

Gestalt Laws of Grouping

Gestalt Psychology and Nativism

Anyone who has taken a course in introductory psychology is no doubt familiar with the Gestalt “laws of grouping.” They are reflected in the proposition that “the whole is more than the sum of its parts.” This is the idea that there are properties in a unified whole that cannot be explained by simply adding up the elements that compose the whole. Simply put, Gestalt psychologists championed the idea of *emergentism* or *emergent properties*. A simple example can be drawn from chemistry. When two gases, hydrogen and oxygen, combine the result is the liquid water. According to the *Gage Canadian dictionary* (1983) a gas is “not a solid or liquid” (p. 486) and a liquid is “a substance that is neither a solid nor a gas” (p. 672). Something, a liquid, emerges from something else, two gases, but gas and liquid are qualitatively different. So, too, with the principles of grouping, do distinct elements come together to yield properties not possessed by the composite elements. This can be demonstrated in the following example of the “law of similarity,” according to which items that are similar to each other tend to be perceived as a group. In the following example, for instance, even though the ●’s in the array have no actual relation to each other, there is a perceptual tendency to perceive them as forming a square.

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In themselves, there is nothing about the principles of grouping that seem problematic. In the above, for instance, I had the intent of producing an objective stimulus that would demonstrate the “law of similarity.” The organization of the ●’s and *’s was designed by me, upon the basis of a realist bias that we, each and every one of us, have access to the very same objective world, and that the organization that I put into the stimuli was, for others beyond myself, an objective organization in the physical stimulus. This was not, however, how the Gestalt psychologists explained the principles of grouping or organization.

The Problem of Elementalism

The founders of Gestalt psychology—Wertheimer (1880–1943), Köhler (1887–1967), and Koffka (1886–1941)—were, in essence, *phenomenologists*. Their focus was on the subjective experience of perceiving, on immediate perception. It was their contention that the phenomenological *percept* (what one perceives) could not be explained by a dissection into supposed composite elements (*elementalism*). Decomposition to base elements they felt

would result in a loss of qualities or properties that are found in the organized *percept* or what one experiences perceptually. As such they rejected Titchener's *structuralism*.

Titchener's elementalism

E. B. Titchener (1867–1927) readily represents elementalism in perception since it was his aim to deconstruct, or break down, immediate experience into its constituent elements (Hergenhahn, 2001). The plaid skirt that one may perceive as a unitary object is a complex composed of threads of different hues of, perhaps, red, green, blue, and black. It may also yield elementary sensations of softness or coarseness. It may also be constituted by olfactory sensations associated with cleanliness or moldiness; and so on. Regardless of the nature of the object that is perceived as a whole—be it dog, cat, moon, book, apple, or automobile—it was always constructed from more primary, basic, and fundamental constituents.

It was Titchener's aim to provide an inventory of the whole gamut of elementary sensations that could comprise all of the perceptions that one can experience. There were possibly thousands of elementary sensations that are involved in the full range of olfactory, gustatory, tactile, visual, auditory, and other sensory experiences; and these needed to be identified before we could give an account of the complexity that is the percept. Having identified the basic elements of conscious experience, Titchener intended to then identify the laws that explained their combining to produce conscious experience. That he failed in this is for us no matter. What does matter for us here is the Gestalt psychologist's criticism of his suppositions.

The Gestalt Critique

The Gestalt psychologists were *holists* who focused on conscious experience, hence, they were *phenomenologists* too (Hergenhahn, 2001). It was from their phenomenological stance that they mounted their attack on elementalism. In their examination of perception, the Gestalt psychologists opposed the idea that elements are real existences and that they were the stuff of which psychological experience was made (Heidbreder, 1933). They flatly denied that elements were pieced together (fused or associated) in any way that could account for perception, as it is actually experienced, i.e., in terms of the percept which presents itself as a whole configuration. Direct examination of experience does not disclose elements. This theory (characterized by Wertheimer as the *bundle hypothesis*) proposed that experience was an aggregate of elements. Such suggestion of elements then required speculation regarding those processes that bound the elements together in experience. From the Gestalt perspective, this search for elements had the result of blinding one to the actual situation by altering or even destroying it.

To the Gestalt adherents, the deconstruction of a percept into elements reflected the dangers of analysis (Heidbreder, 1933). The argument that they made was that the intellect, in its operating on experience, can break experience down into parts but it does not follow that such experience can actually be made of such components into which it has been broken. Analysis, they claimed, alters that which is given and destroys the very thing that it is the business of psychological science to explain—experience. In such a dissection, the total character of the percept, its uniqueness, is lost. As a corollary of analysis into elements, there was the problem of explaining the recombination of elements to form the percept. The result of the error of analysis into elements was the further error of association. According to Wertheimer, if experience is broken up into artificial bits one will then be left with the need

of devising some artificial means for putting them back together—associative bonds and the principles of association are the result.

The Problem of the Constancy Hypothesis

It was a further contention of the Gestalt psychologists, Köhler in particular, that psychology had falsely accepted the *constancy hypothesis* (Ash, 1998). The constancy hypothesis had to do with the relation between stimulus conditions and sensory experience. Adherents were proposing that there was a one-to-one correspondence between the physical stimulus and the sensory experience (Hergenhahn, 2001). Helmholtz, for instance, had proposed that sensations and perceptions were determined by peripheral stimulation although sensation was not an exact, point-for-point correspondence with the physical stimulus (Ash, 1998). Furthermore, it was claimed that the same stimulus would produce the same sensation no matter what the circumstances (Hergenhahn, 2001). So long as there was a constant, one-to-one relation between the physical stimulus and immediate experience there was nothing to explain (Heidbreder, 1933). When discrepancies did emerge the general tendency was to suggest some mediating connection that could preserve the correspondence. Köhler used the phenomena of shape constancy and the perception of the rectangularity of a table as an example.

Under normal viewing conditions, despite the irregularity of the retinal projection, an irregularly shaped retinal image is perceived as perfectly regular (Gray, 2002). A table is something perceived as a rectangle even though, from different angles of observations, it may depart from rectangularity (such as a trapezoid that only has two parallel sides). On the other hand, trained introspectionists, like those coming from the structuralist camp, have reported irregularity in their analysis of the percept (Heidbreder, 1933). Both accounts, the naïve and the trained, are fair reports but one must be more real than the other which must, by default, be illusory. It is the irregularity that, to the introspectionist, is valid but, to Köhler, these are exceptional experiences given the common sense standpoint. In ordinary life conditions it is the experience of regularity that we act upon in our dealing with the world, and, furthermore, the irregular table of the introspectionist is a secondary abstraction that is derived from the natural percept. While constancy is arrived at by the methods of introspective analysis, everyday experience is at variance with that notion. The perception and the true sensory experience may be quite at odds with each other. Such a discrepancy, when it arises, infuses the defenders of constancy with a need to restore order, to restore the correspondence. To do so, a common strategy was to devise alternative processes that interceded between peripheral stimulation and perception as corrective mechanisms but these entities and acts, Köhler argued, were untenable since they could not be verified (Ash, 1998). *Meaning theory* was one such unverifiable process.

Meaning Theory

Meaning theory is a theory that attempts to reconcile discrepant percepts with the sensory data as it is actually presented (Heidbreder, 1933). The theory proposes that the basis of a percept is the collection of sensations that have been associated in experience repeatedly. Having encountered rectangular tables, for instance, from various angles and conditions of presentation, a body of sensory information is accumulated regarding tables. Between each

separate peripheral presentation and the experience of the sensation there is constancy, a clear correspondence, but they may be discrepant between each other. With accruing experiences collections of these separate experiences fuse and result in an amalgam of experiences that give to the object its meaning. The immediate sensation that reflects constancy is displaced in consciousness by meaning, the compound merger. The evidence for this, however, as Köhler would contend, is lacking. Those experiences that meaning theory purports to account for, he charged, have not been demonstrated. A large amount of learning would have to occur, he insisted, for meaning theory to be true. To account for the recognition of the human face from all possible angles and given all possible conditions of lighting and shade would require, given meaning theory, a considerable cache of experience yet, Köhler pointed out, the human infant accomplishes human face recognition quite early in its perceptual career. The evidence was thus lacking for meaning theory.

From Elements to Patterns

According to *elementalism*, *associationism*, the *constancy hypothesis*, and *meaning theory*, the nervous system is a complicated mechanism composed of separate conductors such as receptor cells, sensory neurons, and interneurons (Heidbreder, 1933). It was proposed that nervous impulses travel from localized points of stimulation, the sensory receptors, along pathways whose lines of conductance are fixed throughout. The nervous system was conceived of as being a machine having determined, inflexible organization. Köhler (1947) suggested that this is the sort of understanding that is found in the behaviorist stimulus–response formula since it too did not allow for the nervous system to possess its own characteristic processes. In such an arrangement, each part of the mechanism was suitable for only one type of action. Such a conception, according to the Gestalt group, was well suited to a theory that had as its subject matter elements and associations between elements and assumes both the *constancy hypothesis* and *meaning theory*. Such a theory, from the perspective of Gestalt theorizing, was inadequate as an explanation of phenomenological experience, no matter how elaborate the potential connection among elements may be, and should therefore be rejected. Sensory processes and the combining of elements could not explain subjective experience. Gestalt theorists put forward a different kind of physiological explanation to account for perception.

According to the Gestalt argument, an examination of immediate experience, of the world of experience, will reveal an apprehension, visually, of objects as unified wholes—people, things—not aggregates of sensations (Heidbreder, 1933). These wholes of immediate experience are also segregated, set apart and isolated from other things that form a distinct background, i.e., figure/ground relations. The reason that mechanistic accounts have failed to appreciate this is that the field of dynamics in physics, which studies the interaction of physical forces, has been ignored. Recognition of this is what will form the basis of Gestalt explanation. The brain, it was postulated, possessed structured fields of electrochemical forces that were in place prior to any sensory stimulation. Neural processes associated with perception are located within a medium that is continuous and, consequently, events in one region influence events in another region and are also directly dependent upon the properties of each in relation to the other (Köhler, 1940). Sensory data that entered this field modified the field's structure and that, in turn, modified the sensory data (Heidbreder, 1933). The product of the interaction of sensory data with field forces was consciousness. The electrochemical force fields of the brain thus provide sensory data, the individual sensations,

with meaning, i.e., what is perceived. Mental fields were Gestalts or organized configurations that were wholes rather than an assemblage of elements.

Gestalt Epistemology

Gestalt psychology is aligned with Kantian *nativism* and *indirect realism*. As I just noted, the Gestalt psychologists opposed *unconscious inference theory* (the *bundle hypothesis* plus *meaning theory*) but accepted Helmholtz's *indirect realism*. Recall that sensory data interacts with brain processes that formed a structured field. These processes were in place before sensory stimulation had occurred, hence *nativism*. This interaction of current sensory data with innate forces of the brain had consciousness (and perception) as its product. Perceptual organization was largely determined by the innate, neurological, organizing principles (Eysenck, 1993). Allport (1955) put it, organizational processes "are natively given, are experienced directly, and are a property of the nervous system" (p. 115).

One's perception is of sensory data after it has been organized and, in this organization, new properties may emerge that were not of the elements. For instance, with the *phi phenomenon* (the perception of two lights, alternately turning on and off, as a single light moving back and forth) there emerges movement from elements that are stationary; after organization within the brain comes movement and it is that that is perceived. So it is not the objective world of the *distal stimulus*, nor is it the *proximal stimulus* of sensory elements, that is perceived, but the organization of the *proximal stimulus* by the brain processes. Köhler (1947) was quite clear on this point:

.sensory organization constitutes a characteristic achievement of the nervous system. This emphasis has become necessary because some authors seem to think that, according to Gestalt Psychology, "Gestalten," i.e., segregated entities, exist outside the organism and simply extend or project themselves into the nervous system. This view, it must by now be realized, is entirely wrong. (p. 94)

In fact Köhler (1947) pointed out in a footnote that psychophysical isomorphism referred to the similarity between the physiological processes and sensory experience. This isomorphism, however, as he stressed, did not apply to any relationship between these processes and the physical environment. Kant's "thing-in-itself" was not what perception was about.

In the above quote it can be noted that Köhler directly opposes the suggestion that I made earlier in my demonstration of the principles of organization (the ●'s that were organized perceptually into a square). Segregated entities, he claimed do not exist outside of the organism. This, however, in a rather underhanded way, was what I was suggesting. I projected my understanding of the principle of "similarity" onto the page with the assumption that you, the reader, would have access to my objective product, i.e., the organized display of *'s and ●'s. To present my example I had to assume that each of us has access to the objective world and that through the physical means available to me—the medium of print—I would attempt to convey my appreciation of the Gestalt principle. Köhler too, while denying himself access to the physical, objective world also must depend upon the very same medium to convey his message as I did. This is a clear distinction between *direct realism* and *indirect realism* (assuming that Köhler allows for the existence of a world beyond the senses, a point I

don't doubt since he was writing to someone and trying to convince someone other than himself).

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