A NEW Q TOO?

Peter Gould
The Pennsylvania State University

Abstract Atkin's Q-analysis is further distinguished from Stephenson's Q methodology, and questions are raised about the latter vis-a-vis the effect of its algebraic operations on its data, the role of statistical tests of significance, its relationship to quantum theory in physics, and the distinction between objective and subjective.

> I'm a gnu...a gnother gnu....
> -- Flanders & Swan
> *The Drop of a Hat*

> [...ideas become] welded together into a system of thought sustained by pre-established affective organization.
> -- Steven Brown (1984b)

To focus upon ideas, rather than the persons who put them forward, and to lay out claims carefully for critical inspection, rather than laying out those who made them, constitute precious opportunities too rarely met in the human sciences today. It is in this spirit of concern that the following, and necessarily brief, remarks must be made. Since much is compressed,

Operant Subjectivity, 1985(Jan), *8*(2), 42-53.

references have been chosen to provide leads for those who wish to examine these questions more deeply and in all their conceptual and technical ramifications.

CLEARING THE UNDERGROWTH

There appears to be a tinge of worry among some "operant subjectivists" that the letter Q has in some way been usurped. Let us put aside this concern immediately, for it should not color a thoughtful dialogue. Notation is notation: It happens that in algebraic topology Q (and P) are often used to designate the dimensions of a space and the structures it contains (Atkin, 1974, Appendix B). When Atkin coined this standard notation, he was totally unaware of any factor analytic tradition in the human sciences, and in any case he would have been unable to subscribe to its tenets. Over the past twelve years, no confusion appears to have arisen--I know of no one working with Atkin's Q-analysis who is aware of Stephenson's Q methodology--but since we must discuss claims about both, let us agree to talk here about Q_A and Q_S. Why Stephenson also chose Q for his methodology, and why difficulties have arisen with Cattell's PQRSTs, is something I cannot comment upon, but I suppose if you grew up totally within the factor analytic tradition as "Spearman's 'backroom boy'" (Stephenson, 1977), and you correlate "...persons instead of tests" (Stephenson, 1935), then confusion between what *most* people mean by standard (i.e., Cattellian) Q-mode factor analysis and Q_S may not be all that surprising. In any event, these historical notational claims are of little importance, and need not detain us here.

LAYING OUT SOME CLAIMS

After examining a number of articles and essays, it seems to me that the unique power claimed by Q_S rests on the distinction between what has traditionally been termed *subjective* and *objective* and the "...fundamental incommensurability between [them]..." (Brown,

1972). Historically, of course, we must recall that this is a comparatively recent Cartesian distinction, one whose pertinence and utility are increasingly being called into question (Heidegger, 1980), not the least by modern quantum theorists. I find the claim difficult to understand, despite an open stance and great good will. Q_S appears to be concerned to elicit and structure people's opinions and feelings about things, events, and other people (Brown, 1980, 1984b), rather than forcing them to conform to *a priori* categories, but I have the uncomfortable feeling that these distinctions may be less than sharp, and the claim to a unique concern for subjectivity may be difficult to sustain. For example, Personal Construct Theory (Kelly, 1955; Bannister & Fransella, 1971) also attempts to elicit opinions, attitudes and feelings; modern psychotherapeutic practice that passes beyond traditional Freudian, Jungian and other categories certainly does the same (Boss, 1979; Storr, 1979); and so do many "free" methods of interviewing. Moreover, when three psychotherapists (Whyte, Constantopoulos & Bevans, 1982) attempt to elicit feelings of nurses towards their patients by asking them to respond to:

> When I am in conversation with [the name of a patient]
> I feel myself feeling: (please ring appropriate answer)
> Happy (cheerful, amused)
> .
> .
> .
> Tired (exhausted, drained...[and so on, for 30 feelings])

and the psychotherapists are then told that these feelings are only "a priori logical categories" (Brown, 1984a, p. 10), then an outsider to the Q_S tradition really has considerable difficulty understanding what is going on. As the three psychotherapists carefully explain (p. 188), they were *not* satisfied with previous "mood adjectival checklists"

because many of the words "are not relevant to nurse-patient interactions"; they were fully aware that such a list "is best developed out of expressions that [the nurse] uses to describe her own feelings"; they "discussed [the study] on a number of occasions with all the nursing staff," and "asked [the nurses] to individually provide (sic) a list... that best described the feelings they personally experienced...a list of their actual feelings rather than those expected of an ideal nurse," and so on. After all this, if the nurses are not giving their own, quite personal feelings toward patients, then I am not sure what they are doing.

Moreover, the nurse-patient study (which only uses the first couple of steps of a full Q_A-analysis) is then Q_S analyzed (in the traditional way of factor analysis) to yield *operant factors* (Brown, 1984a, p. 11, Table 4), which appear to have emerged, despite all the misgivings, from "the response categories [that] are only logical distinctions." Further claims about the adequacy of Q_S, and the inadequacy of Q_A, are then advanced, but these cannot be sustained, since they rest upon several misunderstandings. For example, Atkin's careful requirement of set definition and membership (fundamentally a requirement that we know *what* we are talking about), does not at all exclude degrees of intensity described; e.g., by sets of integer and rational numbers. Moreover, the careful and patient exploration of relations between sets by slicing parameters, vectors, and even matrices (Johnson, 1981) yields a number of geometric "texts" for interpretation that retain the multidimensional connective "tissue" of the structure, rather than crushing everything down to the orthogonal dimensions of a vector space (Gould, 1982). Similarly, equating eccentricity in Q_A with communality in the traditional factor analytic approach of Q_S is neither true nor sustained by the example cited (Brown, 1984a, pp. 8-11). To be specific: Nurses 3 and 7 may both have low communalities--I take this as given, since they cannot be estimated from the two factors reported--but the eccentricity of Nurse 3 is 0.88 (on a scale of $0-\infty$; 0.47 on a scale of 0-1),

while the eccentricity of Nurse 7 is zero (on both eccentricity scales).[1] There are other misunderstandings, but it may be more appropriate to let these emerge in the course of examining the claim that in their attempts to unveil inherent structure "there is no difference between Stephenson's Q methodology and Atkin's Q-analysis" (Brown, 1984a, p. 16). With considerable generosity, the claim may be valid at a very high level of generality (both Q_A and Q_S *are* structural approaches), but the actual attempts by Atkin and Stephenson in their methodological concreteness are very different indeed, and the q-chain of connection between them is long and tenuous.

THE LONG AND ROCKY ROAD FROM Q_A TO Q_S

Let us examine the question of how we might make the intellectual journey from Q_A to Q_S, noting that at each step of the way we are adding constraining assumptions to Q_A to arrive at Q_S, in much the same way that very general, powerful, and essentially structural statements in algebraic topology can be constrained down to yield a variety of traditional forms of mathematical structures (the calculus, linear algebra, etc.). Thus, if we start with the usual weighted incidence matrix of observations in Q_A, and:

1. *If* we are prepared to constrain the descriptive possibilities from a relation between two sets, to a mapping, to a function, and
2. *If* we are prepared to add the further constraint of linearity to the functional form, and
3. *If* we are prepared to ignore algebraic rela-

---

1. There is an error in the components table (Table 4, p. 193) in the Whyte, Constantopoulos and Bevan paper, repeated in Brown (1984a, p. 8). According to the original data matrix, Nurse 7 is a 4-dimensional simplex in the complex $K_N(R;\lambda)$, and so cannot appear at $q = 6$. In this particular case, the error does not affect her eccentricity value of 0.

tions in a hierarchy of cover sets, and so mix elements at different hierarchical levels, and

4. *If* we misuse binary operations defined on the set of real numbers for the sets of integer and rational numbers in which we actually record our observations in an always *finite* world, and
5. *If* we do not make a distinction between *backcloth* (supporting structure) and *traffic* (that which is supported by a multidimensional structure), and
6. *If* we force the continuum of metricity on a finite data set, where none existed initially, through totally undefined binary operations lacking closure (ex. $\sqrt{\ }$), and
7. *If* we force the data through a linear filter, and throw away all the non-linear information (regretably to wither by the roadside of traditional factorial methodology, never, *by definition*, to "re-emerge and flower in the complexities of the factor score matrix" (Brown, 1984a, p. 15), since information *discarded* cannot reappear in the *structure* for interpretation), and
8. *If* we impose an orthogonal (or even oblique) structure by spanning the resultant vector space, rather than letting the natural, multidimensional structure emerge from the sets of data and the relations, and
9. *If* we interpret eigenvalues and eigenvectors as having *human meaning* analogous to physical meaning, instead of seeing that they reflect merely the linear redundancy of information generated by factorial methodology, and
10. *If* we only consider the complex, and ignore the conjugate structure, and
11. *If* we are content to generate a single, highly artificial structural "text" for interpretation, instead of multiple texts by careful and sensitive slicing, then...

Then we have arrived finally at the traditional factor analytic approach to structure that has been a

methodological standby of many analyses in the human sciences for about 60 years.

But further claims of Q_S must be laid out for inspection. First, the claim that Q_S affects the data "as little as possible, so that the factors which emerge...are guaranteed to be homologous with actual audience segments" (Brown, 1984b, p. 14) cannot possibly be sustained when the data are subjected to undefined algebraic operations that inject metric (distance) information into ordered spaces, and are then filtered so that only a (linear) portion of the information ever appears in the final structures (factors) that are to be interpreted. Such metric additions, and subsequent filterings, do, indeed, "affect the data."

Secondly, it is refreshing to see inquiry in the human sciences that resolutely puts aside the sort of inappropriate statistical nonsense and paraphenalia that has been piled on so many research procedures (Brown, 1984b, pp. 3, 9, 11), and we must recall that science did splendidly without statistics for 300 years or more before Fisher. The idea that statistical methodology is isomorphic with the scientific method is a notion that must be scotched by educated people, as opposed to those only technically trained. It is, therefore, disappointing and paradoxical to find tests of statistical significance constantly reported in the Q_S literature (Brown, 1972, p. 82; 1980, pp. 24, 29; 1984a, p. 11; 1984b, pp. 11, 27; Barchak, 1984, p. 122), as though these somehow add legitimacy to the results. We cannot have our statistical cake and eat it too.

Thirdly, analogical claims between areas of inquiry involving conscious, sentient, self-reflective human beings, and those areas involving the physical world of things, must be examined with great care, and such caution applies to both Q_A and Q_S. To say that three people of mixed opinion loading moderately on orthogonal factors "express sentiments in ways akin to Bohr's principle of complementarity" (Brown, 1984b, p. 12) is to stretch analogy to the breaking point. In the same way, *all* claims to a grounding of Q_S in quantum theory (Stephenson, 1982, 1983) must be

considered analogically suspect. If you borrow mathematical structures devised by Hamilton, Cayley, Boole, Clifford, etc., in the 19th century for the description of physical phenomena, and you then force, by severe many-to-one mappings, rich and multidimensional human phenomena onto such structures, you should not be surprised if the physical and human worlds begin to look the same. The problem is that the apparent isomorphisms lie in the similar mathematical structures chosen. If you strain human phenomena down enough, and force them into a Gramian (positive definite, or even semidefinite) matrix, whose fundamental structural characteristics appear to describe certain aspects of the physical world with great fidelity (Fraunhofer lines, etc.), you can play with your *eigenwerten* and *eigenvektoren* as much as you like, but you have *not* discovered the roots of interbehavioral psychology in quantum theory. In general, the physical sciences have set an impeccable example of reflecting deeply upon the descriptive requirements posed by the physical world of things, and *then* have devised mathematical structures appropriate for the descriptive task (Gould, in press-a). It is a tradition going back to Aristarchus (Heath, 1913), one which runs through Kepler and Copernicus, Galileo, Newton and Leibnitz (the calculus), Hamilton and Boole (linear algebra), and is maintained today at both the quantum and cosmological scales. In contrast, those working in the human sciences have almost without exception (game and graph theory?) borrowed their mathematical structures from the physical sciences--sciences whose questions led to the mathematics, not vice versa (Gould, in press-b).

Finally, and for all structural approaches, we are really obliged to ask "structure for what?" And we ask here, *why* are we attempting to provide a structural description in the first place? *Why* is a structure worth describing, *why* is it important? It is with this question that the distinction between Q_A and all other structural approaches, including Q_S, comes to the fore. Q_A-analysis, at the outset, insists upon the distinction between backcloth and

traffic, and one major worker in the area of Q_A has insisted (I believe quite rightly) that without a conception of traffic existing upon, and perhaps being transmitted over, a backcloth there is no Q_A as Atkin originally conceived it (Johnson, 1984). Either structures are important for other things, so that they allow, forbid, but do not require various forms of traffic on them (Gaspar & Gould, 1981), or they just stand there to be contemplated. Either changes in structure have consequences for the things that are supported on them, and move over or through them (Griffith, 1983), or they have no meaning and relevance beyond themselves.

FROM AN HISTORICAL AND PHILOSOPHICAL STANCE

We are all children of our times, both Q_A and Q_S, and perhaps it is worth regarding both approaches briefly in historical perspective, and in a reflective mood. In time, both Q_A and Q_S will be seen as part of a continuing process in the human sciences towards structural description that recognizes the delicacy of the human material that comes under the scrutiny of those who seek to understand the complexities of the human world in all its many ramifications. It is also clear that this trend constitutes a movement away from the quantitative towards the qualitative, away from number towards language (Gould, Johnson, & Chapman, 1984), away from borrowing *a priori* mathematical structures devised in the physical world of things towards more appropriate forms that arise out of the descriptive necessity of the human world. These must eventually be structures that allow, forbid, but do not require. For this reason they cannot be functional (surjective, injective or bijective mappings), in which a change on one side of the equation *mechanistically* requires a change on the other.

Both Q_A and Q_S are "text creators," but the former allows the creation of many texts for the careful and sensitive interpretive task. The latter creates a single, highly constrained structural text (although intuitive graphical rotations by hand do allow for some freedom here). As text creators, both Q_A and Q_S

stand initially in the technical perspective (Habermas, 1971), and both acknowledge the next critical step of the hermeneutic perspective, the interpretive stance that attempts to persuade others of the intersubjective validity of the always historically contingent "story." But in the final, emancipatory perspective, Q_A acknowledges the possibility of inducing structural change to meet goals, thus raising explicitly those moral and ethical questions that are constitutive of the human, as opposed to the physical, world from which the *eigenwerten* and *eigenvektoren* arose. Atoms do not care if they are split apart; people do.

Objective or subjective (and I hope I have thoughtfully pointed to some, and only some, of the difficulties with this Cartesian distinction), the crucial methodological step that "structures" in Q_S remains factor analysis. It is a harsh, even brutal, methodological step that forces rich human material through a linear filter and onto an orthogonal (or oblique) rack. And it is precisely here that we begin to understand the warning of Heidegger to listen carefully to the roots of *theoria* (Heidegger, 1977). In the ancient Greek, we can hear *Thea ora*, the honoring of, the "reverent paying heed" to, truth, *before* the Romans translate it into *contemplatio*. But *contemplatio* contains *templum*, in which we hear our own *template*--a form preselected, to be placed on other material to carve, force and fit it into that prechosen shape. Factor analysis is precisely one of those prechosen templates that forces the structure, that shapes the multidimensional human material, into its own image. That it has had such a long run in the human sciences is only one indication of the poverty of ontological, epistemological and methodological thought in this realm of inquiry. It is time to put aside the "chowder and marching bands" (Brown, 1984b, p. 33) and go back to the beginning.

Finally, let me note that it is a rare privilege today to be able to raise such questions with people who fundamentally share a concern for such ideas. We are all children of our time, but that such questions are once again being raised confirms that times do

change.

Peter Gould, Department of Geography, The Pennsylvania State University, University Park PA 16802

REFERENCES

Atkin, R. (1974) *Mathematical structure in human affairs.* London: Heinemann Educational Books.

Bannister, D.S. & F. Fransella (1971) *Inquiring man.* Harmondsworth: Penguin Books.

Barchak, L. (1984) Discovering communication paradigms with Q methodology: Ferment or sour grapes? *Operant Subjectivity, 7,* 115-130.

Boss, M. (1979) *Existential foundations of medicine and psychology.* New York: Jason Aronson.

Brown, S. (1972) A fundamental incommensurability between objectivity and subjectivity. In S. Brown & D. Brenner (Eds.), *Science, psychology, and communication* (pp. 57-94). New York: Teachers College Press.

Brown, S. (1980) *Political subjectivity: Applications of Q methodology in political science.* New Haven: Yale University Press.

Brown, S. (1984a) "Q-analysis": Caveat emptor. *Operant Subjectivity, 8,* 6-17.

Brown, S. (1984b) Q methodology. Unpublished manuscript, Kent State University. [Revision to appear in W. Berry & M. Lewis-Beck (Eds.), *New directions in social science research.* Beverly Hills: Sage Publications.]

Gaspar, J. & P. Gould (1981) The Cova da Beira: An applied structural analysis of agriculture and communication. In A. Pred (Ed.), *Space and time in geography.* Lund: C.W.K. Gleerup.

Gould, P. (1982) Is it necessary to choose? Some technical, hermeneutic and emancipatory thoughts on inquiry. In P. Gould & G. Olsson (Eds.), *A search for common ground* (pp. 71-104). London: Pion.

Gould, P. (in press-a) Allowing, forbidding, but not requiring: A mathematics for a human world. In J.

Casti (Ed.), *Structure and evolution of systems.* Berlin: Springer Verlag.

Gould, P. (in press-b) The present and future being of geography as a human science. *Geoforum.*

Gould, P., J. Johnson & G. Chapman (1984) *The structure of television.* London: Pion.

Griffith, H. (1983) Using mathematics to simplify Q-analysis. *Environment and Planning B, 10,* 403-422.

Habermas, J. (1971) *Knowledge and human interests.* Boston: Beacon Press.

Heath, T. (1913) *Aristarchus of Samos: The ancient Copernicus.* Oxford: Clarendon Press.

Heidegger, M. (1977) *The question concerning technology and other essays.* New York: Harper & Row.

Heidegger, M. (1980) *Being and time.* Oxford: Basil Blackwell.

Johnson, J. (1981) Some structures and notation of Q-analysis. *Environment and Planning B, 8,* 73-86.

Johnson, J. (1984) Q-analysis: A theory of stars. *Environment and Planning B, 10,* 457-469.

Kelly, G. (1955) *The psychology of personal constructs* (2 vols.). New York: W.W. Norton.

Stephenson, W. (1935) Correlating persons instead of tests. *Character and Personality, 4,* 17-24.

Stephenson, W. (1977) Factors as operant subjectivity. *Operant Subjectivity, 1,* 3-15.

Stephenson, W. (1982) Q-methodology, interbehavioral psychology, and quantum theory. *Psychological Record, 32,* 235-248.

Stephenson, W. (1983) Quantum theory and Q-methodology: Fictionalistic and probabilistic theories conjoined. *Psychological Record, 33,* 213-230.

Storr, A. (1979) *The art of psychotherapy.* New York: Methuen.

Whyte, C., C. Constantopoulos & H. Bevans (1982) Types of countertransference identified by Q-analysis. *British Journal of Medical Psychology, 55,* 187-201.