

Axioms and their role in psychology

Los axiomas y su papel en la psicología

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ABSTRACT

It is the theme of this article that the scientifically valuable insight that axioms are assumptions requires elaboration and extension. Axioms as the behavior or behavioral products of scientists, logicians, and mathematicians are points on a behavioral continuum along with reflecting, wishing, guessing, and believing. Accordingly the entire enterprise of science including choice of events studied, hypothesizing, research planning, investigating, postulating, and law formulating are in origin and operation assumptionable.

Axioms it follows, then, are not merely the bases of local systems of knowledge as in geometry but one type of specific assumptional factors in interbehavioral fields. All scientific systems consist of the activities of individuals or groups while observing and describing events of interest to them. All of the factors are subject to evaluation as to their fidelity to observed events, in brief a criterion whether assumptions are naturalistic as derived from events or nonnaturalistic as derived from traditional sources.

In this article the functions and operations of axioms and other assumptional factors are assessed with direct reference to the discipline of psychology. Attention is focused upon the early shift from the axioms derived from observations of psychological behavior to the religio-cultural, artifactual assumptions of soul, mind, and consciousness. It is suggested that today a reconstructed theory of axioms and other assumptions distilled from the observation of actual scientific work will serve to make psychology a veritable science with advantages for general theory and many sorts of practical confrontations with normal and deviant conduct.

DESCRIPTORS: axioms, scientific behavior, interbehavioral psychology.

RESUMEN

El tema de este artículo es que el entendimiento científicamente valioso de que los axiomas son suposiciones requiere elaboración y extensión. Los axiomas como conductas o productos conductuales de los científicos, lógicos y matemáticos son puntos en un continuo conductual junto con el reflexionar, desear, adivinar, y creer. Por consiguiente,

toda la empresa de la ciencia incluyendo la elección de los eventos estudiados, el plantear hipótesis, planear la investigación, investigar, postular y formular leyes son sujetos a suposición en origen y en operación.

Por lo tanto, los axiomas no son meramente las bases de los sistemas locales del conocimiento, como en la geometría, sino un tipo de factores específicos de suposición en los campos interconductuales. Todos los sistemas científicos consisten de las actividades de individuos o de grupos mientras observan y describen los eventos de interés para ellos. Todos los factores están sujetos a evaluación en cuanto a su fidelidad de los eventos observados, o sea a un criterio de si las suposiciones son naturalísticas, o sea derivadas de los eventos, o no naturalísticas, derivadas de las fuentes tradicionales.

En este artículo se evalúan las funciones y operaciones de los axiomas y de otros factores de suposición, con una referencia directa a la disciplina de la psicología. Se centra la atención en el temprano desplazamiento de los axiomas derivados de las observaciones de la conducta psicológica a las suposiciones religio-culturales, artificiales, del alma, la mente y la consciencia. Se sugiere que en la actualidad una teoría reconstruida de los axiomas y otras suposiciones destilada de la observación del trabajo científico real servirá para hacer de la psicología una verdadera ciencia con las ventajas para una teoría general y muchas clases de confrontaciones prácticas con la conducta normal y la desviada.

DESCRIPTORES: axiomas, conducta científica, psicología interconductual.

AXIOMS AS ASSUMPTIONS

Although it is now widely appreciated that axioms are basically accepted assumptions, a conception which represents a distinctive achievement in intellectual sophistication, that is only the first step in the understanding of an important factor in thinking and reasoning. In order to deepen appreciation of the nature and function of axioms and their role in psychology it is essential to be familiar with the origin, source, conditions, and operation of axioms. Psychologically of course axioms are on a behavioral continuum with indifferent guesses and assertions. In this paper, however, we limit ourselves to the upper level of scientific postulation.

BRIEF HISTORY OF AXIOMOLOGY

In the Greek period of our scientific culture axioms were generally considered as fixed and eternal cosmic certitudes, the operating rules for creating systems of mathematics and general science. The characteristic example is of course the Euclidean foundations of geometry. No one at the time could know that axioms were constructions with a basis in the humanistic preoccupation with the logic and epistemology of science and learning in general.

The relative simplicity of Greek thinking is effectively illustrated in the philosophy of Plato. The solution to the problem of ultimate reality is a reflection from his mathematical background. Impressed with the rigor and objectivity of mathematical relations he proposed to account for the power and certainty of abstract formulae by contrasting them with appearances.

This is clearly seen in his invention of the analogy of the cave.¹ Chained and immobilized persons sitting with their backs toward their source of light could only see the shadows of things passing and movements but not the things themselves. Reality for him then is comprised of ideas that is eidola, patterns, and representations. These idols he found a venue for in a poetical world beyond the heavens. Only Plato's successors knew that he thus constructed a verbal institution which has ever since served as axiomatic entities, though in a metamorphosed aspect.

Similar noncognition of the nature and function of axioms has survived for many centuries since the decline of the Greek and Roman objective culture. What followed was the transformation of the Greek cosmic dualism by the church fathers and saints into a duality of matter and spirit. Human organisms were split into souls and bodies. All philosophy and the sciences became infected with this duality. For example, such outstanding leaders in the mathematical sciences including physics as Newton and Leibniz failed to realize that their basic axioms or postulates were theological instead of based on naturalistic observation and interpretation. Similarly, such giants of the biological and psychological disciplines as the eminent Helmholtz, Sherrington, and their disciples were unaware that they were building their neurological and psychological edifices upon the soul-mind and body dichotomy.

The duplex mind-body assumption has continued in a vigorous way down to the current date albeit with some modifications. Even when psychology seemed to undergo a radical revolution in the early decades of the twentieth century no discernible departures from the venerable idealistic position was apparent among the acknowledged speakers for psychology. Basic axioms remained incognito when Watson began to question the need for psychologists to concern themselves with consciousness while studying the learning behavior of animals. What he actively proposed as a methodological psychology was merely to disregard any reference to mentality or consciousness.

The present writer submits that a full recognition of the nature of axioms opens the way to the view that all types of psychological events even the most subtle and intricate can properly be investigated as occurring events without hindrance from ancient dogmas.

Even a scanning analysis of the history of science reveals four types of relationships to axioms. 1. A complete disregard of basic assumptions, 2. the passive and tenuous reference to axioms, 3. working in accord with partial, localized, or fallacious assumptions, and 4. a full appreciation of valid and serviceable first principles.

Only the last relation can comport with a progressive march of science. For only by implementing this relationship can a worker cleave to things and events when formulating theories or building models concerning events

1 Plato, *Republic*, Book seven.

which he is called upon to describe and interpret. In the case of psychology one would not interpret the interaction of organisms and their stimulus objects as the operation of psychic forces, or the sole causal determinations of a brain.

IMPORTANCE OF AXIOMS

Doubtless the most important aspect of axioms is the aid they afford intellectual workers to be properly oriented. To appreciate the assumptions one is building upon, and no scientific behavior is performed without prior axiomation, is to make possible that data, investigation, and interpretation are in harmony with the original assumptions.

Copious examples are available in the scientific literature of the wide gulf separating assumptions from events. A biologist² preparing a philosophical treatise castigates naive realism, in no uncertain terms. He cannot accept the view that objects exist independently of knowers on the ground of the perceptual model that objects are created by the brain and mind after contacts with electromagnetic inputs stir up impulses that reach the brain. The brain and mind produce psychic sensations as components of cognized things and events. Little does he realize that he is bulding upon the Cartesian assumption of "Je pense doc je suis."

Similar errors of thinking in quantity are to be discerned in the psychological domain. Consider the enormous battles between Wundt (1907) the elementarist and Brentano (1874) the configurationist. Little weight is carried by their arguments since both are steeped in idealistic or spiritistic doctrines concerning the universe. A mirror image of such confrontations is localized in the domain of scientifically inclined psychologists. What value attaches to the divergent views of James (1890), Angell (1903), and their followers as against Titchener (1910) and his disciples, one side with staunch defense of Functionalism and the other with utter commitment to Structuralism derived from a chemical elements model. Both sides stand as firmly as anyone can on a platform of dualistic mind and body inherited from the church fathers and saints.

How powerfully has progress in psychology been impeded after the establishment of the axiom that the brain is the seat of consciousness and the mind! The emergence of this dogma as an axiom is collateral with the equally erroneous psychic axiom which inhibits the study of behavior by organisms in their invariable interaccions with things and events constituting their natural environmental auspices.

² Rensch (1971).

ESSENTIAL FUNCTIONS OF AXIOMS

That axioms are assumptions accepted and chosen by individual scientific workers is certainly a fact but only a superficial one. A more penetrating notion is that while scientific axioms are continuous with the assumptions of everyday thinking they are factors necessary in carrying on intellectual and scientific work. Whether known or unknown to the worker no intellectual work can be organized into a system of interpretation and explanation without the operation of axioms as basic assumptions. In a notable sense scientific work attains its meaning and significance largely in the measure of its deliberate inclusion of assumptions guiding the work. Without the full awareness of the active existence of specific events the work may be futile as well as misleading. In physics, investigation of Blondlot's N-rays³ could not add to the facts of physics, and in psychology to build upon the supposition that the brain is the seat of a soul or mind is using sand as a solid foundation.

An important suggestion here is that the longevity and power for good or evil of axioms is that they consist of fundamental cultural institutions. They partake of the longevity and force of incontrovertible doctrine and pillars of civilization exactly as do the absolute truths and other "traditions" of religion.

THE PSYCHOLOGY OF AXIOMS

Psychologically considered, scientific axioms are propositional responses of persons to particular types of stimulus objects. They develop as do any other class of subtle behaviors such as concepts, theories, beliefs or reasoning. However, they do not always remain as personal behavior since they may be recorded and embodied in descriptive terms or formulae. Then they become behavioral products open to the consideration and acceptance by other individuals. Thus scientific assumptions as products take on a life of their own and survive as cultural institutions. Thus for the type of points, lines, and planes that concerned Euclid his axioms still are functional and useful.

An invariable feature of scientific axioms is their reciprocity with confrontable things and events which serve as the external stimuli for constructional behavior. Scientific axioms contrast sharply with autistic or traditional propositions. It is this trait that lends longevity to basic axioms by comparison with such occasional behaviors as styles or fashions.

3 Cf. Thomson, J. J. (1937).

AXIOMS: KNOWN AND UNKNOWN

We have mentioned above the circumstance that often scholars do not realize that they are oblivious concerning axioms as assumptions. Were Lashley⁴ and his cobelievers not so utterly captive to the axiom concerning the neural basis of psychological events they could not have been so frustrated by the fact that learning occurred, though they could not find any engrams to substantiate their assumption. Similarly, were not the various Gestaltist⁵ psychologists so wedded to their mentalistic assumptions they would not have substituted the notion of unified consciousness for the fact of interbehavioral fields.

We cannot overlook the observer's conclusion that inattention to basic assumptions can result in fallacious and misleading results from experimentation and interpretation. On the other hand it is clear how the advancement of a science can be facilitated by an adequate alertness to the proper attitudes involved in investigations and the things and events worked with.

AXIOMS: A PRIORI AND EXPERIENTIAL

The fact that basic axioms are a heritage from former intellectual periods and are embodied in letters has given rise to the notion that some at least of psychological axioms are a priori. For example that there are minds and bodies. But such a notion belies completely the actual nature, origin, and operation of basic axioms. Yet it is obvious that axioms of all types and levels are thoroughly ensconced in the experiential world of culture and history.

Since the continued existence and objectivity of cultural institutions are based on the embodiment in letters and symbols we can observe the analogy between them and religious absolutes. Authoritative and sacred writings maintain for believers in "creative science" and other articles of faith assumptions that there are eternal and omnipotent and omniscient personalities. Such simple adaptations are plain. Persons merely enlarge and expand the capacities of societal leaders and fabulators.

AXIOMS: VALID AND INVALID

Granting that scientific axioms are not simply the starting points for local system making, as in the case of a particular intellectual situation, for example Euclid's axioms for geometry, but rather general orientational attitudes guiding the hypotheses, investigations and interpretations of research. Then it follows that axioms may be either valid and helpful or invalid and hurtful.

⁴ Lashley (1960).

⁵ Wertheimer, M. (1945), Koffka, K. (1924), Kohler (1938, 1947).

Despite the fact that the obvious data of psychology consists of fields in which organisms interbehave with stimulus objects the standard and universal assumption has it that objects in cognized situations are created by a brain or a mind residing in or on the brain. Again, although the brain and the entire nervous system are known only to conduct impulses serving as functions to coordinate and integrate complex organisms they are loaded with centers and homoncular powers. The brain is assumed to think, reason, fear, enjoy, and govern. By virtue of its assumed capacities a part of the organism is metamorphosed into the whole. Moreover psychological events are made into organocentric happenings to the neglect of the adaptational processes of which they actually consist.

At once the question is raised as to the differentiation between valid and invalid axioms. Difficult as it may sometimes be to specify the quality of assumptions there is a definite and reliable rule. Are the assumptions whether hypotheses, techniques or laws derived from interactions with actual events or from traditions. Implied is the advice to take seriously the history of psychology.⁶ There it is clearly shown that the thinking and experimenting in psychology derive first from theological sources, then from the metaphysical precipitations from religio-cultural sources.

The value of sound or valid assumptions in psychology is clearly seen when practical problems are faced as in modifying deviant behavior or in promoting advantageous conditions in domestic, industrial and general human conditions and relations. Although in each circumstance the term axiom is replaceable by such equivalences as inferences, diagnoses, therapeutics and so on there always are gross necessities of correctness, expertness making up components of valid axioms based on prior interactions with similar situations.

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⁶ Kantor (1963-1969).