William Stephenson, Quantum Theory, and Q Methodology

James M.M. Good, Ph.D.
University of Durham, UK

Introduction

The following article by Simon Watts and Paul Stenner is noteworthy for at least three reasons. First, it draws attention to an important influence on the development of William Stephenson's thinking about subjectivity and the focus of much of his writing during the last ten years of his life — what he came to describe as his "quantum theory of subjectivity." The article also draws attention to the potential importance of Stephenson's work for the current interest in the relationships between psychology and physics.[1]

Second, the article identifies an important cultural dimension in Q methodological work, demonstrating important affinities between Stephenson's work and current developments in the human sciences concerning shared knowledge and meaning.[2] A significant part of the article focuses on Stephenson's ideas about concourse and communicability — what might be termed his social psychology — and their relation to culture and the *discursive turn* in psychology.

Third, it introduces readers to the discursively oriented *British dialect* of Q methodology.[3] It also suggests that the Bohmian ontological interpretation of quantum theory provides a more adequate basis for understanding the links between Quantum theory and Q methodology than the Copenhagen Interpretation favoured by Stephenson.

In this introduction I begin by attempting to locate Stephenson's interests in quantum physics and its impact on his work as a whole. I then comment on some of the central issues raised by the exchange between Watts and Stenner,

---

[1] For some discussions of psychology and quantum physics, see Green (2002), Knight and Rupp (1999a, b, and c), Matson (1964), Penrose (1994), Valentine (1999), and Zohar (1990).

[2] Since the early 1990s the *second cognitive revolution* in psychology has lead to a steady increase of interest in the study of discourse, social representations, and collective forms of remembering. See Bruner (1990), Harré (1992a and b), Middleton and Edwards (1990), and Edwards and Potter (1992), for samples of recent work.

[3] See Rex Stainton Rogers (1995) and *Using Q as a Form of Discourse Analysis*, a Special Issue of *Operant Subjectivity*, edited by Wendy Stainton Rogers (1997/1998).

Author's address: Director, Centre for the History of the Human Sciences, Department of Psychology, University of Durham, South Road, Durham DH1 3LE.; j.m.m.Good@Durham .ac.uk.

and Brown. I conclude with some brief observations about whether these opposing views can be reconciled.

William Stephenson and Quantum Physics

William Stephenson was educated to doctoral level in physics at Armstrong College, then part of the University of Durham.[4] He graduated in 1927 having also studied for a Diploma in the Theory and Practice of Teaching. This brought him into contact with Godfrey Thomson, Professor of Educational Psychology, who was also a physicist and one of the pioneers of the application of factor analysis to the study of mind. In his obituary notice for Thomson in the *British Journal of Psychology*, Stephenson notes that in a review of Burt's *Factors of the Mind,* [Thomson] expressed deep interest in Burt's comparison of factor analysis and the theory of groups used by theoretical physicists in quantum theory. The concern in the two cases was with the structure or patterns contained in action, with relationships or structure "which exists between unknown and unknowable components" (Stephenson 1955, 246).

It is clear that Thomson, who Stephenson describes as his first mentor, had an influence on Stephenson's decision to move to University College London where he studied for a second doctorate with Charles Spearman. Graduating in 1929, he subsequently served as a Research Assistant to both Spearman and Cyril Burt.

As early as 1936, Stephenson had declared his objective "[of bringing] the method of physics into the realm of personality measurement." It is clear from the outset that he did not see the relationship between psychology and physics as one merely of analogy. As he was later to observe:

> I had been trained in physics in the early 1920s, and for good reasons proposed that if quantum theory had to apply to psychology, it must do so on its own grounds, and not with purely analogic ties to physics. (1989, 180)

He also subsequently recalled that:

> [he had] introduced a new statistic, a new "probabilistic" called Q-technique, in 1935, which corresponded to that upon which quantum theory is based....and continued thereafter to bring quantum theory to bear upon psychology, not as speculation and analogy, but by force of experiment and determination of phenomena particular to psychology. (1988/89, 2)

During the 1930s there had been considerable interest shown by psychologists in the mathematical similarities between quantum mechanics and factor analysis. As Stephenson puts it:

> London, at the time of Charles Spearman, Maxwell Garnett, Cyril Burt and William Brown, with Karl Pearson and R.A. Fisher in the background, was

[4] For an account of Stephenson's university studies in England see Good 2000.

> an exciting place for the new-found applications of mathematics to psychology. (1981, 131).

Indeed in 1938, Stephenson participated in a meeting at the Royal Society of London about quantitative methods in psychology. The connection between quantum mechanics and factor analysis was remarked upon by Cyril Burt. The other participants included Charles Myers, Charles Spearman, and Godfrey Thomson (Myers et al. 1938). Stephenson certainly was familiar with the views expressed by Burt in *Factors of the Mind:*

> ...one of the most striking features of factor analysis is this: not only in its general nature, but also in many minor details the peculiar type of mathematical argument which the psychological factorist has developed is almost exactly the same as that which is employed by the quantum physicist in analysing the fundamental constitution of the material world. (1940, 92)

Despite this promising beginning, these early objectives set by Stephenson were ones that he was not able to return to for over forty years. This was initially because of his involvement as a Consultant Psychologist to the British forces during the war and partly due to his academic commitments at Oxford. In the interim, he set about developing the theory and generating the experimental findings that would provide the basis for a quantum science of subjectivity. As he recalls:

> It was only late in the 1970s that I could satisfy myself about the pragmatics of quantum theory in subjective science ([as in] Stephenson 1980): it required the putting together of communication theory, concourse theory, the operantcy of factors, and Newton's Fifth Rule, to make tangible what had previously been mainly an exciting analogy between physics and psychology, for matter and mind. (Stephenson 1981, 132)

During the last ten years of his life there appeared a remarkable outpouring of Stephenson's mature thoughts about the relationship between physics and psychology (1981, 1982, 1983, 1986a, 1986b, 1987, 1988/1989, 1988a, 1988b, 1989). There are also two posthumously published papers (1990a and b) and two unpublished manuscripts that were put together during 1988.[5] In these papers Stephenson provides, for this author at least, a convincing case that he has indeed moved beyond "mere analogy." He describes striking parallels between a variety of Q phenomena and concepts in quantum physics. These all revolve around the consequences of the act of

---

[5] One of these, "Q-technique and Q-methodology: A quantized science for subjectivity" (1988d), formed the basis for the *Operant Subjectivity* articles "Fifty years of exclusionary psychometrics" (1990a and b). According to Stephenson (1988f), the other "Elements of quantized Q-technique and its methodology" (1988e) was intended as an introduction to Q methodology for use at the graduate level. See Appendix for the Table of Contents for 1988e.

measurement in Q and include illustrations of complementarity, interference effects, and the collapse of the wave packet. I will offer just one example.[6]

In his unpublished *Tribute to Melanie Klein* (1988c), Stephenson refers to a segment of a single case analysis with a patient, the *Case of Martre*.[7] There were four operant factors A, B, C, and D. Factor A had a distinct ambivalence. Stephenson summarized as follows:

> A simple account of Martre's condition, in dynamic terms, is provided by relating its four factors to one another. Factor A is how he conforms in the family, as a sensible young man. Factor D, instead, is the happy-go-lucky, don't care if I do, girl-in-boy solution to his wishes. For present purposes Martre's conflict turns upon the incompatibility of A and D. If he could have behaved in either way, all might have been well. Neither wins out, however, and Factor C erupts instead as an "episode" of disturbed hostility and confusion. Yet C still represents the essential conflict within it, as non-rational ambivalency. In such behavior, however, madness lies, against which Martre is defended by depression of Factor B. Thus, instead of living in an adjusted way as *either* A or D, Martre's life is at present largely characterized by B. There is, as William James might have said, the certainty of disharmony and a "discordant splitting of the self." (1988c, 33)

Stephenson goes on to suggest that these factors can be seen in complementary relationships, as with Bohr's Principle of Complementarity (1950). He sees factors AD, BC as clearly pointing in that direction. This example does, in my view, offer a compelling example of a single case study with multiple conditions of instruction which lead to natural segregations of a person's mind — these complementary segregations emerging as a result of the act of measurement.

Comments on the exchange between Watts and Stenner, and Brown

Brown's comments on the Watts and Stenner paper focus on five main issues: the *normative* dimension, the *meaningfulness* of statements, the role of an *inner subjective world*, the *relevance of quantum theory*, and the *location of causation* in explanations of human conduct. In this section I discuss three of these and touch briefly on matters of explanation in the concluding section.

The role of an inner subjective world

Despite Watts and Stenner's acknowledgement that for Stephenson quantum experimentation was to involve "...preparing phenomena of mind, so-called, so that it can display its structure" (1982, 237), a task that "...dispenses with consciousness and its various surrogates as 'nonessentials,' replacing them

---

[6] See Brown (1992) and, especially, (2003a) for some detailed examples of these parallels illustrated by Q data.

[7] Presented in full in Ch. VIII of *Psychoanalysis and Q-methodology* (Stephenson 1954/1979).

with what is 'essential,' namely, *consciring*, the 'sharing of knowledge'..." (p. 240), they nonetheless claim that in his use of the term *schema*, Stephenson ultimately sought refuge in an internal, mentalistic world. Watts and Stenner write as follows:

> Yet having denied his system of communicability an independently meaningful and structured existence, in 1986 he does return to an isolated inner domain as a means of explaining our meaningful experiences. A domain of subjectively real schemata, familiar to a long tradition of cognitive psychology, seems once again to play the role of the system of measurement that collapses the otherwise meaningless cultural system of communication into a locally and temporarily meaningful form. The prodigal subject, we might say, returns to centre-stage. Where once the concourse represented *the single most significant contribution to subjective science,* it is now these Bartlettian schemata or apperceptive mental contents that are seen as "fundamental to all else" (see Stephenson 1986c, 51). (Watts and Stenner 2003, 162)

This, I believe, is a serious misunderstanding of the schema notion as used and understood by William Stephenson. Stephenson's use of the term reflects that by Frederick Bartlett (1932) who had taken the term from the work of the British neurologist Henry Head (1920). In Bartlett's and Head's use of the term, there is nothing *mentalistic* about this notion (at least in mental representational terms). It simply attempts to capture a systematic relationship between current behaviour and past experience or learning.[8]

The term *schema* was, of course, subsequently adopted by American cognitive psychology in the late 1960s and early 70s and eventually acquired its current mental representational overtones. But I see no inconsistency in Stephenson's use of this term. It is perfectly compatible with his more general anti-Cartesian stance. Given the present currency of the schema notion, however, Stephenson's use of this term does exacerbate other problems for Q methodologists that arise from the adoption of terms such as *internal* and *subjectivity*.[9]

The meaningfulness of statements

This issue is critical for Watts and Stenner. As they put it, "Stephenson also needed this [hybrid psychological/cultural] field (and all the statements

---

[8] Alan Costall has helpfully documented some of the transformations that have taken place in Bartlett's use of the schema concept. He writes as follows:

> Although Bartlett's concepts of schema and also conventionalization were intended, in part, to explain the cultural mediation of the psychology of the individual, the theoretical concept of the schema readily came to be privatised – that is, treated as merely a sort of private analogue of social representations. Later Bartlett's colleagues at Cambridge (e.g. Oldfield and Broadbent) went one step further, by translating the term *schema* into the mechanical language of information theory and cybernetics. (1992, 636)

[9] See Smith (2000, 340).

which constitute it) to be inherently meaningless. The Copenhagen interpretation would otherwise be compromised" (2003, 161). They go on to claim that since the sample of statements in a Q methodological study is drawn from "the concourses of the cultural field":

> ...such statements must be considered *passive* and *meaningless* entities prior to the sorting process. Only when individual participants project their own feelings, conceptions and concerns — i.e. the contents of their own schemata — onto the statements is their essentially indeterminate and meaningless nature overcome (2003, 162, emphasis in original).

In his reply Brown makes it clear that for Stephenson it was in the sorting process that statements are endowed with *specific* meaning (Brown's emphasis). In other words, depending on the condition of instruction, a sorter's *operant* subjectivity is manifest in the sorting process. It could also be added that the meaning of individual statements is constrained by the set of statements as a whole. The schematics that emerge are wholistic and patterned.

In Watts and Stenner's cultural reading of Q methodology, Q methodologists are just "cartographers of the reliable schematics and consistent patterns of a cultural manifold" (p.163). The ontological status of *individual* Q sorts is thus unclear. While one of the strengths of this article is undoubtedly its emphasis on Q methodology as the study of shared knowledge, one of its major weaknesses is an unwillingness to acknowledge the central importance for Stephenson of self-reference, and more generally, of what he frequently termed the centrality of the self (seen in processual and non-essentialist terms).[10]

The relevance of quantum theory

While Watts and Stenner's exposition of an alternative Bohmian account of Q methodology is valuable and thought-provoking, if widely adopted would it be likely to change the nature of Q methodological practice? Q samples would continue to be drawn from concourses, statements would still be sorted according to conditions of instruction, and factors would be extracted and rotated (albeit in ways that reflect some of the cultural differences alluded to by Brown in his first footnote). And just how important is it that the conditions of the Copenhagen Interpretation be met? Is it really the case, as Brown suggests, that Stephenson didn't have "much investment in the Copenhagen Interpretation as such" (2003c, 181)?

I suspect that the *practice* of Q methodology is unlikely to be much affected by this *discursive* turn. What *is* likely, and welcome, is that Q methodology would, as a consequence, more likely be recognised as a

---

[10] See Stephenson (1979).

powerful technique for the study of shared knowledge and meaning.[11] But I believe that there would still be a central place in Q research for the use of single-participant studies involving multiple conditions of instruction and revealing segregated and complementary *states of mind.* Here there is much work to be done in bringing together discursive approaches to self and Stephenson's ideas about the centrality of self and self-reference.[12]

As far as Stephenson's commitment to the Copenhagen Interpretation is concerned, it may well be the case, as Brown has suggested (Brown, 2003b) that Stephenson only came to attach much significance to the notion of complementarity in the 1970s.[13] Nonetheless, in many of the late papers, Niels Bohr and the Copenhagen Interpretation occupy a central place, most especially the notion of complementarity.[14]

Two worlds of Q?

How should these two accounts of Q methodology be regarded? Can the *British* view of Q methodology outlined by Watts and Stenner be reconciled with the *American* view, or do they reflect incommensurable approaches to the study of subjectivity — a *constructionist* one and *realist* one, respectively.[15] In a recent paper, Brown describes Stephenson as an "unwavering realist," noting a remark made by him in 1989, "We take a stand with Bohr that the world is real, and quantum phenomena are its substances" (1989, 186). Watts and Stenner would appear to be clearly aligned with the constructionists. Is there some way of transcending this constructionism/realism dichotomy?

Given Stephenson's commitment to *operant* subjectivity, to subjectivity emerging from the sorting process (i.e. from the act of measurement), his work cannot be seen as supporting any form of metaphysical realism i.e. the view that the nature of reality is wholly independent of human practices with its commensurate notion of truth which involves characterizing what is out

---

[11] Although the study of social representations was pioneered by the doyen of French social psychologists, Serge Moscovici, over forty years ago (Moscovici 1961), the subsequent development of this work has been hampered by the absence of any agreement on how best to study shared knowledge empirically. Q-methodology can be seen as providing social psychologists with a powerful tool for this purpose. Breakwell and Canter (1993) bring together a wide variety of procedures for studying social representations. Needless to say, Q methodology is not among them.

[12] Rom Harré's discussion of the ontology of selfhood in *The singular self* might be a good place to start (Harré, 1998).

[13] Indeed there is some evidence to suggest that this is the case. The 1954 discussion of the Martre case makes no mention of the factors in terms of complementarity.

[14] E.g. in Stephenson (1986a and b, 1987, 1988a, d, and e, 1988/89, 1989). On the place of the notion of complementarity in the work of Neils Bohr, see Faye (1991). Folse (1994) provides a valuable discussion of complementarity in relation to realism. A more general discussion of the place of the notion in the history of science can be found in Held (1994).

[15] For a recent critical discussion, see Hacking (1999).

there independently of how anyone would regard it. Perhaps his work should be seen as reflecting one of those forms of contemporary realism in the philosophy of science that more explicitly acknowledge the impact of the knower on what is known.[16] Better still, perhaps he could be seen (as Brown himself seems to suggest) as being more at home in the pragmatist tradition of Dewey and Bentley's *transactionalism.*[17] Here we might surmise (as Brown does at the opening of his commentary on Watts and Stenner) about the rhetorical significance of Brown's unambiguous assignment of Stephenson to the *realist* camp.

As Brown points out, Stephenson's views about the objectivity/ subjectivity polarity reflect influences on his thinking of Jacob Kantor, John Dewey, and Arthur Bentley among others. There is little doubt that Stephenson, despite his use of the term *subjectivity*, was trying to avoid being trapped in Cartesian dualisms such as objective/subjective, mind/body, inner/outer. In that regard his view of *objectivity* might be seen as heterodox, corresponding to the third of Allan Megill's four senses of objectivity — an interactional or dialectical sense which holds that objects are constituted as objects in the course of an interplay between subject and object.[18]

In the foreword to *Quiddity College*, Stephenson recalls his methodological differences with Cyril Burt some forty years earlier. "Burt," Stephenson writes, "remained throughout his life fixed upon a 19th century paradigm: I felt that, instead, mine was a thrust into the 21st century, with

---

[16] Such as Putnam's "natural" realism (Putnam, 1999) or Rom Harré's "policy" and "convergent" realism (Harré, 1986, 1990a). A recognition of the positioned or situated character of human inquiry need not lead to the abandoning of the quest for secure knowledge. The recognition that there can be no cognitively privileged point of observation opens the way for a more adequate grasp of the complex relationships between the knower and objects of knowledge and the conditions of their production. As Putnam puts it: "the notion of *how things are* makes no sense apart from the way in which we interact with such things" (Putnam, 1995, 288, emphasis in original). Reflecting on Bohr's view that quantum mechanical phenomena arise in an indissoluble blend of apparatus and the world, Harré writes: "Empirical techniques cannot be detached from the conceptual apparatus theoreticians have created. In classical physics it looks at first sight as if we can do so. But in high energy physics...we are not looking at the world through transparent apparatus, but at what is afforded by the apparatus-and-world as an indissoluble unit. In describing the results we are not ascribing properties to substances no matter how it may appear. We are locating affordances. We cannot fasten those affordances on to an apparatus-free universe in which there would be just pure goings-on. About these we would know absolutely nothing" (Harré 1990b, 158).

[17] The transactional approach to knowledge (Dewey and Bentley 1949) involves three aspects: self-action, inter-action and trans-action, corresponding to early or pre-scientific approaches, the Newtonian perspective, and the Einsteinian view of science, respectively. For a recent endorsement of the transactional approach, see Palmer (2003).

[18] Megill's three other senses were: philosophical or absolute — a type of objectivity which derives from the ideal of representing things as they really are; a disciplinary sense, which no longer assumes a wholesale convergence and takes consensus among the members of a particular research community as its standard of objectivity. The procedural sense aims at the practice of an impersonal method of investigation or administration. Unlike the absolute and disciplinary senses, the dialectical sense leaves room for the subjectivity of the knower (Megill 1994).

relativity and quantum theory as its guidelines" (Stephenson 1970/1980, 3). In this regard, Stephenson was, as in so many of his judgments, well ahead of his time. He was not, of course, alone in sensing the necessity for psychology to embrace the new quantum world view.[19] However, he saw more keenly than most what had to be done, and he had, against all the odds, the courage of his convictions to see to fruition the development of an empirical and theoretical approach to the study of subjectivity, Q methodology, that was equal to the task.

Not least of the merits of Watts and Stenner's provocative article is its challenge to reflect on some important boundary questions, questions about the nature of individual and social knowledge, about the ontology of selfhood, about science and non-science, and indeed about the partitioning of body, mind, and the world.[20]

I am grateful to the Editor for the invitation to write this introduction. I wish to acknowledge the support of the Leverhulme Trust and of the Stephenson family who allowed me access to William Stephenson's study and to some of his private family correspondence. I am also indebted to Steve Brown for all of the usual reasons and in addition for sharing with me some of his correspondence with William Stephenson.

[19] In an important new biography of John Dewey, Thomas Dalton has described how, in the late 1920s, John Dewey made a determined effort to ensure that his *Quest for Certainty* (Dewey, 1929) reflected the latest thinking about quantum mechanics. Dalton relates how Dewey's daughter Jane, who held an International Fellowship from Columbia University in 1926-27 and was a researcher in Niels Bohr's Laboratory at the Institute for Theoretical Physics in Copenhagen, kept her father informed about the latest developments (Dalton 2002). Dalton notes that "Dewey welcomed the prospect of dropping misleading deterministic metaphors used to characterize physical events. Instead, he embraced a language of probability and transformation that retained the possibility that phenomena undergoing change can still be intersubjectively authenticated and are generalizable to other similar situations" (Dalton 2002, 173).

[20] John Haugeland has recently introduced the notion of "the *intimacy* of the mind's embodiment and embeddedness in the world. His use of the term "intimacy" is meant to convey something more than just interdependence, but a "kind of *commingling* or *integralness* of mind, body and the world — that is, to undermine their very distinctness" (Haugeland 1998, 208, emphasis in original).

References

Bartlett, F.C. 1932. *Remembering: A study in experimental and social psychology.* Cambridge: Cambridge University Press.

Bohr, N. 1950. On the notions of causality and complementarity. *Science* 111:51-4.

Breakwell, G.M. and Canter, D.V., eds. 1993. *Empirical approaches to social representations.* Oxford: Clarendon Press.

Brown, S.R. 1992. Q methodology and quantum theory: Analogies and realities. Paper presented at International Society for the Scientific Study of Subjectivity meeting, University of Missouri-Columbia. Available at: http://facstaff.uww.edu/cottlec/Qarchive/qindex.htm

———. 2003a. Subjective behavior analysis. *Operant Subjectivity* 25(3/4):148-63.

———. 2003b. Personal communication.

———. 2003c. Comments on Watts and Stenner's "Q methodology, quantum theory, and psychology." *Operant Subjectivity* 26(4): 176-83.

Bruner, J. 1990. *Acts of meaning: Four lectures on mind and culture.* Cambridge, MA: Harvard University Press.

Burt, C. 1940. *The factors of the mind: An introduction to factor-analysis in psychology.* London: University of London Press.

Costall, A. 1992. Why British psychology is not social: Frederic Bartlett's promotion of the new discipline. *Canadian Psychology/Psychologie canadienne* 33(3): 633-9.

Dalton, T.C. 2002. *Becoming John Dewey: Dilemmas of a philosopher and naturalist.* Bloomington: Indiana University Press.

Dewey, J. 1929. *The quest for certainty: A study of the relation between knowledge and action.* New York: G.P. Putnam's Sons.

Dewey, J. and Bentley, A.F. 1949. *Knowing and the known.* Boston: Beacon Press.

Edwards, D. and Potter, J. 1992. *Discursive psychology.* London: Sage.

Faye, J. 1991. *Niels Bohr: His heritage and legacy. An antirealist view of quantum mechanics.* Dordrecht: Kluwer Academic.

Folse, H. 1994. Bohr's framework of complementarity and the realism debate. In *Niels Bohr and Contemporary Philosophy.* Boston Studies in the Philosophy of Science, ed. J. Faye and H. Folse, vol. 158. Dordrecht: Kluwer Academic.

Good, J.M.M. 2000. William Stephenson and the post World War II bifurcation of British psychology. *Operant Subjectivity* 23(3):116-30.

Green, E.J. 2002. Quantum mechanics and the analysis of behavior: Reflections and speculations. *Psychological Record* 52:19-32.

Hacking, I. 1999. *The social construction of what?* Cambridge, MA: Harvard University Press.

Harré, R. 1986. *Varieties of realism: A rationale for the natural sciences.* Oxford: Blackwell.

———. 1990a. Exploring the human umwelt. In *Harré and his critics: Essays in honour of Rom Harré with his commentary on them,* ed. R. Bhaskar. Oxford: Blackwell.

Harré, R. 1990b. Tracks and affordances: The sources of a physical ontology. *International Studies in the Philosophy of Science* 4(2):149-58.

———. 1992a. The second cognitive revolution. America. *Behavioral Scientist* 36:5-7.

———. 1992b. The discursive creation of human psychology. *Symbolic Interaction* 15:515-27.

———. 1998. *The singular self: An introduction to the psychology of personhood.* London: Sage.

Haugeland, J. 1998. *Having thought: Essays in the metaphysics of mind.* Cambridge, MA: Harvard University Press.

Head, H. 1920. *Studies in neurology.* Oxford: Oxford University Press.

Held, C. 1994. The meaning of complementarity. *Studies in History and Philosophy of Science* 25:871-93.

Knight, M. and Rupp, G. 1999a. "Two sciences..." Part I: The epistemology of object/subject inter-dependence. *Operant Subjectivity* 22(3):2-11.

———. 1999b. "Two sciences..." Part II: Mental life and the language of science. *Operant Subjectivity* 22(4):3-10.

———. 1999c. "Two sciences..." Part III: Stephenson's Quantum psychology. *Operant Subjectivity* 23(1):1-8.

Matson, F.W. 1964. *The broken image: Man, science and society.* New York: George Braziller.

Megill, A. 1994. Four senses of objectivity. In *Rethinking Objectivity*, pp.1-20, A. Megill. Durham, NC: Duke University Press.

Middleton, D. and Edwards, D. 1990. *Collective remembering.* London: Sage

Moscovici, S. 1961. *La psychanalyse, son image et son public.* Paris: Presses Universitaires de France.

Myers, C.S. et al. 1938. A discussion on the application of quantitative methods to certain problems in psychology. *Proceedings of the Royal Society of London. Series B — Biological Sciences* 125:415-34.

Palmer, D.K. 2003. The transactional view and autopoietic biology. *Transactional Viewpoints* II (2). Great Barrington, MA: Behavioral Research Council.

Penrose, R. 1994. *Shadows of the mind.* New York: Oxford University Press.

Putnam, H. 1995. Comments and replies. In *Reading Putnam*, ed. P. Clark and B. Hale. Oxford: Blackwell.

———. 1999. *The threefold cord: Mind, body and world.* New York: Columbia University Press.

Smith, N.W. 2000. *Current systems in psychology. History, theory, research and applications.* Belmont, CA: Wadsworth.

Stainton Rogers, R. 1995. Q methodology. In *Rethinking methods in psychology,* pp. 178-92, ed. J.A. Smith, R. Harré, and L. van Langenhove. London: Sage.

Stainton Rogers, W., ed. 1997/1998. Special issue: Using Q as a form of discourse analysis. *Operant Subjectivity* 21(1/2):1-40.

Stephenson, W. 1936. Some recent contributions to the theory of psychometry. *Character and Personality* 4:294-304.

———. 1953. *The study of behavior: Q-technique and its methodology*. Chicago: University of Chicago Press.

———. 1954/1979. *Psychoanalysis and Q-methodology*. Unpublished manuscript. Western Historical Manuscripts Section, Ellis Library, University of Missouri-Columbia.

———. 1955. Obituary Notice. Sir Godfrey Thomson 1881-1955. *British Journal of Psychology* 46:245-7.

———. 1970/1980. Quiddity College: A Jeffersonian approach to moral science. Unpublished manuscript. Western Historical Manuscripts Section, Ellis Library, University of Missouri-Columbia.

———. 1979. The communicability and operantcy of self. *Operant Subjectivity* 3(1):2-14.

———. 1980. Consciring: A general theory for subjective communicability. In *Communication Yearbook 4, ed.* D. Nimmo. New Brunswick, NJ: Transaction.

———. 1981. Cyril Burt, quantum theory and Q: Historical note. *Operant Subjectivity* 4(4):120-34.

———. 1982. Q-methodology, interbehavioral psychology and quantum theory. *The Psychological Record* 32:235-48.

———. 1983. Quantum theory and Q-methodology: Fictionalistic and probabilistic theories conjoined. *The Psychological Record*, 33, 213-30.

———. 1986a. William James, Niels Bohr, and complementarity: I - Concepts. *The Psychological Record* 36:519-27.

———. 1986b. William James, Niels Bohr, and complementarity: II - Pragmatics of a thought. *The Psychological Record* 36:529-43.

———. 1986c. Protoconcursus: The concourse theory of communication. *Operant Subjectivity* 9(2):37-58 and 9(3):73-96.

———. 1987. William James, Niels Bohr, and complementarity: III - Schrödinger's cat. *The Psychological Record* 37:523-44.

———. 1988a. William James, Niels Bohr, and complementarity: IV - The significance of time. *The Psychological Record* 38:19-35.

———. 1988b. William James, Niels Bohr, and complementarity: V – Phenomenology of subjectivity. *The Psychological Record* 38:203-19.

———. 1988c. A Tribute to Melanie Klein. Unpublished Manuscript. Western Historical Manuscripts Section, Ellis Library, University of Missouri-Columbia.

———. 1988d. Q-technique and Q-methodology: A quantized science for subjectivity. Unpublished manuscript in William Stephenson's study, Columbia, MO.

———. 1988e. Elements of quantized Q-technique and its methodology. Unpublished manuscript in William Stephenson's study, Columbia, MO.

———. 1988f. Letter to Steven Brown, Feb 22.

———. 1988/1989. The quantumization of psychological events. *Operant Subjectivity* 12(1/2):1-23.

Stephenson, W. 1989. Quantum theory of subjectivity. *Integrative Psychiatry* 6:180-95.

———. 1990a. Fifty years of exclusionary psychometrics: I. Q technique. *Operant Subjectivity* 13(3):105-20.

———. 1990b. Fifty years of exclusionary psychometrics: II. Developments. *Operant Subjectivity* 13(4):141-62.

Valentine, E. 1999. Popper's three worlds and attitudes to the explanatory gap. *New Ideas in Psychology* 17:31-9.

Watts, S. and Stenner, P. 2003. Q methodology, quantum theory, and psychology. *Operant Subjectivity* 26(4):157-75.

Zohar, D. 1990. *The quantum self: A revolutionary view of human nature and consciousness rooted in the new physics.* London: Bloomsbury.

APPENDIX

Elements of Quantized Q-Technique and its Methodology: Table of Contents