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RESEARCH NOTE

WILEY SYSTEMS RESEARCH and BEHAVIORAL SCIENCE

Commentary on Roth: Adding a conceptual systems perspective

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1 | INTRODUCTION

Recently, Roth (2019) provided a well-written, informative, and thought-provoking article arguing "that the concepts of openness and closure are highly amenable to moralization with adverse implications for the development of the present-day systems theoretic thought" (Van Assche, Valentinov, & Verschraegen, 2019, p. 252). Plainly put, Roth explains a prejudicial tendency for scholars to write in favor of "open systems." That tendency may be understood as unnecessarily simplistic as a system may be in some ways open and closed at the same time. Roth's view generates substantial implications relating to the way we evaluate theoretical perspectives with serious implications for the development of general systems theory (GST), open systems theory, and other theories of the systems sciences. The present commentary will strive to explore some of those implications.

Roth's article could be enhanced by a discussion of "conceptual systems," as his argument relates to the difficulty of using one conceptual system (moral perspective/stance/code) to understand and choose another (open systems over closed). To provide some context, this commentary begins with brief definitions and reviews some common systems concepts/perspectives to clarify how they relate to conceptual systems.

2 | CONTEXT

It is important to understand conceptual systems as systems because they are one of two general classes or categories of systems. "Systems can be either physical or conceptual or a combination of both." https://sebokwiki.org/wiki/System_(glossary) Also, of equal or greater importance, we require conceptual systems to understand our other systems.

"Generally, a conceptual system is any form of theory, model, mental model, policy, etc." (Wallis, 2016, p. 579), whereas a theory is "an ordered set of assertions" (Weick, 1989, p. 517). That definition fits ethical/moral guidelines/stances/perspectives (Wallis, 2010). For example, "The Ten Commandments" asserts what behavior is "good," and a statement such as "organizations should be open systems" asserts what management behavior is "good."

Dent and Umpleby (1998) list eight key concepts as underlying The science of conceptual assumptions of systems traditions. Although this is not a comprehensive or authoritative list, these concepts will serve as a starting point for some level of shared understanding.

2.1 | Environment

Conceptual systems seem to exist in multiple environments. These include human minds and storage devices, such as computers, books, and journals. Thus, conceptual systems may also be said to exist in one or more physical and social environments where they are created, stored, tested, applied, changed, and discarded. Theories and moral codes are developed to include concepts relevant to stakeholders and their situations (Wright & Wallis, 2019). We might also think of those conceptual systems as existing in environments of research and practice.

2.2 | Self-organization

Our conceptual systems are part of an ecology of knowledge (Disessa, 2002), with many concepts (and systems or networks of concepts such as theories and morals) interacting, competing, growing, and dying. A single concept, by itself, does not seem to be a stable thing. It seems to seek connection with other concepts similar to the way that elements tend to form bonds with other elements to form molecules. When a conceptual system achieves equilibrium, it becomes relatively stable as when a theory becomes more sustainable (Wallis & Valentinov, 2017).

2.3 | Reflexivity

The reflexive process includes conceptual systems, because we are always using some form of conceptual system to observe and engage the world. Where improvement of social systems is often obvious, the improvement of conceptual systems is too often opaque. That lack of clarity impedes development, a problem resolved by measuring the usefulness of conceptual systems on three dimensions of data, meaning/relevance, and logic structure (Wright & Wallis, 2019).

2.4 | Observation

Each observer constructs reality by the process of observation. Indeed, "a 'system' is a set of variables selected by an observer" (Umpleby, 2009). For a conceptual system, also, the observer may choose which conceptual components seem most relevant. That choice, however, does not guarantee the creation of a highly effective theory or moral code.

2.5 | Holism

Holism relates to the characteristics of a system that emerge from the interaction of its component parts. In a conceptual system, the individual concepts are the component parts. "Conceptual systems … do not directly exhibit behaviour, but exhibit 'meaning'." https://sebokwiki.org/wiki/System_(glossary).

Multiple streams of research show that conceptual systems of more interconnected parts have more meaning (are more useful for understanding situations; cf. Gentner & Toupin, 1986; Suedfeld, Tetlock, & Streufert, 1992; Wallis, 2016).

2.6 | Relationships

In conceptual systems, a number of types or forms of relationships may be identified. Similar concepts may be clumped into categories, or connections may be identified between them. However, relationships that are merely descriptive, such as "cats chase mice" (where "chase" is the relationship), are not very useful for creating theories that are highly effective, and relationships that are vague, such as "concept A and B are related," are even less useful.

2.7 | Causality

Understanding causal relationships is an important part of theory creation (Pearl, 2000), leading to more useful proposition (Dubin, 1978). Indeed, "causal explanation is the key to theoretical explanation" (Salmon, 1984, p. xi). We should avoid theories with simple or *linear* causality, in favor of circular causality (Dent & Umpleby, 1998).

2.8 | Indeterminism

With more intersecting loops, the paths that one might take through the conceptual system become less deterministic, and the theory becomes more useful for understanding real world situations and making effective decisions to reach desired goals (Wallis, 2019). Figure 1 shows two abstract conceptual systems with varying levels of indeterminacy in their structures. The diagram on the right shows the least determinacy and also the greatest potential usefulness based on systemic structure.

Summarizing this section (italicized words representing above context), within the *environment* of our disciplines publications and minds of our scholars, conceptual systems (such as GST, open theory, and moral codes) *self-organize*. We use various conceptual systems to *reflexively* consider and strive to improve other conceptual systems using *observation* to choose relevant concepts; but progress is not always clear. If we strive more to identify multiple *relationships* between concepts that are *causal*, we may accelerate the development of conceptual systems with multiple loops and so greater *indeterminacy*. The *holistic* nature of such conceptual systems will exhibit emergent behavior of meaning that reflects their usefulness in real world application.

3 | THE OPENNESS OF THEORY AND ITS FRIENDS

In his article, Roth (2019) applies von Bertalanffy's concept of open systems to social and natural environments

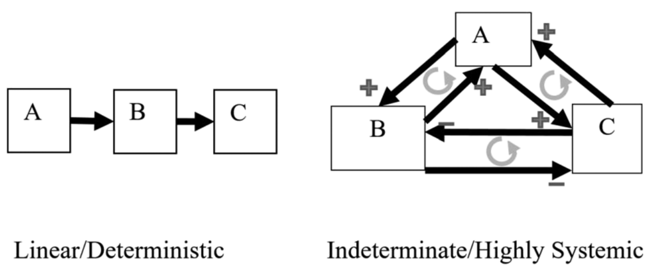

FIGURE 1 Abstract conceptual systems of different levels of internal indeterminacy and systemic structure with boxes representing concepts and arrows representing causal connections

to show that there are tradeoffs between the openness and closeness and that both may exist at the same time. Specifically, that systems may be open to information but closed to matter. Applying von Bertalanffy's distinction to conceptual systems, we may understand matter to represent the concepts within the system and the information to represent the data relating to measurements of real world systems.

A conceptual system with few or no casual connections between the concepts (e.g., the left hand diagram in Figure 1) tends to be less stable. That is, it will be open to concepts being added and removed easily (as we see in philosophical conversations and academic publications where new versions of old theories are put forward frequently). When a conceptual system has many casual connections between its component concepts (e.g., the right hand diagram in Figure 1), it becomes more difficult to change its component concepts. For example, no engineer would consider using Ohm's law of electricity (including volts, amps, and ohms) to design a radio, in a way that leaves volts out of consideration.

When a system has more causal connections between the concepts, as in Ohm's law of electricity, it is more open to information. That is to say that its concepts or variables are more measurable, and those causal relationships between them are supported with data. This makes them more useful in practical application. When a conceptual system has few or no connections, data seem to be secondary, as in faith-based reasoning.

The difference in stability of conceptual systems may be understood in terms of systemic structure, which may be measured using integrative propositional analysis (Wallis, 2016). Those with higher levels of structure are more open to data but less open to changes in conceptual components. Those with lower levels of structure are more closed to data but more open to changes in conceptual components.

Thus, highly structured theories are more interesting and useful for practitioners (for making decisions to reach specified goals), whereas less structured theories are more interesting for researchers (for investigating changes in concepts and connections between them). Although research may lead to more structured conceptual systems (as it did in the scientific revolution), results are not guaranteed.

This perspective raises a question as to how well-structured GST and open systems theory might be, and how well structured is the set of moral guidelines used to judge it. Using integrative propositional analysis would certainly be possible to evaluate those, although such a study is beyond the scope of the present commentary (due, in part, to the tacit nature of many moral stances and the many variations of GST). However, given my experience in measuring the structure of systems theories (Wallis, 2008, 2012) and moral/ethical systems (Wallis, 2010; Wallis & Valentinov, 2016), it seems reasonable to assume that open systems theory has a medium to low level of structure, whereas the moral system is likely much less. Thus, moral positions are indeed poor tools for evaluating GST.

4 | CONCLUSION

Roth's concern about established theories being judged by morals seems well founded. Also, his effort to identify tradeoffs between openness and closeness and the associated demoralization is a good step forward. That step is enhanced by the present perspective that goes beyond Roth's binary and quaternary notions to show that the structure, and therefore the usefulness, of theoretical perspectives should be measured using rigorous methods such as IPA rather than moral stances.

Another side of the present coin is that the low level of structure held by many theories makes them vulnerable to moralization, misunderstanding, attack, and faddish change. This leads to fragmentation instead of advancing the science.

In short, a theory with a low level of structure is its own enemy.

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