Synesthesia and Hallucination

Word Count: 2977

Synesthesia literally means a "union of the senses" whereby two or more of the five senses that are normally experienced separately are involuntarily joined together in experience (Cytowic 2003, Simner and Hubbard 2018). For example, some synesthetes experience a color when they hear a sound or see a letter, although many instances of synesthesia occur entirely within the visual sense. After making some preliminary distinctions, I engage critically with Sollberger's (2013) view that there is reason to think that at least some synesthetic experiences can be viewed as truly veridical perceptions, and not as illusions or hallucinations. I explore the possibility that many forms of synesthesia can be understood as experiencing what I will call "second-order secondary properties," that is, experiences of properties or qualities of objects induced by the secondary qualities of those objects. In doing so, I shed light on why synesthesia is virtually always one-directional.

1. Synesthesia

Synesthesia, or "synesthetic experiences," often involves instances where two or more of the five senses that are normally experienced separately are involuntarily joined together in experience (Cytowic 2003). For example, some synesthetes experience a color when they hear a sound or see a letter. Synesthesia can also occur entirely within one sense, for example, "grapheme-color synesthesia," the most common form of synesthesia, involves experiencing (black) letters or numbers as inherently colored. For example, one might always experience "R" or "2" as red, or "N" and "8" as purple.

Motion-sound synesthesia involves hearing sounds in response to visual motion and flickers. Saenz and Koch (2008) report evidence that, for at least four synesthetes, seeing visual motion or non-moving visual flashes automatically causes the perception of sound. These synesthetes outperformed control subjects on a difficult visual task involving rhythmic temporal patterns, for example, judging whether two successive sequences (whether both auditory or both visual) were the same or different. This is presumably because they not only see but also hear the patterns. Unlike many other abnormal psychological phenomena, however, synesthesia is not a disease or illness. In fact, the vast majority of synesthetes prefers to have synesthesia and could not imagine life without it.

Several key distinctions are important:

(a) Grossenbacher and Lovelace (2001) use the terms ‘‘inducer’’ to refer to the stimulus that triggers the synesthesia and ‘‘concurrent’’ to refer to the synesthetically induced sensory attributes. Synesthetic experiences are highly individualized, that is, no two people’s set of synesthetic experiences seem to be exactly the same.

(b) There are so-called “higher” versus “lower” synesthetes in grapheme-color synesthesia (Ramachandran and Hubbard 2001, Cytowic and Eagleman 2011). Higher synesthesia is much more common and has to with the “meaning” of a grapheme, that is, the *concept* inherent in a grapheme that induces color, not the visual shape itself. Letter capitalization and font size generally do not change an induced color. For example, J, j, and *J* evoke the same color experience. Lower synesthesia is rare and the inducer is the visual shape itself.

(c) Another distinction is between "projectors" and "associators" in grapheme color synesthesia (Dixon, Smilek, and Merikle 2004). The concurrent images are either projected onto the external world (projector synesthesia) or perceived in the mind's eye (associator synesthesia). In projector synesthesia, the projected concurrent may also be seen as floating above its inducer. In associator synesthesia, the concurrent image is seen internally, much like a visual image retrieved from memory or generated by imagination.

There is significant evidence for the view that synesthetic experiences are perceptual in the sense that they are genuinely experienced as properties of objects. For example, it has been shown that grapheme-color synesthetes can perceptually group graphemes according to their synesthetic colors (Hubbard and Ramachandran 2005). Nunn et al.'s (2002) neuroimaging studies have shown similar brain activation in synesthetes as found in typical non-synesthetic color processing. One explanation is that there is heightened "cross-activation" of adjacent brain regions (Ramachandran and Hubbard 2001). Cytowic and Eagleman (2011) explain the neural differences between higher and lower synesthetes by pointing out how different brain areas cross-activate with V4 (the primary color area in the visual cortex).

2. Synesthesia and Hallucination

Is synesthesia a special kind of hallucination or are synesthetic experiences veridical in some way? I will mainly focus on Sollberger's (2013) excellent discussion. He aims to show that "there is reason to think that at least some synesthetic experiences can be viewed as truly veridical perceptions, and not as illusions or hallucinations" (p. 171). He focuses on "…a sub-group of synesthetes who: (a) literally attribute the sensory properties of the synesthetic experiences to the *distal* stimulus itself [and] (b) do not take their synesthetic experiences to be

nonveridical, e.g. illusory or hallucinatory" (Sollberger 2013, p. 173). This would certainly be the case for projector grapheme-color synesthesia. He also cites an instance described by Cytowic (2002, p. 13): "I remember at age 2 my father was on a ladder painting the left side of the wall. *The paint smelled blue* [emphasis added], although he was painting it white. I remember to this day thinking why the paint was white, when it smelled blue."

Sollberger defends three reasons for treating synesthetic experiences as veridical perceptions:

(1) "…the fact that synesthesia is not a…dysfunctional biological trait, but a condition that can indeed benefit the possessor's cognition and perception, opens up space for considering synesthetic experiences as potentially veridical perceptions" (Sollberger 2013, p. 175).

(2) "…the subjective reports of synesthetes [show that they] are firmly convinced that what they synesthetically perceive is real and ''valid,'' and not hallucinatory or illusory" (p. 175).

(3) "…from a purely evolutionary perspective, the goal of perception is to maximize fitness, i.e., to raise more offspring. Perception must be viewed as a…problem-specific cognitive function whose purpose is to enhance fitness" (p. 175).

Sollberger carefully considers several objections to each of the above reasons and, for example, rejects the notion that we should not take the reports of most synesthetes at face value. He concedes that some synesthetes probably do not really take some concurrents to be properties of the distal objects (e.g. that numbers really have personality traits or genders) but he reiterates

that he is not claiming that all synesthetes are the same in this respect. He warns against being overly dismissive of what is experientially possible with respect to the following options (Sollberger 2013, p. 178):

(A) **Strong actual reading**: the synesthetic concurrents appear to the synesthete as properties of the distal object x.

(B) **Strong possible reading**: it is possible that the synesthetic concurrents appear to the synesthete as properties of x.

(C) **Weak actual reading**: the synesthetic concurrents appear to the synesthete as being bound in some way to x.

Sollberger sees little reason to rule out (A) and allow only for (C). Some might suppose that we cannot make sense of (A): "That is, a skeptic might be tempted to rule out such cases *a priori* because she thinks that this kind of cross-modal property attribution is inconceivable…. Cases of (B) must *eo ipso* also be rejected by such a skeptic. What is odd about such a dismissive view about what is experientially possible is that it is far too narrow-minded" (p. 178). Still, as Sollberger knows, there are cases of "associator" grapheme-color synesthesia which would seem to fit (C) better than (A) which instead better describes "projector" grapheme-color synesthesia.

Before going further, it is useful to have a working definition of a hallucination. On one view, it is "a percept-like experience which (a) occurs in the absence of appropriate stimulus, (b) has the full force or impact of the corresponding (real) perception, and (c) is not amenable to direct and voluntary control by the experiencer" (Slade and Bentall 1988, p. 23). But this definition could characterize synesthesia in different ways. Indeed, it is pretty clear that (b) and (c) are present in some synesthetic experiences, as we have already seen. The problem, however,

might be with (a) and its specific use of the term "appropriate stimulus." Presumably, this refers to something like the "normal" stimulus for typical perceivers. But if this is so, then synesthetes are having hallucinatory experiences since they are not typical perceivers in this respect. If meeting the above three conditions is sufficient for having a hallucination, then it would thus seem that Sollberger's view could be challenged on those grounds. Still, there is something far more intrasubjectively stable and systematic in the synesthete's experience which is lacking in other random and momentary hallucinations. The stimuli in question are, we might say, "appropriate" or "normal" *for the synesthete*. If they are hallucinations, they are at least different than those caused rarely and randomly by ingesting drugs or suffering from epilepsy.

There also seems to be an ambiguity in the use of the term "appears" in the above statements (A) – (C). In some cases, such as in projector grapheme-color cases, the term 'appears' refers to the way the distal stimulus looks to the synesthete. But, especially in other non-visual cases, such as color-smells or sounds-taste synesthesia, the term 'appears' seems to mean something more like "caused by" which is not quite the same. That is, if the paint smells blue, is the claim that the paint *causes me* to experience a certain smell or am I saying that the smell appears *in the paint* in some sense?

Indeed, there is perhaps even a further ambiguity in the use of 'appears.' Consider another one of Sollberger's examples:

"The shapes are not distinct from hearing them -- they are part of what hearing is. The vibraphone, the musical instrument, makes a round shape. Each is like a little gold ball falling. That's what the sound *is*; it couldn't possibly by anything else" (Cytowic 2002, p. 69)

This seems to be an example of sound-vision synesthesia. Is the concurrent (the shape) experienced as part of the synesthetic auditory experience? It would seem so if we take the report at face value, especially in the first and fourth sentence above. However, the second sentence might be taken instead as reporting that the sound, or even the instrument itself, causes ("makes") a round shape. This seems more like the language of cause and effect. Does the instrument or the sound itself "appear" round or does it cause the synesthete to experience round shapes? I am not sure but the ambiguity cries out for clarification. Would this synesthete reach out to pick up the instrument with expectation that it will feel round? Perhaps even more difficult to understand, is the sound *itself* round in some sense?

So the case for treating synesthetic experiences as hallucinations is perhaps stronger that Sollberger claims according to the above definition, especially if we interpret the "appropriate stimulus" as the normal stimulus for a typical perceiver. It is worth noting that the official American Psychological Association definition of a hallucination is not very helpful here. According to it, a hallucination is a "false sensory perception that has a compelling sense of reality despite the absence of an external stimulus. It is important to distinguish hallucinations from illusions, which are misinterpretations of real sensory stimuli" (https://dictionary.apa.org/hallucination).

It is pretty clear, however, that virtually all cases of synesthesia emphatically do *not* involve "the absence of an external stimulus" if this means the *total lack* of any distal object at all. There are no experiences of pink rats climbing on the wall when there is nothing at all on the wall. So this tends to favor Sollberger's view that synesthesia is not hallucinatory. However, there is still the absence of the *property* attributed to the object (the "appropriate stimulus"), at

least according to normal perceivers. In this respect, perhaps synesthesia is closer to an illusion than a hallucination. In the next section, I will explore a view along these lines.

3. Primary and Secondary Qualities of Objects

The above discussion leads me to consider how the traditional distinction between primary and secondary qualities of objects can shed light on the nature of synesthetic experience.

John Locke (1689/1975, Bk II, chapter eight) famously distinguished between primary and secondary qualities of objects. Primary qualities have to do with the object's microstructure and, according to Locke, are inseparable from the external object itself, such as size, shape, mass, number, and motion. Secondary qualities, however, are "nothing in the objects in themselves but powers to produce various sensations or ideas in us," such as colors, tastes, and sounds. It is only ideas of primary qualities of a perceptual object that really *resemble* what is in the object. According to Locke's representative realism, primary qualities are "really out there" mind-independently, especially as compared to secondary qualities which are mind-dependent to some extent.[i]

So it makes sense that secondary qualities are almost always those experienced as the concurrent qualities. In this way, synesthetes can have an intrasubjective coherent stream of conscious perceptions. Since secondary qualities are at least not entirely mind-independent in some sense, they perhaps matter less to coherent conscious experience in the sense that one can have an individual and idiosyncratic way of experiencing the color, taste, and smell of objects. If we treat secondary qualities as themselves appearances of objects, then concurrents are more like unusual appearances of objects or, perhaps even better, "appearances of appearances" where a secondary quality inducer triggers a concurrent experience of another secondary quality (such as

in sound-color, smell-touch, or sound-taste synesthesia). That is, we can understand many instances of synesthesia to involve what I will call "second-order secondary properties," that is, the experiences of properties or qualities of objects induced by the secondary properties of those objects. So it is crucial to notice that the concurrent is virtually always a secondary quality of objects, such as a taste, smell, or color. The inducer is also often a secondary quality but can sometimes be a primary quality such as size, shape, and motion.

I suggest that perhaps this is why synesthesia is almost always one-directional, that is, synesthetes who experience an inducer-concurrent pair (I, E) will not experience that pair in reverse (E, I). One exceptional instance is Julie Roxburgh who sees color when she hears sounds *and* hears sounds when she sees colors (as described in Cytowic and Eagleman 2011, pp. 102-103). However, this leads her to have a kind of psychopathology whereby there is sensory overload and she has problems functioning in everyday life, including navigating through traffic: "The onslaught of cacophony results in considerable perceptual interferences and causes her distress" (p. 102). She "feels frightened and exhausted…[it is] difficult to avoid traffic and people…every one of her senses is "being battered"… [the] neon lights are shouting [and]…flashing lights give her a tactile sensation in her fingers" (p. 102). This description certainly seems to run counter to Sollberger's characterization of synesthesia as enhancing cognitive fitness and not as a dysfunctional biological trait. Nonetheless, Sollberger may unknowingly be pointing to the reason why bi-directionality is so rare.

Perhaps even more important for my immediate purpose is the fact that there are rarely, if ever, cases where there is a secondary quality inducer and a primary quality concurrent. There are some unusual forms of synesthesia which might appear to fit this description, such as audio-motor synesthesia (Cytowic and Eagleman 2011, p. 40). However, in this case, we have a boy

who felt compelled to *move his body* into various poses in response to the sounds of words. It was not as if he experienced the motion of outer objects when he heard these words. Otherwise, I would think that his daily life would be extremely difficult.

It seems to me that, as long as there is some *internal individual experiential consistency* among experienced concurrents, there is little worry about disruptive experiences. In contrast, the potential for difficulty successfully interacting with the world results (or would result) from cases where concurrents involve primary qualities such as size, shape, and motion. It is true that some synesthetes do talk about seeing a black letter as, say, *both* black and orange which would seem potentially disruptive. However, these synesthetes are presumably not saying that they experience objects or letters as black and orange *all over at the same time* and nothing is changing in location or size. On the other hand, it would be much more difficult to understand what it would possibly be like, say, if a colored object appeared to be both large and small, or in motion and at rest. Similarly, it is difficult to see how one could coherently experience a food smell as inducing the experience of that food moving or being larger than the other food on a plate. The same can be said for systematically experiencing a type of colored object, say, moving in ways that other colored objects do not. For one thing, many objects have more than one color. And try to imagine, for example, judging the distance between objects. How could one drive or play a sport without becoming paralyzed into inaction? These kinds of abnormal conscious experience would certainly be more noticeable to others and highly debilitating to the people in question.

4. Conclusion

I have engaged critically with Sollberger's (2013) view that at least some synesthetic experiences can be viewed as truly veridical perceptions. With the help of the traditional Lockean primary-secondary quality distinction, I explored the possibility that many forms of synesthesia can be understood as experiencing what I will call "second-order secondary properties," that is, experiences of properties or qualities of objects induced by the secondary qualities of those objects. Depending on the definition of hallucination, it may be that some synesthetic experiences are hallucinatory in at least some sense. In the process, I have also attempted to shed light on why synesthesia is virtually always one-directional, that is, the greater potential for difficulty in successfully interacting with the world when concurrents would involve primary qualities such as size, shape, and motion.

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NOTES:

[i] There is of course still significant debate today as to how best to characterize the mind-dependence or mind-independence of secondary qualities (especially with respect to color). For example, the question might be framed as "What kinds of properties are colors?" or "Are colors mind-independent in some sense?" For example, a "reductive physicalist" holds that colors are "hidden" properties of bodies, that is, complex, physical properties that dispose bodies to look blue, pink, yellow, and so on. Another view is "dispositionalism" such that colors are perceiver-dependent, dispositional properties; that is, powers to look in distinctive ways to appropriate perceivers, in appropriate circumstances (Maund 2019, p. 9). Note, however, that we still have the problematic and ambiguous expressions "appropriate perceivers" and "appropriate circumstances." Sollberger recognizes that synesthetic experiences seems to rule out "that colors could be construed as intrinsic, categorical properties of physical objects. Instead, it marries up more easily with a form of psychological-dispositionalism about color…" (Sollberger 2013, p. 183). Of course, an idealist, such as Berkeley, would say that even the so-called primary qualities are mind-dependent (at least dependent on God's mind). However, for our purposes, let us simply assume that there are mind-independent objects and that we often do experience secondary qualities as properties of external objects, for example, that objects appear to us as colored. Still, some secondary qualities seem better described as *caused by* external objects, such as the sound of a guitar string vibration or the smell of a specific food.