

## The Stimulus Error and Experimental Design: The Manipulation of Perceptual “Set”

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The psychologist E. B. Titchener is credited with introducing the notion of “stimulus error” into experimental psychology. As discussed by Boring (1921), the term has several applications. Its primary meaning, as in Titchener (1905, xxvi), characterizes the “error” that occurs when subjects in experiments directed toward sensations use their beliefs about the physical stimulus in making their responses, rather than reporting the phenomenal attributes of sensation:

We are constantly confusing sensations with their stimuli, with their objects, with their meanings. Or rather – since the sensation of psychology has no object or meaning – we are constantly confusing logical abstraction with psychological analysis; we abstract a certain aspect of an object or meaning, and then treat this aspect as if it were a simple mental process, an element in the mental representation of the object or meaning. (ibid.)

The “error” results when, instead of holding object-perception and meaning in abeyance, the subject abstracts an object-content from perception and reports that content. Titchener gives examples from auditory, gustatory, and haptic perception but also alludes to the tendency in visual spatial perception to overlook sensations (which correspond to “peripheral cues”) in favor of objects arrayed in space (1909, 314). According to him, the elemental sensations of vision are bidimensional and we acquire perception of the third dimension (1909, 303–6). Boring (1921, 462–3) describes an instance from size perception, deriving from Martius (1889), of the need to direct experimental subjects to respond to the apparent sizes of rods at various distances rather than their actual sizes (to which subjects normally attend).

Viewed in one way, the notion of a stimulus error belongs to an outdated viewpoint that draws a hard and-fast distinction between sensation and perception. Accordingly, sensations are pure states of sensory effect, devoid of interpretation and meaning. In vision, they correspond to the retinal image. Philosophically, they may be equated with now discredited “sense data.” Such sensations are mistakenly posited as what we find by “introspecting” or “turning inward”; but, in fact, we find nothing by looking inward. In reflecting on seeing, we only find the world out there. Subjects who are directed to introspect are right to report only on the object, because there is nothing else available.

This response accords with present-day philosophical accounts known as naive direct realism (or plain “disjunctivism”) and content physicalism (or the pure informational, intentional, or representational theory). Such positions deny subjective intermediaries in vision and point to the “transparency” of perception, its world-presenting character, as a refutation of the older view of introspection ascribed to Wundt and Titchener (as “structuralists”).

As it happens, these more recent responses are not well-attuned to the actual practices and debates that surrounded the phenomenon of stimulus error. Moreover, the aspects of these recent positions that would discredit the notion of subject-dependent aspects of perception are heavily theory-dependent: they rely on contentious analyses of the relation between perception and its objects and make too easy an inference from phenomenal “transparency.” In this way, they partake of a feature of the earlier discussions that I want to highlight: the interplay between experimental design and theory. Other theorists besides Titchener found differences when subjects were asked to report on phenomenal

aspects of experience as opposed to actual object properties (perhaps without finding “error” in the latter or treating the former as elemental sensations). By comparing Titchener’s notion of sensation with other outlooks, I show how different theoretical stances yield different conclusions about the legitimacy of experimental protocols aimed at uncovering subject-dependent aspects of perception.

Although Titchener believed that sensations are the primitive (unanalyzable) elements of mental life, for him even the seasoned introspector does not experience unvarnished sensations. Rather, we discover the properties of sensations by establishing conditions for isolating them and then reporting introspectively on their attributes, such as quality, intensity, or duration, all of which cannot be attended at once or made the subject of a single report. From his point of view, if one succeeds in focusing on the pitch of an upper partial tone in a musical note, one has noticed an attribute of an element that was present in the tone all along. Still, the notion that there are primitive sensations that compose complex experiences comes from theory (Titchener 1915).

Various investigators who were sympathetic to phenomenal reports, from James (1890) through Gibson (1950), accepted that one begins from unitary phenomenal experiences that are as of a scene or sound in the world (phenomenal “transparency”). They then applied diverse procedures in studying aspects or attributes of such experiences. How they conceived the experimentally determined attributes depended on their theoretical outlooks. Some theorists, including the Gestalt psychologists and Gibson, held that in vision the experience of a three-dimensional visual world of objects is not only phenomenally immediate but psychologically primitive, as is an ordinary tone. Accordingly, one experiences the upper partial tone, or a bidimensional visual field, by adopting a special attitude that does not uncover a pre-existing element but produces a new, secondary sort of experience in place of normal experience. Nonetheless, such theorists allowed that experimental investigations can be conducted by attending to phenomenal attributes or dimensions of normal experience, in abstraction from other attributes and meaning. Thus, one might attend to sizes, distances, or shapes as attributes within visual experience.

This paper explores the interplay between experimental protocols and theoretical outlooks in relation to “stimulus error.” From the time of Martius (1889), experimenters used instructions to invoke specific perceptual attitudes in subjects. Subjects might be asked to attend to “apparent” size or to judge the “objective” physical size of objects. The latter task does not produce an “error” but simply a different perceptual response. By examining the use of instructional protocols by Fernberger, Brunswik, Boring, and others in the investigation of size and shape perception in vision, I seek to determine whether they see the differing responses under differing instructions as resulting from (1) changes in phenomenal experience due to a change in task; (2) access to different aspects of a unitary phenomenal experience; or (3) access to distinct phenomenal and conceptual dimensions of experience. The answers can be related to differing philosophical analyses of the perception-object relation, including naive realism and content physicalism as above, but also critical direct realism and appearance theories, in which objects are presented via subject-dependent aspects of experience.

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