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Kant and Abstractionism about Concept Formation

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Unlike several of the authors discussed in this volume, Kant does not provide any extended discussion of the metaphysical status of universals, understood as the sort of items that many particulars may share (properties and relations).[1] Kant is much more interested in our capacity to represent properties and relations as the sort of items that many particulars share. According to Kant, we do this by employing concepts. For instance, we represent the color of a drape as a feature that other objects share by subsuming it under the concept RED.

This chapter focuses on Kant's abstractionist account of the formation of empirical concepts such as RED, an account that, along with abstractionist theories as such, has been the object of numerous criticisms. Sections 1 and 2 provide a reconstruction of Kant's account. Sections 3 to 5, which focus on color concepts, discuss two criticisms that have been advanced against not only Kant's account, but also Locke's account and abstractionist theories as such. As we will see, none of the two objections is convincing as it stands. Kant can offer replies to both objections that are consistent with his views and with the empirical evidence concerning the perception and representation of colors and sensory properties.

1. Background

Kant distinguishes two ways of representing properties: by means of thoughts and by means of nonconceptual intuitions. We can either "think" or only "intuit" the "roundness" of a plate

(A137/B176). In Kant's vocabulary, thoughts are conceptual representations and thinking is having a mental representation informed by concepts (*Fort.*, 20:325; *Pr. Anthr.*, 7:196). Intuitions too can be informed by concepts. However, at least in principle, intuitions need not be conceptualized. An intuition is "that which, as representation, can precede any act of thinking something" (B67, see B132).

According to Kant, what differentiates thoughts from nonconceptual intuitions is not their "matter," that is, the items they are about.[2] Rather, a house can be represented by both a '*mere intuition*' and an "*intuition* and [a] *concept* at the same time."[3] What differentiates thoughts from nonconceptual intuitions is their "form," that is, the way in which they represent the items they are about. Intuitions are "singular representations,"[4] whereas the form of conceptual representations is "its generality."[5] This means that only conceptual intuitions represent individual objects and their features as instantiating universals. Conceptual and nonconceptual intuitions can represent the red color of cinnabar, a carmine drape, or a poppy, but only conceptual intuitions represent their redness as a feature that "can be encountered in anything" (B133n) and is "common to many objects" (*Wiener L.*, 24:905). For Kant, representing properties as features that many particulars share is representing them by means of concepts.

What is the origin of the concepts that enable us to represent properties as features that many particulars share? Some concepts, like the concept of unmarried adult male, can be formed by combining other concepts, whereas others may be formed by analyzing complex concepts.[6] These processes allow us to derive new concepts from other concepts, but they cannot account for the origins of our first concepts. According to Kant, no concepts are preformed in our minds since the beginning of our lives. Not even the categories, "pure *a priori* concepts" that "contain nothing empirical" (A95), are preformed.[7] They are generated by "reflection" and "abstraction" on mental acts that we carry out "on occasion of experience"

(*Refl.* 409 [1772–1779?], 15:155; *M. L_1*, 28:233–34). Regrettably, however, Kant never provided more than scant remarks on the formation of the categories. His statements on the formation of empirical concepts are more explicit.

Empirical concepts are, by definition, those concepts whose representational content depends on the stimuli that are given to our senses. Nevertheless, their property of representing features as "common to many objects"[8] is never given through the senses, but always "made,"[9] contributed by our mind through acts of comparison, abstraction, and reflection. These acts are performed on "empirical intuition[s]," on which empirical concepts are "grounded."[10] They enable us to represent specific features, like the carmine of a drape and the ruby of a stone, as instances of universals like the color red.

2. Comparison, Reflection, and Abstraction

The Kantian texts on the formation of empirical concepts have been criticized for being excessively concise, fragmentary,[11] "cryptic and obscure,"[12] so much so that it is allegedly "problematic" reconstruct a unitary account on their basis (Vásquez Lobeiras 1998, 141). This section surveys Kantian texts from the Critical period (*ca.*1780–1804) and outlines the unitary account of empirical concept formation that can in fact be found in them.[13]

Kant's account applies to sortal concepts (CUP, TREE) as well as to characterizing concepts (RED, TALL). In order to form both kinds of concepts, "I must have distinctly cognized many individual objects and I must represent distinctly what is common to them."[14] "I compare things and attend to that which they have in common, and I abstract from all other things; thus this is a concept, through which all these things can be thought."[15]

> I see, e.g., a spruce, a willow, and a linden. By first comparing these objects with one another I note that they are different from one another in regard to the trunk, the

> branches, the leaves, etc.; but next I reflect on that which they have in common among themselves, trunk, branches, and leaves themselves, and I abstract from the quantity, the figure, etc., of these; thus I acquire a concept of tree (*Jäsche-L.*, 9:94–95).

Kant's Critical texts provide two analyses of this process. The first set of texts identifies three phases:

1. *comparison* [*die Comparation, d. i. die Vergleichung*] of representations among one another in relation to the unity of consciousness;
2. *reflection* as to how various representations can be conceived in one consciousness; and finally
3. *abstraction* of everything else in which the given representations differ (*Jäsche-L.*, 9:94).

The kind of comparison that takes place in concept formation is carried out on "*many* representations,"[16] namely intuitions, as they are made the objects of a single mental act, "*one* consciousness." [17] The *Jäsche-Logik* (9:94) associates comparison with the search for differences among objects. Most logic texts, however, associate it with the search for differences as well as shared properties.[18] The texts on concept acquisition use "reflection' to refer to the identification of shared properties: "from reflection, one cognizes that which many things have in common."[19] Abstraction is the act of diverting one's attention from the features with respect to which compared objects differ. Kant stresses that we do not abstract the shared properties of objects, but rather abstract *from* the features for which they differ.[20] Abstraction is a necessary[21] but "negative" phase of concept formation because it only excludes certain features from conceptual content (*L. Dohna*, 24:754; *Wiener L.*, 24:907, 909; *L. Busolt*,

24:654). Comparison and reflection play a positive role because they enable us to identify the features that will constitute the content of concepts.

The first set of texts does not make explicit claims on the temporal order of comparison, reflection, and abstraction. However, at least from a logical point of view, reflection and abstraction presuppose comparison. We can only identify shared features and divert our attention from non-shared features if we compare them with one another.

The second set of passages inverts the order of the three phases and gives a new meaning to "reflection".[22] According to these texts, reflecting is the mental act of becoming conscious of, and paying attention to, the features of objects (*L. Pölitz*, 24:566; *L. Busolt*, 24:654). It precedes comparison, through which we identify shared features, and abstraction.

The two sets of texts on empirical concept formation are compatible with one another. They outline the same process, although they single out different phases. They can be integrated into a unitary account by distinguishing between two senses of 'reflection' (*reflection*$_1$ and *reflection*$_2$) and identifying four phases of concept formation, as a few Kantian passages do.[23] Let us assume that we lack a concept of tree and we are comparing the intuitions of a spruce, a willow, and a linden. They may be perceptively present to us, or the vision of a tree or a leaf could bring non-perceptual mental images of trees to our mind.[24] The act of turning our attention to their features is *reflection*$_1$. As we consider them, our mind identifies and records the features that they share (*reflection*$_2$) and those with respect to which they differ (*comparison*). Although the texts provide scant details, we can think of this process in sequential terms, as the identification of a feature in the first tree, followed by a search for that feature in the other trees.[25] We may be doing this by ourselves, or we may be guided by an instructor's verbal feedback. *Pace* Lyssy (2007, 162), the fact that concepts, for Kant, are mental entities does not rule out that "linguistic social interaction" may be involved in their formation. Environmental feedback too may act as an instructor: " if, for example,

primroses were edible, and all other flowers toxic […], feedback from the consequences of the sensorimotor interactions would be supervision enough" (Harnard 2005, 39). If the search is successful, the feature is recorded in a mental list of shared features. Otherwise, it is recorded in a mental list of differences. Then we turn to another feature and repeat the process, until we have identified a sufficient number of shared features and reflection$_2$ stops. At that point, we divert out attention from the differences and focus on the shared features (*abstraction*), which form the content of the concept.[26]

What counts as a sufficient number of shared features may vary depending on the quantity and level of detail of our intuitions, the strength of our memory, our level of attention, and the amount of time devoted to comparison and reflection. These factors depend in turn on other factors, such as our aims and activities. The biological concepts that we form when we are trying to develop a new taxonomic theory are likely to rely on more intuitions and more careful comparisons than those that we form when we casually note a new breed of dogs during leisurely walks in the neighborhood.

3. Two Objections

The broad lines of Kant's account of empirical concept formation are not deeply original. They recall, among others, Locke's comments on how we form abstract ideas[27] and Christian Wolff's explanation of how we come to have distinct universal concepts.[28] However, several specific features of Kant's account are original. For example, the triad comparison-reflection-abstraction and the claim that we must carry out all three mental operations to generate concepts from intuitions cannot be found in Baumgarten, Berkeley, Crusius, Hobbes, Hume, Leibniz, Locke, Meier, or Wolff. Among them, Locke holds that we acquire some ideas by comparison, others by reflection, and others by abstraction.[29] He does not state that we must carry out all three acts to acquire any kind of ideas, although his account of the acquisition of

abstract ideas recalls Kant's account of empirical concept formation (Locke [1690] 1979, II.xi.9, III.iii.7). Georg Friedrich Meier, the author of the textbook that Kant used in his logic lectures, mentions a sequence of three mental acts corresponding to Kant's reflection$_1$, comparison, and abstraction, but only when he formulates the rules to render our cognitions clear, not when he discusses the origin of concepts.[30]

Despite the relative originality of Kant's account of empirical concept formation, several objections that have been directed to his account have also been raised against other authors, such as Locke, and against abstractionist theories as such. In what follows, I discuss two objections that, if successful, would undermine views held not only by Kant, but also by several of his early modern predecessors. I argue that the objections are not successful as they stand.

I focus on the acquisition of color concepts for two reasons. First, Kant holds that we acquire color concepts from empirical intuitions through comparison, reflection, and abstraction. However, color concepts are often mentioned as an example of concepts that we cannot acquire in this way. The same has been said of other concepts, like DEMOCRACY (Prinz 2005) and the concepts of modern cosmology (Gaukroger 1978, 107). Kant could reply that we acquire them by combining previously acquired concepts. This reply is less plausible for color concepts, because their content has a particularly strong relation to sensory experience. If we cannot acquire even those concepts that are straightforwardly related to visual experience through acts of comparison, reflection, and abstraction upon empirical intuitions, there is reason to doubt that we can acquire any other concepts in this way.

Second, although color concepts may be as straightforwardly related to sensory information as auditory or tactile concepts, psychologists, cognitive scientists and cultural anthropologists have studied color concepts much more than other sensory concepts. Kant was not aware of this research. However, I do not claim that Kant rejected the objections in

the ways that I illustrate below. I only claim that, given Kant's views and the empirical results presented below, the objections are not successful as they stand.

According to Kant, although color concepts have empirical origin,[31] they are not given in experience: "the intuition of *red* does not yet give any concept of the understanding" (*L. Dohna*, 24:752). They are generated from visual intuitions through acts of comparison, reflection, and abstraction:

> He who wished to have a representation of the color red first had to see the color red. When he compared the color red in the red of cinnabar, *carmoisin* [carmine], and *ponceau*, however, he became aware that there is something general in the color red, that is contained along with other things in other representations of the color red, and he thought by red that which was common to many objects, and this was a concept.[32]

Other passages add that, when we focus on the red that is 'common to many objects', we abstract from the differences between them. For instance, when I focus on the redness of a scarlet cloth, 'I abstract from the cloth' (*L. Pölitz*, 24:567). The color concept that I form is "thought of as common to *several*" intuitions of red objects, "that in addition" to being red "also have something *different* in themselves" (B133–34n).

4. First Objection: Color Shades and Shared Features

Against Kant, Locke, and abstractionist theories of concept formation as such, it is often claimed that we do not form color concepts by abstraction because "it is false that all instances of a given color share some common features" (Carruthers 1992, 59). "[T]he different basic shades of red do not have anything in common, which can be singled out in attention, and thus give rise to the more general concept 'red'" (Newman 1992, 104).

"[R]edness consists in a continuous range of shades, each of which is only just distinguishable from its neighbors. Acquiring the concept red is a matter of learning the extent of the range" (Carruthers 1992, 59). The location of the boundaries between ranges is 'set by the ordinary meaning of the word 'red'" (Ayers 1991, 1:259).[33]

Kant does not share this view. He holds that the boundaries of at least some colors, like red, are not conventional because there is "something general," a feature that is "common to" all and only their instances, although he does not state what this feature is.[34] Current studies on categorical perception provide support for Kant's view and furnish him with an answer as to what that feature might be.

Let us imagine that we are observing a white square on a black background. The quantity of light that reaches the square is reduced gradually and uniformly, until we are unable to distinguish the square from the background. As the quantity of light is reduced, the color of the square turns gradually from white to black. It would be hard to tell when the square stopped being white and started being grey, or when it turned from grey to black. Lighter and darker shades morph gradually and continually into one another. If, however, we project red light on the square, and we lower its wavelength gradually and uniformly until the square becomes violet, we will witness a rather different phenomenon. The square will first become orange. It will remain orange for some time. It will then become yellow, green, light blue and dark blue. It will remain dark blue for longer than any other color, before becoming violet. From time to time, when the square turns from one color to another, it will briefly have an indistinct color.

The phenomenon that we witness if we look at the changing hues of a square is the same as we can observe when we look at a rainbow or at light rays refracted through a prism. We do not see a series of shades that morph gradually and uniformly into one another. We see colored stripes, each of which is rather uniform and distinct from the adjacent colors, with

narrow stripes of an indistinct color between them.[35]

This is due to the fact that our perceptual system compresses certain frequency ranges, which we see

> as just varying shades of the same qualitative color. These compressed ranges are then separated from adjacent qualitative regions, also compressed, by small, boundary regions that look like indefinite mixtures, which are neutral between the two adjacent categories. And just as there is *compression within* each color range, there is *expansion between* them. Equal-sized differences look much smaller and are harder to detect when they are within one color category than when they cross the boundary from one category to the other […][36]

We are able to discriminate stimuli belonging to different color categories (such as a shade of red and a shade of green) more quickly and more accurately than stimuli that are equally distant on the spectrum, but belong to the same category (such as two shades of red). This phenomenon is the categorical perception of color.

As a result of categorical perception, the location of the boundaries between red and adjacent colors is not purely conventional. The fact that we designate a certain area of the spectrum with the term 'red' instead of 'blue' is conventional, but the boundaries of each area are set by the processes of compression and expansion that are involved in color perception. All shades of red have a common property. This is the property of falling in a specific area of the spectrum, an area that appears to us as homogeneous and rather well distinct from the adjacent areas.[37]

Against this view, one could claim that categorical perception depends on the possession of color concepts and color terms. The categorical perception of shades of red cannot provide the basis for the formation of the concept RED because we perceive shades of

red categorically only if we possess the concept RED. The best sources of support for this view are not anthropological studies of color naming,[38] but studies of the cerebral activity associated with color perception. In adults, the categorical perception of color is associated to activity in the left hemisphere, which encodes linguistic information (Franklin et al. 2008). This provides strong evidence for the claim that the categorical perception of adults is influenced by their color terms, and hence— at least for those who, like Kant, posit a strong link between concepts and language[39]—by their concepts.

Interestingly, however, the study that proved that the categorical color perception of adults is lateralized to the left hemisphere identified a second type of categorical color perception, which is not influenced by color terms. It is found in infants of four to six months who do not master verbal language. It is associated with activity in the right hemisphere, which does not encode linguistic information, but metric information.[40] Kant can appeal to this nonlinguistic categorical perception to explain the acquisition of color concepts from nonconceptual intuitions. He can claim that, in virtue of nonlinguistic categorical perception, the shades of the same color share a feature that can be perceived in absence of color concepts.

5. Second Objection: Shared Features and Comparisons

Besides holding that all shades of red share a feature, Kant holds that, in order to identify it, we must compare those shades with one another. Similarly, in order to notice that a spruce, a willow, and a linden all have a trunk, branches, and leaves, we must compare them with one another. What is required for us to do this? The critics of Kant,[41] Locke,[42] and abstractionist theories as such[43] claim that we must "recognize" the objects that we are going to compare as "associable objects."[44] However, "(*1*) this kind of comparison seems to presuppose awareness of what is presented to us as having the feature corresponding to the concept to be made

explicit, and (*2*) that in turn seems to presuppose a prior synthesis of the manifold according to that concept."[45]

To address this objection, Kant can deny (*1*). Kant would agree that, in order to represent a feature as shared by several objects, we employ concepts. He can also grant that, sometimes, we compare objects with one another because we hold that they share certain features. For instance, taxonomists may notice that certain plants share specific genetic features, which are the basis for the concept of a new taxon. However, Kant need not claim that we always compare objects because we hold that they share certain features. We can compare them because, without employing concepts, we have noted a similarity among them. For instance, Kant can claim that we did not compare shades of red with one another, so as to form the concept RED, because we became aware that they all are red. Instead, we compared them because, without employing concepts, we detected that they are similar to one another, more so than they are to shades of green, blue, or other colors.

Consider Leibniz's and Kant's example of a dog which, having been beaten in the past, sees its owner raise a stick and cries (in Kant's version) or runs away (in Leibniz's version).[46] In this case, the perception of an event brings to mind the memory of a similar event. Kant can explain this by noting that dogs, like humans, have a natural disposition to compare perceptual mental images with non-perceptual, memorized mental images.[47] When a similarity is detected, the representations of the relevant objects, features, or perceptual scenes are brought to our consciousness.

In order to detect similarities, it is necessary to represent them. Kant can claim that dogs can detect similarities, even though they lack concepts,[48] because he holds that concept possession is not necessary to represent and detect similarities. One can detect similarities between particulars (including objects, their features, and entire perceptual scenes) by performing the kind of operations on imagistic, nonconceptual representations that Kant

ascribes to the faculty of imagination.[49] An example of such an operation, mentioned by Kant, is the superimposition of the mental images of different particulars for the purpose of comparing their shapes (*KU*, 5:231–36). This is a simple procedure since it only concerns shapes, and it can fall prey to the vanishing intersection problem (Harnard 2005, 28–29). However, we can conceive of more complex ways of detecting similarities among objects, color shades, or perceptual scenes if we think of the Kantian imagination as operating on similarity spaces. Similarity spaces are used in accounts of conceptual and nonconceptual mental content.[50] In what follows, I understand similarity spaces as nonconceptual representations of sensory features of particulars and similarities between them. Kant can reject the second objection, with regard to color shades, by claiming that we represent their similarities nonconceptually by means of similarity spaces.

The idea underlying the notion of similarity space is that it is possible to represent sensory properties by employing geometrical structures. Consider pitch perception. Humans and other animals can memorize the pitches of three sounds *a*, *b*, and *c*, order them from the lowest to the highest, and tell whether the pitch of *b* is more similar to the pitch of *a* or *c*. One can represent them as points on a line, as shown in Figure 1, where A, B, and C represent respectively the pitch of *a*, *b*, and *c*. If, and to the extent that, the pitch of *b* is perceived as being more similar to the pitch of *a* than to *c*, B will be closer to A than to C.

Figure 1: Representation of sound pitches on a line.

The claim that sound pitches can be represented through spatial structures finds support in the neurophysiology of pitch perception (Gärdenfors 2000, 13). Each sound frequency stimulates a specific area of the cochlea. The area that a sound stimulates is directly

proportional to its frequency, with higher frequencies stimulating areas closer to the base and lower frequencies stimulating areas closer to the apex. This linear organization of auditory stimuli is reproduced in the primary auditory cortex, where there are groups of neurons, called cochleotopic maps, that reproduce the spatial organization of the cochlea. As a result, "the orderly mapping of neurons with sound frequencies is preserved from the cochlea to the auditory cortex."[51]

Unlike sound pitches, other sensory features must be represented through more complex geometrical structures than points on a line. Consider for instance the widely held view that there are four basic tastes (sweet, sour, tasty, and bitter) and that each other taste derives from the combination of three of them.[52] Given these assumptions, each taste can be represented as a point on a face of the regular tetrahedron represented in Figure 2, called Henning's tetrahedron, with the four basic tastes at the vertices.[53]

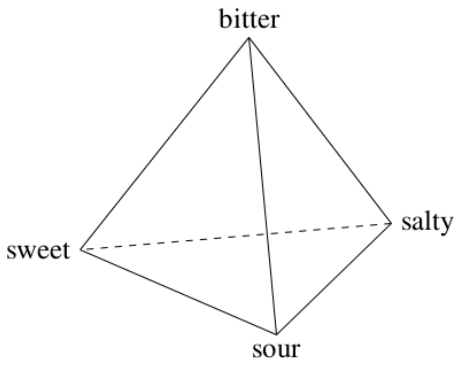

Figure 2: Henning's tetrahedron.

Among the sensory features that can be represented by means of similarity spaces are color hues. For the sake of simplicity, I assume that they can be represented as points on a segment, whose extremes border respectively infrared and ultraviolet radiations. In fact, more complex geometric structures than segments are required to represent them (Knoblauch 2002, 51–54).

Let us assume that we represent color hues *a*, *b*, and *c* by means of points A, B, and C on a segment that mirrors the visible spectrum. The more hue *a* is perceived as being similar to hue *b* than to hue *c*, the closer the point representing *a* on the segment will be to the point representing *b* than to that representing *c*. In order to generate a visual representation of the segment and the points, it is not necessary to employ concepts or formulate judgments. It is sufficient to generate mental images. Employing concepts or formulating judgments is also not necessary to detect if *a* is more similar to *b* or to *c*. It is sufficient to manipulate segments in the imagination. For instance, given Figure 1, one could either translate AB, or rotate it 180 degrees around B, so as to superimpose AB over BC. Once AB and BC are superimposed, it is visually apparent which segment is shorter and, hence, whether *b* is more similar to *a* or to *c*.

Even if one grants that we can represent similarities between particulars nonconceptually by means of similarity spaces, one could claim that we can use similarity spaces only to formulate judgments. As Ernst Cassirer puts it, "[t]he similarity of things" can "only be effective and fruitful, if it is understood and judged *as such*."[54] Since, for Kant, the act of judging requires concept possession,[55] only beings which possess concepts can use similarity spaces.

However, it is not the case that similarity spaces can be used only to formulate judgments. They can also be used to sort objects, as in the following example. There is a bag full of colored chips, some of which are red or have colors close to red, such as dark orange, whereas others are green or have colors close to green, like some shades of blue. Several animals are able to sort the chips into two groups, those whose color is red or more similar to red than green and those whose color is green or more similar to green than red.[56] In order to carry out this task, it is necessary to detect whether the color of each chip is closer to the color of the chips placed in one group or the other. This task requires the detection of similarities,

but it gives rise to the sorting of objects, rather than the formulation of judgments.

One could think that, although we can use similarity spaces to sort objects, we can use them only if we possess concepts because sorting objects requires concept possession. Placing chip *a* in the group of red chips in virtue of its color requires the formulation of a judgment such as "*a* is more similar to these items than to those items." Formulating this judgment requires the possession of some concepts, including at least a concept of similarity.

Kant would reject this view because he holds that non-human animals are able to identify similarities among particulars, even though they lack concepts.[57] We may be inclined to think that, if Kant had access to current-day ethological knowledge, he would have ascribed concepts to some non-human animals. However, not only primates, but also pigeons can carry out sorting tasks like the one in the colored chips example (Harnard 2005, 24–25). The claim that Kant would have ascribed concepts to pigeons is not very attractive, given the range of capacities that Kant closely links to concept possession. They include the capacities to carry out rule-based categorizations,[58] to employ verbal language,[59] to justify beliefs,[60] and the possession of mini-theories about the world.[61]

Since Kant holds that non-human animals can carry out sorting tasks even though they cannot judge, he ought to explain what mental representations underpin their sorting behavior. He could claim that this behavior is guided by the mental act of including a particular, represented by means of nonconceptual intuitions, in a similarity class, represented as a set of particulars whose representations in a similarity space are close to one another.[62] This involves ascribing to Kant the view that non-human animals can represent particulars by means of nonconceptual intuitions. As for humans, Kant could claim that they too represent particulars by means of nonconceptual intuitions. Alternatively, he could claim that, prior to the formation of empirical concepts, humans represent particulars by means of intuitions subsumed under the categories, but not under empirical concepts. However things may be

with regard to humans, this view entails that Kant admits the existence of nonconceptual intuitions, which non-human animals possess and which represent particulars. Although I take these claims to be supported by Kant's texts, they are not uncontroversial.[63]

6. Conclusion

This chapter has reconstructed Kant's abstractionist account of empirical concept formation and discussed whether it falls victim to two objections. According to the first objection, we cannot acquire even color concepts, which are straightforwardly related to visual experience, through acts of comparison, reflection, and abstraction upon empirical intuitions, because "it is false that all instances of a given color share some common features" (Carruthers 1992, 59), and the boundary between colors is conventional. According to the second objection, even if all instances of a given color share certain features, we can identify them only if we possess a concept of that color. Kant can rebut the first objection by arguing that all instances of some colors share a common feature. He can rebut the second objection by arguing that, in order to compare the instances of a given color with one another, it is not necessary to possess a concept of that color. We can compare them because we have detected a similarity among them. We can represent that similarity by means of nonconceptual similarity spaces, which can be employed to group particulars in absence of empirical concepts. Once those particulars have been grouped, it is possible to carry out the acts of comparison, reflection, and abstraction that issue in the formation of an empirical concept.

In addition to the objections discussed in this chapter, other criticisms have been leveled against Kant's abstractionist account of empirical concept formation. They aim to show that Kant's account cannot explain, without circularity, the formation of our first empirical concepts, but only, at most, the process whereby we become conscious of their content (see e.g. Ginsborg 2006, 40). Although these criticisms take several forms, they often

revolve around three claims. The first is the claim that since, whatever may be the case for non-human animals, humans' "intuitions without concepts are blind" (A51/B75), they can only represent the particulars which will be compared with one another if they are informed by concepts.[64] The second is the claim that since, for Kant, all acts of the understanding are acts of judging (A69/B94) and acts of judging employ concepts,[65] the acts of comparison, reflection, and abstraction whereby we form empirical concepts require the employment of other concepts.[66] The third is the claim that those other concepts must be empirical because we can apply the categories to intuitions only if we already possess empirical concepts.[67]

Addressing these objections would involve discussing three issues on which Kant's texts are less than clear, and on which there is little consensus among scholars. The first is the meaning of the claim that intuitions without concepts are blind and the thorny issue of whether Kant was a conceptualist or a nonconceptualist about perception.[68] The second is Kant's view on the origin of the categories and their role in the formation of empirical concepts. The third is whether Kant can allow for a judgmental or proto-judgmental activity that does not employ concepts and can lead to the formation of concepts.[69]

The objections on which this chapter focused do not revolve on distinctive Kantian claims and have also been advanced but also against Locke's account of concept formation and against abstractionist theories as such. I argued that none of the objections is successful as they stand. The abstractionist accounts of concept formation put forward by Kant and several of his early modern predecessors cannot be dispensed with as quickly as has often been suggested.

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Notes

[1] For a discussion of Kant's brief remarks on this issue, see Oberst 2015. References to the *Critique of Pure Reason* appeal to the 1st- and 2nd-edition pagination (A and B). Otherwise, the pagination to which I refer in Kant's texts is from the Akademie-Ausgabe (Kant 1900–), except for *L. Bauch*, *L. Hechsel* and *Warschauer L.*, which are cited from Kant 1998, and *A. Dohna*, which is cited from Kowalewski 1924. I use the following abbreviations: *A. Dohna = Anthropologie Dohna-Wundlacken*; *Danz. RT = Danziger Rationaltheologie*; *EE = Erste Einleitung in die Kritik der Urteilskraft*; *Entd. = Über eine Entdeckung*; *Enzikl. = Vorlesung Philosophische Enziklopädie*; *Fort. = Fortschritte der Metaphysik*; *Jäsche-L. = Jäsche-Logik*; *KU = Kritik der Urteilskraft*; *L. Bauch = Logik Bauch*; *L. Busolt = Logik Busolt*; *L. Dohna = Logik Dohna-Wundlacken*; *Lett. = Briefwechsel*; *L. Hechsel = Logik Hechsel*; *L. Pölitz = Logik Pölitz*; *M. Dohna = Metaphysik Dohna-Wundlacken*; *M. K_2 = Metaphysik K_2*; *M. K_3 = Metaphysik K_3*; *Pr. Anthr. = Pragmatische Anthropologie*; *Refl. = Reflexionen* from *Kant's handschriftlicher Nachlaß*; *R. Pölitz = Philosophische Religionslehre Pölitz*; *Spitzf. = Die Falsche Spitzfindigkeit der vier syllogistischen Figuren*; *Warschauer L. = Warschauer Logik*; *Wiener L. = Wiener Logik*. Translations, where available, are from the Cambridge Edition of the Works of Immanuel Kant.

[2] "In every cognition, one must distinguish matter, i.e. the object, and form, i.e. the way in which we cognize the object" (*L. Pölitz*, 24:510 = *Jäsche-L.*, 9:33; see *Wiener L.*, 24:805; *Refl.* 1628 [1780–1789], 16:45).

[3] *Jäsche-L.*, 9:33. Other passages in the Kantian *corpus* make the same point: *L. Pölitz*, 24:510; *Wiener L.*, 24:909 = *L. Hechsel*, 397; *L. Bauch*, 47–48. See also the passages

on nonconceptual intuitions of the parts of objects (*Entd.*, 8:217n; *Refl.* 220 [*ca.*1776–1783], 15:84; *L. Bauch*, 46). I leave the question undecided as to whether Kant regards these as merely theoretical possibilities or whether he holds that, a matter of fact, there are nonconceptual representations of objects. However things may be, Kant states that, when we conceptualize a "horse" as a "four-footed animal," we represent 'something that was already apprehended in the sensory intuition', prior to that conceptualization (*Fort.*, 20:273–74).

[4] B136n; *L. Pölitz*, 24:565; *M. Dohna*, 28:651.

5 *Fort.*, 20:273–74. Several passages identify another difference between intuitions and thoughts: intuitions are immediate representations, whereas thoughts are mediate (e.g. A68/B93, A320/B377). I do not take a stance on whether the singularity of intuitions and generality of concepts are more basic than their immediacy or mediateness.

[6] *Warschauer L.*, 613 = *L. Pölitz*, 24:570; see *Jäsche-L.*, 9:99. As I argue in my 2012, 94n52, these passages are best read as statements of Kant's views, not just as explanations of a doctrine found in the textbook used for his lectures. If this is correct, the phrases 'every concept whatsoever' in *Jäsche-L.*, 9:94 and 'no concept' in *Wiener L.*, 24:909 are too strong. I expand on other claims of this chapter in my 2012.

[7] *Entd.*, 8:221–23; *Lett.* (1789), 11:82; *M. K*$_3$, 29:949, 951–52.

[8] *Wiener L.*, 24:905.

[9] *Jäsche-L.*, 9:93 = *Refl.* 2855 (1772–1778?), 16:547.

[10] A47/B64. Not by chance, Kant's lecture notes paraphrase the question "how do representations become concepts?" with "how does a concept derive from intuition?" (*L. Busolt*, 24:654; see *Wiener L.*, 24:907). I leave the question open as to whether, according to Kant, we form non-empirical concepts like the categories and mathematical concepts through comparison, reflection, and abstraction.

[11] Carpenter 1995, 227.

[12] Allison 2004, 80.

[13] Since most of these texts are Kant's personal notes (the so-called *Reflexionen*) and lecture transcripts, they must be used with caution. On the necessary cautions and the dating of the lecture transcripts, see Conrad 1994, 43–65; Capozzi 2001, 145–82; Naragon 2006.

[14] *L. Bauch*, 44, see 43. The context makes clear that the distinct cognitions of individual objects mentioned in this passage are intuitions. Along similar lines, A195–96/B240–41 states that, if the concept of cause were an empirical concept, it would derive from the perception of *many* events.

[15] *Wiener L.*, 24:907. See *Refl.* 2854 (1773–1779?), 16:547; *Refl.* 2876 (1776–1779?), 16:555; *Wiener L.*, 24:907–9 = *L. Hechsel*, 393–97; *Jäsche-L.*, 9:93–95.

[16] *Jäsche-L.*, 9:94; *L. Pölitz*, 24:566.

[17] *Warschauer L.*, 610; *Wiener L.*, 24:909; see *Jäsche-L.*, 9:94. Longuenesse (1998, 113–15) identifies other meanings of "comparison" in Kant's texts.

[18] Two *Reflexionen* suggest that one can acquire concepts without carrying out comparisons: *Refl.* 2876, 2878 (1769–1789), 16:555–57. As far as I am aware, no other texts corroborate this suggestion. On comparison, see also *EE*, 20:213.

[19] *Wiener L.*, 24:909 = *L. Hechsel*, 396; see *Warschauer L.*, 610; *Jäsche-L.*, 9:94. Unlike the logic transcripts, the *Anthropologie Dohna* (147) associates reflection to the identification of differences as well as shared properties.

[20] See e.g. *Pr. Anthr.*, 7:131, against Meier [1752] 1924, 16:551. Kant's use of 'abstraction' is similar to Locke's. It does not map on any the meanings of 'abstraction' singled out by Berkeley. See Baxter 2016, sec. 1.

[21] *Warschauer L.*, 610; *Refl.* 2871 (1760–1777?), 16:554; *M. L_1*, 28:328. According to La Rocca (2004, 281n65), three *Reflexionen* deny that we form concepts through abstraction (*Refl.* 2851, 2865 [1769–1775, before 1766?], 16:546, 552; *Refl.* 2878 [*ca.*1776–1789],

16:557–58). None of those passages denies that concept formation involves abstraction. *Refl.* 2851 employs '*Reflexion*' in a broad sense, which includes abstraction besides comparison and reflection. *Refl.* 2865 denies that abstraction is sufficient for concept formation, but not that it is necessary. *Refl.* 2878 suggests that we may form concepts without comparison, but not without abstraction.

[22] *Refl.* 2860 (*ca.*1776–1789), 16:549; *L. Pölitz*, 24:566; *L. Busolt*, 24:654. Two passages mention only two phases of concept formation, but they do not accurately express Kant's views. They are located near passages that, like most texts, identify three phases. Compare *Wiener L.*, 24:907, l. 22–23 with 909, l. 19–20, 24–26; *Warschauer L.*, 608, l. 525 with 609, l. 571.

[23] *M.* K_2, 28:740; *R. Pölitz*, 28:1052–53; *Danz. RT*, 28:1269. These passages call reflection$_1$ 'attention'. For instance, according to the *Logik Busolt* (24:654), reflection$_1$ is "attention to the manifold that is thought in an intuition." Other texts use 'attention' in different ways, relating it to comparison (e.g. *Refl.* 2976 [1776–1789?], 16:555) or reflection$_2$ (e.g. *L. Pölitz*, 567). La Rocca (2004, 281) identifies four phases in Kant's account of empirical concept formation.

[24] Wolff's account of concept formation, that Kant knew, mentions the comparison between perceptual and non-perceptual mental images (Wolff 1751, §§ 273, 832–33).

[25] Kant's passages refer to features that we can detect through ocular inspection. However, the same process can be applied to a wide array of features, including those that trees have only under certain conditions, like losing trees if it is autumn (Longuenesse 1998, 145); disjunctive features; or features that we can only detect by employing instruments and certain concepts, like the features sought by genetic taxonomists.

[26] A728/B756. The search for shared features and differences may resume at any point in the future if conceptual revision is required (Kitcher 1990, 210–11). According to Kant, we

do not juxtapose the features that form the content of a concept in a 'simple list', in 'no particular order' (Frege [1884] 1988, § 88), but we organize them in a structure of co-ordinated and subordinate marks. See Hanna 2001, 125–54.

[27] Locke [1690] 1979, II.xi.9, III.iii.7.

[28] See e.g. Wolff 1751, §§ 273, 832 and Wolff 1738, § 283 on the formation of universal concepts, that is, concepts of genera and species, as opposed to concepts of individuals. Given Wolff's endorsement of innatism (Wolff 1740, 508; 1751, § 819), these passages may be taken to outline the process whereby we become conscious of the content of our innate concepts of genera and species. According to Wolff, this happens when we render a concept distinct. Wolff calls a mental content distinct if we can distinguish it from other mental contents and we can state what the difference between them is (Wolff 1751, § 206).

[29] They are respectively the ideas of relations (Locke [1690] 1979, II.xi.4), reflection (II.ii.8, 24), and abstraction (II.xi.9). Other ideas are acquired passively, through sensation or perception (II.ii.3, 9, 23).

[30] Meier [1752] 1997, § 162; Meier [1752] 1924, § 131. For Meier's definition of clarity, see his [1752] 1924, § 124.

[31] See e.g. *L. Pölitz*, 24:566; *L. Busolt*, 24:654.

[32] *Wiener L.*, 24:904–5 = *L. Hechsel*, 390. This passage implies that blind people lack color concepts. It is unclear whether, according to Kant, those who have seen some colors can form concepts of the colors that they have not seen. Compare *Pr. Anthr.*, 7:167–68 with *M. L1*, 28:233–34. Kant also seems undecided on whether Euler's theory of color perception is correct (compare *KU*, 5:224 with 5:324) and on the role of imagination in color perception (Berger 2009, 41–45).

[33] A similar argument for the claim that we cannot form the concept COLOR by comparison, reflection, and abstraction has been put forward by Geach (1957, 37–38) and

endorsed by Hark (2008, 103).

[34] *Wiener L.*, 24:904–5 = *L. Hechsel*, 390; see B133–34n. Among the authors known to Kant, Baumeister (1747, § 36n) acknowledged not to know what this feature is.

[35] For a list of transition points from one color to another, see Knoblauch 2002, 66.

[36] Harnard 2005, 26. For experiments that prove the existence of categorical perception of color, see Uchikawa and Shinoda 1996.

[37] I identify a second common property in my 2012, 176.

[38] The majority view among cultural anthropologists is that there is a 'universal pattern' of color naming across languages and cultures (Boster 2005, 109). For evidence, see Cook et al. 2005. The opposite view is defended by Davidoff et al. 1999, Roberson et al. 2000. A survey of the debate that followed these two studies can be found in Regier and Kay 2009.

[39] See e.g. *Pr. Anthr.*, 7:155, 192; Capozzi 1987.

[40] Franklin et al. 2008; Regier and Kay 2009, 439–42.

[41] E.g. Carpenter 1995, 233; Allison 2001, 22; Ginsborg 2006, 39; Kalar 2006, 48.

[42] Carruthers 1992, 55; Ginsborg 2006, 43.

[43] E.g. Sigwart 1904, 328–29; Bolton 1977, 14–17; Atkinson 1982, 49.

[44] Pippin 1982, 113.

[45] Ginsborg 2006, 41, numbers added; see Cassirer [1910] 1923, 16–17.

[46] Leibniz [1714] 1890, § 5; *Refl.* 377 (1753–1756? 1762–1763?), 15:151.

[47] Kant ascribes to non-human animals the capacity to compare representations (*EE*, 20:211; *A. Dohna*, 145), identify identities and differences among them (*Jäsche-L.*, 9:65; *Wiener L.*, 24:845–46), and associate them with one another (*Lett.* [1789], 11:52).

[48] On non-human animals' lack of concepts, see, e.g., *Wiener L.*, 24:845–46; an early statement in *Spitzf.*, 2:59; and *Jäsche-L.*, 9:65.

[49] Kant distinguishes the imagination from the understanding, which is the "faculty of concepts" (*KU*, 5:287). In 1781, Kant distinguishes the imagination from the sensibility and the understanding alike (A115). In 1787, he states that the imagination belongs to sensibility (B151).

[50] See respectively Gärdenfors 2000, Gauker 2011.

[51] Gärdenfors 2000, 50. The cortex contains other topographic maps, such as those that reproduce the spatial organization of stimuli on the retina and the localization of tactile sensations on the body. Gallistel (1990, 477) reviews "neurophysiological data supporting the hypothesis that the nervous system does in fact quite generally employ vectors to represent properties of both proximal and distal stimuli. The values of these representational vectors are physically expressed by the locations of neural activity in anatomical spaces whose dimensions correspond to descriptive dimensions of the stimulus."

[52] For an overview and critique of this position, see Erickson 2008.

[53] This model was first put forward in Henning 1916. Those who deny that there are basic tastes might prefer, as an example, the representation of the heaviness of an object as a point in a three-dimensional space (Shockley et al. 2004).

[54] Cassirer [1910] 1923, 15. More recently, Carsten Held (2001, 104) claimed that the "comparison of different objects" is "unintelligible without the thinker already possessing general concepts." Held assumes that, in order to compare different objects, it is necessary to formulate judgements.

[55] This can be gathered from Kant's claim that "there is a concept" in every judgement, understood as the mental content associated with an act of judging (A68/B93).

[56] Categorical perception reduces the number of chips that one would not know how to categorize.

[57] See nn. 47–48.

[58] On the difference between rule-based and similarity-based categorization, see Smith and Sloman 1994. Kant holds that concepts enable us to "think the particular as contained in the universal" (*KU*, 5:179), that is, to categorize particulars. These are rule-based categorizations for two reasons. First, Kant associates concepts to rules (e.g. A106, A722/B750, A724/B752; *Enzikl.*, 29:16, 17; *L. Hechsel*, 396 = *Wiener L.*, 24:909; *M. Dohna*, 28:672). Second, Kant is aware that non-human animals, which he takes to lack concepts, can detect similarities and, hence, carry out similarity-based categorizations, but he does not ascribe the capacity to "think the particular as contained in the universal" to animals.

[59] See n. 39.

[60] Kant relates conceptual content to the justification of the beliefs which are expressed by analytic judgements. See, e.g., *Entd.*, 8:198.

[61] According to Kant, all but simple concepts have a structure of subordinated and co-ordinated marks that encodes a set of beliefs regarding the items falling under those concepts.

[62] Christopher Gauker (2011, 145–83) explains how animals lacking concepts can group objects and carry out other tasks by manipulating mental images. Kant could adopt a similar account.

[63] David Landy (2009, 240, 243) and others hold that Kantian intuitions, as such, are conceptual representations. Stefanie Grüne (2014, § 2) denies that there is strong textual evidence for the view that Kant ascribes intuitions to non-human animals.

[64] See, e.g., Heller 1993, 82–83; Vásquez Lobeiras 1998, 151.

[65] See n. 55.

[66] Several scholars hold that, according to Kant, we form concepts by means of acts of judgement. See, e.g., Allison 1973, 61–65; Longuenesse 1998, 112, 164–65.

[67] See, e.g., Stern 1977, 20; Allison 2001, 24; Kalar 2006, 48. By contrast, according to Claudio La Rocca (2004), empirical concept formation operates on intuitions informed only

by the categories.

[68] See e.g. Hanna 2005; Bauer 2012.

[69] Zuckert 2007, among others, employs the notion of proto-judgement in relation to Kant.