly lived (though usually

unnoticed) and embodied dimension of experience that precedes and necessarily frames any reflective experience (Ciaunica, 2015; Petitmengin, 2007). Specifically, the aim of a micro-phenomenological interview is to move beyond what is in the interviewee's experience or what they think/believe about it, to *how* things appear in their direct, lived experience. According to this framework, all lived experience can be characterized as a space that is structured both synchronically and diachronically (Petitmengin et al., 2019). The synchronic qualities are constituted by the structure of an individual's experiential space at a specific point in time. The diachronic structure is how this space unfolds over time. The goal of the interview is to help the interviewee become aware of these structures, or the *how* of experience, and describe them with precision.

METHODS

Participants

For this study I sampled for participants broadly in the service of capturing as much variation around this experience as possible. Given that this is a novel program with respect to the awe literature, I aimed to establish conditions that maximize as many possible experiences as can occur in such an abstract virtual world. Recruitment was mostly conducted through Facebook advertisements targeted to the general Albuquerque area but was also aimed towards UNM students through the department's participant recruitment system, SONA. I recruited 136 individuals for an initial survey and then selectively sampled 15 of them to follow up for the main portion of the study. Only participants fluent in English, at least 18 years of age, not sensitive to flashing/strobing effects, not prone to seizures or easily prone to motion sickness and who scored above average in dispositional awe (see below) were considered for the main portion of the study. I selected for awe-prone individuals in order to maximize the likelihood that participants would indeed have an awe-related experience. The cutoff to be above average is 4.93 (ranging from 1-7), which was determined by averaging across six samples (N=1,005) collected by Anderson et al., (2020) looking into dispositional awe and its relationship to curiosity and academic performance.

The final dataset comprised of 15 participants (eight male, seven female) with an average age of 42.8 years (+/- SD 13.01 years, range 22-72 years). Four participants reported having a bachelor's degree, two had some college education but no degree, and nine had a graduate or professional degree. Twelve were White, and the remaining three were Native American, Hispanic or multiracial. Eleven of the participants had prior experiences with psychedelic substances, ten had done some kind of VR before (none had done SoundSelf),

and 13 practiced some form of meditation or mindfulness. The dispositional awe items (see procedure below) were scored on a scale from 1-100, making the average, taken from Anderson et al. (2020), 70.43. All but one of the 15 selected participants were above that average. An exception was made due to lack of a response from others who took the survey that were above 70.43. Of the 15 participants, dispositional awe scores ranged from 65-95 (M = 82, SD = 8.15).

Procedure

Participants who responded to my recruitment materials received informed consent, followed by completing an online survey. Compensation for completing this survey consisted of entry into a raffle for a $50 Amazon gift card, and a total of 136 people completed the survey. This survey included demographic questions about participants' age, biological sex, gender, race/ethnicity, socioeconomic status (SES), and education level. The survey also inquired as to participants' proneness to seizures, sensitivity strobing/flashing lights and motion sickness. Those who had such a sensitivity were excluded from follow up. Participants were asked about details regarding auditory and vision issues. Those with significant issues were excluded. Those who wore corrective lenses were included given that they could wear contact lenses for the study. Participants were also asked questions about previous VR experience along with psychedelic and other drug use. Those with daily drug use were excluded from follow up. The survey also asked participants to rate items that index dispositional awe. I used the six awe items from the Dispositional Positive Emotion Scales (DPES, Shiota et al., 2006) as a proxy for dispositional awe, listed below.

- I often feel awe.
- I see beauty all around me.

- I feel wonder almost every day.
- I often look for patterns in the objects around me.
- I have many opportunities to see the beauty of nature.
- I seek out experiences that challenge my understanding of the world.

The DPES involves 38 items measuring people's dispositions to the experience of seven qualitatively distinct positive emotions. These emotions include awe, amusement, compassion, contentment, joy, love, and pride (Shiota et al., 2006). Each discrete positive emotion scale has demonstrated robustness and validity (Dixson et al., 2019). Finally, the survey ended with an open-ended question asking why they wanted to be a part of the study. Participants who indicated they were only interested in the study to get paid were excluded.

Once they were deemed eligible, based on specifications above, the group of 15 participants came into the lab on two separate occasions, being compensated either in SONA credits or receiving $15/hour. In addition to the 15, one participant dropped out after the first visit, so her data was discarded. The first lab visit served to complete informed consent and build rapport and trust between researcher and participant, along with the participant gaining familiarity with the lab space, the broad aims of the research (without revealing specific research questions) and what exactly would happen throughout the duration of the study. Practice toning and a practice interview were also completed. After giving the participant a brief overview of how the VR program unfolds, I would do a few example tones (long, extended sounds with the exhale), leave the room for them to practice, then return and interview them about their experience of practicing toning.

To increase the likelihood of participants having profound emotional experiences in VR, I took set and setting into account (Kitson et al., 2020), designing the lab space with the

goal of having participants forget that they were in a psychology lab, along with gaining comfort with the space and with me as the interviewer. Towards these aims, the room design mimicked a meditation room/comfortable lounge space.

The second visit captured the main focus of the study. After their arrival, any questions that participants had were answered, and I gave more specific instructions going into the VR experience. I then reassured participants that the space was theirs for the duration of the VR experience. Then I set up the VR, along with screen/audio recording software and left the room for 30 minutes. The program went for 20 minutes, and 10 minutes were allowed to give the participants time to come out of the virtual world and settle in before beginning the interview. The screen recording enabled me to confirm that they did complete the program. The screen recording also picked up the audio of the room, so I reassured participants that the recording would be deleted following their participation to ensure they would be comfortable making tonal utterances. After returning following the 30-minute period, I set up both video and audio recording devices and conducted the interview (lasting from 30-60 minutes, though most were closer to 60). Following the interviews, participants were debriefed about the study and paid for their time.

The way I approached the interviews was informed by interpretive phenomenological analysis (IPA), micro-phenomenology (MP), and a handful of pilot interviews I conducted to find the best way to access the experiences people have in this VR program. What resulted were semi-structured interviews that aimed to identify overall impressions of the experience and what was most significant to the participant, along with deeper dives into how they lived those moments of significance. In addressing overall impressions and significance (corresponding to IPA), I asked questions such as:

- What was that experience like for you?
- In that experience, what stood out to you?
- Was there anything else in the experience that felt significant?
- Can you give me an overview of what you experienced in those 20 minutes?
- How engaged did you feel with the program?
- What was the passage of time like during the experience?

Which questions I asked and in what order unfolded as a result of the dynamics of the interview itself, making them semi-structured interviews. This format was adopted to allow participants to express in their own words what they experienced, giving them the stage to talk about what was most significant to them. Thus, the questions I asked can be seen as non-directive prompts encouraging participants to expand on their experience. The purpose of this bottom-up approach was to gain an understanding of the experience in the way that participants made sense of it, rather than imposing my own theoretical and interpretive frameworks on their experience.

Furthermore, many of the questions I asked served as prompts to get participants to elaborate on things they said in the interview. This consisted of my recapitulating what they said (in their own words, to the best of my ability), then either just pausing and allowing them to elaborate or asking something along the lines of "can you tell me more about that?"

This initial bout of open questions usually resulted in two or three significant moments of experience that really stood out to the participant. In addition to prompts used inviting participants to elaborate, questions in this later portion of the interview aligned with questions asked in a MP interview. This included questions regarding the diachronic structure of the experience (e.g. "What happened first?", "What did you do then?", or "What

happened at the end?") along with synchronically oriented questions (e.g. "Do you feel anything in this moment?", "When you feel this, what do you feel?", "Does this feeling have a location?" etc.). In a similar vein, probing questions were asked to invite the interviewee to look closer and further examine the qualities constituting not only *what* was in their experience but *how* it was there. Such questions included (but were not limited to): "When you have (blank) in your experience, how do you know that you have (blank) in your experience?" or "If I were to experience that, what would I experience?" Note that these questions are content free in that they are not suggesting anything new but rather guiding the interviewee to take a closer look at how they lived the moment of interest.

Data Analysis

Audio recordings from the interviews were automatically transcribed through the computer program Otter.ai. Each transcript went through two separate rounds of review which consisted of listening to the recording while reading along with the transcribed text (stopping to edit as needed) to ensure that they were accurate. Texts were transcribed to best reflect how the participants spoke in the interview. To do so, a few notations were used. When a participant extended a word out, the word ended with colons,:::. Pauses were noted by three periods… (note that in quoted texts in the section below, three periods could also represent breaks in the text) and longer pauses included the number of seconds that the pause lasted for (e.g., …4"). Words that participants emphasized were capitalized, and other noises they made were noted with double parentheses ((laughs)).

The resulting transcripts were qualitatively analyzed by two researchers working independently (Jacob Spinks and Kailie Kentopp). We employed thematic analysis (TA, Braun & Clarke, 2006). More specifically, reflexive TA was utilized, which is an

interpretative method of analysis that revolves around constructing recurrent patterns or themes in data, while recognizing that such construction is an active process contextualized within broader theoretical frameworks and requiring researcher creativity and reflectivity (Braun & Clarke, 2019). Our analytic process unfolded inductively (or bottom-up) to best reflect the phenomenological framework utilized. This means we aimed to make sense of the lived experiences of the participants in the way that the participants made sense of their experiences. Furthermore, we saw the language used in the dynamics of the interviews as an active construction of such sense making, rather than a mere reflection of the participants' lived realities. While the aim was to limit our theoretical frameworks in this process, we recognize that there is no theory-free analysis and that the themes were developed creatively, being produced at the intersection of our theoretical assumptions and the data.

The analytic process consisted of an iterative, six-step approach as outlined in Braun and Clarke (2006, 2019). It is important to note that this analytic process "requires a continual bending back on oneself – questioning and querying the assumptions we are making in interpreting and coding the data" (Braun & Clarke, 2019, p. 594). The process is inherently nonlinear, and describing it as a set of steps belies "the open, exploratory, flexible and iterative nature of the approach" (p. 593). Thus, the steps of analysis outlined below unfolded dynamically, often involved moving from the data itself, to how we were interpreting it, to examining the theoretical presuppositions enabling such interpretations, back to checking the data again to see if such interpretations were valid.

The first step involved initial familiarization with the data through repeated reading of the transcripts. In this step, the aim was to both deeply immerse ourselves in the data to gain an intimate knowledge of it, while also remaining critical by taking time to ponder how and

why participants made sense of their experience as they did. Early analytical notes were taken during this phase, both at the level of individual transcripts and across the data set.

Following familiarization, Kailie and I independently coded the transcripts, seeking to identify the basic units of meaning of what participants said. Coding was done more inductively (or "bottom-up") to best reflect the participants' perspectives on how they lived and made sense of the experience. The first round of coding was done in Microsoft Word by highlighting portions of the text and adding codes as comments. From there we used a macro (Babbage, 2023) to convert our coded word documents into Excel spreadsheets (showing the codes with the corresponding texts in respective columns). The second round of coding involved reviewing each code to see if the code sufficiently reflected what the participant said, editing/adding new codes as needed. After completion of the second round of coding, we shared our codes and went through a third round of coding that involved integrating our codes into a final set. The purpose of such synthesis was to utilize each other's perspectives and reach a more nuanced and insightful set of codes, rather than to merely reach consensus.

The third step of the process involved clustering all the codes into categories that served as tentative themes. This was also done in Excel, starting with all the codes in one sheet. Each code (with the corresponding transcript text) was organized into sheets that were named to capture broader patterns of meaning. The categories were not created a priori, but as we went along. Each code would either go into an existing category if it fit, or a new one was created if not. Importantly, these were broad categories that served as preliminary and tentative themes, rather than developed themes with central organizing central concepts. Following this initial round of clustering, categories that were relevant to the research questions were imported into a new workbook. From there, the categories were further

refined. Such refinement consisted of further assessment of relevance and coherence of meaning, combining categories that harmonized with each other, and decomposing categories that were too far reaching in their meanings. Following this step, I met with Kailie to review the tentative themes for feedback.

The fourth step consisted of reviewing the formed categories and further developing them towards themes. Within each category, the codes were organized together by like meaning, forming their various defining features. Each resultant chunk of codes was summarized and given a label. The summaries and labels were constructed by reading through both the codes and the corresponding texts from the transcripts, further ensuring the fit between the two. After all the labels were developed, they were used in the computer program MindMup (a visual mapping tool) to visually represent how these tentative themes and defining features related to each other. This allowed for a creative abstraction of shared meaning across the data set that resulted in further thematic revision and the creation of a new Excel workbook that corresponded with the visual map.

The fifth step involved the final defining and naming of the themes. A summary was written for each theme to establish and define the essence or core concept that the defining features for each theme were centered around. Creative names were given/revised for each theme to be informative as to what the theme entailed.

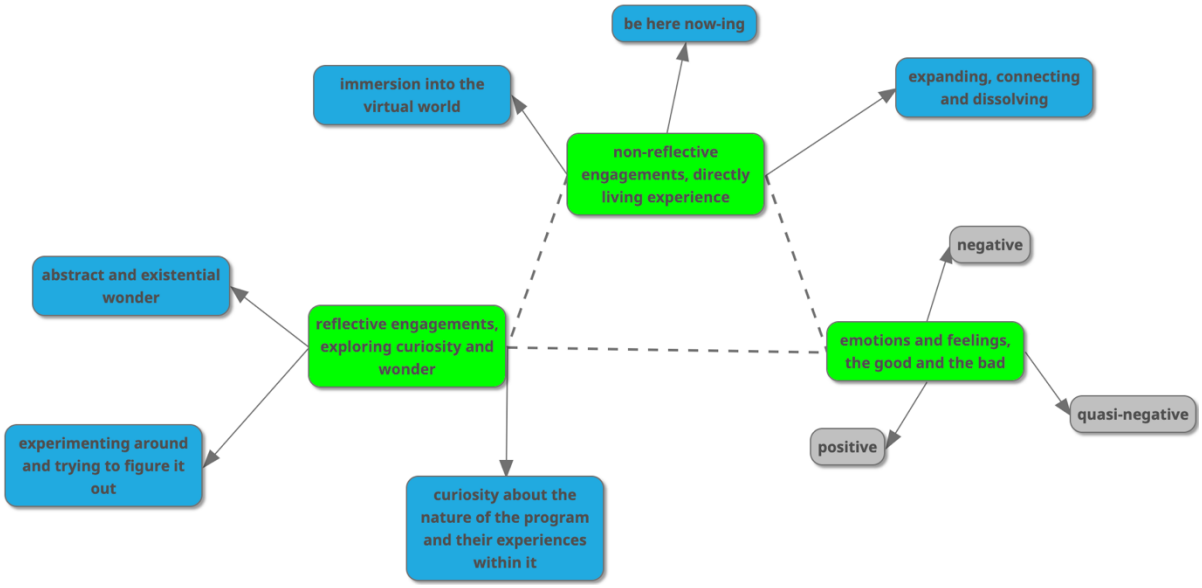
The last step consisted of producing the report and organizing the final write-up to marry thematic elaboration with illustrative transcript extracts. This step was just as iterative as the rest of the process and included re-reading portions of the data themselves, sometimes re-working the defining features of various themes and how they related to each other and connecting the themes back to the conceptual maps detailed in the introduction. In other

words, rather than the write up being merely a reflection of the analysis, it was a crucial step in the construction of the analysis.

ANALYSIS AND INTERPRETATION

The basic research question guiding this study aimed towards understanding participants' lived experiences in SoundSelf, and how that corresponds to awe, other related emotions, and similar self-transcendent experiences. Through a reflexive thematic analysis, three main overarching themes were constructed: (a) *emotions and feelings, the good and the bad*; (b) *non-reflective engagements, directly living experience*; and (c) *reflective engagements, exploring curiosity and wonder*. Figure 1 is the overall thematic map, showing these main themes, their respective subthemes (in blue) or defining features (gray).

Figure 1. *Thematic map*



Emotions and feelings, the good and the bad

Participants' lived experiences in SoundSelf were anything but uniform and included various emotions and feelings ranging from positive, to negative, and somewhere in between. This variation appeared both across and within individuals. While not exclusively so, the majority of experiences were positively valanced, and fort the most part, participants enjoyed

the experience. Participant 208's experience was particularly illustrative of this range and distribution of affect:

> Although it wasn't euphoric the entire time in a way, I feel like I went through like ALL emotions, like, at one point ((laughs)) … I wouldn't say every emotion. I didn't feel angry at any point, I didn't feel sad at any point, just those. Kind of like excited or euphoric and then the kind of like scared for- for a minute… but overall, uh, yeah just ver- yeah very, uh, it was f- fun, and uh... interesting, and relaxing. (Participant 208)

This participant's experience reflects the capacity of SoundSelf to solicit uplifting and freeing feelings that can often lead into moments of fear. The emotional range she experienced is indeed illustrative, but not totally representative, of the broader and conflicting varieties of feeling and emotion represented in this data set. While many participants spoke to positive emotions that were exhilarating in some way, such as excitement and euphoria, other participants spoke to positively valanced experiences involving a calm and inviting pleasantness:

> I felt more calm, more at peace. And the visuals were of course really relaxing, you know, seeing the patterns move around the screen, and then it just kind of stimulated me more to kind of like see how far I could go on this. (Participant 143)

From the above extract, we can see that participant 143's experience lacked intensity, and he perceived the visuals as relaxing. But they were not relaxing in terms of just passively going through the virtual space. Rather, he perceived the visuals as inviting him to further explore the experience. The visuals of the VR program were not always perceived as relaxing and inviting, instead:

> It felt a bit overwhelming to have all of a sudden colors and shapes and patterns come at me so quickly. Um, in such movement that- that you know um, it- it did feel overwhelming, like and- and almost over too much sensation, too much sensory overload of just it coming at you. (Participant 147)

The experience's intensity and its overwhelming quality were not always construed in negative terms. Participant 166, for example, experienced an intense moment of euphoria that resembled experiences he had has previously on psychedelic substances:

> …it was incredibly accurate to like- like an actual psychedelic experience… more so than I expected, you know, that it was like very, like intense. Kind of like when- when mushrooms like hit, like, in that, like, intense moment. And... like, when they kind of like start peaking like that… and then the giggles start and you're like, 'Okay, well fuck. I'm in for the ride now'. And that was kind of what I felt when I noticed the transition from the walls of color to, like, the geometric shapes. Where I was like, 'Okay, now I'm in this'. Like, and that's where I- when I started laughing. (Participant 166)

Participant 166 was not the only one to reference psychedelic experiences in making sense of the experiences lived in SoundSelf. A full analysis of the various relations between participants' VR experiences and prior experiences on psychedelic substances is beyond the scope of this analysis. However, it is relevant here in that such relations spanned the range from positive to negative:

> It was positive, you know. It feels like it was trying to simulate sort of a psychedelic and meditative experience. Kind of feels like, you know, it was trying to create a shortcut to some of the experiences that people have with, with deep meditation or

> with psychedelics. And in a way it's effective. I wonder if part of it is just distraction. But then, you know, reflecting on it, I really- I really did have you know, positive experiences that I have associated with other states of mind. Yeah, it was- it was really interesting. (Participant 254)
>
> But there was one::: moment, I don't even remember what the visual was, like, it was like a combination of the colors and the sound that was like... TERRIFYING for a second and it got me to that like 'oh, it's about to be a bad trip' kind of thing. (Participant 208)

Participant 208's remarks extend the initial quote that opened this section, reflecting on a fleeting moment of fear. This moment was short-lived, and as her initial comments reveal, the majority of her experience was quite enjoyable. One other participant compared part of her experience to a “bad trip”, going beyond a single moment of fear:

> So that, deeper like male hum, kind of, you know, was very familiar, because I've had experiences where, like, it- that a similar sound is present when I'm avoiding something. And that's when I realized like that I really don't.. like that ((laughs)), that frequency… It was like, in that instant. I was like, 'Oh', it was like a memory. You know, it's like, 'oh, I I've experienced this before and I don't like it'… Yeah, once I realized… why I was feeling that way, my body had the initial reaction of like, freaking out, and just kind of feeling like numb but shaky ((laughs)). But as I realized what was going on, you know- and also, it's not like an actual experience, you know, like, I have more control over what is going on, you know. And also realizing that when I started to feel this way, the- the VR didn't make it more like intense, you know. Like it- it continued in its own way. And that helped me like not go into that

> feeling more. And then, once I realized that, I was able to calm down… I just knew that I was okay ((laughs)). I'm not actually having a negative experience. It was just the- the memory and then the sensation of having one. (Participant 320)

Participant 320 described a moment in which she began to feel similar sensations from a previous negative experience on a psychedelic substance. Initially, it came up as a non-specific negative but familiar feeling. This arose as a felt increase in her heart rate coupled with visceral discomfort. She then realized why she was feeling that way (the memory coming back), and at first it intensified those negative feelings, bringing that prior experience closer to the forefront of her current experience. She then was able to remind herself that she wasn't currently on a psychedelic substance, recognizing that the virtual world wasn't continuing to rise in intensity, and calmed down as a result.

Having a memory emerge while in SoundSelf and feeling the qualities of that prior experience were not exclusive to experiences on psychedelic substances. Participant 319 came across a particular visual display in the virtual world that brought her back to a previous experience of awe:

> I think it's like this- like kind of like access to the memory of when I was standing in the room of mirrors that... that produced... Yeah, just astonishment and awe in me, in reality back then. And so I think the memory of that feeling exhibited yeah, kind of a similar feeling. Which is excitement and just being impressed about how beautiful it is. (Participant 319)

Her experience embodies a couple of qualities of awe experiences: the "astonishment" and "excitement" comparable to Heschel's construal of the emotion as a "radical amazement"

(Heschel, 1955, p. 45), as well as an aesthetic appreciation. Other participants experienced similar qualities:

> I think um... I think it just was very beautiful. I think that just there was a, um, being able to just slow down and take in the environment, and just realize how, um, beautiful the lights were, beautiful the color was being able to process it more. (Participant 147)

> …also just like, liking what I heard back as it kind of like, used my voice and my tone, and then also added all these other sort of like, percussion and kind of like other sounds like it was just very, very beautiful sounding as well. (Participant 279)

The visuals and sounds of the program were not uniformly appreciated by participants. Some expressed having aesthetic preferences in simply not liking some of the visuals or sounds they came across, leading toward attempts to alter what they were hearing and seeing with their toning:

> I will say to that there was one particular design pattern that I did not like because it felt claustrophobic- claustrophobic. Everything else was like, SUPER, fun, serene. Felt comfortable, but there was one pattern that I was like, okay, you can get rid of that. ((laughs))… at some point, the floating circles came back again and I got a little irritated. I was like no, no, I- this is not- ((laughs)) this is not the PATTERN I'm interested in. Like, can I make these go away? ((laughs)) So I- I know I was experimenting... Oh, yeah, that's right because I was actually specifically making a tone that said, Uh-uh:::, and then I was- then I did another one. And I said, Ah-ha:::, and it changed the color of the circles. But then I've realized that the best way to not

> have the circles do what irritated me was to not make any noise...4" So I kind of just waited for them to go away (Participant 107)

Along these lines, one participant experienced a stronger aversion to some of the visuals, interpreting them in a negative manner:

> And then it started coming in with a bunch of like red squiggly stuff. So it was like kind of EVIL looking, like uh, capillaries or blood veins and stuff like that… I did feel that little bit of ANXIETY and that evilness that was there. (Participant 134)

The last experiential facet of note here concerns ambiguity surrounding some of the negative experiences. This ambiguity was characterized by aspects of participants' experiences not neatly fitting into the category of 'negative' but instead being characterized as 'quasi-negative.' These feelings included disorientation or discomfort, which were not positive but were not totally negative:

> A few moments of like... discomfort or like... disorient- I guess mostly disorientation, uhm... But- which was- which was also a, you know, quasi negative feeling. (Participant 208)

> Um, I guess I still was a bit confused, still was a bit disoriented and confused… Um... it was- it was like going to, um, a large mall that I've never been to, like, like going into cottonwood mall for the first time and you're sort of in this space, and it's all new, and foreign. Um, and unknown, and a bit disorienting. Um, uh, but I didn't feel lost. I didn't feel, um, intimidated or- or any anxiety. (Participant 147)

Below is a more detailed map of this theme, showing all the positive and negative emotions and feelings that participants experienced, along with demonstrating the negative ones that did not always fit perfectly into that category (denoted by dotted lines connecting to

'quasi-negative). Note the wider array of positive over negative. This is indicative of the ratio of one to the other. Of the 15 participants, 12 of them had mostly positive experiences, with four of those 12 having had one or two moments comprised of negative emotions and/or feelings. Two participants had closer to an even balance between positive and negative affect, and the remaining participant did not experience anything significant enough to be labeled as either positive or negative.

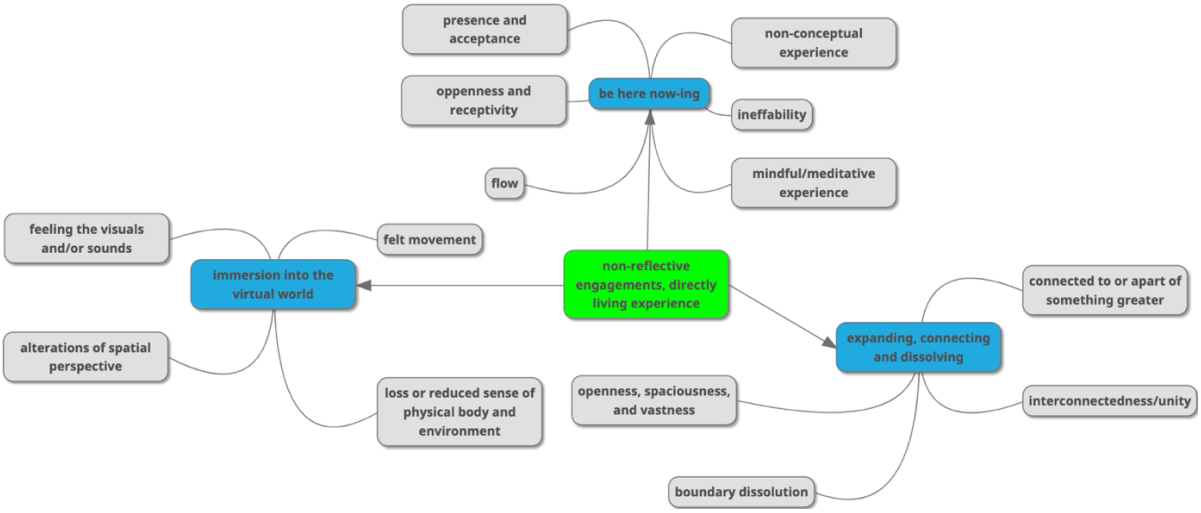
Figure 2. *Emotions and feelings, the good and the bad*

Non-reflective engagements, directly living experience

Common to the phenomenology of awe and other self-transcendent experiences is a departure from one's reflective orientation towards experience and a pull towards an absorption and immersion within the present moment. Along these lines, many of the participants at one point or another experienced modes of being characterized by presence,

immersion, openness, and receptivity without judging or identifying with the contents of their experience. This was also exemplified by an acceptance of the moment as it was, feelings of expansion and connection, along with a lack of a need/ability to label their experience. Instead of being an addition to one's experience, these modes of being are better construed as a removal, reduction, or lack of reflective thoughts or conceptual overlays on one's experience. This was experienced in a variety of ways, for which I constructed four distinct (yet related and overlapping) themes: *immersion into the virtual world*; *be here now-ing*; *expanding, connecting and dissolving*; and *ineffability with a bit of mystery*.

Figure 3. *Non-reflective engagements, directly living experience*



Immersion into the virtual world

During the VR experience, participants were either sitting or lying on the ground (sometimes with a switch between the two) and were only engaging in visual and auditory stimulation from the VR headset. Multiple participants appeared to forget this and became immersed into the virtual world. In other words, participants lost an awareness of their non-virtual surroundings and/or bodily sensations having to do with sitting or lying on the ground, wearing a VR headset:

> It was like, at that point, I didn't realize I was like sitting in the basement of a building, like on UNM in Albuquerque… I was like happening, like, in the virtual reality world… I was not in touch with my surroundings at that point. (Participant 208)

Immersion into the virtual world can be characterized as a set of pre-reflective processes, meaning that it has to do with how participants directly engaged or interfaced with the world. Participants did not notice they were in this mode of engagement, and such a recognition could actually disrupt that:

> The only reason why I kind of got- got tapped out of it was, I kind of, like, moved my arms a little bit and like felt my like jacket. So that kinda was like, 'oh, yeah', like, you know, it kind of snapped me out of it. (Participant 279)

This was not the case for everyone. Two participants spoke to remaining aware of the artificiality of the program or did not lose a sense of their body in their physical environment:

> Well, I never forgot that I was looking at video screens. And I never forgot that I was interacting with the computer program. (Participant 197)

> I was AWARE of my body touching the ground and where my back was. And you know that I was wearing a headset. Like I didn't lose sight of that or sense of that. Better term. I didn't lose sense of that. (Participant 160)

For participants who did experience immersion, such immersion can be characterized by a few different pre-reflective qualities. One of those qualities consisted of feeling like one was moving through the virtual space, evident by physical sensations of movement and acceleration:

> It's akin to the first drop on a roller coaster. So, you're riding up the roller coaster and it's like ((making roller coaster noises)) and then that first feeling of dropping where gravity- the G forces are pushing you that's kind of how it felt going into the shapes and patterns… I could feel sort of a pressure pushing down as I'm going into it… Mostly on my chest. (Participant 147)

Much like the overall experience, the ways in which participants experienced movement in the virtual world was not uniform. Much of it was felt as forward movement, but sometimes it was less clear:

> …feels like a tunnel right. That you're, like, flying through a tunnel or something in a lot of- in a lot of ways. Sometimes forward, sometimes backwards. (Participant 319)

Furthermore, some participants did not perceive themselves to be moving but rather perceived the visuals as moving in reference to them:

> Yeah, most of the time, it was coming at me. A little- few times it was going away. Like maybe, I'd say 10% of the time it was going away. (Participant 134)

At other times, it was unclear as to whether the movement was occurring as a result of their moving or the visuals in reference to them:

> And then I was moving through- I don't know if I was moving through it or it was coming through... or it was moving towards me. (Participant 320)

For some participants, this felt movement resulted in feeling various qualities of the experience that were visual and in one case auditory, akin to some forms of synesthesia. The qualities they felt in this regard included pressure, temperature, and various shapes as they passed by them. Below are a few examples:

> There was a part where you're climbing up the tree, getting ready to go through the little eye hole there that- I did notice my body was like trying to squeeze through… in my shoulders mostly, like, I kind of felt them like squeezing in. (Participant 143)
>
> I remember sort of like, um, almost like polka dots or round cylinders in a grid coming at me. And it did feel like those were pushing more towards me, on my body. So if you know, there's a grid of round cylinders, they're all coming at me… But just as it got closer, it felt like it was warmer. (Participant 147)
>
> I also had some physical sensations from some of the audio as well… it was the audio of just kind of like the sound of like, running water… it GAVE me this sensation of like water passing over me… I think it would be like as if we were to somehow set up like- like a rectangular, set up rectangular like fountain almost, where there's like water like flowing kind of on each of the four sides of the rectangle. And you're kind of placed in the middle. So the water would kind of like hit your thighs like here, and just like sort of fall down, you know, like, hit you kind of- So it's not like you're underwater or anything. So it's not like overwhelming, but it's just like, the like stream of the fountain is like hitting you, like, kind of mid thigh. Or like, 'whoosh', and then, like, falling off. (Participant 279)

Beyond felt movement and feeling the sounds and/or visuals, participants reported alterations in their spatial perspective. For example, participant 208 was sitting upright during the VR experience, but at one point felt herself to re-orient as if she was face down, flying through the experience:

> My orientation FLIPPED. Where like I didn't move my body, but instead of being like upper- I- I felt like I was flying like that ((laughs)). Like, I felt like I was face

> down. Uhm, and- and sort of just kind of floating through the, uhm, through the lines, and then it was still kind of traveling like- like through me… And that- and once I sort of let go of that, uh... you know, that- that KNOWING that I wasn't actually doing that and just kind of in that experience, like then- then it was- it was fairly euphoric again. Again, just that sense of- of freedom and, uh... just kind of- kind of flying like in a dream ((laughs)) (Participant 208)

This experience features more than just pre-reflective qualities. In a sense, participant 208's reflective knowledge of her body being in one position initially disrupted the pre-reflective sense of how she *felt* her body to be positioned and moving, appearing as a dissonance between the two. But through a deliberate intention to do so, she was able to actively release the conceptual overlay coloring her experience and directly live her feeling of being and moving through the virtual world.

Be here now-ing

This subtheme captures modes of being that move beyond descriptions of pre-reflective experience to certain kinds of *coming into contact* with the pre-reflective or non-conceptual realms of lived experience. Some of the characteristics described below are common to experiences of awe but seem to more readily revolve around experiences of mindfulness/meditative states and flow. The first defining feature of *be here now-ing* is marked by presence. Participants' reports here included a lack of concern for things presently outside of their immediate experience and a deeper sense of the present moment:

> I think like a lot of is just like that lack of worry about other things, you know, because with, like, external factors, I think it's like, you have things that you worry about, like that, you know, whether it be relationships, money, car problems, things

> like that. You probably have external factors. In that experience of euphoria, they kind of go away and allow you to just be experiencing this. Instead of allowing, kind of like these other problems that are not necessarily affecting you presently. (Participant 166)
>
> Uhm... and- and the- the RELEASE, the freedom, just like a PRESENCE I suppose. Just being present in that moment, in that experience, not anticipating what's coming next. Not, uh, remembering, you know, things that came before just- just kind of being in the- in the present moment and feeling free because of that. Free of, yeah, free of expectation. (Participant 208)

Thus, in states of 'be here now-ing,' participants were able to let go of discursive thoughts about the past, the future, or how the present moment ought to be, experiencing their engagement with the world as it is. This can also be seen as an acceptance of the ways in which their experiences were currently unfolding:

> So I'm happening the way I'm supposed to! That's kind of the way, you know, I go, everything's fine. And that leads back to that feeling of like, oh, everything's okay. You know, I'm checking Oh, yeah, everything's fine. Is any- Is anything going haywire? No, everything's beautifully harmonizing with itself. And even what I perceive as a mistake, you know, even what I perceive as something malfunctioning, it's really just a part of that. Things happening the way they're supposed to. (Participant 262)

The title of this subtheme came from participant 313 in his interview. He described this mode of being first as a flow state, and then later claimed "be here now-ing" was a better phrase for it, as a reference to the teachings of Ram Dass:

> I don't know if flow state is really a good word. Be here now-ing? ((laughs)) Yeah. Uh, yeah. Living in the moment. Um, and I think that it's- it's characterized mostly by me not feeling like I need to adjust anything. Everything's fine, right now. Everything that's happening is fine. Whether I'm making noise or I'm taking in a breath. That's good- It's good. It's what's happening now. And that's fantastic just let it coast, um. (Participant 313)

Participant 313 was not the only one to utilize the concept of flow in making sense of this experience:

> Um, then I just kind of lost... um, I was not trying to remember as much I was just really free floating and singing along. I wasn't even trying to like change my tones too much. I was just kind of repeating what I was hearing. And it was I was kind of getting into more flow, I would say more of an autopilot kind of flow of less thinking and more just sliding through all the visuals that were coming at me not even pushing back or feeling any pressure it was it was it was truly like I was um sort of flowing and flying along. (Participant 147)

It appears that in both participant 313 and 147's accounts, the term flow is being used in the same sense. The term seems to denote a way of *moving with* the experience, lacking any rigidity or efforts to control what was going on. Instead, there was a full acceptance of the moment as it was, allowing participants to engage the program without overthinking it:

> Um, yeah, it's like a, it's a release of, sort of anxiety or expectation of… like, what noise is going to come out? You know, and just like fucking making, whatever noise is going to happen ((makes guitar-like noises)) it doesn't matter. Um, and, and you're just inhaling and exhaling and making whatever noise. (Participant 313)

Moving with the experience in this way does not seem to be wholly a passive activity but rather a balance between passivity and activity—a sort of passive action. This action can be characterized by being open and receptive to the experience or by cultivating a sense of equanimity. This included a lack of judgement of or identification with what was going on in their experience:

> Yeah, I think it did, I think it just- it deepened the experience. Because it's, it was just all about receptivity without judgment… It's just like all impressions are coming in to your brain, without any sort of judgment, or um... without holding on to any particular experience, it's just like this- it's like your, your brain is just open and aware of every experience, but it's more like this state of flow, where it's just moving, not hanging on to any particular thing. (Participant 254)

> Yeah, for me, it was more like, visually, I could see things coming, coming and going. And I guess not identifying with what was going on. Like, the colors and like, the way the colors or the shape made me feel, or like- or like, the sounds, you know. Like, 'oh, these sounds make me feel like this', and instead, think of it more as like, it's- all of it is coming and going. And not like identifying with what was going on. (Participant 320)

Appropriate to the name, ‘be here now-ing’ shows many parallels to meditative experience. Presence, acceptance, and receptivity towards experience without judgement or identification (all evident in the quotes above) are all common to experiences described within the context of meditation and mindfulness. It appears that many of the participants’ lived experiences were made sense of through such frameworks. One participant spoke to this explicitly:

> So I kind of have to, you know, reference like past in Buddhist meditation, because that's where I kind of learned how to describe some of these sensations. So, without saying that this was like, a meditative Buddhist experience. I- I want to say it felt like clear light and pure awareness… It's like, lack of- lack of self-awareness? Like my, my physical body is- I don't know... I'm in a comfortable position so that I'm not actively aware of any- any tension, not thinking about anything related to physical self. And I'm not- I'm not judging the tone, the one I'm making over the one that I'm getting through the headset. You know, I'm not thinking about, like, the shapes that I'm seeing, or the color necessarily. It's just kind of awareness, and you just like, let the experience pass through. without judgment, just a complete... open mind without anything else going on at the time. (Participant 254)

The 'awareness' that participant 254 is describing is non-reflective in that it is a non-conceptual awareness, comprised of her present moment experience. The 'self-awareness' she was lacking can be construed as a lack of discursive thoughts about the experience or conceptual overlays that color her experience in one way or another. States of *be here now-ing* are characterized by departures from those reflective representations that we commonly use to label experience:

> It was kind of soothing in a weird way ((laughs)) because I didn't feel like... I didn't feel like I LIKED it, but it was just like- I guess I didn't have to decide whether I liked it or not, you know? it was- it was just happening ((laughs)). (Participant 320)

Participant 320's experience exemplifies a lack of reflectivity and a direct contact with the realm of experience underlying any conceptualizations of it. In not needing to decide whether she liked it or not, she expresses that, in her experience, there were no conceptual

overlays serving to label or color her experience as either positive or negative. Instead, her experience just *was*. Describing this, or better yet, *conceptualizing non-conceptual* experience is a tricky business:

> that was just kind of like another- that was a thought. But the experience came before the thought ((laughs)). The thought was just the articulation of the experience... when you experience it, you're like, Oh, this is- this is it, this is every- this is exactly what it is. And then you start thinking about it, and then it's not that anymore. ((laughs)) It's just an articulation of the idea, you know, to- in this context, but that experience is like, IS the experience of what it is, you know… And, you know, you CAN articulate certain things. But the more you articulated the less- the less- the further away you get from the actual experience of it (Participant 262)

Here participant 262 is speaking to the relation between such non-conceptual experience and how we go about describing it. In other words, he seems to be speaking to the process of reflectively conceptualizing experience that itself is not contingent upon concepts. This (ironically) leads us closer to a concept more directly related to experiences of awe, that of ineffability. In the quote above, when he says that the thought or articulation of the experience is not the experience itself and can pull him away from it, he seems to be expressing the ineffable nature of the experience. In other words, he seems to be articulating the idea that some experiences cannot or should not be fully conceptualized or articulated:

> it's- I don't know, it feels it feels really weird to pick apart some of my impressions of what I was feeling because those things don't have words. And they don't NEED verbal descriptors. (Participant 254)

Undergirding many of these reports of ineffability is the concept of mystery and acceptance of such mystery. In expressing that moments of their experiences were not in the world of words, participants seemed to attribute a mysterious quality to their experience. One participant spoke to this explicitly, noting that he can experience, perhaps even label, something but that does not mean he understands it. This lack of understanding was not an issue though and was approached with an acceptance and appreciation of mystery:

> …a real comfortability with, like, I'm pretty cool with not understanding how anything works, because it's like impossible ((laughs)). Like, I can figure out, I can make a tone, figure out how to make a certain shape, maybe, right? But that's not really understanding how anything works. (Participant 262)

Expanding, connecting and dissolving

This subtheme bears the closest relation to experiences of awe as such. Common to these kinds of experiences are feelings of expanding beyond one's usual frame of reference, often accompanied by a felt connection to something greater than oneself. This can include perceptions and/or feelings of vastness or spaciousness:

> Um, I felt very wide flat sort of expansive, it was a very um far reaching type of feeling… I imagine it felt almost like standing on a planet looking up at like you know we see the images of like Hubble or something you know, you just have this like really broad vast kind of universe with clouds and things interacting… there's a level of sort of timeless infinity timelessness uh, and it's a very comforting feeling to be part of this expansive, uh, timeless existence or eternity… it's a very reassuring, comforting feeling of um being part of uh something bigger than oneself (Participant 147)

For participant 147, vastness is something felt. He felt opened to something beyond his typical spatial and temporal perspective, as a part of something greater than himself. More specifically, the "something bigger" to which he refers revolves around a unity or an interconnectedness with everything:

> …it has a feeling of, um, broad interconnectedness like a broad connection with everything in the universe. Like a- a oneness. (Participant 147)

These feelings of expansion and connection can be quite profound and experienced with emotional depth. Moreover, they can contribute to reflections on one's place and significance in the universe:

> I think really, um, for some reason, you know, that's tied to that harmonic sort of picture of the universe. Everything is kind of here. It's just buzzing, it's communicating to each other, everything's communicating to each other, and my narrative is a part of that. And it's the way it's supposed to be because when you look down, and you just see a bunch of little dots buzzing around, there's no distinguishment it's all- it's all important. Every single dot is a part of the whole, and there's no this isn't more important than that. And so it's just realizing, like, oh, well, my narrative, my life and what I tell myself, what I- the way I describe things, is just as much a part of that, and it actually almost made me cry, too. I started to like, tear up, I can even feel it now… I see how tiny this life is compared to everything. ((laughs)) It's an inter- you know, like, it- it wouldn't be a harmonic if you look at that picture in this little dot is this, like, alien thing that's doing its own thing. That's not- you know, it's- it's- that's not the picture. (Participant 262)

Experiences of connectedness were often felt without a sense of distinction between participants and what they felt connected to. One may feel like a small part of the universe, but an inseparable part of it, nonetheless. However, this was not exclusively so. One participant had a similar experience of connectedness to something greater while still feeling separate:

> Um, just almost like it is this sort of light and energy and mist. And I am not part of it. But I'm right there with it. Almost like if you hold hands with somebody, and you're obviously not part of them, but you're connected in a way that's right next to each other. Very comforting. (Participant 246)

In all the cases presented thus far, participants felt a connection to something greater than themselves or something beyond what was immediately present in the virtual world. Whether it be the universe at large, or a more profound and less concrete 'energy', it went beyond the visual or auditory stimulation they were currently experiencing. However, this was not always the case:

> …it felt like… a feeling of unity between the water and me because it felt like the, like my voice, or the frequency of my voice and kind of how the- how the rings were forming. And the water felt very synchronized. (Participant 319)

Participant 319 is describing a sense of connection, or unity, between herself and the visuals of the program, but rather than constituting some profound notion of the universe, the feeling of unity she felt was with the visual contents of her experience. Importantly, this was mediated by her voice. During the experience, SoundSelf records and plays back the user's tones as part (but not all) of the repertoire of auditory stimulation. This appeared to facilitate further feelings of connection or dissolving the boundaries between self and world:

> And that's when I stopped being able to distinct like, what's my voice what's not my voice? Like, sometimes I couldn't tell if I was making a tone or not, you know, I couldn't hear myself because it was matching me so well. And so there was a lack of distinction of what's me and what's not me? Because it was MIMICKING my sound. So it's like is that me ((laughs))? Because it's- it's making the sound but it's taking the sound from me. So there's just this lack of ability to discern. And it's just- I think just- it's like dissolving- it's like, dissolving into something, dissolving into an experience (Participant 262)

Participant 262 seems to be speaking to a lost boundary between the sounds he was making and the sounds the program was producing, leading to his dissolving into the experience. It is important to note that while a lack of ability to distinguish where the sounds were originating contributed to such dissolution, it was not solely an auditory experience and expanded to the boundaries of one's bodily self being loosened:

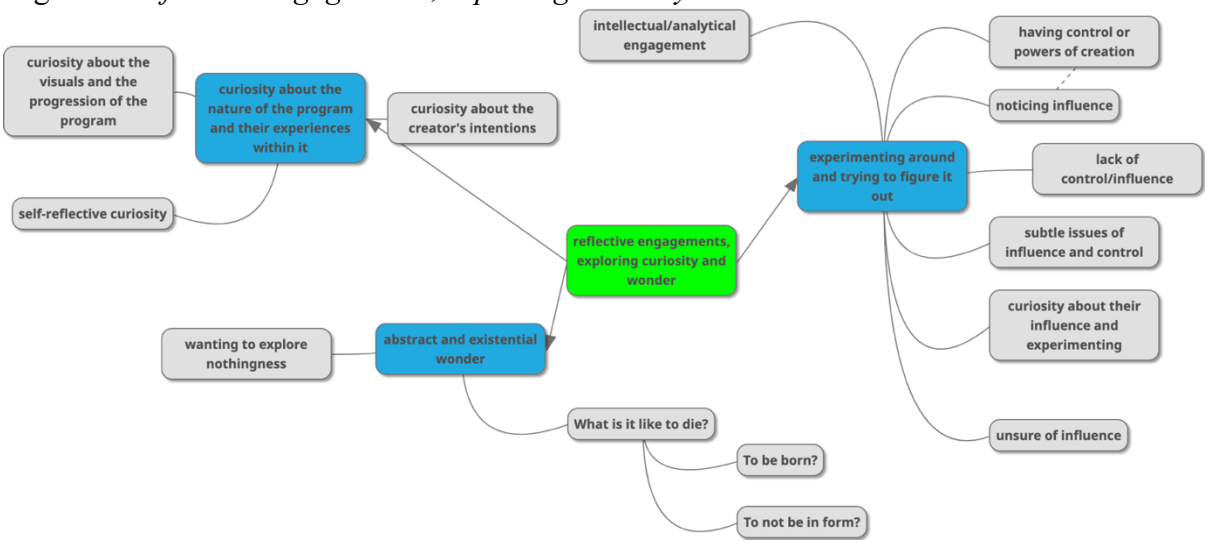
> And sometimes I couldn't tell what was me and what was that. It was like the boundary like dissolved, uhm. Which made it FREER. It was like I didn't- I wasn't aware of my voice, I didn't care… and, uh, sort of FUZZINESS around the limbs like I couldn't have told you exactly where my- my hand stopped. You know, like, the boundaries of the- the body are less defined (Participant 208)

Reflective engagements, exploring curiosity and wonder

Wonder and curiosity are reflective emotions that have to do with experiencing something beyond one's understanding and are coupled with aims towards becoming more aware and learning more about it. This overarching theme explores such reflective engagements lived by participants as they toned their way through the virtual world and is

divided into three interrelated themes: *curiosity about the nature of the program and their experiences within it, experimenting around and trying to figure it out,* and *abstract and existential wonder*.

Figure 4. *Reflective engagements, exploring curiosity and wonder*



Curiosity about the nature of the program and their experiences within it

Although wonder and curiosity can be conceptualized as distinct from awe, they are interrelated and often experienced together:

> Um, I- I after I started feeling that sort of uh thing then I- I just wanted it to change again. I like the I get not bored but I'm curious now what it's going to do next again. I'm actually- okay, I got this, this is beautiful. And you know, this is big and broad and expansive. Like what- what now? Is kind of was my feeling. (Participant 147)

Participant 147 was first referring to his experience of '*expanding, connecting, and dissolving'*. It was the experience of expansion or a vast feeling of being a part of a greater unity characterized by the interconnectivity of everything. As he depicts above, following that feeling came a curiosity oriented towards a wonder of what was to come after. More

specifically, he was curious as to the progression of the program and what visuals he would come across. Other participants experienced a similar curiosity:

> And- and I was pondering that as, like, I was taking in that, like, the intense, like, visual experience. And all of the geometric shapes and, like, the way those- those were coming and, like, being generated. And, you know, as- like, in that time, I was also pondering, like, the algorithm and, like, what causes them to, like, be generated. And like how much variation there is, like, as you go through this, like- like, how much can it change? You know, it's like, colors. Does it change shapes? Does it change? Like, how many- how many other places can it go? Because it's certainly a very- I would, like, be happy to do it again, you know, and kind of curious what happens if it goes longer. (Participant 166)

Beyond expressing curiosity about the visuals and the progression of the program, other ponderings revolved around wondering about the intentions that went into the creation of the program:

> Well, I'm curious, I have a lot of curious thoughts about it. Like, uh, what they were trying to do, or what the point of it is. Or, you know, is it supposed to create a meditative state? Is it supposed to help you... increase your VISTAs for relaxation? I just don't know. How interactive is it? I mean, how varied can the experience be? (Participant 134)

> Some part of me wants to understand what is the creator- whoever created this, what is their intention? Right? What are they trying to do? There's a part of me that's always trying to gather that… And the times it felt like, oh, yeah, this is what they want me to get out of it ((laughs)). You know? And I'm like, well am I just making

> that up? Or am I actually like, kind of understanding what their intentions are? (Participant 262)

This mode of engagement, rather than being a non-reflective and direct immersion into the experience, is characterized by adopting a reflective stance—that is, taking one's experience as something to think about and actively inquire about:

> I think it was like, at times kind of stepping away from it and trying and kind of PONDERING the experience, you know, and thinking, I'd be very curious to know… I was wondering if… the way I was feeling about the psychedelic experience, was because I previously had the experience of mushrooms… And, you know, I'll never be able to experience that having not experienced mushrooms first, right? You know it's, like- and I'd kind of be curious to people who have NOT had mushrooms… And it just made me like kind of wonder if like that- If the developers of like the program, like if they had gone through like a number of psychedelic experiences and tried to figure out like which parts they needed to capture into, like the program for like this to be a thing, you know. (Participant 166)

Participant 166 is referring to moments in the VR that he compared to the intensity and quality of previous experiences he had under the influence of psilocybin mushrooms. This experience was described in *emotions and feelings, the good and the bad* and can be characterized as a non-reflective experience. But here, he took that experience as an object of reflection and curiously investigated it, wondering if his prior psychedelic experiences enabled this one and reflecting upon the inspiration that went into the creation of the program.

Experimenting around and trying to figure it out

SoundSelf is unique among other VR programs in that users interact with the program by using their voices. But how exactly one's voice influences the visual and auditory stimulation/feedback is anything but direct and varies considerably. Participants did often notice some kind of influence, ranging from a correspondence between the qualities of their toning and breathing with the program, to feeling like they could control what was going on or create things via toning:

> It really, uh, I think that the vibrations of my voice, causing the environment to vibrate to frequency. And it was really interesting hearing my voice vibrating the frequency of the visuals… And as I made sound, they would get brighter and move around. So um, the- seemed like my sound was able to make the little highlights. It was reacting to those and those would be vibrating and getting bigger with the sound I was making. (Participant 147)
>
> Um, sort of like a little cluster of stars that got that- that- came down and got bigge:::r and more glitte:::ry. And then they would go back up. And it did seem like they were corresponding to my- to my tone. And I just became totally focused on them. And I don't even know what was going on in the background. They didn't stay very long because it was probably about- it feels like it was about the time where I was like, coming to an end with my tone. And it was then they would RECEDE with me, you know having to finish my exhale and inhale again… maybe this is like something I actually have control over. I'm- I'm actually affecting that part of this design, with my efforts to try to hone in on my- the tone. (Participant 107)
>
> And then all of a sudden, we were like, going into this cool like galaxy. And that was really amazing. That was one of my favorite parts. Uh, and then I felt a little bit like...

> it was weird ((laughs)). I kind of felt like, like I was God and I was creating the universe with sound ((laughs)) (Participant 246)

However, the program was not designed for users to always have a direct control or influence of the visuals or sounds. My personal conversation with Sandeep Prakash (co-founder of the company that created SoundSelf) has confirmed that the program's intentional lack of control was designed to "dislodge the analytic capacity," aiming for users to experience a dynamic between leading and being led by the program. But participants did not know this, and they sometimes struggled with not being able to drive the process:

> In the beginning, you control it a little bit more, the zoom in, but after a while, it's kind of pointless to try to control it. But you still kind of want to so that you can say, oh, what's next? Let's look here. But you can't do that. You have to just let it show you what to look at. I'm more a what's around this corner kind of person, then a oh, well just show me. So that was- the passivity was a little hard. And discovering that toning, kind of seemed random. (Participant 160)
>
> I think I was trying to, uh, sort of recreate what had happened earlier where I felt like I could kind of control it like we talked about a moment ago. So I was, uhm, I- I was trying to do the same tone repeatedly but it wasn't- I wasn't in control this time. Maybe that's where some of the fear comes too. (Participant 208)

As evident in *be here now-ing*, the balance and variation between leading and being led in SoundSelf did often successfully take participants out of an analytical mode. But the content of the present theme shows that this was not always the case. Here we see that sometimes participants' experiences were better characterized by an analytical or intellectual mode of

engagement. Opposed to descriptions in *be here now-ing*, some experiences did indeed carry with them reflective judgements or evaluations of experience:

> Um, just that I got confused at that point with in the middle there where I thought maybe I was doing it wrong, and I was being too interactive. And I shouldn't have been doing that. ((laughs)) (Participant 246)
>
> Um, I was more- had more kind of conscious, discursive thoughts, evaluating it, evaluating the experience, experimenting with how the sounds affected the visuals… Yeah. Um, and then yeah so it's starts, and you know, kind of cool visuals. And, uh, I was mostly starting with just one tone. And, uh, I liked the way it plays it back to you. I couldn't tell which was harmonizing. Or I would sometimes try to harmonize with it again. It was kind of intellectual thing. It was like, oh, let's see if I can harmonize and also changing kind of the- the tambor, like ((making low tone noises)) making funny sounds and couldn't necessarily tell that made a huge difference to the video. (Participant 197)

This analytical mode of engagement involves more intentional and reflective experimentation with the program, such as altering one's patterns of breathing and toning and observing to see if any visual or auditory changes corresponded:

> I would say that the sort of uh feeling of um I think I- my tone has an effect on the visual, but then not really sure if it did, and kind of like this, like, experimentation of, like, well does- does my voice actually change it? Or does it not? (Participant 107)
>
> And, you know, it's like, kind of that question of, like, how much of this is just how it runs? And how much am I influencing what I'm seeing? So I think, like- like, that sort of- of kept me very engaged as well to, like, see and, like, hear that. (Participant 279)

The above quote from participant 279 is a good example of how participants' uncertainty about their influence on the program's contents kept them curiously engaged with the experience. Rather than struggling with lack of direct correspondence between tones and visual/auditory stimulation, participants seemed to appreciate the ambiguous interplay between user and the program:

> And I was, you know, curious, like, oh, if I experiment with a lot of different types of sounds, and mostly just kinda curious, like, does it respond differently to different types of sounds? Um, and sometimes it did, sometimes it didn't. It wasn't clear sometimes that- I appreciate it, it wasn't so obviously, directly linked, like, oh, you start making some funny sound. And then the lights do something funny, it's a little more subtle than that… it didn't just do what you would expect, like it was- it was kind of doing its own thing with some input from you. (Participant 197)

Abstract and existential wonder

As detailed above, the bulk of the curiosities that participants felt and explored while in the virtual experience had to do with the program itself. This was predicated on not understanding the dynamics of how or why the program works but wanting and actively trying to do so. Less frequently (restricted only to two participants) but just as relevant, some experiences in SoundSelf consisted of more existential ponderings that were not geared towards understanding the nature of the program or their influence within it. In other words, this subtheme is characterized by being inspired to wonder about more abstract questions or inquiries:

> So in some way, so it's just like, well, what happens when there's nothing, you know ((laughs))? That's- that's the- that's uh, that draw really was prominent to me. So it

kind of inspired me because sometimes I do meditations. And I want to do that. But I don't- I don't have the incentive, because it's uncomfortable or anything, but might not I really want that. Like, I want to really explore that path as far as I can in this life. (Participant 262)

I guess the other- one of the other thoughts… that I had was, at certain points I was like, 'I wonder if this is what it's like to be born' ((laughs)). Because there was like- like, nothing really made sense and nor did the sounds, but it all was like, 'oh'. It was just a thought, really. Or like dying, you know? Like, just being in space ((laughs)). Not really in form, you know? (Participant 320)

GENERAL DISCUSSION

In this study, I sought to investigate the nature of peoples' lived experiences in SoundSelf, a psychedelic-inspired virtual reality (VR) program, along with how that corresponds to awe, other related emotions, and similar self-transcendent experiences. I chose this particular VR program because of its abstract visual nature along with its unique and vocal mode of engagement, believing it might be an effective avenue for experimentally inducing awe. While some qualities of participants' experiences did correspond with awe, there were very few awe experiences as such, and the VR solicited an appreciably wider range of experiences. In other words, the ways in which participants experienced the virtual world varied considerably, both within and across individuals. To map out this variation, I constructed three overarching themes: (a) *emotions and feelings, the good and the bad*; (b) *non-reflective engagements, directly living experience*; and (c) *reflective engagements, exploring curiosity and wonder*.

Participants' affective experience spanned the range from positive to negative, and often did not fit neatly into either category. The majority of emotionally valanced qualities were positive, and overall, participants enjoyed their VR experience. Reports often revolved around exhilarating feelings such as excitement and euphoria, along with calmer responses like feeling comfortable, peaceful, and/or appreciating the beauty of the visuals or the sounds. Negative emotions and feelings that participants reported included moments of fear, feeling overwhelmed, anxious, disoriented, claustrophobic or simply not liking the visuals or sounds of the program. However, these feelings were typically fleeting, and sometimes reported to be not totally negative, but "quasi-negative". Most participants in the study reported predominantly positive experiences, with a few experiencing a mix of positive and

negative emotions, and one participant had an experience that was neither notably positive nor negative.

Beyond positive and negative affect, other significant qualities characterizing participants' experiences in SoundSelf involved both non-reflective and reflective modes of engagement. The former revolves around immersing oneself in, and directly living, the experience without analyzing it, i.e., without discursive thoughts about the experience. This mode of engagement also included awe-like qualities, such as feelings of vastness and connectedness to something greater than oneself in addition to a broader self-transcendent experience of the boundaries between the participant and their world loosening or dissolving completely. Reflective engagements, on the other hand, better coincided with experiences of curiosity and wonder. In this theme, participants' engagement with the virtual world was characterized by actively reflecting on and trying to understand the program and the experiences they were having within it. It is important to note that the majority of participants experienced both modes of engagement while in SoundSelf. A couple participants' experiences leaned one way or the other, but they were not exclusionary, and participants most often experienced a dynamic moving, back and forth, between reflective and non-reflective engagements.

My personal conversation with Sandeep Prakesh (co-founder of SoundSelf) provided some insight into the intentions behind the design of the program and enriched the framework that I brought to bear on analysis. SoundSelf was not designed to be a soothing guiding meditation; rather, the program was designed for the possibility of inducing both positive and negative responses (evident in my participants' experiences) in hopes of soliciting active participation. This intentional ambiguity of SoundSelf is due not only to the

abstract nature of the program but also to the unclear and non-direct influence that participants can have on the audio-visual world through their voice. This lack of control was intended to take the user out of an analytical mode of engagement and induce a meditative experience in which the boundaries between the user and their world would dissolve. The present study confirms this possibility of experience in SoundSelf and offers some insight into the nuance of how to characterize such experience. However, the present study also demonstrated that lacking control of the experience could pose a problem for some users. Such users often maintained an analytical mode of engagement during the VR session. Analytical or intellectual modes of engagement were not necessarily problematic, though, and often coincided with curious exploration into the program and the individuals' experiences.

SoundSelf is also geared towards more therapeutic aims by attempting to facilitate an open inquiry process and pave the way for personal transformation. In his unpublished dissertation (Prakesh, 2022), Sandeep investigated this and found that SoundSelf has the potential to lead to transformative outcomes including increases in mindfulness and well-being, along with personal insights and empowerment. Sandeep's work included both quantitative and qualitative methodologies, and involved three sessions of SoundSelf. Having multiple experiences in this VR application, along with the cooperative inquiry used in his study, likely contributed to these outcomes.

This introduces one of the present study's limitations: participants in my sample engaged in the VR program only once. There were two reasons why only one session was employed. The first was a lack of funding to pay participants for a second visit. The other was due to the potential of multiple exposures to dilute awe exposures; after all, one's fifth

visit to the Grand Canyon is not as likely to inspire awe as the first. Yet interestingly, multiple exposures to SoundSelf appear to provide some familiarity with the virtual space and allow for more significant experiences to emerge (Prakesh, 2022). Furthermore, while this study offers an in-depth analysis into the nature of peoples' lived experiences in SoundSelf, it has nothing to say about potential effects on participants after their VR experience. Another limitation of the present study is that of generalizability. The thematic outcomes of the study are specific to the participants of this study and do not offer broader claims to larger groups of people. However, this is born of the phenomenological framework that I utilized, which offered an in depth and contextualized analysis of possible experiences in a psychedelic VR program. This phenomenological approach enabled participants to make sense of their experience in their own terms, without having to filter them through any a priori theoretical framework.

Future research should unfold along several lines. One of these lines involves further mapping out the nature of peoples' lived experience in SoundSelf. This VR program does not appear to reliably induce experiences of awe. It could be that abstract visual qualities of stimulation do not solicit experiences of awe as readily as qualities of the natural world do. Alternatively, such abstract qualities may simply solicit a much broader range of experiences than just awe. It is important to note that SoundSelf offers one particular example of an abstract stimulus and therefore is not exhaustive of how abstract qualities can appear and influence individuals' experiences. Beyond awe as such, SoundSelf does seem to lend itself well to the study of meditative and other potentially self-transcendent experiences. Multiple sessions of SoundSelf along with more targeted questioning could further flesh out the nature of these kinds of experiences, along with allowing for the study of their beneficial and

therapeutic outcomes. Furthermore, future research would benefit from investigating how individual dispositions enable certain experiences in SoundSelf. It could be that individuals with higher trait mindfulness benefit more from this VR program than do people lower in this disposition. Similarly, prior psychedelic and/or self-transcendent experiences could pave the way for more significant experiences in this virtual world and could be a fruitful avenue of research. Lastly, future research may benefit from studying the extent to which SoundSelf experiences parallel psychedelic experience. While beyond the scope of this study, the results here suggest that this VR program might be able to elicit similar states, without having to ingest any substance.

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