Q Methodology as the Foundation for a Science of Subjectivity

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ABSTRACT: William Stephenson's 1935 letter to the Editor of Nature, *published 60 years ago, contains within its four short paragraphs all the essentials for a science of subjectivity. Focusing on two studies—on the controversies surrounding animal experimentation and of problem selection in policy analysis—illustrations are provided of the new phenomena brought to light through "inverted" factor analysis, and of the advantages of experimentation which Q methodology enjoys. A proposed study on food habits demonstrates how experimental probes can be made into the cognitive and orectic aspects of nutrition and food choice. The conclusion is reached that Q methodology remains the foundation of the study of subjective behavior.*

Q Methodology, 1935-1995

It has now been 60 years since William Stephenson took pen in hand and informed the editor of *Nature* of that bright idea of his that eventually came to be known as Q methodology (see Figure 1). It has been an eventful 60 years—three major wars, the administrations of 11 U.S. presidents, space flight, cures for polio and other diseases and

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Technique of Factor Analysis

Factor analysis is a subject upon which Prof. G.H. Thomson, Dr. Wm. Brown and others have frequently written letters to *Nature*. This analysis is concerned with a selected population of n individuals each of whom has been measured in m tests. The $(m)(m\text{-}1)/2$ intercorrelations for these m variables are subjected to either a Spearman or other factor analysis.

The technique, however, can also be inverted. We begin with a population of n different tests (or essays, pictures, traits or other measurable material), each of which is measured or scaled by m individuals. The $(m)(m\text{-}1)/2$ intercorrelations are then factorised in the usual way.

This inversion has interesting practical applications. It brings the factor technique from group and field work into the laboratory, and reaches into spheres of work hitherto untouched or not amenable to factorisation. It is especially valuable in experimental aesthetics and in educational psychology, no less than in pure psychology.

It allows a completely new series of studies to be made on the Spearman 'central intellective factor' (g), and also allows tests to be made of the Two Factor Theorem under greatly improved experimental conditions. Data on these and other points are to be published in due course in the *British Journal of Psychology*.

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Fig. 1. Stephenson's initial statement.

significant advances against others, and developments in information technology of all kinds (television, satellites, computers) with consequent developments in the technical sophistication of mass publics. All of this is progress in the objective mode—of hardware and software, cures for cancer, moon walks, and warfare—but we would be hard-pressed to point to much in the way of advances in understanding subjectivity during this same period, i.e., of humankind's understanding of itself in its own terms. Academic psychology has become preoccu-

pied with cognition and brain physiology, requiring high levels of expert knowledge; psychoanalysis has been chased from the psychology departments and medical schools, or has otherwise been incorporated by departments of English, which have often rendered it esoteric and unintelligible; and postmodernism has likewise removed understanding of human thought beyond the bounds to which ordinary individuals can aspire. The situation has all the earmarks of Marxian alienation: we produce our own ordinary thoughts, but then seem to lack the thinking capacity necessary to repurchase those same thoughts when they are returned to us in the manufactured form of philosophical or psychological theories about thought.

Anniversaries provide occasions to reflect on beginnings and to take stock, and were we to do that with Stephenson's letter, we would see that much of the conceptual and technical equipment necessary to move forward is there, explicitly or implicitly, in that short note. His innovation required a few illustrations which subsequent publications provided, but these were primarily elaborations of the logic already tightly packed into that 1935 letter.

We recognize the first paragraph of Stephenson's letter as a summary of conventional factor analysis (R methodology), against which he wished to contrast another method, and there is no disputing that the conventional version has remained dominant in the intervening years, invariably to the exclusion of the alternative (Stephenson, 1990a, 1990b): The prevailing use of factor analysis remains the factorization of those $(m)(m\text{-}1)/2$ intercorrelations which have arisen from the measurement of individuals on tests.

The Second Paragraph

However, the second paragraph opens the door to something truly new, despite the efforts of some critics to restrict its impact by associating it with the reciprocal of R factor analysis. From the outset, as we see, Stephenson equated Q methodology (which did not yet have a name) with materials as measured by individuals: It was the m individuals who were doing the measuring rather than being measured, and so subjectivity was implicated from the very beginning. And since the $(m)(m\text{-}1)/2$ intercorrelations were then to be "factorised in the usual way," the resulting factor composites, like the individual measures which comprised them, were also drenched with subjectivity.

Take for illustrative purposes the hot topic of animal experimentation and the views about it which have been expressed during the past

100 years and more (as made conveniently available in Magel, 1989):

> For the scientist, animals are only organisms concealing problems which the scientist must solve. (Claude Bernard, physiologist, 1865)
>
> The cry of an injured lark would stab me to the heart, but when we probe the mysteries of life and acquire new truth, the sovereignty of the end in view carries all before it. (Louis Pasteur [1822-1895], chemist)
>
> Anesthetics should, of course, be used, but experiments must be allowed to go forward due to the benefits to mankind. (Charles Darwin, naturalist, 1876)
>
> I could not kill or hurt any living creature needlessly, nor destroy any beautiful thing. (John Ruskin, professor of literature, 1885, who resigned his position at Oxford the day after vivisection was introduced)
>
> The pain which vivisection inflicts upon unconsenting animals is sufficient justification for my enmity without looking further. (Mark Twain, author, 1901)
>
> The rights of the helpless, even though they be brutes, must be protected by those who have superior power. (William James, psychologist, 1909)

And so on up to today's battles over animal rights, which have become so heated as to threaten the unity of the animal rights movement itself, dividing it (or so it is asserted) into those supporting more humane treatment and those taking a more absolutist stance (see, for example, Jasper and Nelkin, 1992).

Stephenson's assertion that conventional factor analysis "can also be inverted" constituted a metaphor which was wasted on various of his critics, some of whom subsequently took satisfaction in pointing out that the matrix manipulation wasn't really an inversion but a transposition. It was, of course, neither; rather, it was a conceptual shift that moved the focus of attention from "variables" of a transindividual character (e.g., intelligence or volition in some abstract sense) to how concrete individuals were actually thinking and reacting to the materials placed in front of them—enjoying or approving of some, disagreeing with others, and feeling neither here nor there about still others. Thoughts and ideas have feeling tones, as Stout (1899, pp. 562-580) long ago noted, and it was these thoughts interlaced with feeling that Stephenson's "inversion" brought into prominence.[1]

These feelings of approval and disapproval, of pleasure and unpleasure, are at the heart of subjectivity, and they are concrete and immediately experienceable rather than transcendental. In *Psychology Down the Ages*, Spearman (1937, p. 449) referred to pleasure and unpleasure as perhaps the sole examples of sensory states that have achieved patency "down the ages," and one of the elegant features of Q methodology is that it provides a formal model of pleasure/unpleasure—in the form of the Q sort. In fact, it is hard to conceive of any simpler or more elegant way to represent subjectivity—hence the title of this article: "Q Methodology as *the* Foundation for a Science of Subjectivity."

What do we find when, as Stephenson instructed, the $(m)(m\text{-}1)/2$ correlations among persons are "factorised in the usual way"? A Q sample drawn from Magel's (1989) collection was administered to members of an animal rights group, plus acquaintances of theirs who they thought might hold different views. It is not especially surprising

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[1]Stephenson frequently cited James Ward as a source of inspiration, and G.F. Stout was Ward's successor at Cambridge University. In his chapter on "Feeling-Tone of Ideas," Stout (1899) notes that thought can "occasion changes in the common sensibility" either by reviving past feelings (as in reminiscence) or as a result of the thought process itself (e.g., by solving a problem). Feeling tone can also be painful, as when the thinker is conflicted or confused. We would add to Stout's inventory the pleasure derived through mere repetition, as when an ideologue uses the Q sort as an opportunity to assert a predigested doctrine once again.

that one of the factors consists of the so-called Absolutists, i.e., members of the animal rights vanguard who believe that animals have absolute rights, and who distinguish themselves from the other two factors in their level of support for the following views:

> Animal experimentation usually produces trivial results, uses intrinsically objectionable means, and morally desensitizes teachers and students.... The pain which vivisection inflicts upon unconsenting animals is reason enough to oppose it, without looking farther.... Extrapolating results from animals to humans can be inaccurate and misleading—physiologically, psychologically, and in other ways.... Animal experimenters defend their practices because they have professional reputations to protect. How can they admit their error when their status rests on a lifetime of publications with their names on them?

The Absolutists are naturally concerned with pain inflicted on animals, and so eagerly embrace Mark Twain's conclusion that the pain involved is reason enough to oppose vivisection. The enemy in all this is obviously science—more specifically, scientists—and the ideological stance of this factor was so strong that it ended up taking precedence over the following two statements, much to the chagrin of persons comprising this factor once the results were shown to them (scores for factors I, II, and III, respectively):

(0 +3 +4) I could not kill or hurt any living creature needlessly.

(0 +4 +4) There must be policies to provide adequate protection for lab animals against unnecessary abuse.

It is understandable that some animal rightists might downplay the second statement (so as not to lend legitimacy to animal labs), but it came as a surprise that this group did not embrace among its first principles Ruskin's declaration against the needless hurting of living things.

Only two people defined the second factor, but one was a researcher who had spent a career devoted to science and the observation of simian behavior in far-away places, and a pro-science stance is the most visible characteristic of this factor, as shown in statements receiving significantly higher scores:

> Anesthetics should be used whenever possible.... Animals will be used rationally if both science and ethics answer the same question:

> Is this animal the best experimental system for the job?.... Where possible, use should be made of humans themselves as experimental subjects in lieu of animals.... Much of the opposition to animal experimentation can be traced to a general lack of knowledge about science generally, and about what actually goes on in an experiment specifically.

At the negative end of the Science factor were denials that the external grant system props up trivial research, that faculty rarely address the ethics of experimentation, and that experimentation morally desensitizes teachers and students alike. But behind the scientific bravado were signs of uncertainty, as in factor II's zero score to the following statement: "There are ethical problems in animal experimentation due to the continuity of human and other animal life" (+3 0 +3).

Finally, factor III: the Humanists—in the sense that they elevate the welfare of *Homo sapiens* above that of other creatures (scores for factors I to III, respectively):

(-1 -1 +2) The justification of animal experiments is in the expected benefits to humans.

(-4 -4 +1) There is more sacredness, surely, about one human being than about all the other animal species put together.

(+1 +3 -4) Where possible, use should be made of humans themselves as experimental subjects in lieu of animals.

The first two statements receive relatively low scores, but relatively high in contrast to I and II; however, the factor's strong negative reaction to the last statement suggests a reticence to make too strong a proclamation about human superiority. Elsewhere in the statement array, the Humanists displayed a marked tendency to side first with the Absolutists (e.g., in questioning vivisection and the legitimacy of science) and then with the Scientists (on issues associated with policing against unnecessary abuse). The Humanists wish not to harm animals unless absolutely necessary for human welfare.

It is worth noting that there were visible points of consensus toward which the three factors gravitated for their divergent motivations—that we need to find alternatives to animal experimentation, that boycotting companies relying on animal research is a legitimate consumer strategy, and that universities have an obligation to promote alternative methods (e.g., to dissection) so that students need not be forced to harm animals. The strong scientific assertion—that animal

research is ethically mandatory—was roundly condemned by all three factors.

As is apparent, therefore, the inversion to which Stephenson pointed in the second paragraph of his 1935 letter brings new features of human existence to light, and those features are more common and understandable. Rather than abstract traits and faculties, such as intelligence and volition, we are brought face to face with such familiar contemporary phenomena as animal rightists so certain in their criticisms of others that they forget kindness as their own first principle, of scientists boldly defending their practices (but underneath perhaps feeling more vulnerable), and ambivalent humanists wishing to defend animals against pain yet feeling conflicted when animal rights come into conflict with human welfare. These are not faculties or abstract social categories, but recognizable ways of living in the world. In introducing this inversion, therefore—in which individuals are now doing the measuring, rather than being measured—Stephenson set factor analysis and the study of human behavior spinning on a new axis.

The Third Paragraph

The third paragraph in Stephenson's letter promises new and practical applications in regions of inquiry not previously examined by factor procedures, with aesthetics and educational psychology especially singled out, and he notes that his inversion "brings the factor technique from group and field work into the laboratory." This serves as a reminder of Stephenson's training as a physicist, and of the skills and reasoning of the experimentalist which training of this kind brings with it. The work of previous factor analysts, in their search for primary abilities and dimensions, necessarily involved large masses of data. As Thomas (1935) wrote, in the same year as Stephenson's letter, "The only method which promises any finality of decision is to get together as many different people as possible, to test them for as many different abilities as possible, to compare the results, and to base one's views of ability upon the outcome" (p. 25). This takes time, however, and therefore stands as an impediment to a truly experimental science, as Stephenson (1935b) pointed out:

> A research student may spend two years isolating a single factor.... One cannot perform an experiment today and use its results for another tomorrow. Tests cannot be changed in the way that a chemist changes the mixtures in his test-tube to try out his hypothe-

> ses. In short, the present-day technique lacks the pliability that the energetic experimentalist wants at his command. It is a device for massive fieldwork, and not for the clinic, the laboratory, or for rapid and subtle experimentation... (p. 18).

Stephenson then wondered whether there was an alternative: "Can we make factor studies on a few individuals, and bring the methods of correlations and factor analysis into the laboratory?" (p. 18). His answer to his own question was, of course, in the affirmative, and this affirmation was backed up with Q methodology.

A recent inquiry demonstrates how results can be obtained in a timely fashion, as required for "rapid and subtle experimentation," and without recourse to the ponderous volume of observations characteristic of field work. In this instance, members of a senior seminar in policy science were invited to nominate possible policy problems for more detailed study. Following a round-robin nomination process, which netted 27 possible topics, the 23 seminar members were then instructed to Q sort the topics in terms of the interest each had for them. Four factors (two of them bipolar) were ready for discussion within 48 hours.

The factors represent patterns of interest which the students have developed and which guide their choice of those problem areas in which to invest effort for the remainder of the semester. The character of one of the bipolar factors emerges clearly in the issues dominating the two ends of the factor array:

> *Positive pole*: impact of drug traffic on Latin American societies, policy toward drugs, problems of illegal immigration, gun control, changes in the intelligence community.
>
> *Negative pole*: full employment, impact of societal change on women's employment, crackdown on "deadbeat dads," poverty and hunger, animal rights.

This factor pits the status quo against those who wish to alter it. The young policy scientists defining the positive end of the factor are anxious to study those social problems (drugs, guns, illegal immigration) that pose a threat to U.S. society and also those institutions (e.g., the Central Intelligence Agency) which defend it: Social pathologies such as drugs and illegal immigration are seen as signs of societal decay. Students at the opposite end of the factor wish to study those problems (unemployment, poverty) which they see as consequences of

the status quo, and they identify with those social categories (women, abandoned families, animals) which are disadvantaged under current arrangements. For these participants (unlike those at the other end of the factor), poverty and homelessness are causes, and drugs, guns, and illegal immigrants are consequences, rather than the other way around.

As noted previously, ideas have feeling tone, and this applies no less to policy interests and to the operant factors indicative of interest schemata that hold the individual policy problems in place. (As Stephenson [1986] observed in this regard, "... concern is with *states-of-feeling* in Q, not with specific feeling attached normatively to particular statements" [p. 537].) Along with their policy Q sorts, the seminar members were also to provide biographical sketches so as to illuminate those features of their career lines that might reveal the genesis of their policy interests, and these personal essays made clear in most cases how the blooms of policy interest initially took root and were nourished in the fertile soil of significant life experiences. For example:

> *Respondent 16 (factor A-positive)*: This person wished to study the Central Intelligence Agency, in which he had been interested since he was young. He had been strongly influenced by his father, whom he considered his mentor and friend, and who had been a military and civilian police officer as well as associate of personnel in the World War II Office of Strategic Services (predecessor to the CIA). He has applied for a job with the CIA, in which he hopes to enjoy a career.

> *Respondent 20 (factor A-negative)*: This person begins her essay with the declaration that "I am a woman who comes from a family of very strong and independent women." That she is prepared for "all the harrassment I will endure being a woman in a powerful job" she attributes to her mother. Her parents are divorced, and although her father was "always there for me when I needed him," she has nonetheless developed an interest in "deadbeat fathers." Her favorite high school teacher, a woman and animal rights activist, extended her indignation concerning the powerless to include animals. She concludes that "one day I want to be powerful and change people's views about what women can and cannot do in this world."

There were other factors that revealed sentiments for emotional vs. intellectual issues, for international vs. domestic policies, and for alternatives to policies and institutions that were malfunctioning (e.g., social security and welfare), and in virtually all cases the factors were

a function of demonstrable interests which were in turn embedded, like hands in gloves, to the particulars of individuals' lives (for details, consult Brown, 1996).

Such is the nature of *apperception*, i.e., the "readiness to perceive this or that in relation to prior systems of interest" (Stephenson, 1967, p. 149). Introduced by Leibnitz, apperception was incorporated into educational theory by Herbart in the early 19th century, and was a central principle in the systematic psychologies of James Ward (1920, pp. 308-312) and especially G.F. Stout (1896, pp. 110-167), but until Stephenson introduced Q methodology this important concept was without operational foundation. It is, of course, not restricted to education: As Stephenson (1967) points out, newsreading is awash with apperceptiveness, with readers turning to the editorial, sports, fashion, and gossip sections as their interests direct. Contemporary innovations such as electronic Gopher sites and the World Wide Web merely expand the apperceptive arena.

But what about the requirements for "rapid and subtle experimentation" which Stephenson promised in his 1935 letter? In a worked example (Brown, 1989), a policy analyst was invited to Q sort a set of organizational problems under a variety of conditions of performance: Which problems interest you most? Which would the authorities regard as most sensitive? Which are most amenable to solution? are most urgent? are most apt to get worse? are most upsetting? would contribute most to human dignity? and so forth. Each of these experimental performances—with one or two completed each day for a week—places the Q sorter in a different hypothetical situation, thereby altering the experiment comparable to the way in which "a chemist changes the mixtures in his test-tube to try out his hypotheses" (Stephenson, 1935b, p. 18). Although these experimental possibilities were announced 60 years ago, Q's potential in this regard has hardly been explored.

The Fourth Paragraph

Spearman's *g* referred to a general ability that entered into everything from writing a play to tying a shoelace. It was heavily cognitive (as

opposed to orectic)[2] and constituted the major prong of the "two-factor theorem"; the other prong was *s*, the family of specific factors, i.e., specific to each ability: Some people can add numbers quickly, for instance, which implicates *g* but also an ability specific to adding but that does not carry over to a facility for remembering names, which in turn has its own *s* (Thomas, 1935, p. 28).

I wish to propose a study (rather than report one) that involves general intelligence (not in an IQ sense) as well as specific abilities, and both cognitive and orectic capabilities. The topic is *food*, which has physiologic, psychologic, and cultural features.

Food is used in symbolic and socially-expressive ways (Douglas, 1984; Fieldhouse, 1986), and we might begin for comparative purposes with two housewives from different social classes, so as to provide room for contrasts to emerge due to differences in specific knowledge and abilities. Q technique has been employed in food and nutrition studies, but not in especially effective ways. Sutnick (1981), for example, constructed a Q sample composed of the names of 25 foods which 266 experimental students (plus 246 controls) ranked by preference and then again for nutritive value; however, Sutnick then summed across all experimental and all control subjects for purposes of comparison, thereby preventing operant categories from emerging. Simpson (1989) utilized pictures of food rather than food names, but also averaged across arbitrary categories (mothers of low vs. normal weight/length children). Fitzgerald (1977) introduced a Q-sort Food Choice Game with pictures of food, and also recommended multiple conditions of instruction; however, he did not report his findings. None of these really approximates the "greatly improved experimental conditions" which Stephenson's method made possible.

For purposes of structuring a Q sample, pictures of foods or food names could be used, the former illustrated by Fitzgerald and Simpson (*supra*), the latter by Sutnick and also Meiselman and Waterman (1978). How, next, to measure? Most efforts have naturally been categorical, involving such concepts as flavor, prestige, and convenience (Krondl & Lau, 1982), or satiety, price, and beliefs about health

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[2]Cognition involves perceiving and thinking, affection involves feeling, conation striving, and volition willing, the latter three combined into the category *orexis* (Thomas, 1935, pp. 7-13).

(Reaburn, Krondl & Lau, 1979) and the like. Schutz, Rucker and Russell (1975) are in the proper spirit when they suggest "allowing respondents themselves to generate the classifications" (p. 52), but ultimately they take averages across their 200 respondents before proceeding to an R factor analysis.

However, Schutz, Rucker and Russell, before taking their averages, do suggest a number of conditions under which food might be consumed, and these could provide the basis for genuine experimentation:

> *Possible conditions of experiment (cognitive)*: When I want something nutritious.... When I want something inexpensive.... When I want something spicy.... When I want something easy to prepare ... and so forth. (All of these imply special knowledge.)

> *Possible conditions of experiment (orectic)*: When I'm trying to please my husband ("a way to a man's heart").... For the kids when they're being rambunctious.... For the kids when they've been especially good.... Putting on a good show for special guests.... When I'm depressed.... For snacking in front of the TV.... Things I sometimes have a craving for ... etc. (These conditions implicate orectic strivings and desires.)

On several occasions, Stephenson noted his intellectual indebtedness to J.R. Kantor (e.g., Stephenson, 1984), and it is not difficult to imagine that he would have been sympathetic to efforts to include Kantor's ideas along with those of Spearman. Kantor (1959, p. 16), it will be recalled, formalized a psychological event as PE = C (k, sf, rf, hi, st, md),[3] and it is easy to conceive of conditions of instruction (using the above food Q sample) that would cover Kantor's PE dimensions:

> Which of the foods do you most enjoy preparing (sf)? Which make your mouth water just thinking about them (rf)? Which did you like most as a child, or were most apt to have when you and your husband were first married (hi)? Which would you be apt to serve during the work week, or for Sunday brunch, or with candle light,

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[3]Where sf=stimulus function, rf=response function, hi=interactional history, st=setting factors, md=medium of contact, k=specificity (uniqueness), and C indicates that all segments interact.

> or on a picnic, or when you are dining out, etc. (st)? Which fill the kitchen with their aroma (md)?

And on and on. It would be a rather straightforward matter, first to factor the Spearman Q sorts (based on central intellective and orectic principles), and then the Kantor Q sorts (based on PE considerations), and then to refactor the combined arrays from these two solutions to see for ourselves precisely in what ways the two converge.

It is also worth considering that the subjectivities involved in Q sorts produced under conditions of instruction such as the above can be supplemented by certain "objectivities." Nutritionists, for instance, could be enlisted to provide Q sorts representing caloric, fat, nutritional and other contents. Parents often give in to demanding children by giving them high-sugar foods that spiral into even more energetic demands, and depressed and emotionally abused women often turn to foods which exacerbate their situations; anorexics and bulimics likewise have eating patterns which, under the magnifying glass of factor analysis, might be shown to have structures capable of modification.

Lewin (1943), in his classic study of food habits, was concerned to determine the conditions under which bad eating patterns might be altered, and in this regard, experiments of the kind implied in the propositional sets above would bring us closer to understanding the social constraints to be overcome. Lewin noted at the outset that one of the chief difficulties was "to find categories which have meaning from the nutritionist's point of view and still are in line with the everyday terms in which the housewife thinks and acts" (p. 36). Lewin's solution was to interview a relatively large number of individuals and to take averages over social categories, such as Czech, low-income White, and Negro groups. Whereas studies of that kind have their place, they can profitably be supplemented with experimental studies designed to test two-factor, interbehavioral, or any other theorems that suggest promising leads.

Concluding Remarks

And the same holds true for any other problem area in the entire domain of human endeavor. William Stephenson's innovation, announced in 1935, was designed to provide an instrumental basis for studies not heretofore covered by objective procedures. It was not a simple matrix transposition, as so many since have contended and continue to believe: It was totally new, and it was so precisely because

it focused a penetrating beam of light on subjectivity—on individuals *measuring* rather than *being measured.*

This conceptual inversion for the first time placed us in a position to carry out studies of considerable sophistication and within shortened time frames that continue to induce wonder even after more than a half century of technical and conceptual development in the human sciences. And the range of topics amenable to Q is just as impressive—cognitive, conative, volitional (to use the older language) right up to modern and postmodern applications in narrative and discourse analysis, hermeneutics, media hegemony, literary criticism, decision making, and all else, including phenomena which fall under the rubric of quantum consciousness and mind (but which really amount to subjective communicability).

There is no other method or theory which matches Q's versatility or reach, and which comports so well with the principles and concepts of contemporary science (including anti-science!), and so it remains today, as it was envisioned 60 years ago—the foundation for the scientific study of subjectivity.

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