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Aftereffects, High-Levelism and Gestalt Properties

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Abstract
According to high-levelism, one can perceptually be aware of high-level properties such as natural kind properties. Against high-levelism, the Gestalt proposal suggests that instead of high-level properties, one can have a perceptual experience as of Gestalt properties, i.e., determinables of determinate low-level properties. When one looks at a bird, the high-levelist argues that one can perceive the property of being a bird, and the proponent of the Gestalt proposal argues that one first perceives the property of having the bird Gestalt (shared by all and only birds) and only post-perceptually recognizes that it is a bird. In the present study, to resolve the dispute between high-levelism and the Gestalt proposal, I aim to test their abilities to explain the attribution of multiple perceptible properties to the same object by making use of various empirical studies on high-level aftereffects. I conclude that the Gestalt proposal fails the test and hence shall not be a viable alternative to high-levelism.

Keywords Aftereffects · High-levelism · Thick content · High-level perception · Afterimages · Gestalt proposal · Gestalt properties

1 Introduction

The range of properties human beings can perceive has lately been subject to fierce debates in both philosophy and sciences of perception. On the low-levelist side are those who hold that we can perceive only low-level properties such as color, shape, motion, orientation, and illumination in vision. To this short list of perceptible properties, the high-levelist proposes to add more properties, such as natural kind prop-

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erties (e.g., being a pine tree), artificial kind properties (e.g., being a bottle), causal properties (e.g., being the cause of something), semantic properties (e.g., having a certain meaning), aesthetic properties (e.g., being beautiful), moral properties (e.g., being ethical), mental state properties (e.g., being angry), action properties (e.g., being graspable), facial and bodily properties (e.g., age, gender, ethnic origin, emotional expression).[1]

As an alternative to high-levelism, contemporary advocates of the Gestalt proposal (e.g., Jagnow 2015; Landers 2021; see also Brogaard 2013; Pautz 2021; Price 2009) hold that the range of perceptible properties does not include these various high-level properties just listed but the Gestalt properties, properties that are configural, abstract, determinables of determinate low-level properties (Landers 2021, p.79). On this view, the experiences high-levelists take to be of high-level properties are, in fact, of Gestalt properties. In the high-levelist view, when one looks at a bird, one sees it as being a bird. On the Gestalt proposal, one perceives it not as being a bird but as having the bird Gestalt. The experience of the bird Gestalt indicates that the object seen is a bird, so one can only post-perceptually recognize the high-level property of being a bird.

To resolve the dispute between high-levelism and the Gestalt proposal, I aim to test their abilities to explain the attribution of multiple perceptible properties to the same object by making use of various empirical studies on high-level aftereffects. Attributing multiple properties to the same object seems possible for each level of perceptible properties. We can perceive an object as square and green or as green on some parts and red on other parts. Similarly, a glass of wine can smell fruity and look red. On high-levelism, we shall be able to perceive a face as happy, male, and Caucasian. Likewise, on the Gestalt proposal, we shall be able to attribute more than one Gestalt property to the same object. Happy Gestalt, male Gestalt, and Caucasian Gestalt shall be simultaneously attributable to the same face. I argue that the results of high-level aftereffects studies on face and body perception do not allow such attribution of multiple Gestalt properties to the same object but allow attributing multiple high-level properties. Thus, I conclude that we shall choose high-levelism because the Gestalt proposal is not an empirically warranted alternative to high-levelism.

The paper is structured as follows. Section 2 elaborates on the details of the high-levelism debate and shows the place of the Gestalt proposal therein. In Sect. 3, I briefly talk about the aftereffect studies. In Sect. 4, I construct my argument against the Gestalt proposal by appealing to a series of empirical studies on high-level aftereffects. Lastly, I will briefly explain how high-levelism can solve the same problem.

[1] High-levelism about various properties is defended by Bayne (2009, 2011, 2016), Block (2014), Butterfill (2009), Cullison (2010), Fish (2009, 2013), Johnston (2004, 2006), Masrour (2011), McDowell (1994), Nanay (2011), Peacocke (1992), Searle (1983), Siegel (2006, 2010), Siewert (1998) and Toribio (2015). Those who explicitly reject high-levelism about certain properties include Brogaard (2013), Byrne (2009), Dretske (1995), Pautz (2009), Prinz (2013), and Tye (1995, 2000). Logue (2013) has a different position contending that there is no fact of the matter about the range of properties human beings can perceive.

2 Perceiving High-Level and Gestalt Properties

The main question of the range of perceivable properties is which properties one can have a perceptual experience as of. That is, what we are interested in is thus not the representational content per se, but the phenomenal content, that component of the representational content that supervenes on the phenomenology of the perceptual experience. In other words, we are interested in what changes in the representational content have led to changes in phenomenology. Consider how Siegel (2006) initiates the debate by her phenomenal contrast argument. She invites us to compare the phenomenology of your perceptual experiences in the following two cases. First, you look at a pine tree without being able to recognize it as being a pine tree. Second, you look at the same tree after training on pine trees and having the relevant capacity to recognize pine trees. The intuitive observation is that these two experiences are phenomenally different. When one gains the ability to recognize a property, it seems that one has an experience with a new phenomenal property. According to Siegel (and to high-levelists in general), this is because the latter visual experience represents pine trees while the former does not.[2]

One main way to reject high-levelism is to argue that what the experience with the new phenomenal property represents is not the high-level property in question but a Gestalt property shared by group members instantiating the relevant high-level property. Gestalt properties are identified neither with the high-level properties that we have been talking about nor with any low-level properties but with the complexes (Siegel 2006), holistic constellations (Block 2014), conglomerations (Brogaard 2013), determinables (Landers 2021), congeries (Burge 2014), or envelopes (Oliva and Torralba 2001) of low-level properties.[3] All birds share the bird Gestalt, and nothing else instantiates the same bird Gestalt. As Block (2014, p.562) puts it, they are "recognitionally co-extensive" with high-level properties. Proponents of the Gestalt proposal (e.g., Jagnow 2015, Landers 2021) maintain that the purported cases of high-level perception are indeed cases of perceiving Gestalt properties. When one gains the recognitional capacity to perceive pine trees, what happens is that one perceives the Gestalt property of pine trees. The perceptual representation of the Gestalt property indicates that it is a pine tree. Thus, the phenomenal contrast created by Siegel is explained by the perception of the Gestalt property of the pine tree rather than the perception of the high-level property of being a pine tree.[4]

[2] Certain theories of perception disagree that perceptual experiences represent. On naïve realism, for example, properties are simply presented rather than represented in perception. On such non-representational theories of perception, the same discussion can be carried out by using the presentational terminology rather than the representational one. Here, I will use the representational terminology for convenience, and if one disagrees with this, she can replace them with the presentational terminology. The discussion shall remain intact.

[3] The distinction between high-level and low-level properties is based on intuitive lists, and a property is called high-level when it is not among the properties we intuitively take to be low-level. In principle, Gestalt properties are not among the low-level properties. Hence, they are high-level properties as well. However, to sharpen the distinction between high-levelism and the Gestalt proposal, I will keep talking about "Gestalt properties" and "high-level properties."

[4] Notice that the Gestalt proposal is research in the admissible content of perception in the philosophy of perception, not in Gestalt psychology. Although the name "Gestalt" comes from Gestalt psychology, the

Instead of providing a positive argument for it, its proponents argue that the Gestalt proposal is a viable alternative for high-levelism. The strategy is to argue that those cases that the high-levelist claims to be instances of perception of high-level properties can indeed be instances of perception of Gestalt properties. So, high-levelism is not the only possible position. One positive argument favoring the Gestalt proposal comes from the computational modeling of perceptual expertise in recognizing high-level properties. Such recognitional capacities can be carried over in our perceptual system by computing the distribution of specific low-level properties or, simply, Gestalt properties (see, e.g., Landers 2021; Oliva and Torralba 2001). Landers (2021) uses empirical data on face and expert recognition. Young, Hellawell, and Hay (1987) showed subjects a conjoined face whose bottom and top halves belonged to different faces. Subjects were asked whether the top or bottom half of the face belonged to someone they were already familiar with. Subjects performed better when the top and bottom halves were misaligned. When they were aligned correctly, this performed poorly. Landers explains this data by Gestalt properties. According to him, when the bottom and top halves were aligned, they created a new face Gestalt, which makes it difficult to recognize the bottom or top halves as belonging to another face. Thus, he argues that the data "neatly fits" with the Gestalt proposal (p.91).

The data, however, does not necessarily speak against high-levelism. We saw that our question is not which properties are used in the perceptual brain in recognizing certain worldly properties but which properties are consciously represented by the resulting new perceptual experience. Thus, for the Gestalt proposal to be an alternative to high-levelism, the experience shall represent the Gestalt properties of worldly objects. It might well be possible that our perceptual system makes use of Gestalt properties to achieve relevant recognition. Yet, the resulting experience with the new phenomenology represents a high-level property (cf. Bayne 2016, p.121). Landers admittedly claims that "these studies do not directly rule out competing accounts (2021, p.91)" such as high-levelism. Further, Jagnow clearly recognizes that "it does not prove the falsity of [high-levelism], it nevertheless secures the existence of a plausible alternative (2015, p.183)".

3 Aftereffects

Aftereffects occur when prolonged exposure to a particular stimulus biases the subsequent experience.[5] In negative aftereffects, after the relevant exposure, the subsequent experience appears to exhibit *opposing* features. The most well-known visual aftereffect is called waterfall illusion. When one looks at a waterfall long enough, the next stationary object one looks at seems to move upwards. Similar aftereffects have also been observed for other low-level properties such as shape, color, and orienta-

debates are mutually exclusive.

[5] In the high-levelism debate, instead of "aftereffects", the generic name "adaptation effects" is used to refer to these phenomena. Aftereffects are specific versions of adaptation effects, and what is mainly discussed in this context is only the aftereffects, rather than the adaptation effects in general. Since this is the case, and since I will discuss only the studies on aftereffects in this paper, I will use the name "aftereffects", instead of "adaptation effects" to avoid confusion.

tion (see Thompson & Burr 2009). When one is exposed to a red stimulus for a long time and shifts her gaze to a white background, the white stimulus will look green to the subject.

Lately, many empirical studies have shown that aftereffects are not only confined within the realm of experiences of low-level properties but also include experiences of high-level properties, such as causal properties (e.g., being the cause of something) (Rolfs et al. 2013), gist properties (e.g., being a natural scene) (Greene and Oliva 2010), numerosity (e.g., being densely populated) (Burr and Ross 2008). Current studies heavily investigate the perception of facial and bodily properties such as age (e.g., being old or young) (Webster at al. 2004), gender (e.g., being male or female) (Little et al. 2005), emotional expression (e.g., being angry, being fearful, being sad) (Butler et al. 2008; Pollak et al. 2009), ethnic origin (being Asian or being Caucasian) (Jaquet et al. 2008) and many others (see also Webster and MacLeod 2011). Take, for example, gender perception. Staring at a female face for a long time will make the next androgynous face look more male than it would typically look.

Studies on high-level aftereffects have been repeatedly used to argue that we can perceive high-level properties (e.g., Block 2014, Di Bona 2017, Fish 2013, Bayne 2016). The underlying idea of using these studies in favor of high-levelism is that if an experience of high-level property exhibits aftereffects, then it is a perceptual experience. However, these arguments from high-level aftereffects cannot settle the dispute between high-levelism and the Gestalt proposal (see Block 2014, Burge 2014, and Landers 2021). Take gender aftereffects. When one perceives a face as male, the experience represents the male Gestalt, which indicates that the face seen is male. The subsequent androgynous face she views looks more female because the new experience represents the female Gestalt, which indicates that the face is female. What is subject to the aftereffects in question are experiences of Gestalt properties (cf. Landers 2021). Thus, the argument from aftereffects in itself does not rule out the Gestalt proposal. A proponent can happily accept this argument and keep arguing that these experiences represent a Gestalt property, rather than a high-level property.

Block (2014) was aware that the argument in this form cannot rule out the Gestalt proposal and constructs another argument from aftereffects directly targeting the Gestalt proposal. He uses Susilo at al. (2010)'s research on the aftereffect rate of the height-transfer between (inverted or upright) faces and the letter (inverted or upright) "T". Height-transfer occurs when one views an elongated face for a while. The next non-elongated face she views looks shorter. The result of the experiment is that the height-transfer rate between an inverted face and an inverted T is almost the same as the height-transfer rate between two inverted faces. Furthermore, the height-transfer rate between two upright faces is much higher than the rate between an upright face and an upright T. Depending on the assumption that inverted face adaptations occur only through low-level aftereffects, Block concludes that aftereffects on high-level properties play a significant role in the height-transfer between upright faces.

Although this argument can successfully eliminate explanations that are solely dependent on the low-level properties such as the explanations referring to only shape aftereffects, the Gestalt proposal can meet this challenge. The height-transfer between inverted faces and inverted Ts occurs through the properties shared by both inverted Ts and inverted faces, such as shape properties or maybe even inverted T

Gestalt, but not face Gestalt. In those cases, no experience of face Gestalt occurs. For this reason, height-transfer rates between two inverted faces and between an inverted face and an inverted T was almost the same. In upright cases, however, when one views an upright face, one perceives a face Gestalt, but when one views an upright T, one does not perceive a face Gestalt. In this case, the aftereffect occurs between face Gestalts, and this is the reason why the height-transfer rate was higher between the upright faces. Burge (2014, p.579) and Landers (2021, pp.92–93) seem to have the same concern about Block's argument against the Gestalt proposal.

In the previous section, we saw that the arguments of the Gestalt proposal cannot rule out high-levelism and here we saw that the argument from aftereffects offered so far cannot rule out the Gestalt proposal. In what follows, I aim to develop a novel argument from aftereffects and use these studies to decide between the two alternative proposals. I will argue that their results do not allow the Gestalt proposal to attribute more than one Gestalt property to the same object.

4 Attributing More Than One Gestalt Property

To explain the purported cases of high-level perception within the Gestalt proposal, an advocate of the view should allow attributing several Gestalt properties to the same object because a face can easily be seen as being happy, male, Caucasian, and so on. On Gestalt terminology, an experience of a face attributes to the same face happy Gestalt, male Gestalt, and Caucasian Gestalt, so we can post-perceptually recognize that the face is happy, male, and Caucasian. Given that Gestalt properties are of the same kind, the question of how this is possible naturally arises. Another way to put the question is to ask how a specific group of low-level properties can be a determinate of more than one determinable. The low-level properties of the same face should be allowed to be a determinate of various determinables.[6]

To better grasp the problem, we can compare Gestalt experiences with color experiences. An object cannot be seen as blue and yellow at the same time and location. There are several ways to perceptually attribute more than one property to an object. First, it might be that the properties attributed to the object are attributed by experiences of different phenomenal spaces, such as one from color space and one from odor space. Second, those properties might be seen not simultaneously but successively at different times by shifting the attention. Third, those properties might be attributed to different parts of the object. Mimicking these options, the Gestalt proposal has at least four reasonable ways to respond to this challenge. The first way is to establish that experiences of Gestalt properties are all in different phenomenal spaces, so they are attributable together. The second way is to appeal to attention

[6] This problem should not be confused with what Landers (2021, pp.93–95) calls the Goldilocks problem. The Goldilocks problem for the Gestalt proposal concerns the difficulty of determining the right level of abstractness for the Gestalt proposal. On the one hand, if a Gestalt property is not abstract enough, it might not include some members of a group. On the other hand, if a Gestalt property is too abstract, it might include non-members too. On the "more than one Gestalt" problem, even if the Gestalt properties have the right-level abstractness, the problem remains. Even if the happy Gestalt includes all and only happy faces, the same face can be in the male Gestalt.

shifts to attribute different Gestalt properties to the same image as in the case of the duck-rabbit ambiguous figure. The third way is to simply argue that different Gestalt properties are attributed to different objects (or different parts of the same object) so that their simultaneous attribution can constitute no severe problem for the Gestalt proposal. Thanks to a significant difference between low-level and Gestalt properties, the Gestalt proposal has one more way not available to low-level properties. The last way is to argue that instead of attributing two Gestalts (say, happy Gestalt and male Gestalt) to the same object, one might argue that the experience attributes one Gestalt property to the object, namely the "happy and male" Gestalt, which is one single Gestalt and less specific than happy Gestalt and male Gestalt. The "happy and male" Gestalt is not the conjunction of happy Gestalt and male Gestalt, but one single Gestalt, which differs from both happy Gestalt and male Gestalt.

In what follows, I will visit all these four responses and aim to show that neither way is empirically warranted because the phenomenal nature of the purported experiences revealed by the studies on high-level aftereffect does not allow the Gestalt proposal to take any of these ways to be able to attribute multiple properties collectively to an object.

4.1 Different Phenomenal Spaces

Attributions of properties of different phenomenal spaces to an object are not mutually exclusive. A property in the odor space and a property in the color space can be attributed to the same object simultaneously. Suppose experiences of Gestalt properties are all in different phenomenal spaces. In that case, their simultaneous attributions can be compatible so that a face can be seen as happy, male, and Caucasian without posing any problem for the Gestalt proposal.

Although empirical studies on aftereffects cannot establish that certain properties are in different phenomenal spaces, they can prove that certain properties are in the same phenomenal space. If an experience of a property is subject to aftereffects with respect to the experience of another property, then we can conclude that they are in the same phenomenal space. But if they are not subject to aftereffects with respect to each other, we cannot conclude that they are in different phenomenal spaces. Compare it with color aftereffects; a white object will look green after prolonged exposure to a red stimulus. From this, we can easily derive that the experiences of red, white, and green are all in the same phenomenal space. Similarly, if we discover aftereffects among certain Gestalt properties, we are justified to conclude that they are in the same phenomenal space.

A series of empirical studies have observed that experiences of certain emotional expressions are subject to aftereffects with respect to each other. Cross-emotional aftereffects strongly indicate that their experiences belong to the same phenomenal space. Webster et al. (2004) create an image of an ambiguous face between anger and surprise by morphing between angry and surprised faces. After adapting an angry face, subjects see the morphed face as being more surprised than angry, and vice versa. This shows that the Gestalt properties of an angry face, a surprised face, and the face morphed between them are in the same phenomenal space (see also Pell and Richards 2011; Rutherford et al. 2008; Butler et al. 2008). Juricevic and Web-

ster (2012) observed that similar aftereffects occur not only cross-emotionally but also between degrees of emotions (such as being happier and less happy). After prolonged exposure to a happy face, the subject becomes less sensitive to happy Gestalt, and consequently, the subsequent faces look less happy than it otherwise would. Aftereffects occur in gender perception and ethnic origin perception too. Webster et al. (2004) show that adapting a female face makes the subsequent stimulus of an androgynous face (created by morphing male and female faces) look more male. Furthermore, after adapting a Japanese face, subjects see the subsequent face created by morphing between Japanese and Caucasian faces as being more Caucasian and vice versa (see also Jaquet et al. 2008).

These studies yield that the experiences of emotional expression Gestalts figure in the same phenomenal space because various emotional expressions and their degrees are all subject to aftereffects with respect to each other. Also, male Gestalt and female Gestalt belong to the same space. Lastly, ethnic-origin Gestalts are in the same space. However, from aftereffect studies, we cannot derive if these phenomenal spaces are the same or different spaces. The problem remains if they are all in the same phenomenal space. Still, a proponent of the Gestalt proposal might argue that experiences of Gestalts of emotional expressions, ethnic origin Gestalts, and of gender Gestalts have their own distinct phenomenal spaces. Experiences of happy Gestalt, angry Gestalt, and the Gestalts of other emotional expressions are in the same space, which is different from the phenomenal space in which experiences of male and female Gestalt figures. In this way, one can see a face as happy, male, and Caucasian, but not as happy and sad or as male and female at the same time.

This explanation is not in line with the general Gestalt proposal's spirit. Gestalt properties are properties of the same kind. That is, they are all Gestalt properties, i.e., determinables of low-level determinates. Properties of the same kind are likely to be represented by the experiences of the same phenomenal space. By the same token, experiences of Gestalt properties are expected to be in the same phenomenal space, which contradicts the empirical results. Now, suppose that alleged experiences of Gestalt properties are really grouped into various phenomenal spaces just as indicated by the above studies. That means that experiences of, say, emotional expression Gestalts have their own phenomenal space, and the experiences of, say, ethnic-origin Gestalts have another phenomenal space for them, and so on. Further, this grouping mimics the grouping of high-level properties. In that case, this simply means that something different than Gestalt properties is represented by making use of Gestalt properties. If experiences and what they represent do not share certain similarities, this creates the problem of how different kinds of experiences represent the same kind of properties. Compare this with color experiences. Colors are properties of the same kind and are represented by experiences of the same phenomenal space, namely color space.[7] It is hard to imagine how some colors can be represented by experiences of, say, odor space and some other colors by the experiences of, say, sound space. Similarly, one cannot easily imagine how Gestalt properties can be rep-

[7] Depending on the theory of perception and the theory of colour one wishes to opt for, natures of colours and of experiences that represent colours might change. Nevertheless, on each theory, colours are still of the same kind, and experiences that represent or present colours belong to the same phenomenal space.

resented by the experiences belonging to different phenomenal spaces. In the picture drawn by the empirical studies on facial aftereffects, Gestalt properties, which are of the same kind, are expected to be represented by the experiences of different phenomenal spaces. That is, there is supposed to be a massive mismatch between the nature of experiences and what they represent. Then, it is highly unlikely that these experiences attribute Gestalt properties to the object.

A proponent of the Gestalt proposal needs to settle two issues if she insists on the present explanation. First, we need an explanation of how experiences of Gestalt properties are grouped together with respect to the natures of high-level properties that are not represented by those experiences, rather than to the nature of the represented Gestalt properties, and why the additional component responsible for this particular grouping is still compatible with the Gestalt proposal because there are certainly more than Gestalt properties in this picture. Second, a proponent needs to explain how this new proposal is a viable alternative to high-levelism because it is compatible with high-levelism that perception of high-level properties, if true, works by our perceptual systems being sensitive to Gestalt properties and grouping them into various phenomenal spaces with respect to the nature of high-level properties that the experiences in question are supposed to represent.

4.2 Attention Shift

The famous duck-rabbit figure reveals that the same object can be seen to have different Gestalt properties when we change the direction of our attention. In this ambiguous figure, depending on our attention, we see the object either as being a rabbit or as being a duck, but we do not see it as being both rabbit and duck at the same time. Leopold and Logothetis (1999, p.260) take this feature called exclusivity as one of the fundamental properties of such figures. Similarly, seeing a face as happy and as male might have the same property too. Using the duck-rabbit example as a guide, one might attempt to explain the perception of a face as male and happy by appealing to the idea that one sees a face as being happy and as being male only successively by directing her attention, but one does not see the face as male and happy at the same time. This explanation may be seen as a special case of the "different part of the object explanation," which shall be discussed in the next section.

To understand the role of attention in high-level aftereffects, Davidenko et al. (2016) conducted a series of experiments using female Asian and male Caucasian faces. In this study, subjects were instructed to focus on the gender (or ethnic origin) of the presented face before starting the adaptation phase. After the instruction, subjects viewed a female Asian face. When shown a neutral face (neutral with respect to both gender and ethnic origin) after the adaptation phase, subjects were asked to rate the intensity of the unattended feature (e.g., ethnic origin) by typing a number between 1 and 7 (1's being "extremely Asian" and 7's being "extremely Caucasian"). Davidenko et al. (2016) found out that intentionally directing attention to one property (such as gender) does not alter the rate of aftereffects on the unattended property (such as ethnic origin). The aftereffect rate of an attended property is almost the same as the aftereffect rate when it is unattended. These results can be further supported by

the experiments on aftereffects when the attention is intentionally directed away from the to-be-adapted property (see, e.g., Murray et al. 2012).

Returning to the Gestalt proposal debate, these experiments reveal that the experience represents both Gestalt properties (gender Gestalt and ethnic origin Gestalt in this case) simultaneously. If one were not experienced, it would not be adapted at all. Experiences of both properties are shown to have been adapted together in a single shot. The experiment also revealed one more significant point that might be decisive in our debate. Both properties are represented without subjects' shifting their attention. If seeing a face as both male and Caucasian were similar to the duck-rabbit ambiguous figure, then we would expect first that subjects shift their attentions to see the other property and second that both properties are not adapted simultaneously. These considerations strongly speak against the present explanation of how more than one Gestalt property can be seen to be instantiated by the same object.

4.3 Different Parts of the Same Object

Objects can indeed have more than one color if they are attributed to different parts of the objects. Similarly, to be able to attribute more than one Gestalt, a proponent might argue that Gestalt properties are attributed to different parts of the face. Talking about the objects of Gestalt property attribution is not an easy task. Unlike colors or odors, we do not normally attribute Gestalt properties to any ordinary object around us. They are postulated for theoretical reasons. The issue is further complicated because high-level aftereffects can occur cross-modally, meaning that an *auditory* stimulus can bias the subsequent *visual* stimulus in the opposite direction and vice versa (e.g., Bestelmeyer et al. 2010). Auditory objects and visual objects are of different metaphysical natures and mostly cannot be attributed to properties of the same kind.

Again, we can simply start by comparing the Gestalt proposal with color experiences. Landers describes Gestalt properties as determinables, determinates of which are low-level properties. "Being red" is determinable, and one of its determinates is "being scarlet." So, whenever an object instantiates the property of being scarlet, the same object also instantiates the property of being red in virtue of instantiating the property of being scarlet. Thus, the object of the property of "being scarlet" is the same as the object of the property of "being red." By the same token, we can say that the object of a determinable coincides with the object of its determinate in virtue of which the determinable is instantiated.

Given this rough idea of what the objects of Gestalt attributions are, the present explanation amounts to saying that objects of Gestalt properties shall not coincide. If they did, this object would also be the object of two determinables; hence, the problem remains. For this explanation to work, all low-level properties of the whole face, for example, cannot be determinable of any Gestalt because the same face instantiates more than one Gestalt property, such as the happy Gestalt, male Gestalt, and Caucasian Gestalt. Low-level properties of a happy, male, and Caucasian face should be carefully partitioned into various Gestalt properties so that they share no low-level property.

Furthermore, a proponent might combine this explanation with the discussion in Sect. 5.1. by arguing that objects of the emotional expressions are the same or the

same area of the face, and this is the very reason why one does not perceive a face as both happy and angry. Also, objects of gender Gestalts are another part of the face. In this way, a face cannot be seen as both male and female but can be seen as both male and happy. Thus, for each group of high-level properties, proponents of the present proposal might reserve a different part of the face. This strategy might work for various groups of high-level properties such as age, gender, emotional expression, or ethnic origin. At least in principle, it seems possible to insist that recognition of emotional expression is always carried out by the low-level properties of, say, the mount and eye regions of the face, and the recognition of age always depends on the corners of the eyes and so on.

To dismiss this explanation, one shall find a facial property that cannot be attributed to a particular portion of a face but can be found or distributed over the face arbitrarily. In other words, I shall point out a facial property whose object can coincide with other facial properties. There is one kind of facial aftereffects that reveals that certain Gestalt properties must share its objects: identity-specific face aftereffects.[8] Hole (2011) conducted an experiment to test whether aftereffects occur between experiences of the identities of two familiar faces. He morphed the faces of Brad Pitt and Keanu Reeves. In this experiment, subjects first viewed pictures of Brad Pitt from various perspectives. The subsequent face subjects viewed was the morphed face between Brad Pitt's and Keanu Reeves's pictures. The morphed face looked more like Keanu Reeves to the subjects. This study indicates that we can perceive familiar faces as being someone's face (see also Laurence and Hole 2012, Hills et al. 2008).

If human beings can perceive faces' identities, as the studies on identity-specific face aftereffects strongly indicate, this fact is incompatible with the present explanation. It is unlikely that we attribute facial identity Gestalt to one highly specialized area of faces and that this area does not coincide with the object of the other Gestalt properties. Low-level properties used to reveal someone's identity can be located anywhere on the face. While one's identity can be understood in the eye area, another person can be identified by the mouth area, for example. Each face can have its own unique low-level cues signaling its identity. It would thus be unintelligible to claim that all facial identities can be drawn from the same area of the face. If the Gestalt proposal purports to be an alternative explanation of these purported cases of high-level perception, then its defenders shall look for another explanation.

4.4 Less Specific Gestalt Property

The last possible explanation of seeing a face both happy and male is to say that instead of attributing happy Gestalt and male Gestalt to the face, the experience attri-

[8] What I call "identity-specific face aftereffects" or "face-identity aftereffects" in general shall not be confused with face-distortion aftereffects. Sometimes in the high-level aftereffect literature, the name "face-identity aftereffects" or "identity-specific face aftereffects" are also used to refer to face-distortion aftereffects. When one sees a face that is arbitrarily distorted, such as expanded, an average face the subject subsequently views looks compressed. This is what I mean by "face-distortion aftereffect". The identity-specific aftereffects I will be making use of are about the properties of being the face of a particular person, such as being X's face and being Y's face.

butes the "happy and male" Gestalt, which is different from male and happy Gestalts. To refute this explanation, I will appeal two more facts about the high-level aftereffects. First, cross-category aftereffects are possible. That is, using *a body silhouette* without a head as the adapting stimulus can bias the image of the subsequent *face* without a bod*y* in the opposite direction (Palumbo et al. 2015). For an aftereffect to occur, the adaptation stimulus and the test stimulus need not be of the same category. Second, aftereffects work in both directions. That is, the red adaptation stimulus biases the subsequent white test stimulus towards the green stimulus, and the green adaptation stimulus biases the subsequent white test stimulus towards the red stimulus.

Palumbo et al. (2015) observed that using a front-view photograph of a female face as adapting stimulus makes the androgynous body silhouette the subject subsequently views look more male. The female in the adapting stimulus is young, Caucasian, happy, and attractive too. Since aftereffects occur in both directions, if the present explanation of the Gestalt proposal is true, we can postulate that if we were to use a male body silhouette as the adapting stimulus, we would expect that the subsequent androgynous *body* one sees would look "young, Caucasian, happy and attractive." This is unintelligible since we do not see body silhouettes as happy, for example, or it would be unexpected if the body conveyed information about the ethnic origin. Indeed, Lai et al. (2012) showed that using body silhouettes as adapting stimulus does not induce any age aftereffect on viewing faces. Thus, contrary to what the present explanation predicts, we cannot experience the neutral test body silhouette as "young, Caucasian, happy and attractive" after we view a male body silhouette. This violates the fact that aftereffects work in both directions. These results show that we do not experience "happy and male Gestalt," but we experience happy Gestalt and male Gestalt because their experiences are adapted individually.

5 Attributing More Than One High-Level Property

Before concluding the paper, I would like to briefly gesture at how high-levelism can explain the attribution of more than one high-level property to the same object. Although I think that both "different phenomenal space" and "different parts of the object" options are available for high-levelists, the most prominent one is to opt for the different phenomenal space option. Different groups of high-level properties have different natures, structures, or semantics, and it is very natural to expect that their experiences belong to different phenomenal spaces, just as sound and color experiences. The idea that different groups of high-level properties are represented by experiences of different phenomenal spaces can be further supported by various studies on aftereffects.

For example, several studies on aftereffects can be used to show that emotional expressions are not attributed to parts of faces. One line of evidence comes from the cross-emotional aftereffects. When a happy face and an angry face are morphed, the resulting face is not seen as both angry and happy, but it is seen as ambiguous between happy and angry (Webster et al. 2004). Another way to show this is to appeal to hybrid faces created by combining parts of faces expressing different emotions

(Butler et al. 2008). An adapting face whose upper right and lower left parts are from a happy face, and upper left and lower right parts are from an angry face has shown no aftereffects on a neutral test face. This tells us that such a hybrid face is not seen as both happy and angry. If they were attributed to different parts of a face, we would expect that in these cases the subjects perceive the face as both happy and angry. But if they are in different phenomenal spaces, this is precisely what we should expect: not being able to attribute several emotional expressions to a face.

6 Conclusion

In this paper, I have argued that the Gestalt proposal is an empirically unwarranted alternative to high-levelism by using various studies on high-level aftereffects. In the high-levelism debate, these studies have been used to defend the idea that we perceive certain high-level properties. Here, I have used them to decide between two alternatives: high-levelism and the Gestalt proposal. I argued that the nature of experiences revealed by the high-level aftereffect studies does not allow simultaneous attributions of multiple Gestalt properties to the same object. In the end, I hope to have shown that the Gestalt proposal is not a good alternative to high-levelism.

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