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Phenomenal Externalism’s Explanatory Power

 Phenomenal externalism claims that the supervenience base of conscious perceptual states encompasses external physical properties in a perceiver’s surroundings. I’ll argue on the basis of explanatory power that phenomenal externalism’s claim about the nature of conscious perceptual states is preferable to phenomenal internalism’s claim that these states supervene on perceivers’ internal physical properties.

 The debate between phenomenal externalism and internalism centers on the qualitativeness of perceptible qualities such as colors, sounds, and smells.[[1]](#endnote-1) Although the term ‘quality’ is used in a variety of ways, my use is restricted to such perceptible qualities, and the kind of qualitativeness on which I’ll focus is the sort that characterizes perceptible qualities. This kind of qualitativeness is commonly understood in terms of what it’s like to be conscious of qualities such as colors. Using standard terminology, I’ll call what it’s like to be conscious of qualities *qualitative character*.

 Because qualitativeness is commonly understood in terms of qualitative character, it’s commonly assumed that there is no qualitativeness that is independent of consciousness. But this assumption isn’t universal. David Rosenthal (1991, 2005, 2010), Austen Clark (1993, 2000 Ch. 1), and Benjamin D. Young, Andreas Keller, and David Rosenthal (2014) offer a characterization of qualitativeness using quality space theory that provides an alternative to a characterization in terms of consciousness. Quality space theory characterizes a determinable such as color to be a qualitative determinable just in case its determinates can be ordered into a psychological quality space.[[2]](#endnote-2) These orderings are with respect to qualitative similarity among determinates,[[3]](#endnote-3) but finding these orderings does not rely on the assumption that perception of determinates requires consciousness. For example, orderings of qualitative similarity can be found through stimulus generalization tests for non-human animals using techniques such as multidimensional scaling (Clark, 1993, pp. 117-119), and these findings don’t depend on the assumption that the perceptual states of non-human animals tested are conscious (even if the animal is conscious).[[4]](#endnote-4) Because these findings don’t assume that the perceptual states involved are conscious, it is possible that the qualitative similarities constitute a consciousness-independent qualitativeness. I’ll build on this possibility with the aim of making phenomenal externalism, along with consciousness-independent qualitativeness itself, plausible.[[5]](#endnote-5)

 As part of my argument for phenomenal externalism, I’ll show that phenomenal externalism is best understood as claiming that conscious perception provides access to external physical properties that are qualitative independent of consciousness and perception. I’ll call external qualitative properties, such as colors, *external qualities*,[[6]](#endnote-6) and I’ll appeal to the psychological color space in characterizing the qualitativeness of these external physical properties.

 I’ll model color perception as a certain sort of information filter that I’ll call an externalist-style information filter. This model will help clarify what’s meant by qualitativeness independent of consciousness and perception as well as put us in a position to see the explanatory power of external qualities. A preliminary description (developed in section 3) of an externalist-style information filter is that it’s an information filter with inputs that carry information about determinates of a determinable that exists independent of the filter and outputs that carry information about different determinates, but where input and output determinates are nevertheless of the same determinable. For example, an externalist-style information filter for size could have inputs that carry information about fully determinate size and produce outputs that carry information about coarse-grained determinate size (for example, small, medium, and large), but input and output determinates are of the same determinable. Since input information is about determinates of a determinable that exists independent of the filter, the output information is as well. Nevertheless, properties of the filter itself explain the determinables (for example, size or color), and the ranges of the determinables, about which the filter picks up and processes information.

 The externalist-style filter model for color perception holds that color is a determinable that external objects have independent of consciousness and perception, and that the properties of the perceptual system of a given type of perceiver allows perceivers of that type to perceive a particular range of color. Given my characterization of qualitativeness, the qualitative similarity relations among determinates in a type of perceiver’s range of color–the relations represented in the type of perceiver’s color space–exist independent of consciousness and perception. Consequently, neither consciousness nor perception creates the qualitative similarity relations.

 I’ll argue that external qualities, characterized as external physical properties that are qualitative independent of consciousness and perception, are necessary for explaining qualitative character. Thus, I’m not proposing to reject qualitative character, but rather to embrace qualities that exist independent of consciousness and perception as part of explanatory resources for explaining qualitative character.

My argument for preferring phenomenal externalism is: external qualities are necessary to explain qualitative character; however, internalism is best understood as denying, while externalism is best understood as embracing, such qualities. Consequently, internalism fails to explain qualitative character, and phenomenal externalism is preferable on the basis of explanatory power.

In section 1, I’ll describe Joseph Levine’s internalist framing of the problem of explaining qualitative character and contrast it with an externalist framing. In section 2, I’ll argue that externalism’s inclusion of external physical properties in the supervenience base for conscious perceptual states is best understood as an endorsement of the claim that there are external qualities, and that internalism’s exclusion of these properties is best understood as a denial of this claim. Then in section 3, I’ll support the claim that external qualities are necessary to explain qualitative character. The support for this claim involves the model for color perception as an externalist-style information filter. This proposal allows us to make explanatory progress with respect to explaining qualitative character in non-qualitative terms, even while filter effects mislead us into thinking that we can’t.

1. Background for Explaining Qualitative Character

 The problem of explaining qualitative character is often considered in the framework of Joseph Levine’s problem of the explanatory gap. I’ll describe Levine’s presentation of the problem of the explanatory gap, and in the process I’ll set up the point that his framing of the problem is consequential with respect to the explanatory resources available for addressing it.

 Levine presents the problem of the explanatory gap as that of explaining qualitative character in terms of non-qualitative properties–in particular, physical (including neurophysiological) or functional properties–of conscious perceptual states. He poses the problem as that of “…providing an explanation for qualitative character–what makes my sensation a reddish one, as opposed to a greenish one…” (2001, p. 7). In this usage, the term ‘reddishness’ refers to the specific qualitative character of a subject’s consciousness of red. Taking qualitative character as the explanandum, the explanatory aim is to gain an understanding of qualitative character, including what distinguishes reddishness from greenishness, in terms of some physical or functional explanans (Levine, 2001, pp. 5-7). Levine argues that despite compelling reasons for accepting materialism about the mind, qualitative character is strongly resistant to being understood in any non-qualitative way consistent with materialism. He is thus extremely pessimistic about achieving the explanatory aim.

 But in attempting to achieve this aim, what are the available explanatory resources in the explanans? Levine is a phenomenal internalist, and I’ll argue that phenomenal internalism sets a constraint on these resources that phenomenal externalism doesn’t. According to phenomenal internalism, a distinctive qualitative character such as reddishness supervenes on perceivers’ internal physical or functional properties. Consequently, this view holds that twins hypothesized as having identical internal physical or functional properties necessarily have experiences with the same qualitative character. If one twin’s experience is reddish, the other twin’s must be reddish. Many philosophers and scientists find phenomenal internalism highly plausible, and the opposing view, phenomenal externalism, highly implausible.[[7]](#endnote-7) Yet, as I’ll argue, internalism does exclude external properties from resources in explaining qualitative character.

 Phenomenal externalism claims that the supervenience base of qualitative character such as reddishness encompasses external properties, such as physical properties of objects in the twins’ surroundings, in addition to the internal properties of the twins. Given the wider supervenience base, it’s possible that twins with identical internal physical or functional properties have experiences with different qualitative characters. While one twin’s experience is reddish when confronted with one external property, the other twin’s experience could be greenish when confronted with a different external property (for a detailed description of this possibility, see Ross, 1999). I’ll argue on the basis of this point that externalism accepts external physical properties as part of the resources for explaining qualitative character.[[8]](#endnote-8)

2. An Internalist Constraint on Explanatory Resources[[9]](#endnote-9)

Levine often puts the problem of the explanatory gap as being one where the internal physical and functional properties of qualitative mental states leave something out (1993; 2001, p. 10). I’ll show that this point can be turned against phenomenal internalism. I’ll argue that internalist attempts at explanation leave external qualities out.[[10]](#endnote-10)

 A defining claim of phenomenal externalism is that it’s possible that physically and functionally identical twins have visual experiences with different qualitative characters when seeing different external properties. Considering this possibility, the best explanation of it is that external properties such as reflectance properties are qualitative independent of consciousness and perception. If external properties were merely non-qualitative causes of perceptual states, it would be difficult to make sense of the claim that twins—who as twins are internally identical—could have experiences with different qualitative characters. This abductive reasoning assumes that external physical properties (as opposed to external non-physical properties or divine intervention) are the most plausible candidates external to the perceiver, and so rests on judgments of plausibility. But given this relatively non-controversial background assumption, externalism is best understood as affirming that conscious perception provides access to external physical properties that are qualitative independent of consciousness and perception.

 Phenomenal internalism’s contrasting definitive claim is that it’s not possible that twins have visual experiences with different qualitative characters. The internalist’s best explanation of this lack of possibility is that external physical properties are not qualitative independent of consciousness. Since, according to internalism, it’s not possible that twins differ in qualitative character, external qualities—that is, external physical properties that are qualitative independent of conscious perception–would be oddly redundant. The internalist supervenience claim, that same internal physical properties necessitates same qualitative character, rules out any role for external qualities with respect to determining qualitative character. Thus, external qualities would be explanatorily idle, and can be rejected. The abductive reasoning here assumes parsimony: an internalist theory that doesn’t include external qualities is more parsimonious than one that does.

 Internalists can regard external physical properties as being qualitative, so long as this qualitativeness is dependent on consciousness. For example, an internalist who is also a dispositionalist about color (and so claims that colors are dispositions of physical properties of objects to produce perceptual states of color), claims that external physical properties of objects cause conscious qualitative perceptual states, and acknowledges this causal role by describing external physical properties as being qualitative. However, this qualitativeness is not independent of consciousness. To the contrary, this qualitativeness is characterized in terms of perceivers’ conscious perceptual responses. Any qualitativeness that external physical properties have that is independent of consciousness would be in addition to that characterized in terms of perceivers’ conscious perceptual responses, and so would be explanatorily idle. Thus, internalism is best understood as holding that external physical properties, when regarded as independent of consciousness, are merely non-qualitative causes of perceptual states.

 Preempting this consideration with respect to parsimony, many internalists claim that qualitativeness requires consciousness (for example, see Levine, 2006, pp. 277-278). From the standpoint of this claim, qualitativeness independent of consciousness is simply a non-starter. Thus, either through abductive reasoning or through the claim that qualitativeness requires consciousness, phenomenal internalists reject consciousness-independent external qualities. (Even though Levine [2006, p. 281] says that “objects can be red on their own,” for example, by remaining red in a room without a perceiver, he does not mean to sever the relation between qualitativeness and consciousness. Rather, he points out that we can describe red as being a certain sort of disposition, putting the relation between qualitativeness and consciousness in a counterfactual way: red objects in a room without a perceiver would look red if it were consciously perceived.)

 Instead, phenomenal internalists indicate that when we are perceptually conscious of red, internal properties create qualitativeness, and, in particular, internal properties create the qualitative similarity relations by which I’ve defined qualitativeness. As a result, perceivers attribute qualitativeness to external properties that are not qualitative independent of consciousness. (Even if, as an internalist dispositionalist view would claim, the colors we see are properties of external physical objects–as opposed to mental qualitative properties of perceptual states–these external properties’ qualitativeness is dependent on consciousness.) Internalists have proposed a variety of ways in which this qualitative attribution might work. For example, Ned Block (1996, p. 29) proposes that qualities instantiated by visual experience play a mediating role in perception of external physical properties. Alternatively, Levine (2006, p. 281; 2008, pp. 228-229) claims that this mediating role is played by an irreducible appearance relation between subjects and external physical properties.

 Since it’s difficult to make sense of a phenomenal internalist view that claims that there are external qualities and it’s difficult to make sense of an externalist view that doesn’t claim this, the choice of phenomenal internalism or phenomenal externalism lines up with different claims about the existence of external qualities such as external colors. Rather than examine phenomenal internalists’ attempts at explanations of phenomenal character, my strategy in arguing for phenomenal externalism is to directly address the concern that internalism leaves something out, and show how externalism can both diagnose and go some distance in remedying the gap. If external qualities are required as part of explanatory resources for addressing the problem of the explanatory gap, then by rejecting external qualities phenomenal internalism sets a constraint on explanatory resources that effectively precludes it from explaining phenomenal character. By accepting external qualities, phenomenal externalism avails itself of necessary explanatory resources.

 But why think that external qualities are required for addressing the problem of the explanatory gap? In section 3, I’ll address this question in the context of proposing that color perception is a certain sort of information filter.

3. Color Perception as a Filter

 I’ll present the explanatory role that consciousness-independent external colors play by modeling color perception as an externalist-style information filter–a model that phenomenal externalism allows but phenomenal internalism rejects along with its rejection of external colors. To describe this model for color perception, I’ll distinguish between object filters and information filters, and explain what an externalist-style information filter is.

 Generally speaking what filters do is take some physical input, and differentially treat input on the basis of its diverse physical properties, giving an output that includes some (but not all) of the input according to these properties. (Sometimes filters are taken to be much more encompassing, including any input-output function; in this case, a filter is just a function. Also, filters can do more than include and exclude; electronic filters can also amplify some or all of their inputs. But I intend my general description in terms of partial inclusion and exclusion to capture a core function of something we would typically call a filter.)

 Object filters perform this input-output function with physical objects or physical energy, such as light or sound waves, on the basis of physical properties of the objects or energy. So, a sound filter takes sound as input and produces output by differentially treating it on the basis of its various frequencies, including some (but not all) frequencies in output.

 Another example of an object filter is a wire mesh that doesn’t let large pebbles pass through but lets smaller ones through. Because its workings are relatively transparent, I’ll use the wire mesh as a representative object filter to introduce some terminology. I’ll call the fully determinate size of a particular pebble the pebble’s *maximally determinate size*, and I’ll call the filter-imposed sizes (larger and smaller) *filter determinates*. Given input pebbles with maximally determinate sizes, the filter functions to differentially treat input on the basis of maximally determinate sizes to produce an output that includes smaller pebbles and excludes larger. Thus, the filter causes pebbles with an indefinitely wide variety of maximally determinate sizes to be sorted into the coarse-grained sizes of filter determinates. Due to the filter’s role in imposing the filter determinates larger and smaller, these filter determinates can be used to refer to properties of both the filter that does the sorting and the pebbles sorted. However, since these properties are very different, it’s important to use different terms in referring to properties of the filter and properties of the pebbles. I’ll call the filter determinates (such as larger and smaller) of filters *media qualities*. I’ll call the filter determinates (such as larger and smaller) of the pebbles *filter-accessed qualities*.

Because my wire mesh example involves only one filter, it doesn’t highlight the usefulness of terms applied to the filter. But consider a combination of two wire mesh filters to separate small, medium, and large pebbles. In this case, it’s useful to distinguish between the filters themselves as small and medium. And at the same time the importance of the distinction between filter-accessed qualities and media qualities becomes clear. The filters don’t instantiate filter-accessed qualities. The wire mesh itself isn’t the small, medium, or large of the pebbles. Instead the wire mesh filters have media qualities, the apertures of different sizes, that pick out these filter-accessed sizes by imposing boundaries among objects with a wide variety of fully determinate sizes.

An information filter is different from an object filter in that its filtering function involves processing information about objects and their properties. Thus input and output are carriers of information about objects and properties, not the objects and their properties themselves about which information is carried. Carriers of information can be properties of physical energy, such as light, or properties of neural states. Like object filters, information filters perform this input-output function on the basis of physical properties, but the physical properties involved are carriers of information. (For a very helpful overview of information theory that focuses on perception, see Kulvicki, 2015.) The filter receives an input carrier of information, such as properties of light, as the result of some form of causal relation between light and the particular object or property the information is about, and in the course of processing information the filter functions to produce media qualities–that include and exclude certain information–as output. As a result, the output carriers of information are media qualities, such as properties of neural states, that carry information about filter-accessed qualities.

 Applying the object-information filter distinction to the idea of an externalist-style filter, an externalist-style *object* filter has the following relation between fully determinate properties and some range of filter determinates: given input objects with fully determinate properties of some determinable, the filter functions to impose filter determinates *of the same determinable*–and so a determinable that characterizes input objects independent of the filter. The wire mesh is a filter of this sort, since small, medium, and large are of the same determinable as maximally determinate size.

 An externalist-style *information* filter works in an analogous way. The filter receives an input carrier of information as the result of some form of causal relation between (for example) light and particular objects or properties the information is about. The input carries information about determinates of some determinable that exists independent of the filter, and the filter produces outputs that carry information about filter determinates, but input and output carry information about determinates *of the same determinable*.

 Phenomenal externalism can model color perception as an externalist-style information filter.[[11]](#endnote-11) I’ll make the background assumption that color perception involves some form of causal relation among the reflectance properties of surfaces of objects (or transmittance properties of volumes of transparent substances, or emittance properties of light), light, and perceivers due to which perceivers receive properties of light as an input carrier of information about reflectance (or transmittance or emittance) properties. (For simplicity, I’ll focus on reflectance properties.) This assumption is consistent with both internalism and externalism.

 Adopting terminology from Hilbert (1987), I’ll call the fully determinate reflectance properties involved in particular causal relations of color perception *maximally determinate colors*. According to the externalist-style information filter model, in the course of processing information about maximally determinate colors, color perception produces outputs that carry information about filter determinates (such as red and blue) of the same determinable (color).

Filter determinate terms (such as ‘red’ and ‘blue’) can be used to refer to properties of the filter as well as to external physical object properties picked out by the filter. Thus there is an ambiguity in color terms (for this ambiguous use of color terms, see Rosenthal, 2005, Chapter 7, Section IV; I further describe this ambiguity, and develop the information filter model of color perception in terms of it, in my [forthcoming]). Properties of the visual system are media qualities–the red or blue of visual states or processes. Physical object properties picked out are *filter-accessed colors*–the red or blue of physical objects–and are, along with maximally determinate colors, a sub-group of external colors. But even though the same terms (such as ‘red’ and ‘blue’) refer to media qualities and filter-accessed qualities, it is important to distinguish these types of filter determinates. The visual system itself doesn’t instantiate the filter-accessed colors about which it processes information. But it does have processes that produce neural states with media qualities that carry information about filter-accessed colors. The production of media qualities involves imposing boundaries on information carried by light about maximally determinate colors. Because these processes are merely imposing boundaries, and not creating a qualitative determinable, filter-accessed colors are of the same determinable as maximally determinate colors (they are both colors), and the filter is externalist style.

 According to phenomenal internalism, color perception is a non-externalist-style information filter. Similarly to externalism, internalism holds that the visual system receives inputs carrying information about maximally determinate reflectance, and produces outputs carrying information about different determinates, namely filter determinates such as red and blue. However, input and output determinates are not of the same determinable. Inputs carry information about determinates of reflectance. Outputs carry information about determinates of color. And for the internalist, reflectance, considered as independent of consciousness and perception, isn’t color; considered as independent of consciousness, it isn’t even qualitative. For the internalist, internal properties create color as a determinable, which perceivers visually attribute to external physical properties that are not qualitative independent of consciousness and perception.

 Thus, while both phenomenal internalists and phenomenal externalists can model color perception as a certain sort of information filter, they characterize color perception as information filters of different sorts. I’ll take visual scientist Stephen E. Palmer as a representative advocate of both phenomenal internalism and the information processing framework for color perception. Palmer claims: “Neither objects nor lights are actually ‘colored’ in anything like the way we experience them. Rather, color is a *psychological* property of our visual experiences when we look at objects and lights, not a *physical* property of those objects or lights” (1999a, p. 95, emphasis in original). As a result, Palmer must hold that at some point or stage of information processing, internal physical or functional properties create color as a qualitative determinable, determinates of which, as Block and Levine claim, are attributed to external properties that are not qualitative independent of consciousness. And how to understand qualitative determinables and their determinates in terms of internal physical or functional properties is the problem of the explanatory gap (Palmer, 1999a, pp. 617-618).

 However, by holding that color perception is an externalist-style information filter, phenomenal externalism denies that there is a point or stage of information processing at which internal properties create qualitative determinables. Input information is about properties that are qualitative independent of consciousness and perception. Instead of creating qualitative determinables, information processing works with information about determinables that external objects already have. Phenomenal externalism in conjunction with the externalist-style filter model puts us in a position to see external qualities’ explanatory power.

3.1 The Problem of Explaining Qualitative Character

 Levine contends, as I do, that we are unable to explain qualitative character in terms of internal physical or functional properties of conscious perceptual states. But, of course, Levine’s argument does not involve rejecting internalism in favor of externalism. In order to support phenomenal externalism, I must make it plausible that phenomenal internalism fails *because* it leaves out external qualities. To make this plausible, I’ll argue that external qualities are necessary to explain qualitative character.

 The general form of this argument is this: external qualities are necessary to explain some aspect A of qualitative character; an explanation of aspect A is necessary to explain qualitative character; thus, external qualities are necessary to explain qualitative character. By using this argument form, I’ll show that external qualities are necessary to explain qualitative character while avoiding any suggestion that they are sufficient to explain qualitative character.

Regarding sufficiency, it is difficult to see how we would be able to explain qualitative character if, in rejecting internalism, we *limited* the explanans to external qualities. Qualitative character is what it’s like for a perceiver to be conscious of color or other external qualities. While I claim that external qualities such as color exist independent of consciousness, qualitative *character* cannot exist independent of consciousness. Since qualitative character can’t exist independent of consciousness, it cannot be explained solely in terms of external qualities. However, since phenomenal externalism claims that the supervenience base of conscious perceptual states encompasses both perceivers’ internal properties and external qualities, it doesn’t claim that qualitative character is explained merely in terms of external qualities. In particular, according to the externalist-style information filter model, media qualities, as well as external qualities, are necessary. Media qualities explain the determinables and the ranges of the determinables to which a perceiver type has perceptual access.[[12]](#endnote-12)

 The aspect of qualitative character that I’ll plug into A of the general argument form is what I’ll call the *spatial simplicity* of color as consciously perceived. (I’ll use ‘color as consciously perceived’ and ‘the qualitative character of color’ interchangeably.) By saying that the qualitative character of color has spatial simplicity, I mean that qualitative character such as reddishness has no spatial structure. Thus, even though any instance of reddishness is perceived as spatially located, reddishness as a type is not distinct from other color qualitative character types on the basis of spatial characteristics. Color as consciously perceived is different in this way from so-called primary qualities as consciously perceived. Shape as consciously perceived is typed by spatial characteristics. While reddishness and orangishness aren’t distinguished by spatial characteristics, distinct shapes as consciously perceived are distinguished by spatial characteristics.

This characterization of reddishness and orangishness as not being differentiable in spatial terms suggests that color as consciously perceived is better termed ‘non-spatial’ rather than ‘spatially simple’. However, this characterization in terms of not being spatially differentiable gets us to focus on an aspect of qualitative character that provides a challenge for explanation that is related to challenges due to what has historically been called the simplicity of color (for helpful discussions of the usage of ‘simplicity’ and related terms in connection with color and other qualities, see Westphal. 1991, Ch. 8; and Byrne and Hilbert, 2008). So, I’ll use the term ‘spatially simple’. The explanatory challenge is this: since non-qualitative explanans involve properties structured in macro- or micro-level space, it is difficult to see how we can get a handle on explaining the spatial simplicity of consciously perceived color in non-qualitative terms. (Hill, 2014, pp. 199-200, offers a similar point with respect to the simplicity of color as consciously perceived, but without specifying the kind of simplicity he means. I think that the point needs to be made in terms of spatial simplicity.)

Accordingly, the spatial simplicity of reddishness seems to be a problem for phenomenal externalism. Consider reflectance as an example of external color. Reflectance is a disposition of a surface to reflect a proportion of incident light with respect to each wavelength. The particular reflectances of surfaces in a scene, along with other chromatically relevant properties such as those of illumination, cause particular distributions of wavelengths to reach the perceiver. The microphysical bases of reflectance, as well as light (assuming it is describable by wavelength), and perceivers’ perceptual systems are not spatially simple. Resources do not seem to be available for explaining the spatial simplicity of consciously perceived color. However, with the externalist-style filter model, phenomenal externalism can turn this apparent problem into an important point in its favor. As a filter, color perception introduces filter effects. I’ll show that the spatial simplicity of reddishness can be explained as a filter effect. And, since spatial simplicity is particularly enigmatic, it is a filter effect that misleads us into thinking that qualitative character can’t be explained in non-qualitative terms at all.

The causal relation between the reflectance properties of surfaces and perceivers’ retinas involve two stages that result in conscious perception’s absence of spatial information about reflectance properties. Concerning the first stage, light striking a surface is either absorbed, reflected, scattered, refracted, or transmitted. The interactions most relevant to reflectance are absorption and reflection, and surfaces absorb or reflect light depending on the combination of the (often wide range of) energy quanta of the photons making up the light and the states of surfaces’ microphysical components. Photons are absorbed only if their quanta of energy match the energy required to move the valence electrons of the surface’s atoms or molecules to a higher energy state (Nassau, 1980, p. 5); reflected photons have quanta of energy that don’t match. However, a particular reflectance can be realized by a wide variety of different microphysical bases. Thus, information that properties of light carry about reflectance doesn’t provide information about the particular realizing microphysical base involved (Nassau, 1980; also see Hilbert, 1987, pp. 99-100). Since all the information that the visual system has about external color is carried by properties of light, information about microphysical bases is lost before wavelengths arrive at the retina. This loss of information has nothing to do with the visual system, and thus nothing to do with color perception being a filter.[[13]](#endnote-13)

But the other stage that contributes to an absence of spatial information does involve the visual system. In bright light conditions, the three types of retinal cones combine to form an information filter. The cones receive information about reflectance carried by the wavelength distribution of reflected light interacting with the retina. In this interaction, the absorptions of photons by cones’ photopigments cause isomerizations, biochemical changes that result in neural spiking (Cornsweet, 1970, pp. 91-96, pp. 124-126; Clark, 1993, p. 31). The likelihood of the absorption of a photon depends on its wavelength and the type of photopigment involved. The three types of cone each have a type of photopigment that’s distinctive with respect to its absorption spectrum, that is, the likelihood of absorption as a function of wavelength (Clark, 1993, pp. 31-35). Due to the three cones’ distinctive absorption spectra, the ratio of absorptions for the three cones carries information about reflectance when these ratios are compared across the retina.

However, even though color perception requires the cones’ differential sensitivity to wavelength, and wavelength is spatially structured, color as consciously perceived doesn’t include awareness of spatial structure. First, although information about surface reflectance is carried by wavelengths, it does not follow that the visual system receives information about wavelengths as such; whether it does is controversial (Kulvicki, 2015, pp. 747-749). Second, even if cones receive information about wavelengths when they absorb photons (given that the likelihood of absorption is a function of wavelength), wavelength information is lost in the process of isomerization, because isomerizations do not differentiate between the wavelengths of photons and number of photons, where this number determines the intensity of a light beam (Clark, 1993, pp. 26-45). This lack of differentiation is called the principle of univariance (Clark, 1993, p. 31; Cornsweet, 1970, p. 101). Thus, after isomerization, there’s no spatial information about reflectance.

Consequently, absence of spatial information explains the spatial simplicity of external colors as consciously perceived. The difference between object filters and information filters is important with respect to this explanation. Although the wire mesh pebble filter ignores many of the pebbles’ physical properties (including size-dependent characteristics such as surface-to-volume ratio), the output pebbles retain all of their physical properties. In this case, further investigation of the pebbles would find these physical properties. For color perception, however, the output is not objects, but media qualities carrying information about external colors, and these outputs simply don’t have information about spatial structure. That spatial information is absent–as opposed to obtainable with further investigation–is evident in it being strikingly intuitive that further investigation of the qualitative character of color will not find spatial complexity.

 Moreover, external qualities are necessary to this explanation of the spatial simplicity of color as consciously perceived. This explanation requires a causal relation between an information processor and properties about which information is processed, and there is no plausible candidate for color *other* than external qualities where this explanation applies. By way of objection, an internalist could suggest that colors are neural properties (as Palmer suggests), and offer an explanation of the simplicity of color as consciously perceived in terms of absence of information about the spatial structure of neural properties.[[14]](#endnote-14) This explanation would in effect shift the filter inward: it would shift the filter from having information about external qualities as input to having information about internal qualities as input.

 But there is no evidence that this explanation is correct. More fundamentally, the claim that color perception involves attributing neural properties to external objects is implausible. For example, if object size and shape as consciously perceived are external physical properties–as is typically assumed–then how does perception of these external physical spatial properties become integrated with perception of internal colors? Different versions of so-called projectivism offer different suggestions for perceptual integration of colors (characterized as properties of visual experience) and spatial properties. But in principle problems with these suggestions provide reasons to think that projectivism is implausible.[[15]](#endnote-15) The externalist explanation avoids these problems by allowing that, just as there are external sizes and shapes, there are also external colors.

 Alternative to a version of internalism that claims that color is property of visual experiences, an internalist could claim that color doesn’t exist as a property of anything internal or external and hold that qualitative character is an illusion. Thus, the spatial simplicity of qualitative character is an illusion. However, if colors don’t exist, then there are no colors about which information is processed and spatial information is missing. While I can explain the illusion of spatial simplicity in terms of mechanisms that result in the absence of spatial information about existent colors, this internalist view can’t, and it has no other prospects for explaining this illusion.

 Because I am arguing for phenomenal externalism on the basis of explanatory power, the externalist view has an advantage. Externalism is able to explain the spatial simplicity of qualitative character, and external qualities are necessary to this explanation. There is no other plausible candidate color property about which spatial information is missing. Substantially different alternative explanations of spatial simplicity (consistent with explaining qualitative character in non-qualitative terms) aren’t available. Assuming that an explanation of the qualitative character of color requires an explanation of its spatial simplicity, external qualities are necessary to explain qualitative character. Therefore, externalism is preferable on the basis of explanatory power.

 However, the externalist explanation depends on the existence of external qualities. Thus, if there were a compelling objection to the existence of external qualities, it would undermine the externalist explanation. In the next section, I’ll defend the existence of external qualities against two kinds of objection.

3.2 The Problem of Explaining External Color

 How could a physical property such as reflectance be the quality red? I’ll call the problem of explaining the qualitativeness of external physical properties such as reflectance properties the *problem of external color*.

 This problem can be divided into two sub-problems. The first sub-problem, which I’ll call the *correspondence problem*, has to do with the relation between the filter-accessed colors of ordinary perception–such as red–and maximally determinate colors. The other sub-problem, which I’ll call the *problem of physical qualitativeness*, has to do with individual maximally determinate colors.

 Metamerism is an aspect of color perception in which many maximally determinate colors are indiscriminable in a given viewing condition. The correspondence problem is a problem because it is often assumed that if red (for example) is a physical property of physical objects, then red physical objects have in common a natural kind of physics, such as a particular reflectance. However, as color science shows, red physical objects don’t have in common any such physical kind. Thus, it seems that red isn’t a physical property such as reflectance. (To apply this reasoning to specific shades of red, replace ‘red’ with a term for a specific shade.)

 I’ll use the distinction between media qualities and external qualities to address the correspondence problem. When a wire mesh filter sorts pebbles it imposes filter determinates (such as small, medium, and large) within the determinable category of size. Maximally determinate sizes are physical kinds. But the filter takes as inputs pebbles with maximally determinate sizes and produces as outputs groups of pebbles sorted into coarse-grained determinate sizes according to filter determinates such as small. The media quality small–the filter determinate of the filter itself–isn’t a physical kind. The media quality small is explained by utility (in the case of a human designed filter). However, the filter doesn’t create the determinable property of size; pebbles already have some maximally determinate size prior to being sorted. And the filter-accessed quality–the property of pebbles being small–is a physical property in at least one sense: it is a range of maximally determinate sizes as picked out by a filter. The range is not logically or metaphysically tied to the filter; the range exists independently. (The point that colors–what I’m calling filter-accessed qualities–are independent of color perception has been made many times; see for example, Smart, 1975, p. 3; Smart, 1987, p. 47; Armstrong, 1987, pp. 39-40; Hilbert,1987, pp. 109-110.)

 Or take a complicated system of filters, where pebbles of roughly the same shape are sorted according to more fine-grained filter determinates for size so that those sorted together are indiscriminable in size by ordinary human perception. These more fine-grained media qualities still pick out physically variable maximally determinate sizes. But as with the simple filter system, the filter-accessed quality is a physical property in at least one sense: it is a range of maximally determinate sizes as picked out by a filter.

 Color perception as an externalist information filter receives input information due to some form of causal relation with maximally determinate colors, and produces as outputs neural states with media qualities carrying information about filter-accessed colors, which are ranges of maximally determinate colors. This filter serves to exclude information about maximally determinate colors and include information about these ranges. And as with medium-sized pebbles, that red physical objects don’t have a physical kind in common doesn’t refute the claim that the filter-accessed color red is a physical property.

 Instead, media qualities pick out the categories of filter-accessed colors, and media qualities (such as those of a normal human visual system) are the products of evolution. Furthermore, because filter-accessed colors are picked out by media qualities, the qualitative relations among filter-accessed colors are not explained in terms of physical theories, but rather in terms of the filter-accessed colors that media qualities pick out. Media qualities pick out properties that exist at a higher level than physical theory (meaning they exclude information about maximally determinate colors and include information about ranges of maximally determinate colors), and so have the effect of finding qualitative similarities that aren’t evident at the level of physical theory. (A substantial literature has developed addressing the issue of whether physicalism about color is consistent with the qualitative relations of the color space. In [Ross, forthcoming], I’ve applied the information filter model of color perception to provide a new way of supporting consistency.)

 What is typically called red is the filter-accessed quality–that is, the range of maximally determinate external colors picked out by the filter–rather than the media quality. And it’s important to distinguish between the filter-accessed quality and the media quality that serves to pick out the filter-accessed quality. By distinguishing them, we can see how media qualities play a role in picking out external colors, where external colors are physically constituted, but the explanation of the media by which these physical properties are picked out comes from evolutionary biology, not physics. Conflating them leads to looking for an explanation of filter-accessed colors–and in particular, the qualitative similarity relations among them–in physics. When an explanation is not found in physics, it seems that these external properties cannot be colors, and that internal properties create qualitativeness that perceivers attribute to external properties that are not qualitative independent of consciousness.

 The problem of physical qualitativeness is the claim that natural kinds of physics are not qualitative. If this claim is correct, then since maximally determinate reflectance properties are physical kinds, they are not qualitative. This would then suggest that qualitativeness really is dependent on perceivers.

 The claim that natural kinds of physics are not qualitative seems plausible on the assumption that there’s no qualitativeness independent of consciousness. Yet, this claim is false if qualitativeness is not characterized in terms of consciousness but in terms of quality space theory. Separate from color, some physical kinds can be ordered into a psychological quality space, and so are qualitative according to this alternative characterization of qualitativeness. For example, spatial properties are physical kinds, and there is a quality space for spatial properties as they are visually perceived, described in terms of azimuth, altitude, and depth (Clark, 1993, pp. 131-133, pp. 138-140). Thus, spatial properties are qualitative according to quality space theory’s characterization of qualitativeness, and natural kinds of physics can be qualitative.

 Furthermore, understanding spatial visual perception as an externalist-style filter is relatively non-controversial. In this case, the filter receives input information due to some form of causal relation with maximally determinate spatial properties, and in the course of information processing, imposes spatial filter determinates. The current standard theory of visual spatial perception explains it as involving a large number of psychophysical channels each of which is a filter for certain sinusoidal gratings, for example, for a particular narrow band of frequencies or orientations within a wide range of frequencies or orientations (Palmer, 1999a, pp. 158-171). As with color vision, evolved media qualities of the filter find relations of similarity among filter-accessed spatial properties.

 And, as color perception does not (in ordinary viewing conditions) distinguish among maximally determinate colors, spatial perception does not distinguish among all physically distinct spatial properties. But that some information about physical differences among colors and among spatial properties is ordinarily excluded makes sense with respect to adaptive value (for a compelling argument for this point, see Hatfield, 1992). Also, setting aside adaptiveness, if a visual system were to have a psychophysical channel for each wavelength–that is, if a visual system were to have a color system much more like our spatial system–it would approximate detection of reflectance with the same sort of accuracy with which our visual systems approximate detection of spatial properties (Hilbert, 1987, pp. 105-106).

 Thus, reflectance properties are qualitative in just the way the spatial properties are. The externalist-style information filter model erases standardly drawn sharp distinctions between qualitative and non-qualitative–namely, between ordinary colors such as red and maximally determinate colors such as particular reflectance properties, and between colors and spatial properties. That’s exactly what one would expect if progress is to be made in explaining qualitative character in non-qualitative terms.

4. Concluding Remarks

 A major challenge for explaining the qualitative character of conscious perception of color is in figuring out how to separate the influence of visual processing of color from the nature of color. I’ve modeled color perception as an externalist-style information filter to support the plausibility of external qualities, namely, qualities that are qualitative independent of consciousness and perception, and the plausibility of phenomenal externalism. According to the externalist-style information filter model, color perception plays the role of accessing external qualities in the external world, as opposed to the role of creating qualitativeness out of whole cloth and attributing it to the world as phenomenal internalism indicates. This model allows for accessing relatively coarse-grained filter determinates–determinates such as red and blue that are imposed by the filter–without rendering external physical properties non-qualitative. Also, it explains the spatial simplicity of color as consciously perceived in terms of the absence of information due to the filter.

 In addition, the explanatory power I’ve attributed to the externalist-style filter model can be empirically tested. Filter effects, involving both object and information filters, are of interest in a wide variety of scientific fields–from ecology to computer science. The externalist-style information filter model suggests various empirical questions about filter effects. For example, do other fields offer examples of externalist-style information filters where an absence of spatial information leads to representation of spatial simplicity? Or do other fields offer examples where the filter finds similarities among filter-accessed properties that are not evident at the level of physical theory, even though filter-accessed properties are in some sense physical? If such examples exist, they might provide independent support for the understanding of color and color perception proposed here.

 If external qualities are necessary as part of explanatory resources for addressing the problem of the explaining qualitative character, then phenomenal externalism has considerable explanatory power, and is preferable to internalism. If my argument is along the right lines, external qualities in fact are necessary.[[16]](#endnote-16)

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1. I’ll focus on vision and color. Although generalizing from vision and color to other modalities and qualities need not be straightforward, I assume that my basic points in favor of phenomenal externalism do generalize. [↑](#endnote-ref-1)
2. However, Rosenthal doesn’t specify quality spaces in terms of determinates and determinables. This distinction is useful in connection with color and other qualities, and follows Hilbert, 1987 and Byrne and Hilbert, 1997b. Funkhouser (2006; 2014, Ch. 2) offers a helpful analysis and explanation of the determinate-determinable relation. [↑](#endnote-ref-2)
3. Clark explains that the psychological color space is distinct from other color ordering systems in that its sole aim is to represent qualitative similarity relations (as opposed to using the ordering of colors for another purpose, for example, for systematic reference to dyes and paints) (1993, p. 120). [↑](#endnote-ref-3)
4. See Rosenthal (1993, p. 46) for the distinction between state consciousness and creature consciousness. [↑](#endnote-ref-4)
5. Rosenthal (1991; 2005, Ch. 7; and 2010) offers a variety of arguments for the claim that quality space theory provides a characterization of qualitativeness independent of consciousness. [↑](#endnote-ref-5)
6. Rosenthal uses quality space theory to characterize corresponding mental qualities and external qualities, where each of the corresponding families of qualities are qualitative independent of consciousness (2010, pp. 376-381). However, his focus is on mental qualities while mine is on external qualities. [↑](#endnote-ref-6)
7. For examples of defenses of internalism, see Block 1990 and 1996; Stalnaker, 1996, pp. 102-104; and Palmer, 1999a, pp. 626-627, and 1999b, pp. 979-981. [↑](#endnote-ref-7)
8. For a classic defense of phenomenal externalism, along with a diagnosis of its apparent implausibility, see Dretske, 1995, Ch. 5; recent defenses of phenomenal externalism include Byrne and Tye, 2006; Lycan, 2006; Schroer, 2009; and Tye, 2015. Due to phenomenal externalism’s very general characterization of perceptual experience–that is, as having a wide supervenience base–it is consistent with a variety of philosophical theories of perception. For example, it is consistent with both representationalism, which holds that visual perceptual experience is a representational mental state, and disjunctivism, which claims that visual perceptual experience–as opposed to visual hallucination–is a relation between subjects and external objects and properties. (Even so, disjunctivism can hold that perceptual experience has a kind of representational content, where representationalism and disjunctivism are distinguished in terms of two ways of characterizing representational content: either as like the information in a newspaper [representationalism’s way], or as like the contents of a bucket [disjunctivism’s way] [Siegel, 2005, section 2]. In sections 1-2, what I have to say is neutral on this distinction. As I’ll note, section 3 is presented in terms of representationalism, but perhaps could be recast to accommodate disjunctivism.) Explicit defenses of phenomenal externalism, however, have tended to be given in conjunction with representationalism. [↑](#endnote-ref-8)
9. I am grateful to Robert Schroer for prompting me to develop the claims of this section. [↑](#endnote-ref-9)
10. I’ve briefly suggested approaching the explanatory gap by way of externalism before (Ross, 2001, pp. 155-156). This paper is an attempt to spell out that approach. But others have pointed out that phenomenal externalism can figure in a response to the problem of the explanatory gap. For example, Alex Byrne’s (2006) description of a shift from the mind-body problem to the color-body problem suggests the approach to the explanatory gap that I’m proposing, as does Mark Kalderon’s point that the mind-body problem is unsolvable due to an introjective error–an error where “…we systematically misattribute mind-independent qualities to mental things” (2007, p. 597). [↑](#endnote-ref-10)
11. Although this is stated in representationalist terms, perhaps it could be restated in disjunctivist terms, where color perception is an externalist-style object filter. [↑](#endnote-ref-11)
12. Also, due to the involvement of media qualities, the externalist-style filter model offers a perspicuous way of thinking about the subjectivity of experience. Perceptual access to the world is relative to a type of perceptual system. The externalist-style filter model indicates how a type of perceptual system has an impact on the appearance of the world for a subject by virtue of its production of properties of neural states that carry certain information about external qualities. Thus, this model elegantly explains how the subject’s constitution, in terms of media qualities of neural states, makes a difference with respect to experience. [↑](#endnote-ref-12)
13. Thanks very much to David Hilbert for pointing this out to me. [↑](#endnote-ref-13)
14. I know of no phenomenal internalist who in fact offers this suggestion. But thanks to Robert Schroer for pressing it as an objection. [↑](#endnote-ref-14)
15. See Ross, 2012 for a systematic description and rejection of these proposals. The kind of projectivism that Palmer supports, according to which colors are properties of visual experiences, is called literal projectivism. In the next paragraph, I’ll take up what’s called figurative projectivism, which claims that colors are not properties of anything at all. The literal-figurative projectivism terminology is from Shoemaker (for example, 1994, p. 231). [↑](#endnote-ref-15)
16. I presented parts of this paper at the CUNY Graduate Center’s Cognitive Science Speaker Series, and work-in-progress groups at Cal Poly Pomona and the Claremont Colleges. I thank audiences at those events for comments and discussion. I’m also grateful to Janet Levine and Brian McLaughlin for comments on and encouragement with respect to an early version of this paper. I’m particularly grateful to Robert Schroer, David Hilbert, and two anonymous referees for extremely helpful comments. [↑](#endnote-ref-16)