

## **“Two Sciences....” Part III: Stephenson’s Quantum Psychology**

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***ABSTRACT:** William James defined psychology as “the science of mental life” and the psychologist/physicist William Stephenson used Newton’s Fifth Rule of science to formulate a measurement technique for realizing this goal. In Part III of the “Two Sciences...” essays we use a Q methodology experiment with a single individual to exemplify the measurement of self-referential verbal behavior. This intensive analysis experiment is used to showcase Newton’s first four rules for achieving objective science and Stephenson’s actualization of Newton’s complementary Fifth Rule for achieving subjective science. Viewed in this way objectivity and subjectivity are revealed as mutually exclusive and inter-dependent – an essential worldview for a quantum psychological science.*

As we have seen in Parts I and II of this series, psychology’s befuddlement with subjectivity derives in part from an immature understanding of objectivity in science as a search for linear causal relationships. On a purely pragmatic level the problem has been one of how to measure mental life; that is, how to measure conspiring (C.S. Lewis’ concept of shared communication). To measure is to observe and a statistical instrument like factor analysis enhances our ability to see inherent “simplicity” (simplicity and complexity as complements) where once only chaos was thought to reside. Nowhere is this more the case than for those “bursts of energy” we call behavior. Nowhere is the simplicity embedded in apparent randomness more obvious than in human verbal behavior.

Psychological science, “The science of mental life” (James 1890), strives to reveal the simplicity of psyches through the measurement of self-referential verbal behavior. Wilhelm Wundt described his methodology for doing psychological science as *selbstbeobachtung*: perception of self (in contrast

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to the mediated experiences of physics). This term was incorrectly translated as introspection (Marx and Hillix 1987). The complementarity of experience is that it has the dual aspects of object and subject, and human verbal behavior is a description of this interactive experience. If the verbal behavior resulting from this interactive experience is conceptualized as operant behavior, as real and tangible as any rat pressing a bar or child throwing a tantrum, then, as Skinner might put it, we have indeed made contact with behavior (that which is measurable), and experimentation is possible.

In 1935 William Stephenson wrote a letter to the journal *Nature* proposing the use of factor analysis to bring order to the description of an individual's self-referential verbal behavior. Q Methodology, as this procedure came to be called, was unique and revolutionary. Informed by James, Bohr, and quantum physics, it was Stephenson's idea to invert traditional experiments where the variable (object) is usually what is of interest to the researcher and focus attention instead on the individual (subject) in relation to the variable. Traditional psychometric approaches, called R Methodology, had assumed that variables like intelligence, etc., were trans-individual. The transcendent variable was conceptualized as an *independent object*. The group average was given the status of the ideal, Quetelet's *l'homme moyen*, "what nature was aiming for," and individual diversity was storied as "nature's mistakes," misses, and error variance (Boring 1950, 477). Rather than measuring variables as applied to individuals, Stephenson proposed that individuals could measure themselves relative to variables. This makes all the difference, because object and subject are viewed as complementary. As we have seen in essays I and II of this series, the bifurcation of subject and object as independent rather than inter-dependent is at the heart of the "created" problems of modernist/post modernist contentions. Now, for the first time, a way to examine the unplumbed depths of human "mental" activity is provided, one that neither denies nor objectifies the source of that activity.

### **A Q Methodology Experiment, for Example**

What follows is a demonstration of Stephenson's Q methodology, a tentative foray into subjectivity by way of an "intensive" Q experiment. Stephenson's Q Methodological approach as developed in *The Study of Behavior* (Stephenson 1953) is most attractive because of its sophistication of probabilistic measurement as revealed in factor analysis and its applicability to the psychological domain of mental life. As an example of this method, refer to the factor structure revealed in Table 1. The factor-analyzed data came from a single individual; the author (mk), male, age 50, who Q sorted 36 self-descriptive adjectives drawn at random from a pool of 555 adjectives normed by Anderson (1968). The adjectives were sorted from dissimilar to similar with frequencies of 2, 3, 4, 5, 8, 5, 4, 3, 2 using the 12 conditions of instruction

**Table 1. A Q Methodology Experiment with a Single Case**

Condition of Instruction	Operant Factor		
	1	2	3
Self	X		X
Ideal-Self	X	X	
Future Self	X	X	
Ishmael	X		
Moby Dick		X	
Ahab		-X	
Nature/God		X	
Self at 7		X	
Self at 30			X
Starbuck			X
Whaling Industry			X
Queequeg			-X

shown in Table 1. This author's consciring was made operant by choice behavior in sorting the adjectives for similarity. This operant consciring was factor analyzed using principle components analysis with a varimax rotation. An "X" in Table 1 indicates a factor loading greater than 0.40.

The three factors describe mk's perception of self in relation to past, future, and ideal selves using characters from the book, *Moby Dick*. The complementarity in Factor 2 jumps out, with the whale, *Moby Dick* symbolizing God and Nature and a negative loading for Ahab. This is also true for Factor 3 with the whaling industry, and Starbuck as its agent, juxtaposed with the negative loading for Queequeg, the "noble savage." This is an example of *intra-factor* complementarity. *Inter-factor* complementarity is seen in the comparison of Factors 2 and 3. *Moby Dick*/God and Nature complemented by the whaling industry/Starbuck. These complementary factors describe the theme of the book for me — namely, Nature and man's unending struggle to control it. In *Moby Dick* I see humans as self-proclaimed gods, controlling who lives and who dies, with Ahab's madness reflecting our own twisted view of reality. The power of the great whale shows us that we are not gods; that we are in fact the evil usurpers of power, and like Javier in *Les Miserables*, we cannot live with this knowledge. Both Ahab and Javier commit suicide, each in his own way. This is the human condition.

What of self-perception in this experiment? Factor 1 is the Self factor with additional loadings for Ideal- and Future-Self and the character Ishmael. In the novel, Ishmael is the observer, the human doing his day-to-day living trying to

make sense of life. This helps to bring meaning to the factor structure, but notice that Self also loads on Factor 3 with Starbuck while Ideal- and Future-Selves load on Factor 2 along with Self at 7 and Moby Dick. Is this a statement of dissatisfaction with the present and the expectation and desire for a return to harmony? Questions, always questions. Stephenson (1987) has said that if the experiment is designed well complementarity will be revealed, to which we might add "and questions will be asked."

### **Object←Subject Unification**

So far, we have shown the Fifth Rule of Newton in action: that a "subject" creates meaning in relation to the interplay between hypotheses (in the above, the conditions of instruction) and concurrence (the randomized adjectives) and that the factor structure derived from that interplay is an example of the semantic shape emerging from the conscurring process, a statistical representation of an aspect of "nature." But what of the first four rules? Stephenson contextualizes Newton's first four rules within a broader framework of inductivism, within a science of subjectivity that is more descriptive than prescriptive, more exploratory than confirmatory. The First Rule — the admonition of parsimony — is satisfied by the universal applicability of factor structure to all subjectivity. The Second Rule — expectancies of uniformity in nature — is satisfied by Stephenson's application of the Gaussian law of error — that the "small causes" give rise to "a normal distribution of effects." Each act of Q sorting by definition demands a participant's "creation" of a quasi-normal distribution. The Third Rule — the "generalizability" across experiments — is satisfied by the consistent discovery of factor structure in Q studies. The semantic specifics of the factor structures themselves are not, in light of indeterminacy, expected to be commensurate; in fact, just the opposite. But universality, the recurrent theme of uniformity in nature, is found in the consistent and replicable appearance of factor structure in experiments. The Fourth Rule — the accepted-as-true propositions derived via the first three — is satisfied by the theory-from-observation inductive approach proposed. Later studies provide empirically based factor structures from which theory is then, and only then, modified, in light of what is discovered.

Newton's Fifth Rule, as elaborated by Stephenson, is not radical but integrative. It couples the validity of empirical observation with the principles of uncertainty, using the powerful "inter-dependency statistical procedures" of factor analysis in an elegantly similar manner to a physicists' application of matrix mechanics to the behavior of light.

As we have seen, in quantum science the nature of light is such that it is "both" wave and particle in terms of potentiality: it exists in a mixed state. In James (1890), thought has similar qualities — transitive and substantive. The

first is fluid, a stream characterized by continuity or “wholeness.” The second is particulate, characterized by discreteness. In Bergson (1946), this paradox of complementary definitive qualities is held together by his concept of “duree,” roughly translated as duration. In Bergson’s phenomenology, the self he describes by characterizing the paradoxical nature of thought is difficult to examine, at least from the standpoint of objectification in science.

In Q methodology, it is possible to retain the rich descriptions of a phenomenological self and the Jamesian transitive-substantive nature of thought while still subjecting it to the rigors of scientific investigation. In order to do this, however, it is necessary to make the same conceptual leap Neils Bohr made when contemplating Heisenberg’s formulae, demonstrating the inseparability of observed from observer. Bohr’s answer to the counter-intuitive findings, such as the wave-particle behavior of light that Schroedinger found so repugnant, was complementarity — a leap in understanding as radical as Newton’s *Principia*. Important to note here is that Bohr’s complementarity did not so much supplant as supplement Newton’s classical physics. Under certain circumstances, such as examination of planetary systems, the sharp representational cut between subject and object outlined by Newton results in accurate descriptions of nature. However, when the examination is conducted at the level of sub-atomic particles, the manner of observation — with the emphasis on the observer — becomes a defining variable in the discoveries made.

Newtonian physics, in Bohr’s complementarity, becomes a special case where the inter-dependencies of subject and object are minimal. Bohr did not limit complementarity to just quantum physics — he also saw it applicable, with its related concepts of mutual exclusivity and inter-dependency, to a large array of other fields, including anthropology, sociology, and (most importantly) psychology. It was in this latter field, the study of the mind, that Bohr found the best match, both conceptually and methodologically, with his way of doing and conceiving science in physics (Folse 1985).

William Stephenson’s remarkable achievement was to elaborate on Bohr’s idea of a complementarity-framed psychology, particularly in devising a methodology, a way to examine subjectivity. However, just as Bohr’s complementarity was more than a new way to perform experiments in that it reconceived the object of study as a probabilistic function, Stephenson’s Q methodology is more than a new way to study the mind. What Bohr offered, as did Newton before him, was a radically new epistemology.

It is perhaps significant that Stephenson was influenced by B.F. Skinner, who could be said to have been elaborating on a Newtonian theory of the mind. Taken to its objectifying limits, that theory nearly eliminates the mind as an “object” of study. Stephenson as physicist was particularly cognizant of the

epistemological limits of Newtonian science in quantum studies, which allowed him as psychologist to recognize the epistemological limits of such a science applied to the mind, as well as its methodological strengths. By embracing Bohr's epistemology and using it to reframe what has been traditionally thought of as mutually exclusive conceptions of psychology, such as psychoanalysis, behaviorism, and humanism, Stephenson offers a paradigm shift in how we should think of the mind.

Importantly, he retains, as does Bohr, a commitment to measurability, to empirical demonstration. Q sorting allows the psychologist to control the experimental setup so that the ultimate observer of the self — the participant herself — is placed at the center of the observation. In a manner of speaking, the object of the study emerges in response to the experimental conditions.

Measurement in Q methodology emphasizes the substantive aspects of thought, those Jamesian junctures. Such substantive moments are "invited" by the conditions of instruction given during Q sorting, and are in turn organized into meaningful wholes by factor analysis. The factor structure, then, is a kind of map of the process of a self emerging in relation to the perceptual demands confronting it. Just as the evidence on photographic plates is not light itself but only representations of its behavior, so too are the factor structures representative of the mind's behavior, not the mind itself. The map may not be the territory, but one can induce functions of mapping by looking at maps produced in systematically controlled arrangements. Carl Rogers' Law, increased congruence between self and ideal self over the course of therapy, is one example of the functions discovered inductively by repeated applications of Q methodology.

In a Kuhnian sense with regard to the nature of scientific revolutions, Stephenson's Q methodology is an example of a revolutionary science; and Q sorting, with factor analysis applied to the results, is an example of how a normal scientific investigation is conducted within that new framework. In the majority of Stephenson's writing, he reinforces his revolutionary theorizing with an experimental demonstration, as we have attempted to do here with our successive Q administrations. More than offering a new theory, Stephenson offers both a new methodology and a new way of theorizing, a theorizing explicitly dependent upon its experimental methodology. In this manner, he was able to reinterpret, by putting to empirical test, ideas drawn from psychoanalysis: the pleasure-unpleasure continuum, Skinnerian theory (such as operancy and reinforcement), and Rogerian psychology (such as a general sense of a phenomenology of self). Perhaps because of Stephenson's broad theoretical interests, his work has not received much exposure in psychology and has gone largely unappreciated, often relegated through misunderstanding to the status of an arcane statistical methodology.

It has been our attempt in these essays to reintroduce, so to speak, Stephenson's ideas within the larger framework of Bohr's conception of two sciences, physics and psychology, both subjected to the rigors of scientific methodology and theory construction. In keeping with Bohr's quest for a "unity of knowledge," we have sought to bridge a number of domains of knowledge, from evolutionary theory to physics to speculative philosophy, in order to provide a reconstitution of psychology as the scientific study of mental life.

Our science is informed by the uncertain and probabilistic characteristics of quantum systems, resolved as Bohrian complementarity. Our "object" of study — the ever-nebulous "mind" — is a creature of complementarities, from volition to determination, nature to nurture, conscious to unconscious. We hope we have argued for a propitious reframing of psychology, one that does not merely equate it with a hard science, but more importantly offers a methodology every bit as rigorous and therefore productive as that of physics. Additionally, we suggest that some of the larger issues raised by those loosely labeled as "post-modernists," such as questions of "constructions of self" (Foucault 1986), "subject position" (Butler 1969), and the general deconstruction of the "enlightenment self" by Derrida and others, are not only amenable to Q methodology, but would benefit from its application.

Psychology, of course, still awaits its *Principia*, and science its *Once and Future King* (White 1958). In a manner of speaking, our concept for psychology is both a marriage proposal and a divorce decree. First, we maintain that psychology should divorce itself from the overly reductive and unproductive reliance on Newtonian conceptions of objectivity. Secondly, we ask that it wed itself to the promising epistemology of complementarity. Q methodology is a powerful way of measuring the mind as it celebrates the mind's capacity for measurement, for probabilistically generating beliefs through feelings. And what of the progeny of such a theoretical and methodological union? Perhaps nothing less than a library of human knowledge where Newton's text and White's are filed next to one another, two slim volumes in nature's unending encyclopedia.

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