SECONDARY QUALITY

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October 21, 2025

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Primary Disciplinary Field(s): Philosophy (Epistemology, Metaphysics), Experimental Science, Psychology

1. Core Definition

A **secondary quality** refers to a property that objects possess, but which does not exist inherently or independently within the objects themselves, serving instead as a power to produce certain subjective **sensations** in an observing mind. These qualities are characterized by their relativity; they are entirely dependent upon the observer's sensory apparatus and the specific conditions of observation. Examples classically cited in philosophical discourse include color, taste, smell, sound, and sensible temperature. Unlike primary qualities, which are thought to be measurable, inseparable features of matter (like extension or figure), secondary qualities are considered the effects that matter has on conscious beings. The knowledge derived from secondary qualities is therefore not objective fact about the external world, but rather an experience of the interaction between the physical object and the perceiving subject.

Philosophically, secondary qualities are defined by their subjective nature; they are ideas in the mind that are caused by the objective powers (primary qualities) of external bodies. For instance, the perception of "redness" is a sensation produced in the mind when light waves of a certain frequency interact with the surface texture of an object, which then stimulates the visual cortex. The object itself is not objectively "red" in the way it is objectively "extended"; rather, it possesses the microscopic structure and motion necessary to trigger the idea of redness in a sentient observer. Consequently, if all observers were removed from the universe, the secondary qualities, such as sound or color, would cease to exist, while the primary qualities of mass and motion would endure.

2. Historical Antecedents and Development

While the definitive formulation of the distinction between primary and secondary qualities is attributed to the English empiricist philosopher John Locke in the late 17th century, the intellectual roots of this concept stretch back to ancient Greek atomism and were strongly revived during the Scientific Revolution. Philosophers such as Democritus distinguished between "things in truth" (atoms and void) and "things by convention" (color, sweetness). This early distinction was crucial in separating the underlying physical reality from phenomenal experience. However, it was the rise of **mechanical philosophy** in the 17th century, championed by figures like Galileo Galilei, that systematized this view. Galileo famously argued that if sensory qualities like tastes, odors, and colors were removed, the fundamental material reality would remain, consisting only of geometrical and quantifiable properties. This emerging mechanical worldview sought to strip physical reality

down to those properties necessary for mathematical description and causal explanation.

The physicist and chemist **Robert Boyle** (1627-1691) significantly influenced Locke, explicitly using the term **secondary qualities** in his corpuscular theory. Boyle proposed that all sensible qualities resulted from the minute configurations and motions of primary particles (corpuscles). For example, the sweetness of sugar was not an intrinsic attribute of the substance but the result of the specific shape and motion of its constituent corpuscles, which, when dissolved and interacting with the tongue's receptors, produced the sensation of sweetness. This provided the necessary scientific bridge for Locke to incorporate the distinction into his foundational work on epistemology, thereby making the primary/secondary quality dichotomy a cornerstone of modern empiricism and the philosophical defense of the new physics.

3. The Lockean Distinction in Empiricism

In his seminal work, *An Essay Concerning Human Understanding* (1689), John Locke defined qualities broadly as the power of a substance to produce any idea in the mind, and then categorized them based on their relationship to the material substance. Locke established primary qualities (solidity, extension, figure, motion, and number) as inseparable from the body, existing whether or not they are perceived. Secondary qualities, conversely, are powers in the objects--specifically, powers to affect our senses through the mechanical action of their primary qualities. Locke illustrated this by explaining that heat is not a quality inherent in fire itself but is the effect of the rapid motion of the fire's insensible particles, which transfers motion to our nerves and produces the idea of heat in our minds. Thus, the idea of heat resembles nothing in the fire but the power of the fire's primary qualities to cause that sensation.

The crucial differentiator for Locke was the concept of **resemblance**. Locke maintained that the ideas we possess of primary qualities (e.g., the idea of a round coin) resemble the qualities existing objectively in the external object. However, the ideas derived from secondary qualities (e.g., the idea of "red") bear no resemblance whatsoever to anything in the object itself. The red color is simply a psychological effect caused by the object's physical structure interacting with light. This radical separation meant that objective knowledge of the world could only be reliably achieved by focusing on primary qualities--those quantifiable, spatial attributes that persist independent of perception--while secondary qualities were relegated to the subjective and unreliable realm of sensory experience.

4. Key Characteristics of Secondary Qualities

Secondary qualities are defined by several key characteristics that sharply differentiate them from the objective properties of matter, emphasizing their relativistic and observer-dependent nature.

Subjectivity and Sensational Basis: Secondary qualities are purely subjective, existing only as

sensations or ideas within the consciousness of the perceiver. The experience of the specific flavor of coffee or the tone of a voice is a mental event; these qualities vanish when there is no mind to register them.

Relational Dependence: Their existence is contingent upon the relationship between the object, the surrounding medium (e.g., atmosphere or light), and the specific structure of the observer's sensory organs. For example, an object's perceived color is altered by the wavelength of incident light, proving that the color itself is not intrinsic to the object but arises from the interaction.

Non-Resemblance of Idea to Object: The central feature, as established by Locke, is that the idea generated by a secondary quality does not resemble the quality that actually exists in the object. The objective reality is particle motion (a primary quality), which causes the subjective idea of sound (a secondary quality); the sensation of sound is nothing like the mechanical vibrations causing it.

Variability and Instability: Secondary qualities are highly susceptible to changes in the environment or the state of the observer. Water may feel warm to one person and cold to another depending on their prior temperature exposure, demonstrating that temperature (a secondary quality) is not a fixed, inherent property but a relative sensation.

5. Contrast with Primary Qualities

The philosophical significance of the concept of secondary qualities is entirely contingent upon its contrast with **primary qualities**. Primary qualities (such as extension, figure, solidity, motion, and number) are regarded as the bedrock of objective reality because they are deemed inherent to and inseparable from matter. These qualities remain constant regardless of the observer's state or the conditions of observation. If a cube of ice melts, it loses its figure (a primary quality), but the resulting water still possesses the primary qualities of extension and solidity, and its aggregate mass remains unchanged.

The distinction provides a methodological division for scientific inquiry. Primary qualities are the proper focus of physics because they are stable, quantifiable, and accessible through mathematical analysis, thereby guaranteeing universal, objective knowledge. Secondary qualities, being variable, private, and non-quantifiable in their phenomenal form, cannot serve as the foundation for objective scientific truth. This dualistic structure, separating the silent, colorless, quantitative "world of science" from the rich, qualitative "world of experience," was essential to the philosophical acceptance of the Newtonian mechanical worldview.

6. Significance and Impact on Philosophy

The establishment and widespread acceptance of the primary/secondary quality distinction by Locke had a monumental impact on modern epistemology and the philosophy of science. Epistemologically, it provided a systematic framework for determining the reliability of different

forms of knowledge. Knowledge derived from primary qualities, being stable and resembling external objects, was considered certain and objective, reinforcing the growing authority of mathematical physics. Conversely, knowledge gained purely through secondary qualities was categorized as subjective and potentially unreliable, requiring careful scrutiny and often correction by reason.

Furthermore, this concept profoundly influenced the development of psychology and the philosophy of mind. By asserting that qualities like color and taste were mental ideas rather than properties of matter, it initiated the modern philosophical project of understanding the relationship between the mind (the recipient of secondary qualities) and the external world (defined by primary qualities). It provided the intellectual justification for treating sensation as a psychological phenomenon distinct from the physical laws of nature, thereby legitimizing the separation between objective physics and subjective human experience. This framework essentially defined the scope of scientific materialism for the next two centuries.

7. Criticisms and Subsequent Debates

Despite its foundational role in classical empiricism, the primary/secondary quality distinction faced immediate and forceful critiques. The most devastating challenge came from the idealist philosopher George Berkeley (1685-1753). Berkeley argued that Locke's distinction was ultimately unsustainable because primary qualities, just like secondary qualities, are accessible to us only through our senses and are equally subject to perceptual relativity. Berkeley pointed out that the perceived size (extension) of an object changes depending on the distance, and its perceived motion changes depending on the observer's frame of reference, rendering them just as mutable and mind-dependent as color or taste.

Berkeley contended that since both types of qualities only exist as ideas in the mind, there is no logical basis for asserting that primary qualities exist inherently in unthinking matter while secondary qualities do not. He argued that if we try to conceive of an extended object stripped of all its secondary qualities (color, temperature, taste), we are left with a concept that is impossible to imagine--or, rather, an object that, when perceived, must inevitably possess secondary qualities. This critique led Berkeley to his radical subjective idealist position, rejecting the existence of mind-independent material substance altogether, concluding that the only things that exist are minds and their ideas. This debate initiated a major trajectory in modern philosophy, transitioning from Locke's representative realism to the skepticism of David Hume, who further questioned the reliability of our knowledge of external objects based on sensory input alone.

Further Reading

John Locke (Wikipedia)

Secondary Quality (Wikipedia)
An Essay Concerning Human Understanding (Wikipedia)
Robert Boyle (Wikipedia)
George Berkeley (Wikipedia)