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## **HOW SHOULD BEHAVIOR ANALYSIS INTERACT EFFECTIVELY WITH THE SOCIAL SCIENCES?**

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**ABSTRACT:** I would like to discuss some perspectives on scientific approaches traditionally viewed as mutually incompatible or antagonistic. This might be illustrated by e.g. natural scientists' claim of unambiguous communication as a result of objective description of experience vs. social constructivists claiming that there can be no such objective description of reality, since reality is constructed in a context and may vary relative to an individual's perception, cultural, ethnic and political belonging. This is not a discussion limited to behavioural analysis vs. humanistic approaches or empiricism vs. hermeneutics, but a seemingly antagonistic and sometimes hostile dispute going on for more than half a century within the European and American intellectual communities. I want to frame this discussion with reference to the classical scientific ambition of "Unity of Knowledge" as expressed by the physicist Niels Bohr. This ambition is further developed and refined by contemporary biologist Edward O. Wilson when he describes the unity of knowledge as "Consilience." I want to argue for a unifying behavioural approach with high scientific ambitions, but with the humble recognition that we have not yet, and may never reach a point we can call "The End of Science."

**KEYWORDS:** Complexity, level of reduction, unity of knowledge, complementarity, cultural selection, metacontingences

### **FROM ANTAGONISM TO COMPLEMENTARITY**

Complementarity, according to Niels Bohr, is letting different perspectives mutually enrich and even complete each other. Bohr is often quoted as having said that "The opposite of a correct statement is a false statement. But the opposite of a profound truth may well be another profound truth".

It is not satisfactory to present differing explanations of the same phenomenon at differing levels of reduction, and then assign the explanations

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equal validity. Complementary perspectives should be considered as unique contributions that, taken together, may explain the phenomenon in question.

It may be said that within the social sciences, and between natural science and the humanities, a certain antagonism is prevalent. The advantages of one presuppose the disadvantages of the other. Rather than recognizing that differing levels of reduction are used, and that this implies that claims as to scientific status must be modest, certain scholars, whether post modernists or social constructivists base their work on so-called "Critical Thinking", which mainly means that they disavow the efforts of others. Cumulative development of knowledge and the basic principles of the scientific method have suffered, while a dialectical, "thesis—antithesis" approach with no synthesis has prospered.

Right after WW2, Elton Mayo described what he sees as the societally disastrous consequences of the imbalance between, on the one hand, the progress of technology and its practical implications, and on the other hand, the lack of significant progress in the practical use of knowledge gained from the social sciences. He went so far as to term physics, chemistry and biology the successful sciences, while sociology, psychology and political science are failures, and characteristically

... (it) does not seem to equip the students with a single social skill that is usable in ordinary human situations ... no continuous and direct contact with the social facts is contrived for the student. He learns from books, spending endless hours in libraries; he reconsiders ancient formulae, uncontrolled by the steady development of experimental skill, the equivalent of the clinic or indeed of the laboratory (Mayo, 1949, p. 19)

A few years later, C. P. Snow (1950) expressed his worry over the seemingly insurmountable cultural conflict and lack of communication that he found typical for the relationship between the natural scientific community and the community of scholars in the humanities in industrialized England.

Between the two a gulf of mutual incomprehension—sometimes (particularly among the young) hostility and dislike, but most of all a lack of understanding (p. 4).

Agreeing with Mayo, half a century later:

After more than a century, the social sciences are still adrift, with an enormous mass of half-digested observations, a not inconsiderable body of empirical generalizations, and a contradictory stew of ungrounded, middle-level theories

expressed in a babel of incommensurate lexicons. (Tooby & Cosmides, 1992 p. 23)

This apparently antagonistic relationship between two different traditions is also the subject of polemics in the book *Higher Superstition* by Gross & Levitt (1994). They address the politicized resistance to natural science that is expressed among both European and American intellectuals.

In this book, the authors take on a tradition that they claim is not only notorious for setting aside scientific principles, but that to a large extent actively distances itself from these principles, if they should lead to results and conclusions that are not ideologically and politically correct. Their historical point of reference is C. P. Snow. On the situation in our time:

Today we find ourselves, as scientists, confronting an ignorance even more profound – when it is not, in fact, displaced by a sea of misinformation. That ignorance is now conjoined with a startling eagerness to judge and condemn in the scientific realm. A respect for the larger intellectual community of which we are a part urges us to speak out against such an absurdity. This, we consider, is one of the duties of the scientific thinker, a duty commonly ignored. (p.7).

According to Gross and Levitt, every member of the intellectual community has a duty to evaluate new knowledge by subjecting it to a reality check: does it survive being tested by accepted principles and sound methods?

These statements and examples are only meant to illustrate the deeply rooted mutual mistrust between two traditions within the academic community.

#### **A SHIFT IN PERSPECTIVE AND THE UNIT OF ANALYSIS**

Within the social sciences, scholars are concerned with accumulating bases of conceptually consistent, coherent and practically useful knowledge to a lesser degree than are their colleagues in the natural sciences. This, however, is the least problematic aspect of the antagonistic approach.

Social development and human interaction are to a large degree forced by technological innovations and globalization of knowledge and capital. This stands as an indisputable fact. The marketplaces of employment and education are global. Increasingly, we are also parts of systems defined by the interrelationships between people and technology. Work and leisure are choc-full of man-machine interaction.

The societal consequences of the imbalance pointed out by Elton Mayo half a century ago—between technological advances by natural science, and social progress brought about by the social sciences—has not diminished. Society has

also become increasingly vulnerable to changes that were once regulated and had their impact softened by geographical or institutional boundaries.

I will later on discuss robustness and vulnerability in systems; how contingencies in and around organisations or culture have changed dramatically over the last twenty—thirty years. This calls for a new approach that can account for new and scientifically sound explanations of how and why some systems seem more stable and resistant to extinction than others. In its turn this may provide strategies for how to make some systems sensitive to interventions, alternatively how to strengthen systems we want to stay stable over time.

First however I will discuss the concept of “Consilience” or the “Unity of Knowledge” as an approach for behaviour analysis to interact effectively with disciplines addressing issues of larger scale like organizations and culture.

A fundamental question concerning validity in research is whether a phenomenon is described and eventually explained on the same level of reduction. As Cook and Campbell (1979) point out, you can not tell if two or more explanations of behaviour are antagonistic or may support each other in a complementary way, until you have defined which level of reduction the explanation addresses.

Alderfer (1995) argues that by joining discussions on different levels of reduction you open up for new perspectives and phenomena that eventually can be analyzed and described in highly sophisticated ways. There is however a prerequisite that you address the right level of reduction.

Only sometimes do education and research programs adequately acknowledge the significance of being clear about the order of entity one is addressing. Whereas understanding at one level of analysis is usually complementary to knowledge at another, one does need to address the different entities to achieve the benefits of the complementarity. (Alderfer, 1995 p. 256).

To use an example from another area; there is no contradiction between describing a meal as a culinary and romantically fantastic experience while having eaten exactly the same food that is characterized by a dietician as a nutritional catastrophe. There is however no reason to say that the opinion of the nutritionist is the right one, while the description of the diners is wrong.

Neither does it make sense to talk about right or wrong if a third description, including, for example, the bacteriological level in the meat, concludes that the meal is just slightly below the recommended limit to be eaten (unless it caused illness). The atmosphere of the restaurant can of course also be a subject of discussion. One may then check with a number of restaurant columnists to find a

sense of inter-subjectivity—from what they write—that gives some guidance as to where the couple could find a place that can match what they are looking for.

These are all descriptions at different levels of reduction. They may all make sense given the proper match between what we want to describe and the unit of analysis. They may even be complementary in the sense that it is all relevant to the couple when they are planning to have their gourmet dinner, wanting to check out if the restaurant has the right atmosphere, offers a healthy menu and also is keeping an acceptable hygienic standard.

Only at the same level of reduction, however, will it make sense to check out whether different descriptions are in accordance with the “truth” or not.

Even though both the nutritionist and the microbiologists may find both Pizza Hut and McDonald’s highly recommendable from their expert point of view, the nutritionist or the microbiologist’s opinions on the meal may not be relevant to their decision at this level.

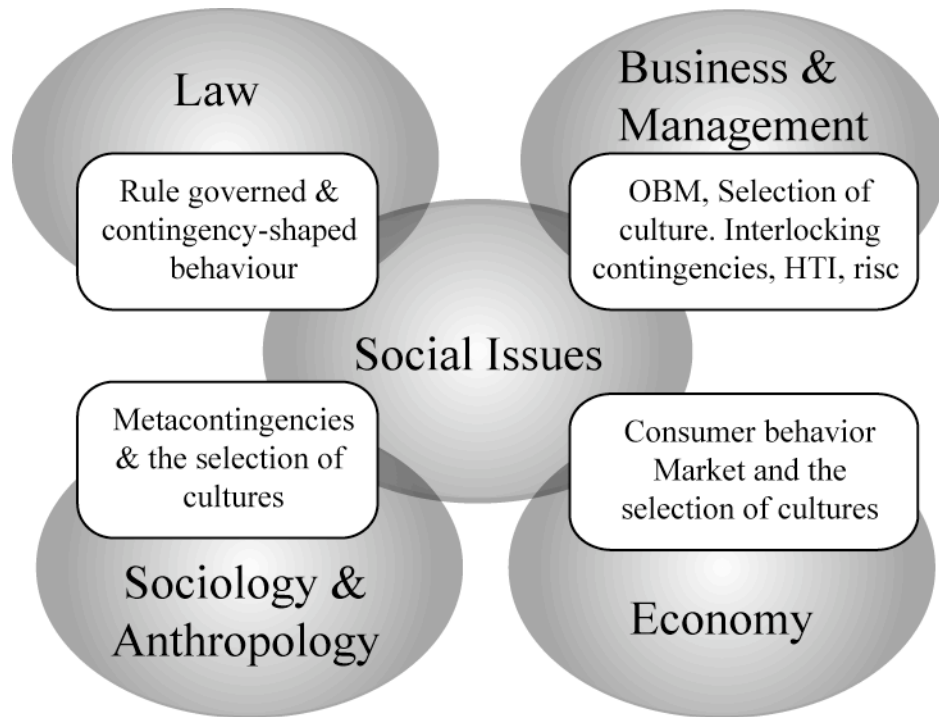
If there is, however, a dispute on whether the meal consists of pork or lamb, this will demand a description on the *same level of reduction*. At this level the different opinions are not equally true or false, they will be either true or false. There is a possible answer according to “the truth” that will tell who is right.

According to research on nutrition, it will be possible to recommend some balance of, for example, proteins and carbohydrates in the meal. Likewise a dispute over the recommended level and types of microorganisms in the food may also be solved by a scientific approach. Candlelight and a private atmosphere are irrelevant to this analysis.

The point of presenting this rather trivial example is to try to illustrate that knowledge has a vertical dimension where each level represents an ontology corresponding to the level of reduction and the definition and restriction of the unit of analysis. *My position is that many of the disputes between social sciences and behaviour sciences are going on between different levels of reduction, and thus no consensus or complementarity may be achieved.*

Behaviour analysts should, both for strategic reasons and for the sake of social responsibility, be concerned with phenomena often left to economists, lawyers, and social scientists.

Behaviour analysis based on empirically developed concepts may offer an ontology that can help different approaches address the same level of reduction and thus (or at least may in the long run) make it possible to test the different approaches empirically. The model below may serve as a simplified illustration.



The figure is an attempt to illustrate how behaviour analysis may offer an empirically based conceptual framework that might help to address social issues. Any interesting phenomenon may be addressed from different perspectives but at the same level of reduction and thus may contribute to complementarity and mutual illumination of the phenomenon.

Edward O. Wilson is optimistic on behalf of scientist from all domains to elaborate on unifying knowledge to common challenges:

There has never been a better time for collaboration between scientists and philosophers, especially where they meet in the borderlands between biology, the social sciences, and the humanities. We are approaching a new age of synthesis, when the testing of consilience is the greatest of all intellectual challenges. Philosophy, the contemplation of the unknown, is a shrinking dominion. We have the common goal of turning as much philosophy as possible into science (Wilson, 1998, p. 11-12)

The concepts of interlocking contingencies and metacontingencies (Glenn, 1988, 2004; Glenn & Malott, 2004) seem a very promising approach to

understanding change in complex systems whether we address the unit of culture or organizations.

As Skinner pointed out, “Man acts upon the world and changes it, and is changed in turn by the consequences of his actions (Skinner, 1957, p. 1)”. This statement describes the nonlinear functional relations between behaviour and its causal variables. The lineage, the entity that is selected, consists of interrelated behaviours maintained by the same consequences, described as an operant. Later, when Skinner describes the selection of cultures as the third level of selection (Catania & Harnad, 1988), he is explicit on the dynamic interaction of the shaping processes between members of a culture:

Individuals shape each other’s behaviour by arranging contingencies of reinforcement, and what contingencies they arrange and hence what behaviour they shape are determined by the evolving social environment, or culture, responsible for their behaviour (p.48).

Even though Skinner is explicit on the effects of the relations between agents in social systems, Sigrid Glenn makes it even clearer when elaborating on the *relations as “the glue”* in cultures—designated as *metacontingencies* (Glenn, 1988, 1991, 2003).

As Glenn (2003) also points out; cultures are made of behaviour and thus should be a main subject of study for behaviour analysts. Whether discussing, cultures, organizations, the escalating interest in social networks or other complex social systems, behaviour analysts should take the responsibility to further develop their knowledge and expanding their scientific ambitions onto fields where social challenges should be faced and may find their solutions.

One such challenge that calls for a behaviour analytic approach may be the question of robustness and vulnerability in complex social systems.

#### **ROBUSTNESS AND VULNERABILITY IN COMPLEX SOCIAL SYSTEMS:**

Any system is open to the surrounding world, if only by minimal exchange of energy. This means that any external event may change the system in a way that disrupts previously stable patterns of interaction, and that new patterns of agent behaviour may result in the emergence of new systems while earlier systems are discontinued. Variation is basic to selection, and selection is blind, not goal-directed. Conditions may prevail which systematically select behaviour patterns that in an extended temporal perspective are destructive for the individual and the social systems in which he acts, but are perceived to be beneficial due to their immediate consequences (Loewenstein & Elster, 1992). Examples of such

behaviour patterns are drug and alcohol addiction (Rachlin, 2002; Herrnstein & Prelec, 1992), unsafe driving, abuse of welfare arrangements by healthy citizens, procrastination and academic underachieving (Watson & Tharp, 2002). Any scientific effort that contributes towards finding reliable ways of affecting these conditions of behavioural selection on a systems level represents a major advance in the fight against important social problems.

From a theoretical and empirical approach to human behaviour we can predict to a certain degree how stable a behavioural pattern will be. If we capitalize on the concept of extinction or robustness as the behaviours resistance to extinction, we may also predict human behaviour on a systems level.

Ideally, statements in behaviour analysis about the lawful relations between behaviour and environmental events—how behaviour is established, maintained and changed—are based on empirical research and expressed in technical terms. These terms are free of normative content, and aim at being purely descriptive. A number of empirical findings support a selection-based analysis of the mechanisms of behavioural and cultural evolution. It is reasonable to assume that the robustness of the relations between agents in a social system is influenced by the conditions under which these relations were established and maintained. The continuum from robustness to vulnerability may be described in terms of resistance to extinction. On a systems level, the cessation of interaction between agents means that the system as a definable unit ceases to exist. Agents may form new relations with familiar agents, or new agents may appear. The concept of *critical mass* may be useful when we observe that behavior or interaction between agents that constitute the system changes in such a way that the defining characteristics of the system (defining characteristics considered as properties at system level) no longer are apparent. The unit of analysis is defined by the properties of the system that distinguish it from other systems on the same level of reduction (or scale of magnitude/complexity), and by how the system is distinguished from other levels of reduction. The strength or robustness of relations between agents is determined by a variety of factors. In organisations, institutional, administrative and other structures and strictures define relations, in addition to agent behavior. An organisation may consist of one or more systems, while a system is not necessarily an organisation.

In this light, the robustness or vulnerability of a system are not properties that can be said to be more or less appropriate or desirable, unless they are assessed at another system level. The question of sub-optimizing behaviour of agents or systems may also be considered as a matter of description, if it merely concerns the relations between a small number of reduction levels in a hierarchy. Ethical issues are paramount when normative considerations are omitted in a description



of a chain of events on different levels of reduction. Vulnerability and robustness are relative concepts, and normative values may only be used in the context of the fitness and survival of a larger system.

... the science of networks teaches us a third lesson: that such systems, from power grids to businesses, and even entire economies, are both more vulnerable and more robust than populations of isolated entities. Networks share resources and distribute loads, but they also spread disease and transmit failure—they are both good and bad. But unless we can understand exactly how connected systems are connected, we cannot predict how they will behave (Watts, 2003).

From the perspective of selection of behaviour in cultures, emergent phenomena and self-organizing systems do not necessarily entail a positive development or happy solution to a problem.

A terrorist network, for instance, can be robust against changes, while the surrounding, bigger system wants to find the mechanisms that make it more vulnerable in order to diminish its potential damage. Conversely, if the school system loses a major part of its norm-setting function, because it is vulnerable as a system to changes in its student body (agent properties), the complexity in the tasks it is required to do, and organization (system properties), the bigger system will want it to be more robust. If a society for example wants to strengthen the school as a system of transfer of social and cultural norms and behaviour, knowledge of what factors make the system robust is needed.

In the dynamic tension between the seemingly exponential growth in complex social systems across geographical and institutional borders, and the wish to design systems for optimal interactions, the heritage from Skinner still seems an important guide. “We choose the wrong path from the very start when we suppose that our goal is to change ‘the minds and hearts of men and women,’ rather than the world in which they live” (Skinner 1978, p 112).

## CONCLUSION

The behavioural analytic conceptual framework may offer a means to approach interesting phenomena in ways that make different perspectives on complex social systems compatible. There is, however, reason to remind ourselves that we also need to expand our conceptual framework—our ontology—according to what new areas we want to explore. As Niels Bohr points out with reference to description of the quantum phenomenon:

The main point to realize is that all knowledge presents itself within a conceptual framework adapted to account for previous experience and that any

such frame may prove too narrow to comprehend new experiences” (1954, p. 67).

This may serve as a reminder that our ontology itself is part of a selection process, and may be analyzed from a selectionist point of view. To be selected, our conceptual framework needs both variety and complexity to match the complexity of the scientific community of which we want to be a part and with which we want to interact.

### REFERENCES

- Alderfer, C. P. (1995). Editor's introduction: Applied behavioral science and the entities of organizations. *The Journal of Applied Behavioral Science*, 31, 256-258.
- Bohr, N. (1954). Unity of knowledge. In N. Bohr (1990), *The philosophical writings of Niels Bohr Vol. II 1953 – 1957* (pp. 67-82). Woodbridge: Ox Bow Press.
- Catania, A. C., & Harnad, S. (1988). *The selection of behaviour. The operant behaviorism of B. F. Skinner. Comments and consequences*. Cambridge: Cambridge University Press.
- Cook T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design & analysis issues for field settings*. Boston: Houghton Mifflin Co.
- Glenn, S. S. (1988). Contingencies and metacontingencies: Toward a synthesis of behavior analysis and cultural materialism. *The Behavior Analyst*, 11, 161-179
- Glenn, S. S. (2003). Operant contingencies and the origin of cultures. In K.A. Lattal & P. Chase (Eds.), *Behavior Theory and Philosophy* (pp. 223-242). New York: Kluwer.
- Glenn, S. S. (2004). Individual behavior, culture and social change. *The Behavior Analyst*, 27, 133-151.
- Glenn, S. S., & Malott, M.E. (2004). Complexity and selection: Implications for organizational change. *Behavior and Social Issues*, 13, 89-106.
- Gross, P. R., & Levitt, N. (1994). *Higher superstition: The academic left and its quarrels with science*. Baltimore: Johns Hopkins University Press.
- Herrnstein, R. J., & Prelec, D. (1992). A theory of addiction. In G. Loewenstein & J. Elster (Eds.), *Choice over time* (pp. 331-360). New York: Russell Sage Foundation.
- Loewenstein, G., & Elster, J. (Eds.) *Choice over time*. New York: Russel Sage Foundation
- Mayo, G. E. (1949/1975). *The Social problems of an Industrial civilization*. New Hampshire: Ayer.
- Rachlin, H. (2000) *The science of self-control*. Cambridge: Harvard University Press.
- Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.
- Skinner, B. F. (1978). *Reflections on behavior and society*. Englewood Cliffs: Prentice-Hall.
- Snow, C. P. (1959). *The two cultures and the scientific revolution*. Cambridge: The Syndics of the University of Cambridge Press.
- Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, J. Tooby, & L. Cosmides (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19-136). New York: Oxford University Press.
- Watson, D. L., & Tharp, R. G. (2002). *Self-directed behaviour* (8<sup>th</sup> ed). Belmont, CA: Wadsworth Thomson Learning.
- Watts, D. J. (2003). Unraveling the mysteries of the connected age. *The Chronicle of Higher Education*, February 14, 2003.

## BEHAVIOR ANALYSIS AND THE SOCIAL SCIENCES

Wilson, E.O. (1998). *Consilience: The unity of knowledge*. New York: Knopf.