Color Relationalism vs. Color Dispositionalism

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Abstract

In the thesis I look at two recent philosophical color theories, namely relationalism and the multiple-aspect view on dispositions. The main aim of my thesis is to evaluate the basic motivations for these color theories. A secondary aim is comparative: to asses which of these two theories provides a better account of color. These aims are achieved by means of, first, considering objections that were recently raised against color relationalism and examining whether it has succeeded in answering them. Secondly, I turn to the multiple–aspect view on dispositions and examine its answers to classical objections that were made against color dispositionalism. Finally, I discuss these two theories vis-à-vis two topics: the apparent–objective color distinction, and ecumenical reconciliation in the cases of perceptual variation. The conclusion of my discussion is that color relationalism fails to account for a clear distinction between apparent and objective color, while the multiple-aspect view succeeds to account for the distinction only partially. Moreover, accounts fail to provide a good motivation to consider ecumenical reconciliation in the cases of perceptual variation as a desirable aim.

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Introduction

In my thesis I will critically discuss relationalism and dispositionalism about color. On the relationalist side I will examine Jonathan Cohen's relational theory of color, and on the dispositionalist side I will discuss Joshua Gert's multiple-aspect view on dispositions. I shall confront both accounts with a variety of objections and evaluate their answers to them. My main aim in the thesis will be to question the basis of both theories on separate as well as on common grounds. Towards the end I will also consider which of these theories does a better job in answering the objections raised against it and gives the most convincing account on color perception. More precisely, I will discuss them on the basis of two topics, the apparent–objective color distinction and ecumenical reconciliation in the cases of perceptual variation.

The problem of color has been a central issue in the history of philosophy (e.g., Aristotle, Galileo, Descartes, Locke, and Newton). Moreover, even though colors were not the main topic of certain debates they have been used for many examples. Byrne and Hilbert (2001) point out the following ones: Hume's missing shade of blue, G. E. Moore's comparison of good with yellow, Nelson Goodman's "grue" and "bleen", and Frank Jackson's super-scientist Mary.[1] Towards the end of the twentieth century the color discourse among philosophers became more intensive. Some of the most influential contributions to the development of the philosophy of color were the works of Hardin with his significant book *Color for Philosophers* (1988), Hilbert (1987) and Thompson (1995). To turn to more recent works, Jonathan Cohen made a significant contribution to the philosophy of color with the proposal of color relationalism. This is why I will to centre my thesis on color relationalism and compare it with a particular version of color dispositionalism – the multiple-aspect view.

[1] For references see Byrne and Hilbert, 2001.

1 Color relationalism

In his article 'Color Properties and Color Ascriptions: A relationalist manifesto', Cohen (2004) claims that colors should be understood as relational properties. A typical relational property is 'being a sister' and a typical non-relational property is 'being cubical'. Cohen forms the following question in order to apply the relational/non-relational discussion to colors: "Suppose x is red; then, as we modify things other than x and thereby modify the relations x bears to other things, will x (necessarily) continue to be red?"[2] According to the relational theory x need not continue to be red. This is why for Cohen 'being colored' is more like 'being a sister' than like 'being cubical'. More precisely he states that colors are constituted in terms of relations between objects, perceivers, and viewing conditions. In his book *The Red and the Real* (2009) Cohen positions his relationalist account in the taxonomy of color ontology. Instead of positioning it into standard taxonomy he proposes what he calls a 'Refined Taxonomy', whose main characteristic is that it takes the distinction between relationalism and non-relationalism as basic distinction for color theories. It is important to mention that he positions color dispositionalism as a subcategory of relationalism. However, in the recent debates color dispositionalism and relationalism are regarded as rivals, a thing that makes Cohen's suggestion about sub-categorization questionable.

I will now consider the essential idea of relationalism. Cohen presents an argument for color relationalism, traces of which he finds in works of some Early Modern philosophers, such as Galileo, Locke and Hume, and of recent ones like Bennett (1968) and McGinn (1983). Cohen's motivation for his defense of a relational account of color is based on the cases of perceptual variation that show the wide range of perceptual effects of a single stimulus. As a first premise of what he calls his *master argument* he points to cases of perceptual variation. For example, in Figure 1 the central grey squares look different hues because of the different

[2] Cohen, 2004, p. 453.

backgrounds they are placed against, although they are the same shade, as can be seen when they are put next to each other. On the basis of such cases he concludes that the evidence shows that "there are multiple, psychologically distinguishable, perceptual effects of a single color stimulus."[3]

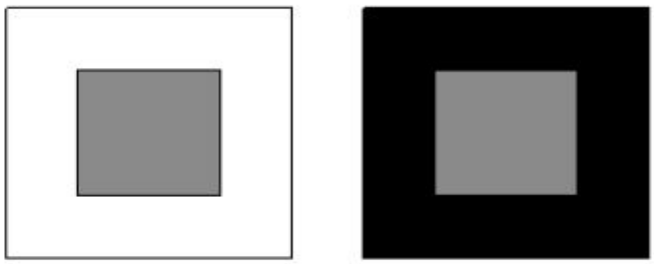

Figure 1: The two center gray squares have equal reflectances, but the one against the lighter background appears darker than the one against the darker background. (Cohen, 2009, p. 24)

The second premise of Cohen's argument is: if colors are non-relational properties of objects, then it cannot be the case that the relevant things are as they look color-wise under each variation, for example, of the previous case. Non-relational properties do not depend on the background they are put against, nor on the perceiver or on the given circumstances because they are not in a (at least not essential) relation with any of those. By contrast, if colors are relational properties of objects, then objects are as they look color-wise in each variation. As the third premise Cohen claims that if we suppose that color is a non-relational property, then "it follows that at most one of the perceptual effects can veridically represent the color of the patch".[4] But, according to Cohen, we do not have any independent and well-motivated reason for singling out just one of the variations and saying that an object has the color it then looks to have. This is why we should not hold that colors are non-relational properties of objects but

[3] Cohen, 2009, p. 24.
[4] Cohen, 2004, p. 455.

the best alternative is rather to say that colors are relational properties and that objects have all the colors they look to have in presented variations. From these premises Cohen infers that colors are relations between objects, perceiver, and viewing conditions. Cohen points out that his argument from perceptual variation is not intended as a "knock-down deductive argument", but rather as some kind of an inference to the best explanation and a way to avoid *ad hoc* stipulations usually implied by non-relationalists' answers to perceptual variation. According to Cohen, the desirable aim in consideration of perceptual variation is to treat all the viewers and circumstances as equally good instead of making unmotivated stipulations by favoring just one variation. This equal treatment is what Cohen calls ecumenical reconciliation of the variants.

Although the argument is based on a particular kind of perceptual variation, namely, simultaneous color contrast case, Cohen argues that his argument holds for a variety of perceptual variations and generalizes the same for the following: inter-species differences, interpersonal differences and intrapersonal differences. In respect to inter-species differences, Cohen compares human visual system (trichromatic) with pigeon visual system (tetrachromatic). He argues that the best way to treat differences in representation is to treat them equally. This is to say that both sorts of visual system have a veridical representation of a surface even if the representations are completely different. This is why Cohen suggests the following: "we should construe colors as constituted in terms of relations to (inter alia) kind of visual systems and accept that if x looks green to a visual system, x *is* green for that visual system."[5] Moreover, considering interpersonal differences, Cohen argues that one cannot determine which representation is veridical on a basis of some sort of standard perceiver because there is no non-problematic way to determine what a the standard perceiver is. This is why, similarly as in the previous case, one should treat all representations equally. Finally,

[5] Cohen, 2004, p. 463.

Cohen considers intrapersonal differences. For instance, subject represents an object differently in two kinds of viewing conditions. One way to determine which representation is veridical is to turn to the one that matches with the representation of the color of an object in standard conditions. Cohen argues that there are some scientific and industrial specifications of standard conditions but there are no general specifications. For this reason, also intrapersonal differences in representation of a color should be treated equally.

As mentioned before, according to relational theories of color, colors should be understood as relational properties. More precisely, colors are constituted in terms of relations between objects, perceivers, and viewing conditions. Cohen (2009) argues for a specific branch within relational theories, namely, role functionalism. He claims that the relations that are colors are functional. These relations are functional because they involve "the performance of a certain functional role that connects surfaces, light, and the like, to visual systems". [6] On his view, red is the functional role of disposing its bearers to look red[7] to a subject in certain circumstances (*mutatis mutandis* for the other colors). Although I shall not discuss in detail Cohen's defense of role functionalism in my thesis, it is important to mention that it seems not to differ essentially from a particular kind of dispositionalism, namely a functionalist theory of dispositions.

I return back to the argument in favor of color relationalism. Cohen's argument seems to get problematic already with its second premise. There Cohen argues that the example of perceptual variation in the case of the simultaneous color contrast (Figure 1) cannot be explained in terms of non-relational properties because these kinds of properties do not depend on circumstances. However, it seems that one can find perceptual variation among non-relational properties as well, for instance, length. Consider the Müller-Lyer illusion

[6] Cohen, 2009, p. 177.

[7] Circularity of his account is discussed later in the thesis.

(Figure 2) where lines appear different in length in two separate conditions (the directions of arrows) even though they are exactly the same in length. This is analogous to the case of simultaneous color contrast, where when the gray patches are put together one sees that they are the same shade. It seems that Cohen mistakes the property with the recognition of the property, because it does not follow that if a property *appears* different in different relations it actually is relational, as is shown in length analogy.

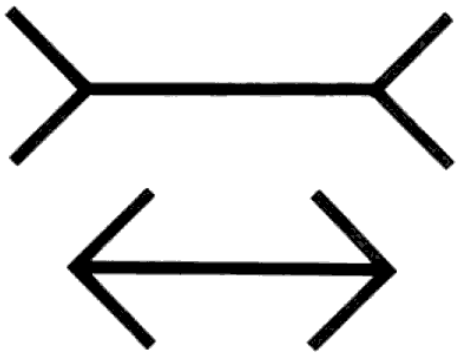

Figure 2: The Müller-Lyer illusion – the two lines are the same length.

In his third premise Cohen argues that if one claims that color is a non-relational property then one does not respect all variations in the presented case (Figure 1), because one has to pick out just a single variation as veridical. Again, this conditional is unconvincing. This is because it is not clear why being non-relational entails not being ecumenical. Let's turn again to the case of a non-relational property – length. In the case of perceptual variation of length (Figure 2) one does not judge that at most one variant is veridical because it is hard to imagine the case when the line looks its *real* length. Instead, all variants of the line are veridical although length is not a relational property. So, the fact that a property is non-relational does not imply that in case of perceptual variation one would have to pick out a single veridical variant.

Furthermore, it seems that the proposed conclusion, namely that the best alternative is to say that colors are relational properties, does not clearly follow from the claim that we do not have a well-motivated reason for singling out just one variant. It appears to me that people do agree on what color things are and usually that objects have one (conventional) color. For instance, people (more or less) uniformly judge that strawberries are red and lemons are yellow, even though they might seem different in certain conditions.

As I tried to show with these short remarks, Cohen's so-called master argument stands on rather weak grounds. In the following chapter I consider similar worries and objections raised against color relationalism.

2 Assessing relationalism

In this chapter I consider the main objections raised against color relationalism. First, I present Cohen's own defense of relationalism contained in the article 'Color Properties and Color Ascriptions: A Relationalist Manifesto' (2004). Secondly, I will present the most up-to-date criticisms of Cohen's account of color by Berry Maund, Keith Allen and Joshua Gert featured in the latest issue of the *Croatian Journal of Philosophy* (issue on color).

2.1 Cohen's defense

2.1.1 Reduction Tubes

Cohen (2004, p. 457) points out that one might argue, contrary to his argument from perceptual variation, that we do have independent and well-motivated reasons for singling out just one of the variations in the case of perceptual variation. For example, in order to figure what a real color of an object is one must block out all simultaneous contrast effects, a thing which can be achieved by viewing through a reduction tube.

Cohen has two answers to this objection. Firstly, contrast effects are ubiquitous in color perception, therefore the surfaces in the ecologically valid settings will not look to have the colors they actually have. Secondly, the use of reduction tubes would eliminate the possibility of an object to have contrast colors. These are "colors whose appearance depends essentially on contrast effects–colors that cannot appear in the absence of contrast."[8] Contrast colors cannot be viewed through reduction tubes, for example when viewing brown surface through a reduction tube it appears either yellow or orange.

[8] Cohen, 2004, p. 457

2.1.2 Color constancy

The second objection against Cohen's argument turns attention to color constancy. This is the phenomenon according to which objects persist to look roughly the same color regardless of the changes in viewing conditions. In the case of the coffee cup (figure 3) an observer will judge that the object has one color and not two or more.

Figure 3: Partially sunlit coffee cup (Cohen, 2004, p. 506)

Cohen argues that such judgments suggest that at most one variant in the coffee cup case is veridical. For him, judgments in color constancy experiments can be such that respect the full variety of perceived data and avoid the claim that just one perceptual variant is veridical. This is possible if we understand perceived data in a slightly different way: "the two regions would look the same (in respect to color) were they both viewed under sunlight."[9] But the neighboring regions are unlike in color because of the color that they are occurrently manifesting. So, according to Cohen regions share both of the colors represented by the perceptual variants.

It seems that Cohen is interpreting concepts and judgments in the context of color constancy in a rather unjust way. It seems to me that in the case of the differently illuminated coffee cup

[9] Cohen, 2004, p. 459

one simply claims that the cup has one color and this particular color looks different shade in different illumination. What an observer S distinguishes are not different colors but different states of illumination as in the figure 4 (this case of perceptual variation is also proposed by Cohen). This is nothing like what Cohen is claiming, namely that a perceiver has to pick out just one variant that is veridical. This kind of understanding of a presented coffee cup case would require one to judge which shade of the cup is its true shade. I believe that this is not a typical consequence of making judgments about the cases such as coffee cup case is. It seems to me that the idea of judgments in color constancy phenomena is not to determine which variant is veridical but just to claim that the color of an object is not actually changing in spite of the changes in viewing conditions.

Figure 4: The central grey circles have equal reflectances but their perceptual effect varies according to the background.[10]

2.1.3 Are relational properties really needed for an ecumenical reconciliation?

As a third possible objection Cohen considers Stroud (2000) on the issue of relational properties. The question is whether perceptual variation is a sufficient condition for relationalism. It seems wrong to infer that colors are relational properties from the cases of perceptual variation because there is also perceptual variation among properties that are certainly not relational. For example, Stroud argues: "whether you get a perception of something ovoid from an ovoid object or a perception of an elephant from an elephant equally

[10] Cohen, 2009, p. 21.

depends on your current state and the perceptual conditions."[11] This is why perceptual variation among color properties does not indicate that they are relational, considering the fact that there is perceptual variation between properties that seem clearly non-relational.

Cohen answers that this objection misses an important point in his argument, which is that in the perception of color there is no independent, well-motivated and nonarbitrary criterion that makes at most one variant veridical, while in the case of the perception of an ovoid object or an elephant there are such criteria. Again (as in the earlier subsection), it seems to me that Stroud's thought was not to determine only one veridical variant. His thought seems to be that perceptional variation of some or other property is not in itself a reason to determine what kind this property is, in this case, whether it is relational or non-relational.

Moreover, in his book 'The Red and The Real' (2009)[12], Cohen considers a variety of accounts that support ecumanicism about color but not the idea that colors are relational properties. Here I will consider just one of the accounts Cohen is replying to. One possible way to avoid color relationalism and still respect the perceptual variety is to explain the perceptual variation in terms of modes of presentation. The classical example used in philosophy of language is the case of Venus (the brightest object on the morning and evening sky). The idea is that when observing Venus as a heavenly body it can be represented in two distinct utterances (depending on the time of the day):

(a) That is the Morning Star.

(b) That is the Evening Star.

The variation between these two utterances is in what they represent about the Venus. The Fregean response to the presented case is that both utterances present the same property – *being Venus*, the only difference is that they do it in a different mode of presentation. For this reason the two utterances are not in a contradiction and do not differ in a truth value. To make

[11] Stroud, 2000, p. 174

[12] This discussion can be found in the part 3.3 – Ecumenicism Without Relationalism? (p. 74–95).

an analogy between conceptual representation in the example from philosophy of language and the perceptual representation in respect to color, Cohen proposes the following example with two subjects observing a single stimulus of the 490nm spectral light:

(U1) The light (demonstration of 490nm light) looks unique green.

(U2) The light (demonstration of 490nm light) looks bluish green.[13]

In accordance with the Fregean solution in the conceptual case, here one could argue that the (U1) and (U2) diverge only in the mode of presentation of a single color property and not in the properties they attribute or withhold to the light. In this respect, *being unique green* and *being bluish green* are not two different color properties but two different modes of presentation of one color property. This goes against the relationalist proposal that the 'demonstration of 490nm light' has all colors that it appears to have.

Similarly to his reply to Stroud, Cohen argues that the Fregean strategy seems intuitively right in the case of the perception of shapes because there one can determine a distinguished mode of presentation. For instance, viewing a round table from a head-on perspective instead of from an angle where it seems to be oval, as he puts it: "There is […] a distinguished mode of presentation such that, when objects are presented under it, whether or not those objects are instances of *being round* is revealed to subjects."[14]

However, Cohen again claims that the same strategy cannot be applied to the perception of color properties. This is because one has no good reason to determine which mode is a distinguished one, for example, in the cases of intrapersonal variation (Figure 1) and even less in the cases of interpersonal variation.[15]

[13] Cohen, 2009, p. 90.
[14] Cohen, 2009, p. 93.
[15] The question whether relationalism is needed for the ecumanical reconciliation will be discussed further in the subchapter 4.2.

2.2 Gert‘s criticism

In his article ‘Crazy Relations’ (2012), Gert discusses Cohen’s master argument for color relationalism. As an alternative to relationalism, Gert proposes a ‘multiple-aspect’ view on color, which supposedly makes less radical claims about color experience. Gert's theory will be discussed in a greater detail in section 4 of this paper. Gert's criticism is focused on the issue of interpersonal and intrapersonal variation in the experience of color. Gert considers Cohen’s case of perceptual variation when the same colored patch looks slightly bluish to one observer and not bluish at all to the another one, or when the same patch looks bluish to me in the morning and not bluish in evening. For this case Cohen claims that the patch has all the described colors quite regardless of the circumstances, although the specific colors are being manifested just to the relevant perceivers in the relevant conditions. Gert argues that such a view has odd consequences. For example, when looking at a shirt of a uniform pink “it is possible to note the fold and wrinkles in the shirt by noting the way its appearance systematically changes in lightness and hue.”[16] The problem that Cohen has with this pink shirt is that according to his previously mentioned claim he is forced to say that the manifested colors of the pink shirt are constantly changing, that the shirt is multi-colored, and that it also appears to be multi-colored. So, Cohen has a problem with explaining the special stability of colored objects (e.g. the pink shirt) because the explanation depends on the recognition that the pink shirt is uniform in color throughout its spatial extent. Another of Gert’s criticisms is that Cohen’s view is counterintuitive because, for example, green things do seem to appear green to almost everyone with normal vision and in normal circumstances. Furthermore, Gert argues that relationalism has problems with the uniqueness intuition – the intuition that the visual system also represents the color of the shirt as unique.

[16] Gert, 2012, p. 317

2.2.1 Cohen's reply

Cohen replies to Gert's objections in his article 'Redness, Reality, and Relationalism: Reply to Gert and Allen' (2012). Regarding the problem of stability Cohen replies that relationalism does not have to give up representation of any uniform property of areas that seem to be distinct in color in order to account for the stability intuition. In respect of the uniqueness intuition, Cohen answers that in ordinary talk colors are relatively coarse-grained relational properties relativized to contextually relevant perceivers and contextually relevant viewing conditions. Moreover, in the pink shirt case the shirt simply exemplifies a number of fine-grained relational properties, and this does not rule out the uniqueness intuition. Furthermore, Gert's criticisms would be threatening only if by accounting for the uniqueness intuition the relationalist would also account for the stability intuition. But, according to Cohen, this is not the case.

2.3 Allen's criticism

Another recent criticism of color relationalism comes from Allen in his article 'Color, Contextualism, and Self-Locating Contents*'* (2012). Allen argues against the relationalist claim that color ascriptions in perception, thought and language are fundamentally subject-dependent. He focuses on Cohen's contextualist semantics about color ascriptions by criticizing relationalism from two aspects: visual representation on the one hand and cognitive and linguistic representation on the other. Here I am only going to focus on the second aspect. Allen argues that perceptually based beliefs about color do not seem to be relational. He shows that Cohen's contextualist semantics for color ascription is unmotivated because color terms are not context sensitive. This is because they fail (i) the completion test, (ii) the context shifts test and, finally, (iii) the agreement and disagreement based test.

(i) As the first test for context sensitivity of the relationalist theory, Allen proposes the completion test. He argues that in cases of semantically incomplete expressions it is generally possible to add the needed expansion. Like in the following example, proposed by Allen:

1) The beach is nearby.

1a) The beach is nearby to here.

However, Allen argues that such an expansion is controversial in the case of color predicates. For instance:

2) The apple is red.

2a) The apple is red for the perceivers relevant in context K under the perceptual circumstances relevant to context K.[17]

For Allen, utterance (2a) is unacceptable because one does not ordinary represent colors as relational properties because color predicates do not have a parameter for perceiver type. Instead, "when we reflect on visual experience, we only appear to be aware of mind-independent objects, their properties, and relations, and not any properties of the experience itself."[18] For example, when one is looking at the white wall illuminated with orange light one might say 'The wall is white, but (merely) looks orange *to me* in these conditions'[19] and not 'The wall is orange to *me* in these conditions' because the implication in the case of the illuminated white wall is that the wall actually *is* white and it only has an appearance of being orange. This is why Allen argues that "the expressions '*to*' and '*for*', followed by a noun

[17] Allen, 2012, p. 340 and Cohen, 2009, p. 119.
[18] Allen, 2012, p. 341.
[19] Allen, 2012, p. 339.

phrase designating a perceiver or perceiver type are not complements of the color predicate."[20]

(ii) The second test that Allen proposes is the context-shift test. On the basis of comparison between utterances (3) and (4) on the one hand and (5) on the other, Allen argues that color terms are not context sensitive in a sense that the type of the observer is a relevant parameter. Here are Allen's examples:

(3) That is a large butterfly, but that is not a large elephant.

(4) Cars must not move while the ferry is in motion.

(5) ?The bucket is blue, but the spade is blue-green.[21]

Allen claims that cases (3) and (4) represent legitimate use of the context-sensitive predicates 'large', 'must not move' and 'in motion' because they are relative to different descriptions. On the other hand, in the case of the intra-personally indistinguishably colored objects (bucket and spade) observed by Jack and Jill it seems strange, to Allen, to utter a sentence like (5). This is because what is usually meant in such a case is that the bucket and the spade look different in color to Jack and Jill and not that these objects actually are different in color.

(iii) Allen's third test for context sensitivity of relationalist view on color is the agreement and disagreement test. He proposes this test because the disagreement is not a usual characteristic of the context-sensitive terms. First, Allen gives an example of a context sensitive expression (and its negation) that does not sustain disagreement:

6) Peter in C1: The beach is nearby.

7) Paul in C2: The beach is not nearby.[22]

[20] Allen, 2012, p. 339.
[21] Allen, 2012, p. 342-343.

As regards these two cases, Allen claims that it would be wrong to conclude that Peter and Paul disagree about whether the beach is nearby. On the other side, when one uses color terms the question about disagreement does not seem as odd as in the previous case. This is how Allen illustrates it:

8) Peter in C1: The apple is red.

9) Paul in C2: The apple is not red.

In these cases the disagreement about whether the apple is red seems to be a legitimate report. However, Allen argues that relationalists about color would not agree with such an ordinary linguistic disagreement. This is because in case color terms actually are context sensitive, then the value of the assumed perceiver-type parameter would be shared between contexts C1 and C2. This is not the case because according to Allen, color terms are not context sensitive given that "agreement and disagreement *presuppose* a common faculty"[23] So, the problem of the color relationalist is that she treats such common linguistic disagreements as something odd or unfeasible.

2.3.1 Cohen's reply

In the article mentioned earlier Cohen (2012) replies to Allen's critique of the relationalist claim that subjects are constituents of perceptual, cognitive and linguistic representations of color. Cohen defends relationalism by arguing that subject-involving color contents are not redundant but serve as the theoretical end of explaining perceptual variation without committing to skepticism. The second point Cohen makes in defense of relationalism is that it is not true that a subject-involving aspect precludes perceptual error.

[22] Allen, 2012, p. 343.
[23] Allen, 2012, p. 345.

Moreover, Cohen also answers to the objections that are based on the tests for context sensitivity. Considering the completion test, Cohen argues that linguistic intuitions are very variable this is why such completion judgments barely support the view that color ascriptions are not context-sensitive. Regarding the context shifting test, Cohen argues that even paradigmatically context-sensitive expressions (e.g.: 'enemy', 'foreigner', modal 'can', and 'nearby'[24]) would fail such context sensitivity as Allen is proposing. This is why his objection does not clearly show that color predicates are not context-sensitive. Finally, Cohen replies to the agreement and disagreement test of context-sensitivity. Cohen agrees with the prediction that the inference from (8) and (9) to the disagreement ('Peter and Paul disagree about whether the apple is red') breaks down relative to these pairs of contexts. But Cohen disagrees that this prediction implies that such inferences fail relative at all times to any kind of pair of context, i.e. "that there is no intercontextual disagreement about color".[25] This is why relationalist can accommodate the disagreement involving color terms.

[24] Cohen, 2012, p. 374.
[25] Cohen, 2012, p. 375.

3 Color dispositionalism and the multiple-aspect view

In this part of my thesis I turn to dispositionalism about color as an alternative to the previously discussed relationalism. First, I give a brief overview of different dispositional accounts and consider the reasons that motivate them. Second, I present a non-relational version of color dispositionalism ¯ the 'multiple-aspect' view. In the remaining part of the chapter I look at four problems that are usually raised against dispositionalist accounts of color: the problem of revelation, the problem of circularity, the problem of unity and the problem of interpersonal variation. The main contemporary proponent of the multiple-aspect view, Joshua Gert, argues that the chief advantage of his account is that it provides good answers to these classical objections against dispositionalism.

Varieties of dispositionalism about color have been defended in the past by Descartes, Locke and Newton. More recent defenders are McGinn (1983), Peacocke (1984), Johnston (1992) and others. The motivation behind dispositionalism about colors is the idea that colors are similar to properties like *fragility* and *solubility*. This is in the sense that only when suitable circumstances obtain the characteristic manifestations of these properties occur. Roughly speaking, dispositionalism about color holds that *red* for a subject in certain circumstances is the disposition to look red to a normal perceiver in standard conditions (*mutatis mutandis* for the other colors).[26] The subject is usually specified as a normal perceiver and circumstances as standard conditions. These two conditions are, according to Hardin (1988), rather problematic because of the changes in conventions concerning who are standard observes and which are standard viewing conditions. Recent defenders of dispositionalism argue that color dispositionalism does conflict with commonsense views on color.

[26] This definition seems obviously circular, but dispositionalists try to avoid the circularity by arguing that one has to distinguish between two distinct notions of color: on the one side color as property of physical objects and on the other side color as a sensation. More on circularity can be found in the subchapter 3.4.

I turn now to Boghossian's and Velleman's classical article that addresses the variety of objections against color dispositionalism – 'Color as Secondary Quality' (1989). They point out two general problems with dispositionalism. Firstly, adherents of the dispositionalist view are committed to the claim that if we turn on the light in a room colors would seem to *come on* when illuminated, just like the lamp comes on. In the darkness colors would appear like they are dormant. However, the authors claim that this conflicts with a commonsense view on color because colors are not like that. Secondly, dispositionalists have a problem with explaining the colors of after-images. Those are visual images that persists after the visual stimulus causing them has ceased. Dispositionalists would have to claim that in the color experience of afterimages the appearance of color in after-images is the appearance of a disposition to look red under standard conditions. However, for Boghossian and Velleman, colors of after-images cannot be described in terms of dispositions since they cannot be reintroduced on any other occasion than in the original one: "(the images) are perceived as exiting only in so far as one is perceiving them."[27]

Apart from these two general objections, Boghossian and Velleman address also more specific problems of dispositionalism such as circularity. They discuss whether the word 'red' in classical formulation of dispositionalism ('a disposition to look red is a disposition to give the visual appearance of being red') expresses the same property that the entire phrase purports to express. Another criticism these authors make is of Peacocke's (1984) dispositionalism, who claims that the visual experience does not normally distinguish between qualities of a field representing objects and qualities of the objects represented. Instead, the visual experience is usually naively realistic because it understands the perceived qualities as qualities of the external world. However, Boghossian and Velleman claim that here Peacocke's model fails because it fits the experience of pain but not the experience of color.

[27] Boghossian and Velleman, 1989, p. 86

The experience of being pricked by a pin contains both the pin's painfulness[28] (the pin is disposed to cause pain) and the finger's pain. Moreover, Peacock would also claim that the experience of seeing a rose contains both the flower's redness and the visual field's redness. Boghossian and Velleman think that here Peacocke goes too far by analyzing all visual experiences as structured dually.

In the remaining part of this chapter I turn to one version of color dispositionalism, namely, the multiple-aspect view on dispositions. I will present the main idea of this dispositionalist account and look into its defense against the objections that usually endanger color dispositionalism.

3.1 The 'multiple-aspect' view on dispositions

In his recent article 'Color constancy and dispositionalism' (2013), Joshua Gert proposes an interesting version of color dispositionalism, the 'multiple-aspect' view. A similar view was already proposed by Noë (2004) and Broackes (1997). Gert argues that this version of color dispositionalism answers a number of classical objections related to color constancy that have been raised against dispositionalist accounts. He opens the argument with an analogy between color and shape. Looking at the coin from various angles gives us the appearance that the coin's shape is round. Gert argues that in such cases one does not typically infer that the shape of the coin is actually changing but rather that the coin can be presented in our visual experience as having two (or more) distinct features. The question, typically posited, is which of these apparent shapes is veridical. Gert wants to avoid terms considering only one apparent shape as veridical[29], and proposes instead that the real shape of the coin should be "associated

[28] As weird as it sounds, here is the quote: »When applied to colour, that model would suggest that the experience of seeing a rose contains both the flower's redness and the visual field's redness, just as the experience of being pricked by a pin contains both the pin's painfulness and the finger's pain.« (Boghossian and Velleman, 1989, p. 95).

[29] This is the point where he agrees with Cohen, as both want to achieve some kind of ecumenical reconciliation of color experiences. I discuss this in the last chapter.

with a function from viewing conditions to apparent shape".[30] Under such description a variety of (simultaneously) incompatible apparent shapes of the coin counts as veridical representations.

To return to the experience of color, Gert argues for a similarity between primary and secondary qualities in the sense that the color of one and the same object can appear in different ways and at the same time all of these apparent colors count as veridical perceptions. Here Gert makes a step further by arguing that regardless of this similarity between shape and color of an object one can still hold a dispositional view on color in terms of the following biconditional: "X has color R ↔ subject of kind S would have responses[31] to x that can be summarized as function FR(c). The domain of FR(c) is the set of possible viewing circumstances and the range of FR(c) is the set of its possible apparent colors."[32] Accordingly, the color of the surface is associated with functions from viewing conditions to apparent colors. An important point of Gert's account is that he makes a distinction between objective colors and their appearances. An objective color "is associated with the function FR(c), and cannot be associated with *a single precise location* in standard 3D color spaces, in the way that apparent colors can be associated."[33] In this respect Gert's view seems to go well together with the commonsense intuition that the color of an object can be uniform regardless of the variety of its appearances. So finally, Gert associates color with the unchanging disposition that causes a variety of apparent colors. However, he does admit that apparent colors are represented in much greater detail than objective colors of objects are.

In his article 'Color Constancy, Complexity, and Counterfactual' (2010), Gert draws the distinction between his dispositional account and the relationalist account of color in the

[30] Gert, 2013, p. 186
[31] It seems to me that Gert uses the expression 'response' in the sense of a perceptual process triggered by distal stimulus.
[32] Gert, 2013, p. 187.
[33] Gert, 2013, p. 187.

following way: “our color terms, as they apply to objects, are relatively broad and somewhat vague, but they are nevertheless referring terms, and they pick out objective, as opposed to relational, properties.”[34] In the article mentioned earlier[35] Gert presents his ‘multiple-aspect’ account as a better alternative to Cohen’s relationalism. The advantage of his view seems to be a distinction between (objective) colors on the one hand and color appearances on the other. Unlike relationalism, Gert argues that a particular object is uniform in color regardless of the variety of its appearances. By this Gert avoids claims such as Cohen is committed to, namely that an object has all the colors that it appears to have. The second advantage of Gert’s account is the explanation of interpersonal variation of color experiences, as it is compatible with the common-sense view that green things do seem to appear green to almost everyone with normal vision and in normal circumstances. Gert also argues convincingly against Cohen’s uniform treatment of different kinds of perceptual variation, namely interspecies variation: Gert rightly argues that it is not chauvinistic to exclude the way colors look to animals when we wonder about the color of object, because animals’ color space is simply not human color space.

In the following sections I will look at Gert’s defense of his ‘multiple-aspect’ view on the basis of four issues that usually cause problems to all kinds of color dispositionalism. These are: the problem of revelation, the problem of circularity, the problem of unity and the problem of interpersonal variation.

3.2 The problem of revelation

The first common objection to dispositionalism is the problem of revelation, famously discussed in Johnston’s article ‘How to speak of colors’ (1992). Johnston claims the following: “The intrinsic nature of canary yellow is fully revealed by a standard visual

[34] Gert, 2010, p. 670
[35] Gert's review of Cohen's relationalism – 'Crazy Relations' (2012)

experience as of a canary yellow thing."[36] Considering dispositionalism, if colors really are dispositions, then color experience would represent colors as such dispositions. However, it does not seem that the ordinary visual experience of color represents them as dispositions. In their article 'Color as a secondary quality' (1989) Boghossian and Velleman use the thesis of revelation against color dispositionalism in the following way: "When one enters a dark room and switches on a light, the colours of surrounding objects look as if they have been revealed, not as if they have been activated (…) If colours looked like dispositions, however, then they would seem to *come on* when illuminated, just as a lamp comes one when its switch is flipped."[37] So, for Boghossian and Velleman color dispositionalism is wrong because it describes color in such counter-intuitive way – as if objects would not be colored when they are not illuminated.

However, Gert provides an answer to the problem of revelation by arguing that the objection might be threatening for a single-aspect view on dispositions but not for the multiple-aspect view he is defending. According to the multiple-aspect view, colors are complex dispositions for which it holds that "a colored object is manifesting its relevant disposition *even in the dark*; it is not waiting to be 'activated'."[38] Even though it is hard for one to see what color an object is in the dark this does not mean that the manifestation of the disposition has failed. Gert argues that even when an object is not illuminated it does manifest a disposition. It is just that in this case a different aspect is manifested than in a case of normal illumination. The multiple aspect view does not agree with the assumption that for color dispositionalism the relevant color of an object can obtain only in circumstances of normal illumination. This is also the reason why Boghossian's and Velleman's objection does not affect the multiple-aspect view on dispositions, because the aspect that is manifested in circumstances of no

[36] Johnston, 1992, p. 223.
[37] Boghossian and Velleman, 1989, p. 86.
[38] Gert, 2013, p. 190.

illumination "can *reveal* which color it was all along."[39] In this sense, the multiple-aspect view does not meet problems with color constancy in the changes of illumination since an object remains the same color while different aspects are being manifested.

Another objection against dispositionalism on the same grounds was proposed by Colin McGinn in his article 'Another look at color' (1996). McGinn argues that since dispositions are not represented in color experience this is why colors do not look like dispositions. Moreover, for him, "colors are *given*, while dispositions are *posited*."[40] Gert considers McGinn's objection as ignoring the distinction between objective color and color appearance. For Gert, there is a phenomenological difference between the representation of a disposition on the one side and the representation of the apparent color on the other. This is why McGinn falsely assumes that color sensations directly correspond with the objective color of an object. According to the multiple-aspect view color sensations do not completely represent the color of an object but only one aspect of the color of the object (the current one of the perceiver). Moreover, for Gert, color sensations are not being individuated by colors but "by reference to hue, saturation, and brightness, which are not, strictly speaking, properties of objective colors."[41] For this the reason multiple-aspect view on dispositions is not *phenomenologically* incorrect.

3.3 The problem of circularity

A commonly discussed problem of the dispositional account of color is the problem of its circularity. This is because in the usual dispositional formulation (*X* is red = *X* has the disposition to look red to normal perceivers, in standard conditions[42]) the word 'red' expresses the same property that the entire phrase purports to express − 'a disposition to look red is a

[39] Gert, 2013, p.190.
[40] McGinn, 1996, p. 540.
[41] Gert, 2013, p. 192.
[42] Maund, 2012.

disposition to give visual appearance of being red'. The problem is that 'red' is being explained in terms of 'looks red'. McGinn argues that this is a vicious circularity because of the following: "If an object is red if an only if it's disposed to look red (under appropriate conditions), then an object must be disposed to look red if and only if it's disposed to look to be disposed to look red … and so on, ad infinitum."[43]

As an answer to this pressing objection, Gert argues that his multiple-aspect account on dispositions avoids the circularity. He starts his defense by explaining what colored objects are disposed to do. Gert's aim is to avoid the problematic appeal to colors as private properties. Color 'going private' is a consequence of describing colors, for example, as dispositions to cause red′ sensations[44] instead of classical description – disposed to appear to be red. The private way of understanding color dispositions is by arguing that there is an essentially private experience of color which cannot be directly assessed. The problematic consequence of this view is that it opens the possibility that nothing is actually red because of the variety of phenomenologically distinct appearances.

According to Gert, the multiple-aspect view on dispositions avoids the circularity through the distinction between *having a certain sensation* and *seeing something as having a certain (objective) color*. Gert argues that when describing a disposition, one should think in terms of *having a certain sensation* that has public criteria. As he puts it: "It is possible to give public instruction that trains people to describe the ways that objects appear to them in terms of locations in 3D color spaces such as HSB space (Figure 5)."[45]

[43] The quote is from Maund (2012), section 6.5. I did not manage to find the original reference because it is not clearly listed.
[44] Peacocke, 1997, p. 373-375.
[45] Gert, 2013, p. 193.

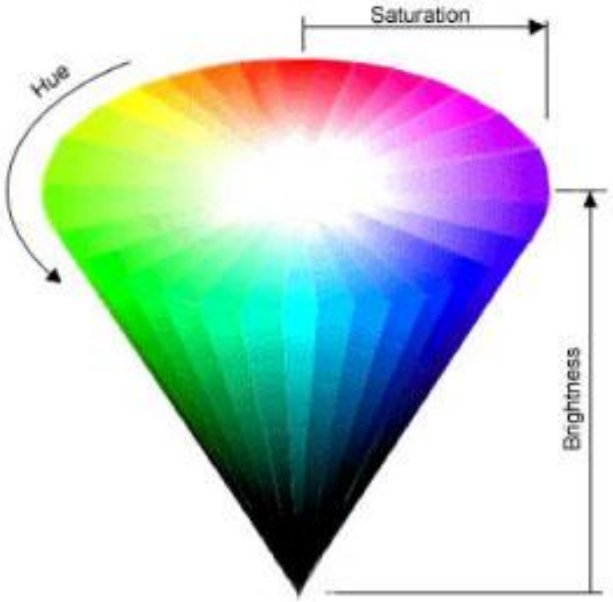

Figure 5: HSB color space (color model) – defines color space in terms of three components: hue, saturation, and brightness.

However, these descriptions do not characterize objective colors but they characterize our sensations. In order to avoid circularity in the phrase – 'appear as dispositions to appear in certain ways', Gert argues that one should not understand the word 'appear' as referring to the same kind of appearance. This different understanding is illustrated in the case of color constancy phenomena: "For it is central to color constancy phenomena that subjects claim that something about an object appears to change while something else appears to remain the same."[46]

3.4 The problem of interpersonal variation

The problem of interpersonal variation was mentioned earlier in the thesis,[47] so I will not introduce it again in detail here. Briefly, the issue is about the cases when two perceivers describe the apparent color of the same object in different ways even though they perceive it in the same circumstances. For instance, Janko describes the apparent color of an apple as

[46] Gert, 2013, p. 194.
[47] In chapters 2 and 3.

unique green and Metka as a slightly yellowish green, although both look at the same apple in the same viewing conditions. This is a problem for the multiple-aspect view on dispositions because it associates colors with complex functions from circumstances to apparent colors. For example, it seems odd to say that both Janko and Metka associate the color of an apple with the very same function when an apple appears differently to them under the same viewing circumstances. Gert deals with this problem in the following way: "The fact that they *are in* the same viewing circumstances does not imply that they *represent* those circumstances in the same way."[48] So, in order to be able to make an inference from different apparent color to different objective color Janko and Metka would apart from being in the same viewing conditions also have to *represent* these viewing conditions in the same way. It seems that Gert is trying to find a reason for this kind of interpersonal variation in some third thing. This is because it is clear that Janko and Metka are in the same viewing circumstances and are observing the same apple, so Gert thinks that the reason for a different appearance must be in the representation of the conditions they are in, for example, they are differently representing the apparent color of nearby objects which has an influence on the appearance of the apple. So, the cases of interpersonal variation do not undermine the thesis of multi-aspect view because the variety of different apparent colors among different perceivers does not bring about difference in represented objective colors. Moreover, the multiple-aspect view can give a good explanation for the interpersonal variation.

[48] Gert, 2013, p. 198.

4 Discussion

In this final chapter of the thesis I compare and contrast color relationalism and the multiple-aspect view of dispositions. I will try to draw some conclusions from the discussion in the previous chapters in order to see how good these two theories answer objections. This chapter focuses on two topics, the apparent–objective color distinction and ecumenical reconciliation. On the basis of these two topics I will try to evaluate each of the two theories on the issue. The final goal will be to evaluate the basic motivations for these accounts on color. A secondary aim will be to assess which of these theories provides a better explanation of the discussed issues.

4.1 Distinguishing apparent and objective colors

In his article 'Color Experience: A Semantic Theory' (2010), Mohan Matthen claims the following of the two color theories I discussed so far: "The problem with dispositionalism is that it posits too great an evidential gap between sensation and color, as dispositionalists understand color. Relationalist accounts of color […] reduce this evidential gap to almost nothing. Consequently, they do better on these tests. But their position on the evidential relationship between object-appearance knowledge and object knowledge is quite implausible."[49] Following Matthen's line of thought I will now discuss how color relationalism and the multiple-aspect view on dispositions regard the possible difference between apparent and objective colors.

As mentioned earlier, an important objection to color relationalism is that it does not distinguish between apparent and objective colors. To illustrate, let us consider the case of Janko and Metka, who live in a room with walls painted white. In the evenings Janko and Metka turn on the bedside lamp that has an orange bulb. They notice that the walls of their room suddenly look orange. Janko is a color relationalist, and this is why he explains to a

[49] Matthen, 2010, p. 72.

friend that in the evenings the walls of their room are orange but during the day they are white. At the same time Metka as a non-relationalist explains to the friend that though the walls of the room are painted in boring white color, in the evenings when they turn on the lamp the walls look as if they are painted orange. It seems that Janko does not differentiate between 'looks orange' and 'is orange', while Metka acknowledges this difference by stating that the walls of the rooms are not two different colors that are changing between day and evening.

On the other hand, the multiple-aspect theorist on dispositions about color makes this distinction. For him, the apparent color is something that perceivers describe in terms of hue and saturation, and it can be associated with a certain location in standard 3D color space. Moreover, apparent color is what changes already with slight variation in illuminant. On the other side, objective color can be only associated with the function FR(c).[50] Accordingly, color sensations are not something that directly corresponds with the objective colors of objects but are something that is associated with objects' apparent colors. In this respect, it seems to me, that multiple-aspect view on dispositions about color can allow for perceptual errors which turn out to be a problem for color relationalist.

The failure of distinguishing apparent from objective color seems to have rather unwelcome consequences for the relationalist account. As discussed earlier, relationalism has problems with explaining perceptual errors. Moreover, it seems that it cannot even allow perceptual error, because this would challenge the key point of relationalism, which is the reconciliation between perceptual variants (even if apparently incompatible). This is because when saying that a perceptual appearance is false one does not regard all the variants equally and makes an *ad hoc* claim without any real motivation and reason for singling out a particular variant.

[50] I might help to look again at Gert's definition: "X has color R ↔ subject of kind S would have responses to x that can be summarized as function FR(c). The domain of FR(c) is the set of possible viewing circumstances and the range of FR(c) is the set of its possible apparent colors." (2013, p. 187).

However, Cohen does develop a strategy to give an account of erroneous color ascription. He argues that perceptual error can be explained with an appeal to a distinction between two levels of color representation: fine-grained colors and coarse-grained ones. Fine-grained colors are determinate colors, e.g. 'x is red for me in this circumstance', while coarse-grained colors are less determinate categorical colors, e.g. 'x is red for the relevant perceivers in relevant conditions'. Cohen argues that in standard color contexts we attribute to objects colors that are coarse-grained properties. As he puts it: "…the colors we ordinary think and talk about […] are relatively coarse-grained relational properties relativized to contextually salient perceivers and contextually salient viewing conditions."[51]

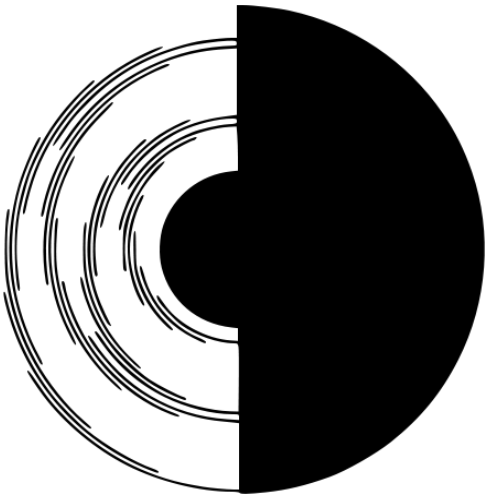

Figure 6: The Benham disk – when rotating this black-and-white disk at a certain speed, the pattern appears to contain colored rings.

The same coarse-grained color properties are attributed in the cases of perceptual error. For instance, in the case of the Benham disk (Figure 6) one makes an error by representing the colors of the rotating disk as coarse-grained – the disk is red for a relevant perceiver and in the relevant perceptual circumstances. In order to avoid the error, one would have to attribute

[51] Cohen, 2012, p. 357.

fine-grained colors, which is to say that "some region of it *is* blue for you under the highly constrained perceptual circumstances you're in."[52] But this is not an ordinary way to attribute colors to object. As it seems, Cohen claims that relationalism can allow for perceptual error because of the coarse-grained color ascriptions.

As discussed earlier, Allen wanted to show that Cohen's strategy with coarse-grained colors does not work. This is because this strategy *"*locates the error in the (post-perceptual) coarse-grained representations figuring in the cognitive and linguistic representation of color"[53] when actually the error regards perceptual representation. The relationalist is committed to a rather unusual claim that both representations of the grapheme are veridical. As Allen puts it: "For the relationalist, what it is *to be* green *just is* to *appear* green."[54]

Considering the relationalist treatment of the distinction between apparent and objective colors, it seems that this account proposes a kind of revision of our ordinary concepts of color. This is because it ignores the possibility of attributing color to an object independently of viewing conditions. This is unlike the multiple-aspect dispositions view, for which the objective color of on object is what fulfills this role. Similarly, Matthen claims that relationalists "do not think that something's looking orange is evidence, in the normal way, for its being orange, […] looking orange is for them constitutive of being orange, not evidence for it."[55] The intuition about inclusion of at least some kind of objective colors seems to be important because it goes well together with our ordinary color concepts. Color relationalism changes the idea of color concepts in such a way that it puts under question even ordinary uncontroversial truths about colored objects, which makes this account less plausible.

[52] Cohen, 2009, p. 131.
[53] Allen, 2012, p. 369.
[54] Allen, 2012, p. 336
[55] Matthen, 2010, p. 74.

4.2 In search for the ecumenical reconciliation about color

Both relationalism and multiple-aspect view on dispositions agree with the claim that when considering different kinds of perceptual variation one should regard each perceptual effect equally. This is to say that no observer or viewing condition should be privileged at the expense of the others. Such treatment is preferred because we, supposedly, do not have any well-motivated reason for singling out just one of the variants, so when we do so, we commit ourselves to an *ad hoc* stipulation. In order to avoid such unmotivated stipulations one should hold an ecumenical view, namely achieve ecumenical reconciliation between apparently incompatible color variants. Accordingly, both accounts of color count themselves as a form of ecumenicism. They disagree, however, on the question what such a stance commits one to. On relationalist side, Cohen infers that the best way to achieve reconciliation is by saying that colors are relational properties – they are relations between objects, subjects and viewing conditions. While, according to the multiple-aspect view, the way to implement reconciliation is to claim that the very same color can present different aspects in different viewing conditions that count as equally veridical appearances. It seems the achievement of ecumenical reconciliation is the main advantage of these accounts and at the same time the main motivation for the specific versions of ecumenicism – relationalism or multiple-aspect dispositionalism.

In his defense of relationalism, Cohen (2012) suggests (as was mentioned earlier in 3.1.2) that if one denies that colors are relational properties than one cannot provide an ecumenical account of the variation in color experience. The example of shape properties illustrates that it is hard to combine non-relational properties with an ecumenical view. This is because in the case of the perception of the shape of an object one can have a variety of different appearances – for instance, a square can from a certain perspective look like a parallelogram or a cylinder can look like a rectangle. In these cases no one would argue for an ecumenical

reconciliation in the variety of perceptual experience, because regardless the looks the object really is a square or, as in the second case, a cylinder.

However, Gert (2012) argues that such a comparison is unjust at first place, since there is a significant difference between color properties and shape properties. On the one side, there is a standard about how a certain shape appears from a selected perspective. For example, the case of interpersonal variation of the shape from the very same viewpoint would imply some kind of error. While on the other side, there is no such standard in the perception of color properties. As Gert puts it, "if there is a sufficient interpersonal variability in color experience when those experiences are described with a high degree of precision ('unique green', 'perfectly balanced orange'), then there is no fact of the matter regarding the stable color of that object that has that degree of precision."[56] For this reason an example with shape properties as clearly non-relational properties does not show that ecumenical reconciliation cannot be achieved among non-relational properties. In fact, according to the multiple-aspect view on dispositions, colors are non-relational properties. Since shape seems to be a borderline case, one should perhaps find some other non-relational property that has a variety of perceptual effects on intrapersonal or interpersonal level but is such that supports an ecumenical view on perceptual variation. I leave the discussion about whether there are such properties and whether the multiple-aspect view as a non-relational account can really accommodate ecumenical reconciliation for a different occasion. I would now like to turn to a more general consideration of this allegedly highly desirable goal of ecumenical reconciliation.

Another question one might posit is whether the ecumenical reconciliation really is such an appealing aim to be achieved, as advocates of relationalism and the multiple-aspect view on dispositions argue. A barrier that a defender of ecumenical reconciliation has to overcome is a

[56] Gert, 2012, p. 323.

possibility of perceptual errors. So, the problem of error strikes again, but now as a consequence in a more general, perhaps even more threatening way. The possibility of perceptual error challenges ecumenical reconciliation altogether. Considering intrapersonal variation, there are cases where a perceptual effect is either veridical and others in which it is an error. If we follow the intuition of Cohen, Gert, or any other defender of ecumenical reconciliation, then all perceptual variations have to count as veridical. But with stating this we eliminate the possibility of perceptual errors. As mentioned earlier it seems that an adequate theory of color perception needs to somehow accommodate the possibility of error and not count every variant as a veridical representation. Otherwise, the theory might become too permissive.

As already mentioned earlier, in defense of relationalism Cohen tries to accommodate the error by appealing to the course-grained colors that are attributed to an object. In this sense color errors are errors in the cognitive representation and not perceptual errors.[57] Apart from Allen's objection mentioned in previous subchapter, it does not seem convincing that color errors really are exclusively errors of attribution or cognition. If color errors would be errors of attribution then it is not clear how Cohen could show that a prelinguistic child made an error in attribution of coarse-grained color instead of a fine-grained one. This is unclear because prelinguistic child is not being able to even acknowledge this distinction, in this sense he is not even being able to make an error. However, it seems that a prelinguistic child is capable of making a color error, so such error are not entirely errors in the cognitive representations but as well perceptual errors.[58] The problem of error again seems to be a great problem for a color relationalist.

[57] Cohen, 2009, p. 128− 132, and 2012, p. 369− 370.
[58] I do not have an answer to what kind of errors color errors are. It just seems that there something wrong with attributning them only to the cognition.

On the other side, it seem that the multiple-aspect view might get around the problem of error considering the fact that it makes a clear difference between apparent and objective colors, as shown in the previous subchapter. Even though this distinction is a great advantage, it does not completely show how to accommodate perceptual error in ecumenical reconciliation. Gert tries to explain the perceptual error by arguing as follows: "In order to represent the objective color correctly, it is not enough that we experience the apparent color associated with that objective color in the circumstances we happen to *be* in. Rather – among other preconditions – we must also *represent* those circumstances more or less correctly. "[59] Accordingly, Gert argues that as in the case of misperceiving the shape of an object one can also misperceive its colors. This is because the misperception is a result of an error concerning the nature of illumination, because in some viewing conditions it is impossible to distinguish an object's objective color. In this sense the multiple-aspect view seems to accommodate the problem of error, but the question that remains is whether such a conclusion still respects the idea of ecumenical reconciliation. Apart from this, Gert also argues that "there is no need to make any inference from the way [an object] looks to the conclusion that in fact it is [like it looks]…"[60] This seems convincing. In the same style one could argue that there is no need to make an inference from 'the representation looks veridical' to the conclusion that 'the representation in fact is veridical. To illustrate, one could say that the colors on the Benham disk look veridical to me and there is no need to make an inference that the Benham disk in fact is as it looks to me. This also seems plausible. But in this sense it seems that the way things look to us does not tell anything at all about how things actually are. It appears as if the multiple-aspect view on dispositions creates too much of a gap between apparent and objective colors, so that it is not able to explain how the interaction between them work in cases such as perceptual error.

[59] Gert, 2013, p. 188.
[60] Gert, 2013, p 186.

The attempt to achieve ecumenical reconciliation suddenly appears superfluous, since it fails to describe colors of object in some independent sense. What it concerns are only perceptual representations of apparent colors of objects (at least in the case of multiple-aspect view) without making a clear reference to an external world. If so, then achieving ecumenical reconciliation should not play a particularly significant role. It seems that apart from being charitable towards the variety of perceptual effects, ecumenical reconciliation cannot provide a color theory with any particular insight into color experience. This is because it is already pretty much at odds with such an everyday situation as perceptual error is.

However, it seems to be hard for a color relationalist to find a solution to the error problem. The multiple-aspect view might find some kind of middle way out. But as was shown above, the 'middle way' that has been suggested is either not convincing or it brings about unwanted consequences. Anyhow, at this point ecumenical reconciliation seems to be a rather misguided target for those who seek for it. This is mainly because it is hard to consolidate it with the cases of perceptual error. Unfortunately, it turns out in the end that ecumenical reconciliation as a main advantage and motivation for both relationalism and the multiple-aspect view on dispositions becomes their biggest problem.

Conclusion

As mentioned in the previous chapter, a secondary aim of this thesis is to make a comparison between color relationalism and the multiple-aspect view on dispositions. The conclusion of the discussion in the previous chapter is that the multiple-aspect view on dispositions seems to give better answers to the raised objections, to make less radical claims about our color perception and consequently to be more in agreement with ordinary color concepts; while color relationalism seems to more or less fail on most of these grounds. So overall the multiple-aspect view on dispositions seems a more convincing account of color. However, in the previous chapter I tried to show that both theories fail to justify their motivation to regard ecumenical reconciliation as a desirable aim. This throws a bad light on both theories.

I am aware that there are several color theories and issues that are closely related to what was discussed above but that were not mentioned in this thesis. I chose to focus on these two particular theories for several reasons. On the one hand, Cohen's detailed defense of color relationalism made a significant impact on recent debates about color theories. It seems that one consequence of this discussion of color relationalism is that it brought back issues about color dispositionalism that were widely discussed mainly in 80s and 90s.[61] One reason for this might me that color dispositionalism, is according to Cohen, a subcategory of color relationalism. Although this categorization seems to be of no particular significance for debates on color theories,[62] it at least points to some kind of common ground between color relationalism and color dispositionalism. On the other hand, the multiple-aspect view on dispositions defended by Gert seems to be a fresh contribution to the historical discussion on color dispositionalism. For these reasons, assessing these two theories on common grounds

[61] For instance by McDowell (1971), McGinn (1983), Peacocke (1984/1997), Johnston (1992/1997), Boghossian and Velleman (1989) etc. Most of these authors I mentioned in the chapter 3.

[62] It seems that Cohen's refined taxonomy of color theories (2009, Chapter 1) was not widely accepted. For example, Mohan Matthen pointed out at a conference in Dubrovnik (April, 2013) that his account is not a relationalist account, although Cohen categorized it as one.

seems to be a fair project, as it confronts recent color theories in the light of issues that are central to the philosophy of color in general. On the basis of such examination one might be able to assess which theory explains color properties and color perception in a better way. I hope that with this thesis I at least partially contributed to this goal.

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