

What is Quantum Psychology?
by
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I thank Sky Chaney for inviting me to write a short introduction for the new MRI electronic journal about my Quantum Psychology Project at the Mental Research Institute. In this note, I will give a brief overview of:

(1) how I was lead to create "quantum psychology" as a new scientific model for psychology in the mid-1970s; (2) what I mean by a "scientific model;" and (3) how I was lead to coin the term "Quantum Psychology" in 1982 to describe this class of science. In subsequent notes, I hope to explore further some of the formal, interpretive, critical, and empirical aspects of my quantum psychology project.

Background:

In the mid-1970s I began to examine what appeared to be controversy in the psychological literature concerning the nature of schizophrenia as a logical phenomenon. Initially, I was interested in the formal arguments between the intrapsychic approach of E. von Domarus, Silvano Arieti, and others, and the interactional/communications approach of Bateson, Jackson, Haley and Weakland, concerning what are referred to, respectively, as von Domarus' principle of "identification by predicates" and "double-bind theory."

The intrapsychic perspective viewed schizophrenia as a logical deficit in which, instead of reasoning, e.g.: "Socrates is a man. All men are mortal. Thus, Socrates is mortal.", a schizophrenic is supposed to reason, e.g.: "I am a virgin. The Virgin Mary was a virgin. Thus, I am the Virgin Mary." The double-bind point of view saw schizophrenia as a consequence of the individual trying to accommodate an inviable communications context in which he (1) believes it is necessary to discriminate and "chose" between alternatives on more than one logical level, each of which disconfirms the other; (2) is not able to comment on the inviability of these options, thereby stepping out of the context; and (3) comes to expect such infeasible experience as ordinary.

I did not see these as being in contradiction and thought that much of the disagreement was due to an inadequate appreciation of the alternative theories and an insufficient symbolic representation for defining and comparing the differing points of view. As I understood that these issues were considered important in psychiatry, I began to try to construct an intellectual tool in order to clarify the matter, as I understood it.

At that time I was also looking at "fuzzy logic" and "the laws of form," which are two variant logics

developed by computer scientists attempting to model thought by generalized classical logics. I saw that there was a way to combine, with minor modifications, certain notions from these Artificial Intelligence approaches to psychology and language into a "nondistributive" logic (technically, lattice) as is found in quantum theory. I did this by taking an equation ($x = -1/x$) which was likened to self-referential paradox in the "laws of form" approach and converting this arithmetic equation into a MATRIX equation. Matrices have the property that their multiplication is order-dependent. In quantum physics, there is a measure of the difference in such ordering, called the commutator, which is precisely a measure of the INTERACTION between the measuring and the measure system...the knower and the known. Since I was proposing a competing model to the "artificial intelligence" efforts, I decided, tongue-in-cheek, to call my approach "genuine stupidity logic." (The change to "quantum psychology" is discussed below.)

Within the logic framework, this order dependent interaction provides the logical equivalent of a type of REPRESENTATIONAL AMBIGUITY between constructs viewed as reference frames. Such an interpretation provides an operational approach to complementarity, whereby one construct restricts the simultaneous availability of another. A type of metalogic results involving the metalinguistic choices between competing, contrary points of view or frameworks. Physicists speak of this metalogical ambiguity as "non-selecting measurement." It is coded by a highly nonclassical type of a "superposition" of states of information resulting in a complementarity for competing metalogical contexts. I saw this framework of complementarity as an intellectual tool to envision both the intrapsychic equivocation process discussed by von Domarus and the metalogical communications of "double-binds" and "second order change."

However, in the beginning of their book Change, Watzlawick, Weakland and Fisch state that for the mathematics of "groups" which they were suggesting, the order of two operations did NOT matter. Since, from my point of view, it was this very property that allowed for the kind of interaction in which I had proposed, I had come out to California in 1976 to discuss my ideas at the Mental Research Institute, where much of this work had originated, thus beginning what turned into my Quantum Psychology Project.

Quantum Psychology is Science, but NOT Quantum Physics:

My quantum psychology offers a formal structure that is similar to the "quantum logic" that had been proposed by John von Neumann in the 1930's to reveal the logical structure of quantum physics through examining the formal structure of experimental

statements, as they are used by physicists in their descriptions of quantum theory. Nonetheless, quantum psychology is NOT an application of quantum physics to psychology. To the contrary, it was constructed originally by piecing together variations upon certain formal models from artificial intelligence, psychotherapeutics, and neurophysiological modeling, in an attempt to reconcile controversy about schizophrenia as logical phenomena. The model was only later observed to have formal features abstractly similar to those which characterize the differences between classical and quantum physics. In addition, the domain of discussion is NOT propositions about physical observables, which carry energy, but about language and psychological experience, a subtle difference that I have discussed elsewhere.

In the spirit of science, I have proposed "quantum psychology" as an HYPOTHESIS and I have adapted the wisdom of Bohr that our experiments are "questions we put to Nature" and that in our theories we should try to state what we have learned from her. Hopefully, such scientific inquiry might disclose physical processes that will be identifiable with certain psychological processes. I have the further belief that the formal features and physical intuitions developed using such formal physical models might give insight into the similar psychological phenomena. As a scientific approach to psychology, my quantum psychology attempted to formulate the empirical logic of psychological experience through a critical evaluation of the logical structure of psychological phenomena. It deals with empirical questions, i.e. propositions about experience, which in principle have measurable consequences, and attempts to identify the rules by which such propositions about such experiences are put together, taken apart, and transformed.

In my work with David McGoveran in the 1970s, we proposed that (1) by exploiting the differentiating consequences between classical and quantum descriptions; (2) by posing appropriate empirical questions (2a) having separating alternatives with, in principle, decidable answers and (2b) such that the "empirical truth" is determined by posing the questions of Mother Nature; and (3) by turning around von Neumann's identifications between physical phenomena and their associated logical (lattice) structures; one could find physical/neurological correlates of the underlying logic that "carries" the language of schizophrenics, and more general psychological processes.

Furthermore, I replaced the "distributive law" of "classical logic," i.e. $[A \text{ and } (B \text{ or } C) \text{ } \rightarrow \text{ } (A \text{ and } B) \text{ or } (A \text{ and } C)]$, by my Principle of Metalogical Ambiguity for competing/complementary contexts:

"If one does not distinguish between two unit predicates A & B, there will always exist a third possible unit predicate C such that $(A \text{ or } B) \text{ } \rightarrow \text{ } (B \text{ or } C) \text{ } \rightarrow \text{ } (C \text{ or } A)$,"
i.e. they are equivalent "perspectives."

This is discussed further, for example, in my Chapter in the MRI 30th Anniversary Proceedings (Propagations). (Until it can be put on the web, a substantial erratum is available from me by providing a specific written request and SASE.)

From Genuine Stupidity to Quantum Psychology:

As a result of McGoveran and I having cited a mathematical paper on "group theory and logic," by imprisoned, Soviet dissident physicist Yuri Orlov, Valentin Turchin -- the founding Chairman of Amnesty International in the Soviet Union -- wrote to me regarding some smuggled papers by Orlov received from the gulag. These papers were on the "wave logic of consciousness" and "a quantum model of doubt." Turchin claimed that they had failed to get Orlov's work approved for publication and that I seemed to be "the only person outside the Soviet Union who understands Orlov's approach in detail." Although I denied that this was actually the case, practicably I appeared to be Orlov's only option. Although Orlov's representatives refused to assume financial responsibility for the work, I agreed to secure the publication of and serve as editor and scientific representative from 1980 - 1986 for Orlov's related and independent work on "wave logic."

Doing so posed further problems since I was being expected to draw Orlov's work to the attention of other physicists, but Orlov had insisted that his "wave logic is not a logic of quantum mechanics." I introduced the language "quantum psychology" in 1982 because it was myself who had hypothesized a relationship between both Orlov and my own models of language and the logic of experience, and quantum physics. I created this expression, in part, so that I could use my own work on "metalogical ambiguity" to attract the attention of the physics community to Orlov's plight, while preserving the integrity of Orlov's disclaimer, by being clear that the "quantum psychology" hypothesis was my own idea.

These complications led to smuggled scientific correspondence between Orlov and myself in 1984. I further had to keep my own quantum psychology hypothesis at low key until Orlov's subsequent release, since in his 1984 letter, Orlov had written "I was very impressed that independently and before me you have started to develop the ideas that are close to me. It is true that you are applying these ideas to the subject with which I am not very familiar. Almost all the literature you are referring to is not known to me...." When Orlov was finally released in 1986, I was honored as a special guest of the American Physical Society, the Center for Democracy in the Soviet Union, which was run by Yuri Yarim-Agaev, who had been responsible for the smuggled scientific interchange, and the Orlov's at their reception at The New York Academy of Sciences.

Subsequently, we had a scientific meeting at the Center for Democracy to discuss the relation between my quantum psychology of metalogical ambiguity and his wave logic model of doubt. (Readers interested in further details are referred to the interviews with Orlov and with myself in the San Francisco Chronicle:

Greenbaum, J.M. (Feb. 22, 1987, interview). "Together, we make our history, an interview with Yuri Orlov," San Francisco Chronicle (This World), pp. 6-10; and (Nov. 9, 1986, interview). "A kind of salvation: a bay area scientist talks about his successful battle to free Russian visionary Yuri Orlov," San Francisco Chronicle (This World), pp. 13-16.)

The Emergence of Quantum Psychology

Subsequent to Orlov's release, I have been attempting to expose my quantum psychology model to the open examination of the scientific community. I believe that quantum psychology embodies the essential features of the controversy over schizophrenia within one coherent model. Quantum psychology provides an operational meaning to ambiguity and to metalogical complementarity. Examples and simple characterizations have been discussed in my Propagations chapter and will be discussed further in future notes. I see at least three advantages of the quantum psychology approach:

(1) AS A CRITICAL THEORY: As a quantum parallel processing model, quantum psychology is distinguishable from classical parallel processing models such as:

(1 a) McCulloch-Pitts type classical neural nets, which in principle do not admit ambiguity, and which were used as the underlying framework for the feedback interpretation of the original double-bind team, and from

(1 b) Karl Pribram's hologram hypothesis, which is based upon a classical wave model of classical waves. Quantum psychology provides explicit criteria for discriminating between these models. We reject the confusion between holograms and quantum physics, as advanced by Pribram, and as currently proselytized by Stephen Wolinsky as some sort of "therapeutic metaphor" under the name "quantum psychology." Such homogenization of disparate fields is antithetical to science, which is meant to promote knowledge, not confusion. The word "quantum" has a precise physical meaning, which in science is to be inquired into with openness and doubt, and not something to be converted to.

(2). REPRESENTATIONALLY: As a representational theory allowing formal induction. For example:

(2a) Quantum psychology provides feasible understanding of how children develop mature concept formation. By using theorems from mathematical physics, I have been able to show how imposing a type of serialization upon the nondistributive lattice claimed by quantum psychology structure forces it to become

classical. I have suggested that this is the formal mechanism underlying the development of Piaget's stage of operational thought processes instead of associative ones found in the developmentally earlier "syncretic thought" processes.

(2b) Since an advantage of formal representations is their formality, I have been able to clearly articulate the differences between, for example, classical, fuzzy and quantum logics. I have shown how fuzzy logic changes the laws of classical logic in precisely the opposite way to how it is done in quantum logic, and thereby how it contradicts quantum physics! I have also shown that the simplest example of a fuzzy logic is the Brown-Varela-Kauffman "extended calculus of indications," which was a competing effort to resolve Epimenedes' paradox "This statement is false." My own effort embodies quantum psychology's metalogical ambiguity instead of the fuzzy logic/laws of form embracement of contradiction.

(2c) My "Picture Logic" approach to the various logical structures has enabled me to clearly exhibit the differences between the logical structures. Using polarizers as filters, although a classical (complementarity) effect, has enabled me to show the type of interactions and metalogical transitions that I believe take place in second order change. Since my formulation is somewhat different than that of the original double-bind team, it should be able to be looked for empirically. Hopefully, these simple intellectual tools will be of use to therapists and clients alike in their understanding of the therapeutic process.

(3) AS AN EMPIRICAL THEORY. Quantum psychology suggests possible experimental confirmation. As examples,

(3a) Roger N. Shepard has proposed (personal communications, circa 1983) a test criteria for von Domarus' principle -- if I understood him correctly, an inversion of usage of unitary data structures, like lightness and saturation of colors, vs. analyzable data structures, like size and orientation of geometric figures in comparisons.

(3b) I have also suggested a word association test would be able to measure the interference effects brought about by the difference in ordering between constructs as provided for by my matrix representation. In addition, one should find an "intrinsic dispersion" of information states, for the type of thought which Vigotsky called "complex thinking," using similar techniques as in quantum physics.

(3c) Freud conceived of unconscious processes (primary processes) as lacking negation. This was supposed to be necessary: (i) for conscious processes, (ii) for mature judgment, and (iii) for forming boundaries between the self and others. In a physical theorem, David Finkelstein has proposed that inquiring question-A of proposition-B requires synchronization

between their information contents in order to code a negative in the information content. I have suggested that the development of such a serial synchronization provides a precondition for consciousness. In addition to other test suggestions discussed elsewhere, am currently working on a hunch that this phenomena also is related to the apparent ability of the EMDR practitioner to bi-pass conscious processes through the cross-hemispheric oscillation of locus of attention called for in the treatment.

(3d) In the early 1970's, Roger Shepard showed that when subjects compare differentially oriented asymmetric objects, the amount of time necessary to decide if they are the same or mirror images is linearly proportional to the angle required to try to align the objects; thus demonstrating that the subject performs "mental rotations" in the comparison. The mathematical structure of my model involves a more general type of rotation and I have recently proposed an experiment capable of discerning this more general representation. Although this test is PURELY CLASSICAL, its purpose is to promote knowledge and not an effort to promote quantum at its expense.

(3e) In my 1980 lecture at the MRI, I noted that the list of "necessary ingredients for a double-bind situation" in the original Bateson, et. al., paper, is remarkably similar to Orlov's description of a conflict or "collision" (e.g., section 3, p. 46, Orlov's 'The Wave Logic of Consciousness...', and his paper "A Quantum Model of Doubt). I referred to these as "necessary ingredients for an Orlovian 'doubt state'," and suggested that the difference may lie in the locus of control of the decision. I coined the term "Orlov Inequalities," for Orlov's criteria for a doubt state and suggested that his "measures of certitude" to experience and for the interference of "doubt states," might be correlated to Julian Rotter's tests on internal and external control.

The Future of Quantum Psychology:

George Kelley the physicist and father of "personal construct psychology" modeled his modeling endeavor after the scientist. He invited his readers to "join me aboard my theoretical vessel and set out on a voyage of discovery, and, sharing with me such instruments as I have on board, to observe the islands we pass." In the same scientific spirit, I invite my readers aboard the Quantum Psychology Project. On this voyage, I have tried to indicate the origins of my scientific approach to quantum psychology and some of its distinguishing features. Although I don't yet have answers, I do have questions and tools to share. I look forward to exploring further the various aspects of quantum psychology in future such trips.