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Journal of Phenomenology and Hermeneutics

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"Becoming the Color"

Synesthetic Gesture in a Case Study of Multiple Forms of Synesthesia

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Abstract

Phenomenological investigations of participants with grapheme-color synesthesia—a condition wherein an *inducer* consistently and automatically triggers an additional *concurrent* perceptual experience—have revealed an apparent paradox. Namely, they describe the automaticity of their synesthetic experiences as being both willed and automatic. Here, we apply in-depth interviews and signal-contingent experience sampling to investigate the lived experience of a single case (HR) of

synesthesia to address this paradox. Our results suggest that for HR an inducer elicits a non-visual, spatially-localized, immediate, and intuitive knowledge about the concurrent. Critically, HR reports that in order to experience the concurrent visually, she must perform a specific mental gesture. We suggest that reporting on the former yields descriptions of concurrent experience as being automatic, and reporting on the latter yields descriptions of concurrent experience as being willful. Our findings demonstrate the need for detailed phenomenological investigations of the experience of synesthesia, in order to develop more accurate descriptions of this experience.

Key words: synesthesia, empirical phenomenology, signal-contingent experience sampling, constructivist grounded theory, gesture.

»Postajati barva.« Sinestetična gesta v študiji primera z več oblikami sinestezije

Povzetek

Fenomenološke raziskave udeleženk z grafemsko-barvno sinestezijo – stanjem, pri katerem *sprožilec* stalno in avtomatično sproži dodatno, *sočasno* zaznavno izkustvo – poročajo o navideznem paradoksu. Namreč, avtomatičnost svojih doživljanj sinestezije opisujejo kot hkrati tako voljne kakor avtomatične. Z namenom, da bi naslovili ta paradoks, tu uporabimo poglobljene intervjuje in od signala odvisno vzorčenje izkustva za raziskovanje živega izkustva sinestezije pri enem primeru (HR). Naši izsledki kažejo, da pri HR sprožilci vzbujajo ne-vizualno, prostorsko umeščeno, takojšnje in intuitivno vedenje o sinestetični asociaciji. Bistveno je, da HR poroča, kako mora za to, da izkusi sinestetično asociacijo v vidni obliki, izvesti točno določeno miselno gesto. Predlagamo, da poročanja o prvi vodijo do opisov sinestetičnih asociacij kot avtomatičnih, medtem ko poročanje o slednjih vodi do opisov sinestetičnih asociacij kot voljnih. Naši izsledki kažejo pomembnost podrobnega fenomenološkega raziskovanja doživljanja sinestezije, da bi razvili natančnejše opise tega doživljanja.

Ključne besede: sinestezija, empirična fenomenologija, od signala odvisno vzorčenje izkustva, konstruktivistična poskusna teorija, gesta.

1. Introduction

Synesthesia is a condition wherein an *inducer* consistently and automatically triggers an additional perceptual experience, referred to as the *concurrent* (Cytowic 1993). For example, in grapheme-color synesthesia, the presentation of a monochromatic letter leads to the automatic experience of color. Further, in sequence-space synesthesia, time-related concepts (e.g., years, days of the week) are experienced as salient locations in egocentric space. One of the defining features of synesthesia has been the automaticity of the concurrent. It is widely claimed that when synesthetes experience an inducer, the concurrent involuntarily presents itself in their visual awareness (Meier and Rothen 2009; Rothen, Seth, Witzel, and Ward 2013), provided that individuals attend to an inducer for a sufficient period of time (e.g., Mattingley, Payne, and Rich 2006).

Developmental theories have emphasized the associative nature of synesthesia (Mroczko-Wąsowicz and Nikolić 2014), motivating investigations into whether synesthesia can be acquired in adulthood. Roger Walsh (2005), for instance, notes that prolonged engagement in contemplative practice may cultivate the experience of synesthesia. Specifically designed training regimens have been used to investigate if it is possible to train non-synesthetic individuals to experience synesthetic concurrents. In these associative training protocols, a series of letters are repeatedly paired with colors through adaptive memory and reading tasks for a period of five weeks (Bor et al. 2014; Rothen et al. 2018). These studies found that following the training regimen, participant's performance for trained letter-color pairs on the gold-standard consistency test (Eagleman et al. 2007) passed the threshold indicative of synesthetic experience (Bor et al. 2014; Rothen et al. 2018). In addition, participants also displayed synesthesia-like behavior for trained letters on a synesthetic equivalent of the Stroop test (demonstrated by greater interference effects and slower response times in incongruent trials; see Meier and Rothen 2009; Ward et al. 2007). Critically, the majority of participants self-reported phenomenology that was suggestive of synesthesia-like experiences (Bor et al. 2014; Rothen et al. 2018). However, these studies only provided superficial descriptions of training-induced changes in phenomenology.

In order to ascertain whether such training-protocols elicit experience that is comparable to naturally-occurring synesthesia, Schwartzman and colleagues (2020) conducted phenomenological interviews both on participants who exhibit training-induced perceptual experiences and individuals with naturally-occurring synesthesia. They report that participants with naturally-occurring and training-induced synesthetic experience display a large degree of overlap, characterized by descriptive similarities in the strength, stability, shape, and location of concurrent experience. They found that only the automaticity of color experience differed significantly between the two groups. While most (9/14) individuals with training-induced synesthesia required effort to experience concurrents, individuals with naturally-occurring synesthesia described a diverse range of experiences associated with the automaticity of their concurrents. First, there was the distinction between *automatic* (concurrents happen to participants) and *willful* (concurrents are willingly brought forward into awareness). Three other types of automaticity were detected in naturally-occurring synesthesia. *Contextually varied experience* refers to the experience wherein the automaticity of synesthetic concurrents changed depending on the situation (e.g., being able to ignore them while reading prose). Second, *semi-automatic* experiences are those, in which participants report being able to block the experience from occurring at all. Finally, *reflective association* describes situations, in which participants had to reflect on or consider the grapheme closely, in order to become aware of the concurrent experience. Paradoxically, ten participants with naturally-occurring synesthesia reported experiencing both willful and automatic synesthetic concurrents in the *same* interview using the *same* inducers. These findings call into question the automaticity of concurrents as a defining feature of synesthesia. To address the apparent paradox, the current study provides an in-depth phenomenological case study of synesthesia.

While case studies that observe the lived experience of synesthesia are common (e.g., Cytowic and Eagleman 2009), few studies (e.g., Gould et al. 2014) have taken into account the contemporary approaches to the acquisition of first-person data. The present study offers an in-depth empirical

phenomenological[1] study of one person's lived experience of synesthesia, as well as aspects of her phenomenology that must be taken into account if we wish to understand how her synesthetic experience fits into the broader description of how it is to be her (cf. Jaspers 1997).

Within this study, we observed a number of fundamental experiential gestures present in the visual experience of our participant that occur across different forms of synesthesia. While the training regimens outlined above focus on grapheme-color synesthesia, data from our case-study suggest that differentiating between types of synesthesia according to the modality of inducer is somewhat arbitrary. This observation is in line with recent critiques of building up theoretical constructs based on behavioral or functional criteria, which emphasize the need to start with the lived experience (Madeira et al. 2018). Therefore, we did not focus solely on grapheme-color synesthesia, but the entirety of synesthetic experiences reported by our participant. This allowed us to investigate the automaticity of synesthetic experience in more depth, observing its invariant properties as well as how it relates to other aspects of the case's mental life (e.g., empathy).

This paper contains two supplementary materials available on the *Open Science Framework* (https://osf.io/mcsu9/):

- Supplementary materials A (SM-A): Transcripts of raw data;
- Supplementary materials B (SM-B): The codebook.

2. The case

We explore the lived experience of HR (herself a co-author of the paper). She is a 34-year-old, right-handed woman. She is ethnically white British, and a citizen of the United Kingdom of Great Britain and Northern Ireland. By the

1 In this paper, we (somewhat artificially) differentiate between empirical phenomenology and philosophical phenomenology, wherein the former refers to a practice of using qualitative research to inquire into individuals' lived experience (Kordeš 2016), and the latter refers to a systematic, philosophical, and logical analysis of the conditions of possibility of conscious experience (including domains of research such as transcendental and existential phenomenology). For a notable exception to this division, see Sartre 2010.

time she participated in this study, HR has had 20 years of formal education, and holds a bachelor's degree in textiles and costume design, a postgraduate diploma in theatre costumes, and a master's degree in Japanese studies. She is currently a doctoral candidate in creative and critical writing. She is a native speaker of English and speaks Japanese.

HR reports multiple forms of synesthesia. She self-reports grapheme-color, sound-color synesthesia (in relation to music), emotion-color synesthesia, person-color synesthesia, ordinal-linguistic personification (i.e., linking symbols with personalities), and sequence-space synesthesia. During the study itself, she also observed taste-color and smell-color synesthesia. Table 1 summarizes the colors and personalities she associates with individual letters of the English alphabet. She scores extremely high (eyes open = 79/80; eyes closed = 74/80) on the inverted Vividness of Visual Imagery Questionnaire (VVIQ; Campos and Pérez-Fabello 2009), suggesting hyperphantasia, a condition wherein individuals experience mental imagery that is so vivid as to be barely distinguishable from perception (Zeman et al., 2020).

Contemporary first-person research emphasizes the relationship between observing one's own experience and contemplative practices (Kordeš et al., 2019). In light of this relationship, we note HR's experience with contemplative practices: she reports 10 years of active practice of mindfulness meditation.

Inducer	Color concurrent [RGB code]	Color name	Personality trait	Inducer	Color concurrent [RGB code]	Color name	Personality trait
<A>	192, 43, 11	Brick red	Proper, plastic	**<N>**	134, 225, 85	Lime green	Fun and playful
<B>	12, 30, 39	Dark blue	Younger male	**<O>**	254, 254, 255	White	Huge, oppressive
<C>	229, 249, 20	Yellow	N/A	**<P>**	46, 9, 31	Purple	Uptight
<D>	22, 54, 12	Dark green	Kind old man	**<Q>**	11, 4, 7	Dark purple	Velvety texture
<E>	250, 47, 42	Pink-red	Cheeky	**<R>**	188, 59, 48	Dark pink	Older woman with glasses, also my collective family
<F>	9, 48, 1	Dark green	Old man librarian with moustache and glasses	**<S>**	199, 56, 44	Dark pink	Teacher
<G>	57, 23, 25	Dark purple	N/A	**<T>**	199, 163, 44	Yellow	Male
<H>	236, 25, 119 / 25, 36, 65	Magenta / blue	"Me!" (referring only to magenta)	**<U>**	219, 89, 9	Orange	Pleasing, background person
<I>	2, 5, 41	Dark blue	Demure, intelligent, calm	**<V>**	66, 7, 126	Blue-purple	Regal

<J>	216, 85, 4 / 137, 228, 102	Orange / Light green	My brothers	**<W>**	102, 43, 33	Brown	Strict and stern older woman with a soft side
<K>	71, 9, 143	Blue-purple	N/A	**<X>**	13, 1, 33	Dark blue	Mysterious male teacher
<L>	218, 223, 219	White-grey	Tall male, about 40-ish	**<Y>**	236, 245, 9	Yellow	Omnipresent in a positive way
<M>	6, 6, 169	Dark red	"Think of my mum"	**<Z>**	N/A	N/A	N/A

Table 1:
Overview of HR's grapheme-color concurrents.
The notation <> marks the letters as graphemes (i.e., elements of text) rather than phonemes (i.e., elements of speech).

Recently, it has come to light that implicit demand characteristics may drive experience, especially for subjects who score high on scales of hypnotic suggestibility (Lush 2020). Lush (ib.) suggests that in the case of mirror-sensory synesthesias, individuals may habitually (but involuntarily) implement phenomenological control in everyday life, when it is in-line with their goals, creating tactile sensations. These findings raise the possibility that habitual phenomenological control may also underlie the reported concurrent experiences in both induced and natural synesthesia. To control for this possibility, HR was tested on the *Sussex-Waterloo Scale of Hypnotizability* (SWASH, Lush et al. 2018). She scores 1.95 on a range between 0.0 and 5.0 on the SWASH test.

3. Method

A mixed-method phenomenological study was conducted. An initial meeting with HR took place in person on March 2, 2020. She was introduced to empirical phenomenology, and asked about her synesthesia. She described how, in experience, her synesthetic concurrents feel connected to feelings of empathy and sensitivity to external sensations. She expressed interest in examining sequence-space synesthesia more closely. She agreed to participate in a long-term, multi-phase study. The study itself consisted of two phases. During Phase 1, phenomena of interest were explored in-detail using phenomenological interviews. In Phase 2, once salient experiential categories were defined, signal-contingent experience sampling was employed to see how

these experiences occur in HR's daily life, away from the specific context of a scientific study.

3.1. Phase 1: In-depth phenomenological interviews

15 in-depth phenomenological interviews were conducted. The in-depth interviews took place between March and June 2020. As the COVID-19 pandemic was ongoing, all communication was done via video conferencing. In the interviews, a specific phenomenon was elicited within the research setup. Then, HR was prompted to report on her experience either at a random moment or, if this was demanded by the provocation of the phenomenon, afterwards.

The interview was based on the *method of empathy*, used in descriptive psychopathology, that is, the field examining the lived experience of anomalous mental states (Oyebode 2008; Jaspers 1997). HR was asked open- and closed-ended questions. Occasionally, she was asked to perform *ad hoc* mental exercises to provide clarifying data on specific aspects of her experience. The interview began by asking HR to broadly describe all the salient events that were present in her experience at the time of the interview. After salient aspects of HR's experience were defined, each event was explored in detail. The interviewer guided HR from descriptions of folk psychological theories, general descriptions of experience, her own beliefs about experience towards descriptions of sensory experience, bodily feelings, mental gestures, and attitudes. After HR provided an account of her experience, the researcher recapitulated his understanding of her experience, in order to a) maintain her contact with the experience in question; and b) check whether his understanding of her experience was adequate. If there were any misunderstandings, the same aspect of experience was explored further. After HR agreed that the researcher's understanding of her experience is accurate, the interview continued. Normalizing statements were used if HR expressed her apprehension or embarrassment about some aspect of her experience (Oyebode 2008). Both audio and video recordings of the interviews were gathered.

Table 2 summarizes the tasks used throughout the interviews to elicit specific aspects of synesthetic phenomenology.

Interview code	Experience	Rationale	Interview code	Experience	Rationale
HR-I-01	Reading a short story	Does secondary activity (reading) change the nature of synesthetic experience	**HR-I-09**	Observing English phoneme /eɪ/ and Latin-script letter <H>	What is HR's experience of grapheme- and phoneme-color synesthesia in her first language?
HR-I-02	Reading a short story	Same as HR-I-01	**HR-I-10**	Observing Russian phoneme /d͡ʒ/, and corresponding Cyrillic-script <Ш>	What is HR's experience of grapheme- and phoneme-color synesthesia in a language she does not speak
HR-I-03	Listening to music	Obtaining experiential dynamics of music-color synesthesia	**HR-I-11**	Observing Russian phoneme /ʐ/, and corresponding Cyrillic-script <Ж>,	Same as HR-I-10
HR-I-04	Empathizing w/ imagined a) fictional character; b) bee; c) the interviewer	In the initial meeting, HR reported on intuitively felt similarities between synesthesia and empathy. HR's experience of empathy was explored	**HR-I-12**	Letter M, presented as the sound /em/ and the letter T, presented as the grapheme <T>	Same as HR-I-09
HR-I-05	Reflecting on color a) indigo; b) orange-yellow	What is the experience of synesthetic colors when carefully considering inducer, rather than merely glancing at them?	**HR-I-13**	Reflect on number related to time: 1962 CE.	Same as HR-I-06
HR-I-06	Reflect on numbers related to time: a) 1984 CE; b) 1911 CE; c) 1999 CE; d) 3017 CE; e) 3017 BC	What is the experience of sequence-space synesthesia?	**HR-I-14**	<E> presented in the color that is congruent to HR's synesthetic concurrent (RGB code: 250, 47, 42). <R> presented as a complementary color of HR's synesthetic concurrent (RGB code: 40, 1, 48)	How does HR experience situations where graphemes are presented in (in) congruent colors?
HR-I-07	Copying a 2D image	What is HR's experience of visual working memory?	**HR-I-15**	Memorizing a sentence while observing a triplet of graphemes in order to dissociate attention from synesthetic gesture	How does HR experience her synesthesia while performing a task that demands her attention?
HR-I-08	Reflecting on: a) a close friend; b) family member; c) stranger; d) celebrity; e) the interviewer.	What is HR's experience of person-color synesthesia?	**N/A**	Reflection on the study	Establishing the validity of interviews.

Table 2:
Overview of prompts for Phase 1 interviews.

3.2. Phase 2: Signal-contingent experience sampling

Signal-contingent experience sampling was used to gather HR's lived experience in an everyday setting, unconstrained by a research setting. The sampling took place between May and August 2020. On a prearranged day, HR received seven prompts via phone for her to sample her experience. Sampling prompts were delivered to her at random moments between 9:00 and 22:00. A script was programmed in Python, creating seven random values in a given time interval. Upon receiving a prompt, HR was instructed to describe her experience according to seven elements:

1. date and time;
2. context: objective facts about the situation;
3. general description about your experience;
4. visual experience;
5. subspace region: an aspect of HR's field of experience identified within the study itself—a space overlaying the world she experiences beyond her body that contains mental imagery and other aspects of her thinking (see below for more details);
6. sensory awareness;
7. aspects of empathy.

After each sampling, HR provided feedback to the researcher on whether the sample was valid, meaning whether she was able to report on her experience *immediately* after the prompt. Whenever samples were invalid, the researcher did not inquire into the reason as to why. At the end of each sampling day, HR sent her reports to the researcher. The next day, a follow-up interview was conducted, clarifying discrepancies and providing additional detail to samples. Typically, two samples were explored in detail. The follow-up interview was structured in the same way as in Phase 1. In total, 13 sampling days took place.

3.3. Analysis

Recordings were transcribed verbatim. Whenever HR made a bodily gesture relevant to the description of experience, it was described in the metatext. HR commonly made idiosyncratic sounds when describing experience, which were transcribed as well. The first stage of the analysis of the gathered qualitative data was segmenting the descriptions into experiential episodes. Not all interviews and samples contained a single experiential episode. In some cases, two samples were constructed out of one. In Phase 1, 37 episodes were explored. In Phase 2, 97 samples were gathered, of which 16 samples were explored in follow-up interviews.

The analysis of the qualitative data was conducted simultaneously with the data acquisition, following the principles of constructivist grounded theory (Charmaz 2004). First, line-by-line coding was performed: a meaningful code was assigned to every line of interview data, thereby minimizing the analysist's bias.

Following this step, inductive coding was employed: raw data were assigned more abstract, general descriptive tags (e.g., all HR's experience that included color were grouped together as *color*, rather than coding for specific shades). Categories were constructed from the data without deference to existing theoretical concepts. Finally, categories were grouped together according to their descriptive similarities (see Figure 1).

In the final stage of the analysis, a codebook was constructed (Nelson 2017; Hurlburt and Heavey 2006; Kordeš et al. 2019), containing a detailed description of induced categories. Experiential categories were specified according to: a) name; b) definition; c) relationships to other categories; d) relevant examples; and e) considerations (i.e., elaborations explaining and examples demonstrating the specific differences between similar categories and notes on dynamic interactions between them). The codebook serves three purposes: a) it represents a system of organization of categories; b) a logically consistent codebook provides evidence towards the validity of the coding process; and c) it provides an independent researcher who would be interested in replicating the findings an instrument to familiarize herself with the analysis procedure.

4. Findings

The categories, constructed within this study, are organized into three classes: *structure of visual consciousness*, *phenomenological dimensions of synesthetic experience*, and *synesthetic gesture*. HR's synesthesia seems to be more dependent on the mental acts she performs than the modality of the inducer (see Section 4.3. below). Thus, we provide a description of synesthesia in general, rather than focusing on specific forms of synesthesia (i.e., based on the modality of the inducer). The constructed experiential categories and subcomponents of HR's synesthesia are described in Figure 1.

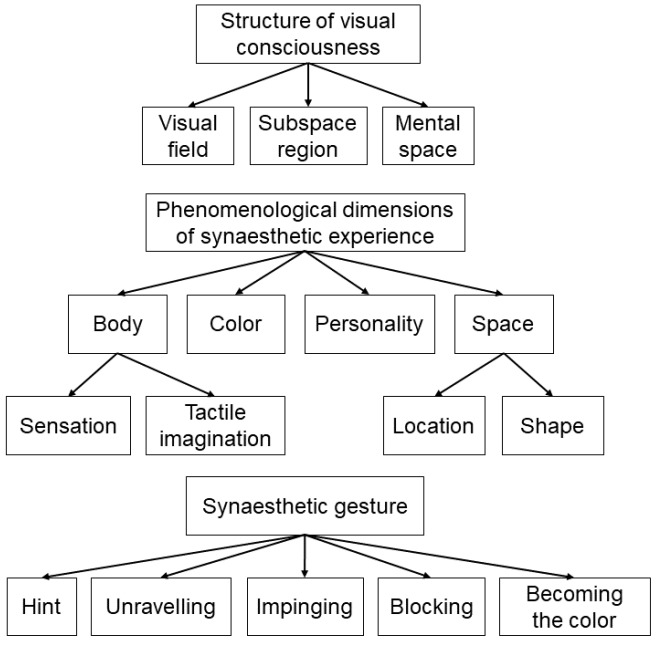

Figure 1:
Experiential categories of HR's synesthesia.

Table 3 summarizes how often HR experienced synesthesia during the second phase of the study (signal-contingent experience sampling). Out of the 97 valid samples, 51% contained some form of synesthetic experience. By

far the most common were linguistically-mediated synesthetic experiences: grapheme-color and concept-color synesthesia occurred 13% and 10% of the time respectively. By comparison smell-color synesthesia occurred only once.

Synesthetic Experience	Grapheme-Color	Concept-Color	Taste-Color	Taste-Color	Emotion-Color	Person-Color	Sequence-space	Smell-Color
51%	13%	10%	6%	6%	5%	3%	5%	1%

Table 3:
Relative frequencies of HR's synesthetic experience during the second phase of the study.

4.1. Structure of HR's visual consciousness

Structure of visual consciousness divides HR's experience into three poles: *mental space, visual field*, and the *subspace region*.

Mental space describes the part of HR's field of experience that corresponds to the location of her point of view; it is internal to her body and it is where she conducts her mentation, where her thoughts arise, and her inner speech takes place. On the other hand, *visual field* is HR's experience of the world as uncovered by her senses and present to her consciousness in the visual mode. *Visual field* corresponds to what Anil Seth (2014, 100) refers to as *subjective veridicality*, that is, perception as "experienced as part of—as continuous with—the real world." This experience of the world is sometimes termed the *objective pole*. It is not objective in the metaphysical sense of having access to an observer-independent reality, but, as Charles Laughlin and Jason Throop (2006, 327) summarize, in the sense "where the 'objective' elements of experience are those that can be grasped by any given experiencer regardless of cultural, historical or social position." For HR, accessing pure *visual field* takes willful action:

> [It is the], erm, exact feel of the soil and the roots, and what that felt like on my fingers, the color of the soil, the color of the roots, looking at the intricate root system that was all intertwined […]. Looking it, sort of as minutely as I can possibly look. Zooming in as far as I possibly could.

> […] I suppose it is like slowly and, like, methodically and carefully running my eyes and registering each little part of something, and really, erm, gaining all the visual information. (HR-II-D04-S02)

The *subspace region* (a term HR uses and is itself a Star Trek reference) is the part of HR's field of experience that connects the *visual field* and the *mental space*. It refers to the part of HR's field of consciousness that belongs to her, to her attitudes, and imagery she projects into the world. HR describes it as follows:

> [I]t's a sort of subspace region. […] So, it's like a filtering. This is what I know or think to know to be reality here [waves her arm in front of her] and then there's a filter of things I know to be my mind's eye or my imagination. Filtered on top. So, I can be in both. Simultaneously. I can choose to be in one or I can choose to be in the other. […] It doesn't seem to be limited at all by anything. So, vast, you know, multidimensional canvas. (HR-I-02-01)

It is a space of her experience that begins at the edge of her embodiment and extends outwards into space:

> So, I'm aware it's not happening in the outside world. […] That it isn't within the objects that I share with other people. It isn't in that space. […] It feels very much like it is my own domain and that [pause] it is not populated by other people. (HR-I-03-01)

Cassandra Gould and colleagues (2014) describe a similar aspect of synesthetic experience. What they call the "mental room," is experienced as a field of experience that is superimposed on the real world. Attention can be willingly shifted between the mental room and the real world.

Let us now recapitulate this section with an illustration that depicts the structure of HR's visual consciousness (Figure 2).

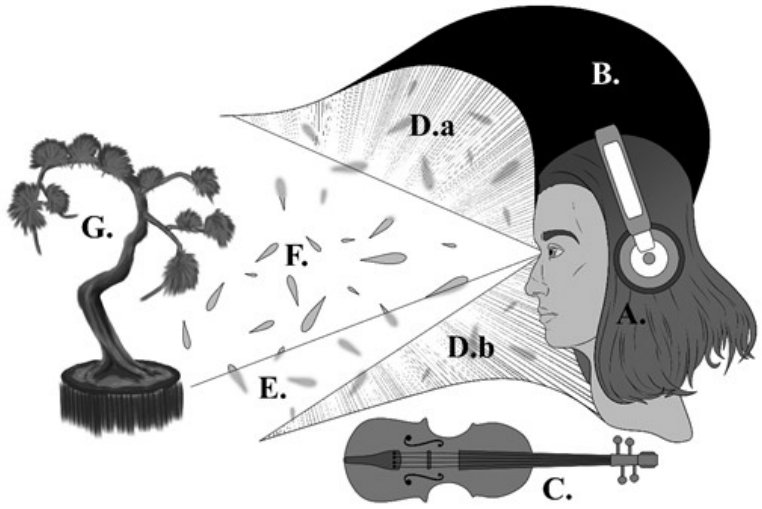

Figure 2:
The structure of HR's consciousness, constructed to describe her experience of the sound of a violin (see Table 4).
A: HR's embodiment; B: mental space; C: inducer; D.a and D.b: subspace region; E: peripheral vision; F: visual field; G: subjective veridicality.
The subspace region overlays her body, her visual field, as well as the entirety of the space she is aware of. HR is aware of her synesthetic experience—the red teardrop shapes—within her subspace region. Where the subspace region overlaps with the visual field, the visual experience of concurrents is the strongest. The image was shown to HR and she verified it accurately describes her lived experience.

4.2. How it feels to be a synesthete: Phenomenological dimensions of HR's synesthesia

Now that we have oriented ourselves within HR's field of experience, we go on to discuss how she experiences individual phenomenological dimensions of synesthesia. HR reports multiple forms of synesthesia (see Section 2.). Based on HR's reports, we do not differentiate between them. Rather, we describe the more fundamental aspects of experience that remain common across the different forms of synesthesia.

All of HR's experiences are described as being spatially localized. She experiences them, first, within her *subspace region* and, second, at a certain distance from her point of view. Consider the following experience of concept-color synesthesia that HR had while reading a story:

> So, I, I'm at the "*his face cut by the backlash of the branch.*" And, erm, *cut* was instantly a red word. And I like felt the motion of *cut* and *backlash* similarly. […] Like something in front of me was torn open and it was red. Like a carmine red. Like the fabric of whatever it is here. The air. Was torn open and that was red. The gash was red. […] [It was] in my perception, yeah. It was both. It was both in the outside world but also in my perception. So, spatially, I felt it beyond my body but I didn't see it as being located outside of me. (HR-I-02-01)

The previous example further demonstrates that HR's synesthetic experiences are not perceptions, but are located in her perception; what we referred to as the *subspace region*.

HR's linguistically-mediated synesthetic experiences (concept- and grapheme-color synesthesias) are the most common but also phenomenologically sparse. They only contain *color* content and a presence in space. By contrast, emotions and sounds elicit richer experiences. The first reason for this is that these synesthetic experiences contain a strong bodily component.

> [My friend] is a very bright and optimistic person, and I think those colors make me feel bright and optimistic. […] I feel that her brightness in my sort of diaphragm. It's a ball of light in my diaphragm. And yellow is pretty much in my chest. (HR-I-08-01)

Consider also the following experience when HR hears a specific word:

> Watching *Suffragette* [a TV show]. Speaker in parliament just said: "eloquence is that which gets things done, Mrs Watts." […] Focused on *eloquence*, which was a very red and gold word. […] It is definitely a feely word. […] I was not speaking it, but I could feel the word in my

> voice box. And the way that my body would response. And the way the word would feel in my mouth and throat. (HR-II-D07-S07)

Speech sounds exhibit synesthesia as well. In the following example, HR heard a phoneme in Russian, a language she herself does not speak:

> [Points at the height of her forehead] It was here, [whistles three times] in a silver, blue, and sort of shard-like shapes in the subspace. […] This physical sensation that I feel is like at the top of my head, there. […] It's already there. And it's silver and light blue shards. Dancing shards. […] Like a prickly sensation. Prick, prick, prick, prick, prick. (HR-I-10-02)

However, HR's strongest experiences of sound-color synesthesia are associated with listening to music, which is made more complex by a specific spatial experience. Namely, her synesthetic color experiences take on discernible shapes and forms. While listening to a piece of classical music, HR drew the shapes that individual instrument sounds have. Her illustrations are reproduced in Figure 3.

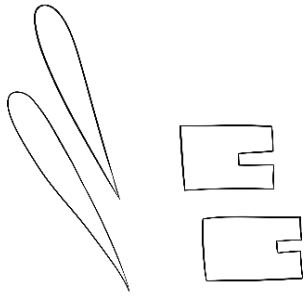

Figure 3:
Shapes HR associates with the sound of a violin (left) and a harpsichord (right).

4.3. Synesthetic gesture: From hints of color to becoming the color

The aim of this study is to attempt to better understand the automaticity of synesthetic experience by examining, in detail, the lived experience of HR's

multiple forms of synesthesia. In the previous sections we first described the overall structure of visual consciousness as experienced by HR, and the static dimensions, according to which we can specify her synesthetic experiences. These sections served to orient ourselves within HR's broader field of experience. Now, we will examine how HR's synesthetic experience evolves through time in relation to specific (willful) mental acts, captured by five identified experiential categories: *hint*, *unraveling*, *impinging*, *blocking*, and *becoming the color*.

4.3.1. Hint

Hint is the experience whereby HR becomes aware of an inducer and the concurrent simultaneously. This immediate awareness of the associated properties is *not* visual. HR experiences *hint* within the *subspace region*. It also has an egocentric location (most commonly on HR's right shoulder or above and to the front of her head). For example, she reports: "It was a literal sensation on my shoulders. As if I was, as if I was carrying something over my shoulder and it was touching my head and shoulders. It had a weight but it wasn't heavy." (HR-I-09-01). Finally, *hint* takes the form of intuitive knowing:

> [I]t feels like they will come over my shoulder. Loodidodido. In a rolling fashion. But I think, ordinarily, [pause] they are like a cloudy mass. Separate and together at the same time. […] It's like powdery and disparate around the edges. There's no fixed point to it. It's like a very definite presence. […] I feel like the weight of the presence. […] It's just a knowing. (HR-I-01-01)

Hint also has a mass, and, by extension, density. It is by virtue of this density that HR feels attracted to it, as if she wants to direct her attention onto it. Consider the following report:

> I wasn't taking the time to look at it. It was just the information was there. […] It wasn't like at the front of experience. So, [pause] it's like a background. Erm, visual experience. Like a [pause] just a really, like,

> almost translucent filter. So, it's [pause] it's more like a sense of knowing that there is a visual element to it. (HR-I-11-01)

4.3.2. Unraveling

Unraveling is a specific mental gesture that is used for HR to become visually aware of her synesthetic experience. *Unraveling* begins with an awareness of *hint*: "So, with [the word] *backlash*, the purple was over here [points to the back of her head on the right] on my right-hand side. Shoulder. Happening over here. And I zoomed into it." (HR-I-02-02)

While this gesture can be performed unconsciously, the automaticity has a character of being habitual for HR, rather than being a passive event. Conversely, the gesture of *unraveling* has a willed component:

> I just decide to think about [the colors]. Yeah, it's definitely a decision. Not a verbalized decision. It's in my mind. Yeah. […] An attentional decision, I guess. […] It takes time, but it's quite quick. […] it's just a growing awareness, I think. […] They come out and I am looking at them. (HR-I-01-01)

HR's descriptions of *unraveling* all share two components. First, she focuses her attention on *hint*, making it more present in her consciousness. The second is a concrete glance. She directs her gaze at the *hint*. Consider the following excerpt, in which both of these dimensions are present:

> It's like a knowing that the red is there on some level. And then looking and zooming in and seeing. […] So, it's sort of that zooming in, zooming out. […] It is quite literally me looking to the right. […] I look with my eyes to the right and I turn my head to the side. [The cherry red] just sort of occupies this whole space over here. And I can very much feel it over my shoulder, and it is contained, but it does feel infinite. In the subspace. (HR-I-09-01)

Finally, in the case of sequence-space synesthesia, *unraveling* does not (necessarily) result in the awareness of a color, but the experience of being immersed in a dense region of space, associated with a specific chronological element:

> So, if I'm looking back in time [pause] erm, [pause] it's sort of a choice of zooming in, zooming out again. So, I see this block, with a wall, bookended by the decade. Erm, and then it's sort of a [pause] you know, I can just see the years. Just there. And if I zoom in, I can see the years, closer, as individual sections. […] See in the subspace. (HR-I-06-01)

4.3.3. Becoming the color

Once the visual awareness of colors or the felt spatial awareness of sequence-space synesthesia is present to her, HR can extend the gesture of *unraveling* further. Continuing *unraveling* results in the experience of *becoming the color*. This is a synesthetic experience, in which the entirety of HR's *subspace region* and *mental space* become filled with color. Additionally, she experiences a prickly sensation in her body, giving her the sense that her body itself is transforming into that color:

> [The indigo]'s like a warm, unctuous river, out here [moves hands horizontally from her mouth outwards]. And it's very still. But also, quite solid. I can be in it. But I can also see what's above it. Erm [pause] So, it's like a very warm, very comfortable river. A bath. With no edges. So, it's sort of an ocean. […] I just looked into my mind's eye. Into my subspace. […] It was there. Instantly. […] I can see it. It's vast. Like before, I said, like an ocean but very thick. I can sense its infinite size. […] And I can feel it. Like the physical sensation of its warmth. (HR-I-05-01)

She further reports the sense of her embodiment disappearing into color:

> I can see parts of my body disintegrating and becoming the color [orange and yellow]. […] Sort of it happening to my arms and shoulders and the rest of my body. I just see it happening. […] It's also very tactile. […] It's very relaxing and very pleasurable to have your body disintegrate. (HR-I-05-02)

HR reports that the strongest of her synesthetic experiences is the sequence-space synesthesia. Its relative strength may be related to it sharing a number of phenomenological similarities with *becoming the color*. Namely, HR enters the synesthetic awareness with her entire body, and the fabric of her *subspace region* organizes itself into the spatial representation of time:

> I am inside of it, not looking at it. But that is how they arrange themselves. I am looking at it, I'm in it. […] I am completely immersed in it. In it. So, it is not about separation. Not about where I am located within it, but there is a sort of [pause] additional focus to it. Which is similar to the ocean of indigo. (HR-I-06-05)

Further, the gestures of *unraveling* in general, and *becoming the color* in particular share similarities with how HR experiences empathy. HR experiences empathy as a gesture forward, towards the entity she is feeling with (as if glancing towards them), leading to her being aware of their emotions in her body. Loss of bodily boundaries bears some similarity with dissolution experience (Caporusso and Demšar 2020). Further, similar phenomenological descriptions of being overwhelmed by a sensory stimulus come from accounts of mystical experiences associated with the Kabbalah, in which it is reported that meditating on specific letters of the Hebrew script, the *aleph-beth*, can be associated with *becoming-the-color*-like experience where "written letters [expand] 'to the size of the mountains'" (Abram 2017, 245).

Figure 4 schematically depicts the phenomenological dynamics of *unraveling hint* first into the visual experience of synesthesia, and then, if HR chooses to do so, into the state of *becoming the color*.

Figure 4:
HR's phenomenological dynamics of unraveling hint into visual experience of synesthesia, and becoming the color.
Full arrows represent gesture-dependent experiences.

4.3.4. Impinging and Blocking

Impinging describes synesthetic concurrents passively happening to HR. There are two phenomenological dynamics associated with this dimension. The first is when HR is attending to the world with a close, investigative, examining attention, an aspect of experience that she refers to as "meticulous observation":

> I think it was more attention-grabbing in his voice, and because of his, perhaps change in voice. Because he enunciated it, he said it with more importance, more gravitas maybe. The, I [pause] my attention was peaked. […] It is [pause] focused listening. (HR-II-D06-04-02)

This meticulous listening is then followed by a visually apprehended synesthetic experience of her interlocutor's voice:

> I could see it as a sort of a mass of purple. And you know, much like when I've seen letters and then the mass of colors is below here. This time it was the word *global* and the color was a mass behind it. […] Black typed letters. […] It happened. […] [It is] just there. (HR-II-D06-S04-02)

It seems that a particular style of observation, an engaged and mindful attention leads to the visual awareness of synesthesia occurring automatically.

Or, as HR poetically puts it: "Interest creates agency. Because I was interested in [it], it happened automatically." (HR-I-04-02)

The second phenomenological dynamic associated with visual awareness of a synesthetic concurrent *impinging* itself onto HR's awareness is when the inducing experience co-occurs with difficult emotional content:

> I am experiencing resistance on that particular year, because it is, has trauma attached to it. […] My body is holding me back. And I am feeling a sense of reticence and unwillingness. I am not willing. […] There is curiosity in 1911. […] Whereas the 1999 feels forced, there's more force involved and I feel [pause] the emotional landscape is very complicated and [pause] I am not [pause] the curiosity isn't there. (HR-I-06-03)

When visual awareness of concurrents impinges onto her awareness, HR is able to perform a counter-gesture to prevent it. She does this by constructing a sense of solid space within her *subspace region,* a mass that prevents the visual synesthetic awareness from coming into the forefront. Consider the following for an example of *blocking* with difficult emotional content:

> There's like a [pause] […] a block, a self-preservation block. […] Almost like I am aware of something that I am refusing to look at it. […] There is definitely like a huge […] movement of resistance, I think. [pause] And I feel dense. […] It's like a pushing away. A complete rejection. (HR-I-08-02)

Figure 5 schematically depicts the phenomenological dynamics of *impinging* and *blocking.*

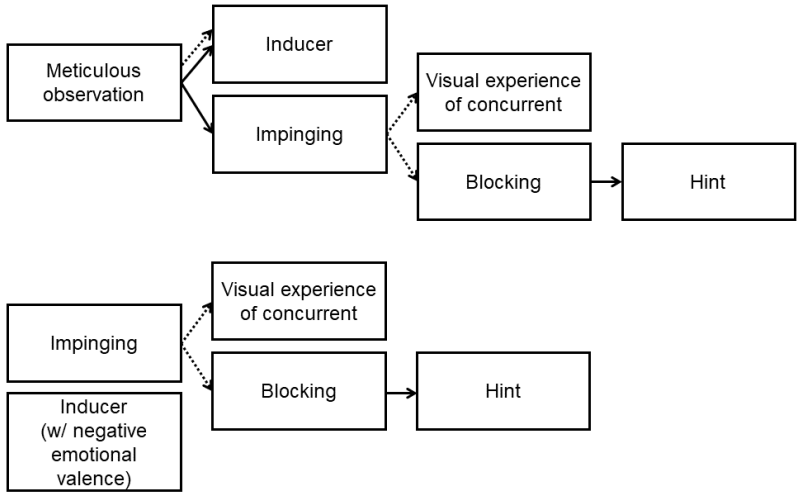

Figure 5:
Description of HR's phenomenological dynamics of impinging (above) and blocking (below).
Full arrows represent gesture-dependent experience. Dotted arrows represent the experience where HR can change the course of the experiential dynamics.

5. Discussion

In this paper, we presented an empirical phenomenological case study of HR, who experiences multiple forms of synesthesia, in order to better understand the automaticity of synesthetic phenomenology. We provided a general description of how HR experiences her visual consciousness, the phenomenological properties of her synesthetic experience, and how her synesthetic experiences evolve over time, depending on the specific mental gestures she performs. We observed an experiential category *hint*, an automatic, non-visual, spatially-localized and immediate awareness of the synesthetic concurrent. It takes a specific mental gesture—*unraveling*—for HR to bring a visual awareness of the concurrent into the foreground of her experience. She is able to *unravel* this visual awareness further, experiencing *becoming the color*. In this state, her entire field of experience disintegrates and becomes the awareness of a specific (concurrent) color.

The case study presented in this paper attempts to resolve paradoxical findings from neuroscientific research on synesthesia (i.e., Schwartzman et al., 2020). Neuroscience conceives of synesthesia as a) a stable trait of a specific subpopulation of individuals; and b) an automatic association of an inducer and a concurrent. This narrow conception of synesthesia, however, is not consistent with its phenomenological understanding. In *Phenomenology of Perception*, Maurice Merleau-Ponty (2012, 275), for instance, writes that rather than being a non-normative kind of experience, synesthesia is the property of everyday consciousness:

> In fact, each color in its inmost possession is but the inner structure of the thing manifested on the outside. […] By opening up to the structure of the thing, the senses communicate among themselves. We see the rigidity and the fragility of the glass and, when it breaks with a crystal-clear sound, this sound is borne by the visible glass. We see the elasticity of steel, the ductility of molten steel, the hardness of the blade in a plane, and the softness of its shavings. The form of objects is not their geometrical shape: the form has a certain relation with their very nature and it speaks to all of our senses at the same time as it speaks to vision.

The dynamic described above by Merleau-Ponty bears striking resemblance to Edmund Husserl's conception of the experience of transcendental objects. In *Thing and Space*, Husserl (1997) writes that objects that are present to consciousness are primarily experienced as extension (i.e., things taking up space). This empty spatial topology is then secondarily filled up with specific sensory qualities (e.g., color, illumination). We can relate this idea to how HR reports on her experience of sequence-space synesthesia: that is, as spatial topology, which, while not filled with sensory qualities, is filled with knowledge about temporal structures.

Further, in the same text, Husserl (ib.) explores the notion of kinesthetics, a synesthetic association between movement (and associated awareness of one's own body) and perception. In HR's lived experience, this association is clear, as she experiences an embodied gesture that unravels hint into a modally-present

experience of, for instance, color. Subspace region, the part of HR's experiential field, in which her synesthetic experiences occur, bears resemblance to the notion of body schema. In phenomenological thought, we can distinguish between two conceptions of the body: the body that one has (*Körper*) and the body that one is (*Leib*). It is through the latter that we are in contact with our surroundings (Fuchs 2016). We can, thus, relate HR's embodied gesture, which engenders her synesthetic to her engaging with her lived space. Her experience is different from normative experience, described by Merleau-Ponty, in that this embodied gesture constitutes novel sensory content.

Finally, we can relate this novel sensory content to the notion of value-ception (*Wertnehmung*) introduced by Max Scheler (1973). Value-ception refers to objects that are present to consciousness containing an immediately felt value. In the data provided above, we see how for HR, her synesthetic experiences are never (even prior to unraveling) affectless. They always constitute a rich landscape of affectivity, which then influences whether she chooses to unravel or block the synesthetic content. To summarize, the active and embodied character of HR's synesthesia in combination with the observation that synesthetic experiences can be acquired suggests that neuroscientific conceptions of synesthesia may be too narrow to fully explain its phenomenology.

Multiple observations within empirical phenomenology suggest that we are always attending to our experience from a particular observational perspective. Urban Kordeš and Ema Demšar (2018; 2019) propose the notion of *horizons*, i.e., different observational perspectives, from which we can—in the context of an empirical phenomenological study—attend to experience, and which ultimately co-determine the precise nature of the resulting findings. For example, when comparing naturally-occurring and training-induced synesthetic experience Schwartzman and colleagues (2020) noted that the same participants observing their synesthetic concurrents during the same interview session provided different data regarding the automaticity of synesthetic experience. When asked about the automaticity of the color concurrents via a closed-form question, most natural synesthetes report their experience was completely automatic. When moments later, however, they were asked to elaborate on their experience of the automaticity of their

concurrent experience using open-ended interview questions, many of them reported that the experience consisted of a willful act of bringing the colors to the forefront of their awareness. This dynamic was also reported by HR in detail when she was prompted to read a short story and then describe the concurrents associated with specific words (HR-I-01 and HR-I-02). When reading rapidly through the text, the concurrents took the form of amodal knowledge, localized in space:

> Background feeling of the colors being there, but because I was reading them quickly, and I wasn't crunching down on them, on each letter, it wasn't right up there. […] I was not focusing on them. So, I couldn't say to you it was this, this, and this. […] They were just here [points to her right shoulder] […] Yeah, right there [points to her right shoulder again]. (HR-I-01-01)

Only when HR was asked to attend carefully to specific words in isolation, this amodal knowledge of color (*hint*) took the form of visual awareness. Schwartzman and colleagues (2020) identified an aspect of experience similar to *unraveling* as reported by HR: reflective association. This is the observation that, in experience, some individuals with naturally-occurring grapheme-color synesthesia have to carefully consider the letter, in order to become aware of the concurrent. Our phenomenal data correspond to findings that link the awareness of synesthetic concurrents to attention. Individuals must either allocate sufficient attentional resources to the inducers (Rich and Mattingley 2003; Ward, Jonas, Dienes, and Seth 2010) or the inducers themselves have to be adequately processed (Mattingley et al. 2006). As noted in Table 2, the session HR-I-15 was dedicated to a mock-experiment, where the researcher told her a sentence that she had to memorize. While repeating the sentence (*John and Mary painted the walls of their new apartment white and yellow*), she was shown a series of three letters (*XHA*). HR memorized the sentence by "slotting" it into her *subspace region*:

> I knew that I lodged the words in the left-hand corner. […] I can see the sentence across the top of the subspace. But I didn't have those

> connecting visual experiences that time. I was just focusing on the lettering. […] When I started saying *John*, it definitely had a quality of white to it. *Mary* had a quality of blue to it. […] I looked at X first, and I saw black, then I looked at H, and I saw pink, and then I looked at A, and I saw red. […] I think I faulted in my speech, and then I was back to what I was supposed to speak. So, my attention did go from speaking to reading back to speech again. And I was able to look back at the subspace and continue saying what I was saying. […] So, it was a [pause] I didn't have to look at them. […] I didn't see [the sentence] […] I felt its presence. […] It was in my periphery. […] Exactly like I know these plants are here. Wooop [tilts the laptop to show flowers to her left] (HR-I-15-01)

This example demonstrates how, in experience, HR's concurrents cannot be *unraveled* at the same time as paying attention to a secondary task. Further, the apparent paradox of the same participant reporting on incongruent experience of automaticity of synesthetic experience reported by Schwartzman and colleagues (2020) corresponds to findings that the means, by which we inquire into experience, co-determines the resulting information reported about a specific experience (Sikka et al. 2017). It has been proposed that the reason for this is that different prompts for subjective reports lead participants towards attending to different aspects of their experience (Heimann 2020). HR's first-person reports, thus, provide a plausible understanding of the divergent response regarding the automaticity of synesthetic experiences.

We suggest that, when using a closed-form question asking if a specific concurrent experience is automatic or willful, participants report on the experience of *hint*. By definition, *hint* is an immediate and intuitive, non-visual awareness of the concurrent. In the literature, synesthetes who report such non-visual experiences are referred to as *know-associators* (Edquist et al. 2006). Conversely, when asking participants to report on their concurrents in more detail using open-ended questions, they attend to their experience more closely, *unraveling* it into a visual awareness of the color. Since *unraveling* has to be actively performed, the participants may be prompted to report on their experience as willful, despite creating an inconsistency in their reporting.

For HR, *unraveling* mirrors the experience of empathy. In a similar way as she might experience intersubjective feelings with another person (HR-II-D06-S05), a fictional character (HR-I-04-01), or an inanimate object (HR-II-D04-S02), HR projects a personality onto inducers via an attentional mental gesture. Richard Cytowic and David Eagleman (2009) report on a number of cases for whom synesthesia is associated with affect (most commonly familiarity). Based on these observations, Cytowic (1993) argues that the primary function of cognition is not a logical parsing of the world, but an emotional one. Our findings, similarly, suggest that empathy and synesthesia are similar in terms of mental gestures that engender them. This has earlier been asserted by David Abram (2017) in his anthropology of animism. He claims that, phenomenologically, synesthesia, defined broadly as the multi-sensory experiences, is directly related to recognizing life in other beings. For Abram, this includes other animals, plants, as well as non-living parts of the world, such as rock formations, much how HR reports empathizing with a wide range of entities, such as bees (HR-I-04-02), soil and seedlings (HR-II-04-02), and grain (HR-II-D01-S01).

Finally, *hint* and the experience of *unraveling* it into a modal awareness bear similarity to the notion of *gist* (Lipič and Kordeš 2017; Kordeš and Demšar 2018; Kordeš et al. 2019). Gist is a phenomenological modality wherein individuals are aware of the potentiality of an experience. This experience is brought to the foreground of their awareness either by simply attending to it, waiting for its emergence, or by interrogating it with a specific intention (cf. Eilan 1998). Thus, *hint* and gist share two principal phenomenological properties: first, they are not present in the same modality as the object they refer to; second, it takes a process or a gesture of unfolding for these aspects of experience to translate itself into a modally present object.

6. Conclusion

Here, we presented an empirical phenomenological case study of HR, who experiences multiple forms of synesthesia. The goal of the study was to provide a better understanding of synesthetic phenomenology, in order to address a paradox reported by Schwartzman and colleagues (2020). Namely, synesthetic

participants reported that their concurrent experience was both automatic and willful. HR reports an experiential dynamic whereby her experience of inducer co-occurs with *hint*, a non-visual, spatially-localized, immediate, and intuitive experience of knowledge about the synesthetic concurrent. HR can then perform the mental gesture of *unraveling*, bringing the *hint* spatially forward and glancing towards it, resulting in a visual experience of a synesthetic concurrent. We suggest that, when using closed-form questions, synesthetes report on *hint*. However, when they are asked to provide a more detailed account of synesthesia, they attend to their experience differently, performing a mental gesture, i.e., *unraveling*, causing them to describe their experience as being willful. Using the methods of empirical phenomenology, we were able to provide a precise phenomenological description of a single case of multiple forms of synesthesia, which yielded a potential solution to a paradoxical insight regarding the automaticity of synesthetic experience. Such work has the potential to transform consciousness science by bringing objectivity to experiential phenomenology. Finally, we acknowledge that qualitative research does not reflect an objective, opinion-free point of view, but we suggest that its strength is in adding a unique level of understanding to a condition, such as synesthesia, which in turn can be used to drive future experimental work.

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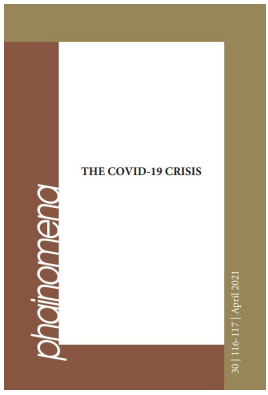

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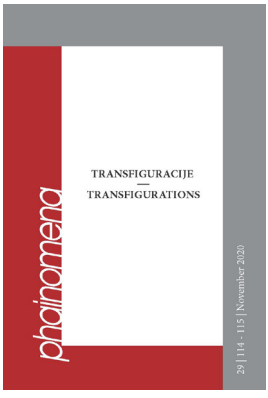

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