

“Two Sciences...” Part I: The Epistemology of Object/Subject Inter-Dependence

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ABSTRACT. William James created a revolutionary new worldview that Niels Bohr called simply, complementarity (Folse 1985; Stapp 1993). What is complementarity? It is not a principle and not a theory, but a conceptual framework where our position as observers accommodates descriptions of phenomena as mutually exclusive and inter-dependent. Just as light is neither and both a wave and a particle, thought is neither transitive nor substantive, and both. So too are object and subject, and it is our intent here to explore this particular, mutually exclusive, inter-dependent duality in relation to what Bohr called the two basic sciences — physics and psychology.

Picture the following:

- A poet, alone in the quiet of his study, brow furrowed and eyes shut, ponders the right word to carry the feeling he wishes to express. He experiences a cascade of shimmering words inseparable from feelings, and encourages the inner babble, waiting for it to flow into the order of a well-made sonnet.
- A quantum scientist sketches mazy formulae on a chalkboard in front of a group of grad students. She pauses, and smiles. “The amplitude,” she says, “Is like a leaf -- its form directed by the observing and nutritious eye of the sun.”

Unrelated activities? At a minimum, they are of the animal human, and so much so that they are illustrative of some quality definitive of our humanity. From engaging in the fluid process of poetic creation, to the finding of a metaphor that approximates a physical process — the human is behaving subjectively, that is, creating meaning, in reference to the self, by way of feeling.

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One would think that with such a fundamental process at work across a variety of human endeavors psychology would have devised appropriate theory and methodology with which to explore this vast but critical terrain. Certainly we have innumerable theories of personality that try to explain what-goes-on “inside” the human. But amid all this richness, nothing approaching an agreed-upon paradigm, like that of relativity for physics or evolution for biology, has emerged. What lies at the heart of this inability to formulate a consensual theoretical and methodological framework?

Embarrassed by our riches we pleaded poverty and escaped into the objectification of Newton's clockwork universe. Paradoxically, while psychology was framing its observations by making a sharp representational cut between subject and object, physics was grappling with an increasing inability to account for observations without redefining the role of the observer as critical to and inseparable from the “object” being studied. Robert Oppenheimer once remarked to Jerome Bruner that “perception as you psychologists study it can't, after all, be different from observation in physics, can it?” (Bruner 1983, 95-96).

Subjectivity should be psychology's domain, but we haven't known what to do with it so, as scientists, we storied ourselves “unclean,” took a wrong turn and proceeded to wander down the objectivity path. Our perplexity has always derived from an inability to measure the subjective. It is ironic then to discover that all measurement is not only subjective, but also the common ground where the two basic quantum sciences — physics and psychology — are unified.

It is our intent here to explore the nexus between quantum physics and psychology, in order to address specific issues of methodology and larger issues of a general “scientific” epistemology. By articulating an alternative approach, we in part subvert the classical mechanical view of doing psychological science, in a sense, providing a psychology as might be envisioned by physicists. Central to this series of essays is the work of two “quantum psychologists:” Niels Bohr and William Stephenson. Two important concerns drive our discourse from the outset:

a belief in the efficacy of a quantum psychology in developing an adequate science of the mind, and

a recognition that Stephenson and Bohr's ideas about psychology have yet to significantly inform the bulk of current research and theorizing in the field.

We will address both of the concerns above in a series of articles. It is our general sense that what lies at the root of both quantum psychology's efficacy and its lack of widespread acceptance is its epistemology. This epistemology, as much implicit as explicit in Bohr's “theory” of complementarity, is what informs Stephenson's Q methodology from the

beginning. Our general aim in these articles is simple: to re-examine aspects of Bohr's and Stephenson's work, in light of a number of other theorists from diverse areas of inquiry, in order to persuade a larger audience of the viability of quantum psychology, i.e. the application of the principles of quantum theory to the study of psychological phenomena.

In this essay, "The Epistemology of Object/Subject Interdependence," we begin by outlining the idea of a representational split between subject and object, and its ramifications for the development of a science of subjectivity. In Part II of this series, "Mental Life and the Language of Science," we examine the importance of language in shaping worldviews and propose a way of translating complementarity and quantum mechanics into familiar psychological concepts. In Part III, "Stephenson's Quantum Psychology," we return to the idea of a science of mental life, and conclude with a model experiment, using it as a demonstrable application of quantum psychology.

To begin, it is important to recognize that humans are the animals that tell stories. We cannot *not* narrate. Richard Alexander (1989) in an article titled, "The evolution of the human psyche," argued that the defining function of humans as sentient social animals is scenario building. That is, telling stories with self-reference. In one form or another the "story" has been identified as the indivisible linguistic unit of human mental life. (See, for example, Maybrury-Lewis 1992, for cross-cultural evidence from anthropology; Rumelhart 1975, for a cognitive psychology description of the architecture for a psychological mechanism for textual narrative which functions in accord with an innate story grammar; and Gazzaniga 1998, for neurophysiology evidence of this unique integrative cognitive function). The Darwinian selective pressure for such an ability derives from the fact that stories exist as coherent units that subsume a cadre of specific details, and as a consequence enhance our ability to remember the past and plan for the future (Knight 1994). It would seem that stories are the atoms of the mind (Knight & Doan 1994). This perspective is inestimably important in trying to understand how our ancestors thought about the world and our place in it.

The Science of Mental Life

Quantum psychology is a return to the psychology of William James, a science of mental life, with Niels Bohr's complementarity as a grounding conceptual framework. As Stephenson (1986) put it, "We take our stand with Bohr (1950) that the world is real, and quantum phenomena are its substances. With him too, we hold that there are only two basic sciences, physics and psychology" (p. 186). Bohr (1950) argues for an explanation of reality through quantum mechanical measurement with subjectivity as the distinguishing feature for psychology. In comparing physics and psychology Stephenson (1989) elaborates on Bohr's position,

Both involve quanta realities. Both use quantum mechanics to fathom these, except that physics does so *without* self-reference, whereas subjective psychology has self-reference as central to all else. In subjective science the human being is both the observer and origin of quantum phenomena. In physics, measurement alone is essential. What Bohr anticipated as a new epistemology is with us for the making (p. 186).

If we are to have a science of mental life, we must identify the quantum phenomena which Bohr asserted are the substances of reality, and achieve probabilistic measurement of the subjective; for it is measurement that makes a philosophy a science. It is “the sovereignty of measurement” (Stephenson 1989) that develops a philosophy into a science and equates quantum physics and quantum psychology, in facts, rather than in analogies (Brown 1992).

The problem of measuring subjective experience, where the observer is implicated in what is being observed, is solved by the factor theory of Q methodology. Using the mathematics of Q methodology, which is identical to that of quantum physics, this apparent contradiction between the objective and subjective becomes, instead, a question as to what is being measured (Brown 1992, 1994/1995). What we in psychology thought was our greatest weakness (our inability to achieve “objectivity”) turns out to be our greatest strength. All we need do is divest ourselves of the inappropriate and inadequate metaphors of classical mechanics and formulate our experimental questions in the language of quantum science, which, in the case of psychology, is a subjective science. In order to return subjectivity to psychology it is necessary for us to explore its complement: objectivity.

The Transformation of the Subjective into the Objective

To reify is, “to regard or treat an abstraction as if it had a concrete or material existence,” to make it real, transforming “a thought” into “a something” apart from the thinker — giving the idea an independent existence. *Reification describes the process of transforming the subjective into the objective.* This remarkable human ability is first recognized in the writings of Plato, in particular his Phaedrus dialogue where Socrates invents the object as separate from the subject when he reflects his student's experiencing back to the student (Jowett 1952). Now the student sees his thoughts “out there.” In effect the Socratic method of reflection changed thinking from the act of *experiencing* to an *experience*, from a verb to a noun, from a doing to a something.

Before the Greeks, and for the bulk of our human history, some four million years, there was no subjective/objective duality. Like any organism we functioned in concert with our environment. Our language like our senses was structure-coupled to the world around us. As Peter Abram (1996) says

in *The Spell of the Sensuous* our cognitions reflected the “participatory nature of being.” A reflection, to borrow from Husserl (1970), of the “inter-subjective” nature of experience. But in the not too distant past language underwent a radical change, and that change altered the course of Western civilization. The change, as recounted in the Phaedrus dialogue, was writing, the assigning of symbols for the various sounds. And the “putting down” of those symbols on parchment, bark, etc. so that the reflections of the world could be shared with others. Because of this a revolution of thought occurred. The reflections of Socrates — the words themselves — came to take on a life of their own. They became objects that existed apart from any particular subjective mind and as such they became transcendent and timeless. Words created to reflect what happens in the world became capable of generating a world much different than the world directly experienced by the senses. Early alphabets retained much of that living world, having both iconic and echoic qualities that “matched” the sensuous world, and therefore tended to bring that world back to the writer, to implicitly reinsert him or her into the living world by the nature of the language itself.

But this new twist in the manner of representing the world went beyond nature, beyond the immediate experience of “being with.” The Greeks were among the first to borrow an alphabet from another people, taking the ability to create and store language but leaving behind almost all the links to sensation that the language had for its originators. This annexation of another culture's system of writing, without the sensuous context of the originators, allowed the Greeks — and all those who followed their new way of languaging and therefore thinking — to introduce a powerful current in the tide of human history. It is this simple: the new alphabet allowed humans to conceive of an objective world without the requirement of first hand experience. It allowed for imagination. The Phaedrus dialogue offers another example of this phenomenon of emergent objectivity when Socrates informs his friend that he has no need of nature — true reality is to be found in the world of ideas — specifically in abstractions, universals. Nature has been reduced to a collection of mere examples — sensations are merely support for the construction of the “real” world of ideas, and that world of ideas is constructed of written language. An interesting twist is evident in this dialogue — language, originally developed as a way of approximating the sensuous world, now becomes a world unto itself. The sensuous world has become an approximation of the “ideals” expressed in the language. Rationalism brings us full circle by making the ideal what is “real.” Therefore, any particular instance of the real world must be an inadequate approximation of that ideal. In this manner the representation, the thought, is reified.

Much as in the cognitive development of children where, a “narrator-I” emerges to observe the “metaphor-me,” the next obvious development for humans was to become Socrates unto themselves. Like reading silently rather than aloud, humans began to socratically reflect and narrate their self-representations. In this manner the reified self-as-object was born. Written language gave visible proof of a transcendent, timeless existence. Humans lost their sensuous anchors to the present and were flung into memories of the past and plans for the future.

An anthropologist or narrative psychologist would be quick to point out that language as such is not the culprit, rather it is the “stories” we tell with language. As long as there have been humans, they have told stories about reality. A belief in Platonic ideals enabled a shift from seeking “meaningful” stories, to seeking that which is “true.” This change was accomplished via the reification of that which had previously been understood as a meaningful approximation of something that could never be totally or completely explained. In other words, it was accomplished via unconsciously reifying “good stories” into universal and unchanging truths.

Enhanced memories and the ability to simulate alternative futures with self-reference have obvious survival value and the arms race of cultural evolution was begun, culminating in the worth and worship of the scientific revolution. In science, objectivity was the godhead, for as William James (1907) says, “The truth is what works.” In competition with other ideas the reified certain truth was selected for again and again, until at last, the modern world dominated human thought. Despite all its technological, religious absolutism, the modern world still stood on reified certain truths.

But what about the individual mind? Was it, too, simply an object? At the pinnacle of modernism we find Descartes and the ultimate reification, the creation of the thinker to explain thinking. The subjectivity/objectivity pendulum had swung so far in the direction of objective truth that it was necessary for Descartes to abandon physics for metaphysics. In the strangest turn of events yet the metaphysical “I” was made “real” to explain the physical “me.” Simply stated Descartes' Error is this: If the result of thinking is to send messages to a thinker, who then does the thinking? We become trapped in an infinite regression of thinking and thinkers (Damasio 1994). Descartes' solution was no solution, but it was here that consciousness emerged as an answer to the riddle of who does the thinking. Before Descartes consciousness meant, “to be in communication with” (Lewis 1967). After Descartes consciousness was manifest as *a ghost in the machine* (Ryle 1950). Perhaps *demon* is a more apt metaphor, a constructed, supernatural imp in need of exorcism. How to dispel the imp and be rid of the demon of consciousness? Through recognition of what was widely known before the Greeks: subjectivity.

Rediscovering Subjectivity

The reification of time and space made possible a belief in an absolute present and an absolute presence. This worldview, once wed to a reified deity and a marketplace economy, was selected for again and again as humans competed with and achieved dominion over the “other” — earth’s other life forms, from which they had separated. To make the separation complete the “conscious self” emerged to help navigate the myriad waters of self-referential musings.

In Western culture the most dramatic reification was that of consciousness as “a something” — an imp, a demon, a transcendent being, a self — which bubbled-up out of the language we used to narrate our own behavior. After Descartes “to be conscious” was literally transformed from something you did into “consciousness,” something you were, a being rather than a doing. In regard to this difference Billy Yellow, a Navajo medicine man, has observed, “You have thousands of being words, we have thousands of doing words” (Maybrury-Lewis 1992).

C. S. Lewis, in his *Studies in Words* (1967), traces this curious bifurcation of the word conscious; pointing out that the original use of *conscio* was “I know together with, I share with someone the knowledge that.” Using Hobbes’ definition, “When two or more men know of one and the same fact (i.e. deed) they are said to be conscious of it one to another” (cited in Lewis 1961, 185). Lewis argues that this original use of conscious to mean a sharing might be better represented by the word “consciring” to reflect its participatory nature. Consciring is communication between individuals, a “togethering.”

From a descriptive word for knowing in communion with another, conscious migrated to internalized consciring. Lewis (1961) describes this internal sharing of knowledge with self about self as follows:

Man might be defined as a reflexive animal. A person cannot help thinking and speaking of himself as, and even feeling himself to be (for certain purposes), two people, one of whom can act upon and observe the other. Thus he pities, loves, admires, hates, despises, rebukes, comforts, examines, masters or is mastered by, ‘himself’. Above all he can be to himself in the relation I have called consciring (p. 187).

At this point in our story, physics and psychology are beginning to merge as object and subject become more ambiguous points of reference. In physics it was Albert Einstein who was among the first to challenge seriously Newtonian objectivity. An absolute place makes no sense. A location or a time has meaning, exists, only in comparison, relative to some other time or place. In contrast with the classical worldview this means that object independence, which is inherent in the description of mechanical

systems, is an arbitrary construction. *Without the subject there is no observation. Subject and object are inter-dependent* (Folse 1985; Knight, Frederickson and Martin 1987).

Niels Bohr and Werner Heisenberg created an alternative worldview where the laws of nature no longer describe an objective reality entirely independent of the mind (Folse 1985; Stapp 1993). In the classical worldview the subject was conceptualized as the observer of the object. In the new worldview, called by Bohr, complementarity, we see that subject and object are arbitrary designations used in the description of experience. Complementarity is characterized by a unity of experience, one where the experimenter as subject is in a kind of "communion" with, is conspiring with, the object.

Following Riemann, Bohr conceptualizes levels of an independent variable in terms of *planes of objectivity*. Illustrated as: "For example when I report seeing a red apple the object of my description of this phenomenon may be taken to be a fruit, or the rays of red light entering my eye, or the sensory stimulus thereby produced, or the psychological event of having the idea, impression, or representation of the apple" (Folse 1985, 52). Folse implies in Bohr's example that the "incautious use" of descriptive terms confuses the planes of objectivity and leads to ambiguity when the experiencing subject attempts to describe his own conspiring, his own experiencing activity, as an object. The essential question is which plane of objectivity prompts the statement "I saw a red apple?" This is what Wundt has called "the stimulus error" where the subject names the object and thereby confounds the sensual experience (Hergenhahn 1997).

What must be recognized is that the experimenter is not a mere observer. The experimenter is an indispensable part of the experiment; a participant who not only interacts with the object but also helps to make it what it is. In this new worldview a phenomenon is defined by operationally specifying the conditions of observation, including the experimenter who produces and observes the experience.

For psychology, the inter-dependent partner of physics, the recognition of the importance of self-reference in perception is crucial, if a quantum science of mental life is to be achieved. Perceptions are representations of reality, not "samples of reality" (Gregory, in Miller 1983). Subjectivity is the mental life experience of these representations as perceived by the self. The conceptual worldview for physics and psychology is complementarity. What is being studied is conspiring, a communication, a doing, with the distinguishing feature for psychology being self-reference.

Complementarity, however, neither negates nor supplants Newton's "objective" science. In fact, it may be understood as a logical extension of Newton's science, in which the four rules of consequence in Newton's

Principia are both addressed and extended. In Part II of "Two Sciences...", we expand on Newton's science by examining his rules of consequence in light of the crucial role of language in both physics and psychology.

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