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What is Sustainable Theory? A Luhmannian Perspective on the Science of Conceptual Systems

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Abstract Sustainability is an important topic for understanding and developing our society (including business, government, and NGOs). For scholars who want their academic contributions to have an impact, sustainability is important for our conceptual systems (including theories, models, and policies). Because our conceptual systems share similarities with our social systems, we may investigate their characteristics to gain insight into how both may be achieved or at least understood. Theories of the humanities as well as the social/behavioral sciences are changing very rapidly. They are fragile and few seem to have any longevity. At the same time, the theoretical base does not seem to be "advancing." They are not supporting highly effective results in the real world, so we continue to have seemingly insolvable problems such as crime, war, and poverty. This may be because academia has become inward-focused or, in Luhmann's terminology, autonomous from the outside world. In seeking to understand how to develop more sustainable theories we found that the concept of sustainability is contested. And, in the process of comparing the sustainability of social systems to the sustainability of theories, we came to realize that neither perspective is viable. Drawing on Luhmann's insights on the interdependence of theories and society, we came to realize that the two exist in a coevolutionary relationship. Importantly, we present an approach for measuring that evolution and suggest directions for accelerating the coevolutionary advance of society and science.

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1 Introduction

Generally, we of the academic world conduct our research and construct our theories. We hope those theories will bring long-term benefits to our students and our careers, that our theories will be sustainable rather than fragile, that our theories will endure in the literature for some length of time. Indeed, Meehl (1992, 2002, 2004) proposes that the life span of a theory may be a key indicator of that theory's usefulness and importance. That view, however, was founded on assumption rather than experimentation.

Indeed, there is concern that theories, particularly those in the social sciences, are generally not long-lived. Theories seem to rise and fall with great rapidity (Oberschall 2000). Some of this change has been investigated in terms of "dynamic robustness" or how theories replace some concepts with others over time.

> Dynamic robustness may be used to describe the stability of a cognitive network that is experiencing external perturbations (Wallis 2008a). A system (e.g. human, organizational, or conceptual) that is robust may be understood as one that will endure, or has endured, for a longer time than one that is not robust. A system that is completely unstable or chaotic would have a robustness of zero, while a perfectly stable system would have a robustness of one. By measuring those perturbations, we may quantify the dynamic robustness of a system of theory that is undergoing change p. 25—(Wallis 2014d).

This is an issue not only for the social sciences but for the natural sciences as well. While theories in the social sciences change rapidly, it should be noted that Einstein's theories revolutionized physics only a century ago. And, Newton's 'laws' revolutionized physics in 1687. Before that, theories based on ideas of a geocentric universe, such as those elucidated by Ptolemy, endured for many centuries. So, understanding the stability and fragility of theories may provide insights into how theories change, and how we may create more useful theories for understanding and addressing the many problems of the world.

We may wonder why we are creating theories, if they are only to quickly disappear. Or, from another perspective, if we can better understand the change in theories as an evolutionary process, then we may learn to accelerate the process to develop more effective theories with greater ease, and so advance our sciences more rapidly for the benefit of all. From a purely egocentric perspective, we may ask, how we might construct theories that are likely to endure.

Generally, a theory may be understood as a set of interrelated propositions (Weick 1989). And, those propositions contain concepts which are related to something in the real world. Lakatos (1970) suggested that each body of theory has a core. He suggests that when the core is challenged by other scholars, adherents to the theory will develop auxiliary hypotheses to protect the core. Does this count as a sustainable theory? The answer is not at all clear. If a theory by the name of "X" contains two concepts (a and b), and subsequent research adds two more (c and d), is it still theory X? Or, should we describe it as theory X + 2; or, perhaps, X + a + b + c + d? The later would be more accurate, if less convenient. Describing the theory-plus-changes would also emphasize the transitory nature of theory. This may cause some concern among scholars who want to claim "ownership" of a theory. Differences may be easy to ignore if we are all using the same name for Theory X—especially when each scholar's underlying understanding of that theory is different from other scholars.

Theories result from an academic "production system" including data, conversation, and publication. However, "This basically means that new theories are produced from existing theories, with a certain aspect of novelty to make them interesting" (Pieters 2010, p. 49). Thus it appears we are muddling through our science with a focus on creativity instead of applicability; while, instead, the world would benefit greatly if we were to accelerate the development of our science. In short, sadly, there appears to be no great progress in science or toward the unification of the sciences. Although some candidates have been put forward (e.g. Ploeger 2010), it seems that we are plodding forward while the world is racing.

In the present paper, we build on Niklas Luhmann's social systems theory in order to understand how theories may be made more sustainable. We likewise draw on insights from the science of conceptual systems relating to the structure and abstraction of theories. Particularly, we draw on research using Integrative Propositional Analysis (IPA) for analyzing the structure of theories to determine their Complexity and Systemicity (Wallis 2015c). Those may be used to conduct objective evaluations of theories to suggest their usefulness in practical application and the extent to which theories have changed over time. Metaphorically, the difference between Complexity and Systemicity may be understood as the difference between a pile of parts and a working automobile. Both have the same Complexity (number of parts) but only the working auto has those parts interconnected systemically so that the whole is greater than the sum of the parts. For analyzing theories, Complexity is a measure of the number of concepts within the theory. Systemicity is a measure of interconnectedness between those concepts; essentially a ratio of concatenated concepts to the total number of concepts (more on this in the next section).

By combining these perspectives, including the structure of our theories and the structure of our world, we anticipate finding new insights into the relationship between our theories and our world. These insights have useful applications for developing theories that will be more enduring. Additionally, because we are exploring some parallels between theory and reality, and because sustainability is an important topic of the academic literature including social and ecological areas (Yolles and Fink 2014) the present article will also provide insights linking the sustainability of our theories with the sustainability of our social institutions.

This conversation is important for advancing our sciences along a theory-centric perspective. This is in contrast to, and orthogonal with, other dimensions of science including research, publication, and practice. Because we are addressing theories on a structural level and because there are structural similarities between all theories (from natural sciences to social sciences and beyond), the insights developed may be useful for developing theories in all sciences.

While some look to theories "to explain" and or "to understand" our world, we hold that theories should also be "useful" in that they may be applied by individuals and groups to identify, understand, and solve problems.

Thus, the efforts here may be understood as a "science accelerator" and a way for scholars in all fields to more easily create more effective theories—perhaps with greater sustainability. And, presumably, create theories that are recognizably more useful or effective in practical application.

2 IPA and the Emerging Science of Conceptual Systems

The science of conceptual systems may be understood as, "the pursuit of knowledge and understanding of conceptual systems using rigorous methodologies" (Wallis 2015c). A conceptual system may be a model, theory, metatheory, schema, mental model, set of hypotheses, or other collection of interrelated propositions that are useful for understanding and engaging the world. In the present paper, we use these terms interchangeably although most typically, we will use the term theory. Theory may be understood as abstractions of reality where the component propositions, including their component concepts, are also existing at varying levels of abstraction (Wallis 2014a). Those propositions are arranged in various causal structures (e.g. linear, circular, concatenated) which may be used as building blocks to help us assemble more useful theories (Wallis 2014c).

For a more traditional approach to understanding science and its progress one might (for example) study the study of ethnic conflict by looking at the number of researchers, publications, and funding. Those would certainly provide measures of activity. And, from that activity, one may choose to claim that the science in question is having some success. However, looking at the persistence of the problems, it might be difficult to claim that those studies are having a serious impact on reducing the level of ethnic violence. With IPA, theories may be understood as our source of empirical data. IPA would be used to evaluate the theories of ethnic violence instead of studying the ethnic violence itself.

It may be interesting to note that the natural sciences, including physics, are more amenable to study because it is possible to design "ideal" experiments." While, in contrast, that approach is difficult or impossible for the social sciences. For example, in studying a national economy, we cannot create an experiment where we simultaneously raise and lower the interest rate. One must happen before the other; and the first will distort the experiment of the second.

Because that traditional approach of understanding science has not indicated a clear direction "forward," IPA was developed to be a tool that is easier than dwelling deeply on the interactions and activities of an entire field and provides a clear path forward for improving the theories of a field. IPA has proven useful for evaluating, understanding, and improving theories in diverse fields including social entrepreneurship (Wallis 2008b), complexity (Wallis 2009a), organizational learning (Wallis 2009b), ethics (Wallis 2010b), physics (Wallis 2010a), policy (Wallis 2010c, 2011a, 2013), complexity (Wallis 2011b), management (Wallis 2012b), interdisciplinary (Wallis 2012a, 2014b), de-fragmenting sciences (Wallis 2014d), sociology (Wallis 2015a), psychology (Wallis 2015b). Additionally, IPA has been the topic of over 30 presentations, at academic conferences and one won a "best paper" award (Wallis and Wright 2015). IPA serves as a science accelerator by providing a new way to evaluate and improve theories and policies "on paper" before (and after) experimentation and implementation. IPA is currently part of at least three grant applications for EU2020 projects. There, IPA is used to measure and improve policies and theories to show that they are of sufficient quality for use. Finally, IPA has been used as a tool to improve the institutional capacity of a German research center as part of a 2015 Fulbright Specialist project.

IPA was developed to be a rigorous and objective approach to empirically analyze formal conceptual structures such as academic theories (Wallis 2014b). IPA is a six step process for deconstructing theories, identifying clear propositions, diagramming, and evaluating the diagram. That evaluation provides two indicators for the structure of theory. The first is the Complexity which is simply a measure of the number of concepts within the theory.

For those readers with a background in complexity theory or systems thinking, this may be understood as "simple complexity" and it is held to be a weak indicator of the potential usefulness of a theory. The second indicator is the Systemicity of the theory. The Systemicity is determined by first counting the number of "concatenated" concepts (on a diagram, a concept/box with two or more causal arrows pointing towards it) then dividing that by the total number of concepts in the theory (the simple Complexity). This gives us number between zero (low) and one (high) indicating the interrelatedness of the concepts within the theory.

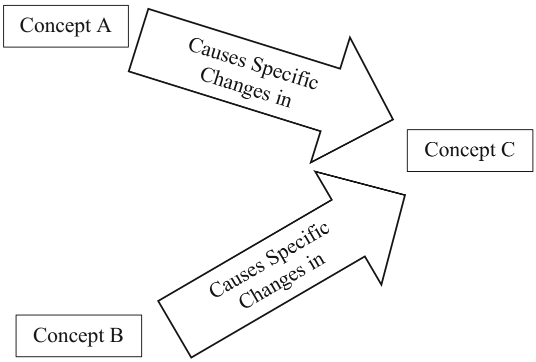
Figure 1 shows an example of a concatenated logic structure. Here, changes in A and B lead to changes in C. Within this concatenated *structure*, C is the concatenated *concept*. Applying IPA to this (rather simple) theoretical model, there are three concepts (A, B, C) so the Complexity is three. There is one concatenated concept (C) so the Systemicity is 0.33 (the result of one concatenated concept divided by three total concepts).

The Systemicity is held to be a strong indicator for the usefulness of a theory. For contrasting examples, theories of physics that are amenable to algebraic manipulation have a Systemicity of one. Theories of the social sciences tend to have a Systemicity around 0.25. The theories of physics are far more useful in practical application than theories of the social sciences.

Generally, IPA shows that theories are more effective in practical application when they have higher levels of Complexity and Systemicity (Wallis 2010a, 2011a). This new and useful view is addition to, and orthogonal with the more traditional perspectives where theories are expected to be more useful when developed using empirical data and applied to situations that are relevant (Wallis 2008c).

We might say that the number of concepts in a Conceptual System serves as a representation of the Complexity of that system. The Social System also has a complexity. And, that complexity of the Social System is always greater than the complexity of the Conceptual System. This is because the Conceptual System is nested within or included as part of the Social System. Thus, the complexity of the Conceptual System is always added to the complexity of the Social system. The complexity of the Global System (combined Conceptual System and Social System) will always be greater than the complexity of the Social System for the same reason. Thus, whatever number of concepts that may be taken into account by the Conceptual System, that number will always be smaller than the complexity of the social system in which it is nested. And, systems that are less complex will always be faced with "surprise" from systems that are more complex. For a deeper view of this, let us turn to Luhmann's social systems theory.

Fig. 1 A concatenated logic structure



3 A Luhmannian Systems Theory

3.1 The Nature of Social Systems

The emerging science of conceptual systems provides tools for detecting the ways in which conceptual systems fail to do justice to the complexity of their real-world objects. However, at the meta-level, it is possible to ask why such failures exist in principle. It is in addressing this fundamental question that the science of conceptual systems can benefit from reexamining the social systems theory of Niklas Luhmann, a leading representative of contemporary German sociology. Luhmann's key systems-theoretic idea is that social systems of whatever type fulfill the function of complexity reduction, which is required to prevent individuals from being overwhelmed and paralyzed by the complexity of their social and natural environment. A logical implication of complexity reduction is the limited sensitivity of social systems to their environment. Applied to the context of conceptual systems, this implication yields a straightforward explanation why many conceptual systems, such as theories, fail to be effective in the real world. If theories fulfill a complexity reducing function, then they must filter out, or externalize, substantial segments of reality by definition. In terms of IPA, this externalization makes theories less complex and systemic. Numerous examples of this externalization have been described in the above mentioned applications of IPA to the fields of social entrepreneurship (Wallis 2008b), complexity (Wallis 2009a), organizational learning (Wallis 2009b), ethics (Wallis 2010b), physics (Wallis 2010a), policy (Wallis 2010c, 2011a, 2013), management (Wallis 2012b), sociology (Wallis 2015a), psychology (Wallis 2015b), and others.

In elaborating on the Luhmannian understanding of complexity reduction, Valentinov (2014a, p. 14) developed the conceptual construct of the "complexity-sustainability trade-off", i.e., the tendency of the systemic complexity-reducing function to lower the sensitivity of the concerned systems to those environmental conditions on which they critically depend. This construct is helpful in conceptualizing the usefulness of theories. Parsimony is evidently a functional equivalent of complexity reduction. By reducing complexity, parsimonious theories impress with their simplicity. Yet, the complexity-sustainability trade-off suggests that this simplicity comes at the cost of the limited practical usefulness in the real world (Valentinov 2014a, b; Valentinov 2015b, c; Valentinov & Chatalova 2014a, b; Valentinov & Chatalova 2016a, b; Valentinov et al. 2016).

The suggested relationship between simplicity and usefulness is well exemplified by the modern economic science consisting of the parsimonious mainstream neoclassical economics and a broad range of disparate heterodox traditions. In the neoclassical economics, "both the tastes and preferences of individuals, and the technological possibilities and constraints that impinge upon the economy, are regarded as exogenous or given, i.e., outside the system" (Hodgson 1991, p. 154). The societal and natural environment of the economy thus remains outside the picture. Against this backdrop it is unsurprising that economists become increasingly aware of their relatively modest success in engaging with the overarching challenges, such as those of the sustainable use of resources, climate protection, healthcare, social justice and inclusion (Elsner et al. 2014, p. ix). Indeed, the authors of a recent economics textbook refer to the tendency of mainstream economists to offer ''noncomplex advice for complex problems'' (ibid, Valentinov 2015a, p. 143, et seq.).

Furthermore, the apparent thrust of many heterodox schools of economic thought is the analysis of relations of the economic system with its societal and natural environment. At the center of economic sociology, for example, is the emphasis on the interrelations between the economy and society, where the former is largely shaped by the latter (Fligstein 2001; Granovetter 1973; Lapavitsas and White 2002; Swedberg 2003). In a similar fashion, ecological economics focuses on the interactions between the economy and its ecological environment. Building, among others, upon Georgescu-Roegen's (1971)analysis of entropy in the economic process, ecological economists accentuate the material nature of economic phenomena which, by virtue of their materiality, have dramatic repercussions on the natural environment (cf. Herrmann-Pillath 2013). The complexity-sustainability trade-off presents the systems-theoretic explanation for the "compulsive shift" (cf. Tool 1981) to consider the embeddedness of the economic system in its environment, both societal and natural, with a view to making the economic science more Systemic and more useful in the real world (Benčo & Vaceková 2011; Svidroňová & Vaceková 2012; Vaceková & Svidroňová 2014; Valentinov 2015b, c; Valentinov & Iliopoulos 2013; Valentinov & Vaceková 2015; Valentinov et al. 2013; Wandel & Valentinov 2014).

At the same time it is clear that this "compulsive shift" (cf. Tool 1981) goes against the grain of the neoclassical mainstream and is unlikely to be a good fit with the extant power structure in the academic organization of the economic discipline. Among heterodox economists, Galbraith (1967) stands out by laying bare the tendency of neoclassical economics not only to provide an indirect legitimation to the persisting corporate hegemony but also to contain an academic power structure of its own. It is this power structure that is responsible for the prioritizing of certain contingent ways of observing and framing economic phenomena while ignoring what Luhmann called the blind spots of observation. Taking these blind spots seriously would require the explicit identification of social imbalances induced by the dominant institutional clusters of markets and hierarchies (cf. Fink and Dauber 2016; Magala 2009). To be sure, rigid power structures in the academia are found not only in economics. In the Anglophone world, the Luhmannian social systems theory, for example, likewise presents a minority heterodox school, for the paradoxical reason that it advocates the "post-enlightenment mindset focused on semantics and communication rather than on humans and action" (Roth 2013).

3.2 Implications for Conceptual Systems

The Luhmannian pessimistic vision of social systems casts important sidelights on why conceptual systems may fail to do justice to the complexity of the real world. Similar to social systems, conceptual systems are complexity-reducing devices. Boundedly rational human beings prefer to deal with simple conceptual systems. The simplicity, however, is bought at the cost of complexity reduction which makes conceptual systems, in the terminology of IPA, less Systemic and thus less useful for understanding and engaging the world. Combining the theoretical frameworks of IPA (Wallis 2015a, b) and the complexity-sustainability trade-off (Valentinov 2014a) we can establish the connection between the Systemicity and sustainability of theories.

The rigorous methodology of IPA has shown that theories that are more Systemic are more useful in practical application and thus more sustainable (Wallis 2010a). For a comparative example, laws of physics (a kind of theory) are fully Systemic ($S = 1.0$) and are highly useful in practical application. Notably, they remain unchanged when used in different parts of the world by different cultures. Despite the otherwise incoherent nature of cultures (McSweeney 2009). In contrast, theories of economics are changed depending on what area of the world they are applied. Indeed, one report has them changing based on religious preferences of the region (Simmons and Elkins 2004). Also, theories of business change significantly between contexts. For example, when scholars draw upon existing theories for new investigations they often change the concepts within the theory. Even when it is the same scholar writing for different journals (Wallis 2014d). Indeed, for two theories of the same name, there are sometimes more concepts in difference than similarity. Those theories are more fragile, they exhibit significant change over changes in time and context. We suggest that this is because the theories are less useful in practical application—a trait that may be determined by using IPA to find the Systemicity of the theory. Or, from another perspective, the problems related to the social sciences are more complex than the problems of the natural sciences. Which is to say that the "call for parsimony" of theories in the social sciences is ill-advised at this time.

The proposed understanding of practical usefulness and sustainability of theories is well in line with Luhmann's (Luhmann 1990) analysis of the autonomy of science as a functional system of modern society (Roth and Schütz 2015). Three implications of this analysis are noteworthy. First, as complexity-reducing system, science cannot generate outputs that would match the complexity of the social and natural environment. Thus it is small wonder that these outputs, such as theories and conceptual systems, often appear too simple (Vogd 2012). Second, the functional system of science is engaged in its own continual self-reproduction. Theories, conceptual systems, methods, and data are the results of this ongoing self-reproduction process that cannot be put into a one-to-one correspondence with the social and natural environment. This self-reproduction may involve, for example, dysfunctional structural couplings between the functional systems of science and mass-media and the concomitant pursuit of publications and citations. Third, against the backdrop of this self-reproduction, the value of practical usefulness of scientific results recedes into the background (cf. Stichweh 1990, p. 202; 2003).

Therefore we should be unsurprised when our conceptual frameworks bring about "disequilibria" and "unintended side-effects" (Luhmann 1990, p. 686). At the same time, Luhmann rejected nihilism (ibid, p. 719). Conceptual systems can be improved; they can be made more Complex and Systemic, along the lines suggested by IPA.

4 Sustainability Issue of Theory

Each theory may be understood as having a solid core surrounded by a shifting belt of concepts. Thus, "… no experimental result can ever kill a theory: any theory can be saved from counterinstances by some auxiliary hypothesis" (Lakatos 1970, p. 182). A more adequate explanation might be that adding additional hypotheses does not protect or sustain the theory, it merely prolongs the use of the theory's name. Instead, adding additional concepts causes a de-facto change in the theory. And, as such, highlights the fragility of the theory.

One way new to look at this issue is through Luhmann's perspective as noted above. Here, instead of looking at the fragility of social systems, we are looking at the fragility of conceptual systems. We may understand a conceptual system as having varying levels of openness—based on the causal connections between the concepts.

For example, a bullet point list of concepts or a storage device full of data would be more open because causal connections between the concepts have not been identified. Concepts may be added or removed from the list at will without significantly altering the overall usefulness of the theory. In contrast, a law of physics would be more closed because each concept within that conceptual system is causally connected to the other concepts. If we remove one variable, the entire equation collapses. What is Newton's $F = ma$ without mass?

The number of citations associated with a theory need not be an indicator of its potential durability. There are many theories where the work was cited, but the theory was used only in a piecemeal way—where the citing author drew on only small parts of the original theory. For example, in a study of Institutional Theory, Wallis (2014d) Identified three papers citing a single source for their theories of the same name. Change between the original theory and the derived theory was measured for each by dividing the number of similar concepts between two theories by the total number of concepts of the two theories. The overlap between each of those papers and the original theory ranged from 8–17 %. The differences vastly outweighed the similarities. Only the name of the theory endured rather than the collection of concepts which made up the theory. The original theory was fragile—the opposite of enduring. To avoid the problem of fragmented/fragile theories, it was suggested that scholars should create theories that are more Systemic. That is, we should use our research to identify more causal connections between the concepts of theories, rather than shifting/changing the concepts rather than seeking more 'novelty'. For example, Hung and Kuo (2008) presented one version of organizational learning theory which could be understood as having a Systemicity of 0.22. Then, they presented their version which had a Systemicity of 0.33. That kind of improvement may be seen as a clear step forward for their field. And, importantly, a step toward theory that will include more interconnected concepts and so a theory that is more useful in application.

While the idea of sustainability seems attractive on the surface, there exists beneath a seething discontent. Starting with the terms used in forestry and agriculture Newton and Freyfogle (2005) argue that the term is vague and malleable. The confusion of usage is heightened when one considered that, "Sustainability suggests a life that is stagnant or repetitive. It implies restrictions that keep us from growing and changing" (ibid, p. 25). Taking up that argument in the field of systems thinking, Yolles and Fink (2014) agree, identifying multiple competing paradigms each supporting a different version of sustainability. Recursively, that very conflict may suggest that the notion of sustainability is not sustainable. Like our theories, perhaps it is also changing rapidly.

In contrast, (Ploeger 2010) suggests that our psychological and social phenomena have emerged through evolution and so would best be viewed from an evolutionary perspective. That perspective suggests that our minds, including our theories, must have some level of fit with our environment as well as having a rich level of structure. To reach that level, evolution involves processes of variation, selection, and retention (e.g. Zollo and Winter 2002).

So it seems that the process of evolution is highly relevant here. More specifically coevolution (where each system contributes to the evolution of other systems). Coevolution is important across multiple sciences including the organizational level (Lichtenstein 2000) and the psychological level (Combs and Krippner 2003). If we can accelerate the evolution of theories, we can more effectively use those theories that are more evolved to solve problems such as war, crime, and poverty. Without such evolution, we may expect to be "stuck" in our present level of "social technology" and so unable to effectively understand or address those serious problems.

In contrast, to our slow evolution of our conceptual systems, our physical technology has been evolving with increasing rapidity. Interestingly, the relationship between physical technology and our conceptual understandings has been explored and provides useful insights to help us move forward. Grodal et al. (2015) explore the coevolution of technology and conceptual frameworks. Technological change through recombination and creation supports the creation of new terminology that describes the emerging technology and those new terms inspire additional technological change. In short, in a system of systems, each system acts to support the evolution of other systems; be they biological, mechanical, social, or conceptual.

The paradox inherent in the unsustainability of sustainability may be applied to understand the sustainability of theories, or lack thereof. Any action to create or apply a theory must involve some level of effort. That effort must cause some level of change to the social world, leading to results that are both anticipated and unanticipated. Those changes must have some kind of impact on the theories (Kuhn 1970). In short, it seems more reasonable to assume that sustainability is not a reasonable goal for theory.

Our assumptions of sustainability may be understood as being rooted in Western notions of permanence and stability, in comparison to Eastern ideas of cyclicality and change (Seligman et al. 2011). That difference leads us to a radical reconceptualization where theory and society exist in a yin-yang relationship of coevolution. The trick now is to identify relevant measures of each to understand that process and so utilize it for the benefit of all.

Metaphorically, we may note that humans have lived with central heat and air conditioning for only about a century. The brevity of that time should not be an indicator as to the importance of those facets of our life and culture (to say nothing of comfort). There is no good reason to return to cave dwellings, even though those were occupied for many thousands of years. From a perspective of biology, simple inorganic molecules may endure for a greater span of time than would complex organic molecules. Yet, those organic molecules make the universe more interesting.

If we rely on Meehls's (1992) criterion of longevity as our primary criterion for validation of theory, there would be no change and no progress. Therefore, it is important to identify more effective criteria. A better approach would be to ask what innovations improve our success in the short run and long run? Central heating and air conditioning certainly seem to be improvements over dwelling in caves.

Neither do we wish to rely only on “truth” in determining the usefulness or longevity of theory. While it does have some bearing, we can certainly find counter-examples. Consider your favorite work of fiction, major Hollywood franchises, or works of dubious ‘reality’ such as the Bible. Those have had significant impacts on the world, without verifiable claims of truth. Instead, what they have is a rich complexity, an interconnectedness of ideas that create a coherent and compelling narrative.

From the perspective of theory, we can see some interesting dynamics between the evolution of theory and the evolution of society. First, in ancient times, theories of low Systemicity existed for many hundreds (perhaps thousands) of years. During that time, society did not make significant advancement. Society of that time used the theories for whatever benefit was possible (perhaps as interesting topics of conversation at ancient Roman cocktail parties). With a low Systemicity, those benefits would have been few. More art than science.

A society using such theories would be expected to evolve only slowly. For example, consider Ptolemy's theory of nested crystal spheres. While that theory provided an explanation, it was not useful for guiding space flight. Indeed, it would suggest that space flight would be very dangerous because the astronauts might crash into a crystal sphere.

In contrast, where theories are highly Systemic, their application will be highly effective. Thus, the society will experience more rapid change due to both anticipated and unanticipated change. For example, the theories (laws) developed during the scientific revolution. Applied during the subsequent centuries to the present day, have engendered significant changes.

To summarize, theories of ancient times endured for hundreds of years, not because they were good/useful/sufficient, but rather because the society (the environment in which the theories existed) lacked the empirical tools and the logical tools to develop better theories.

Today, we are reaping the benefits of the scientific revolution. And, as a result, our society is experiencing rapid evolution in many ways. Primarily technological. We have not, in contrast, experienced a revolution in theories of the social/behavioral sciences. This lack of evolution is visible in many forms.

Within the academic world, we see a great churning as theories are created, revised, appear and disappear—with all the fragility of clouds of vapor. If those endeavors were merely for entertainment or fashion, this would not be a problem. However, we have serious problems (e.g. crime, war, economic turmoil) on the global and local levels. It is tragic that we lack the tools to develop better theory.

Because those theories are interacting more with the academic world, rather than the more complex more complete society, those theories are evolving to fit the academic world. As a result, they seem to be growing smaller over time, perhaps evolving to fit in the niche of academic journals (Wallis 2015a, b). Such theories may support the efforts of individual scholars to gain tenure, but they do not support meaningful change in the real world such as radical improvements in the practice of psychology or the amelioration of international conflict.

In our governmental system (in general) and policy (in particular) it seems we have made little progress. “While all other sciences have advanced, that of government is at a standstill – little better understood, little better practiced now than three or four thousand years ago” (John Adams, quoted in: Wood 2015, p. 1). And, more recently, it seems that freedom has plateaued. The “Democracy Index” has shown little if any progress in the past decade (Puddington 2015). In short, socially, our society seems slow to evolve.

5 Conclusion

In drawing a parallel between enduring societies and enduring theories, the present paper makes an important contribution to systems thinking and the emerging science of conceptual systems. First, we can understand conceptual systems as systems and draw inferences by comparing them with natural systems and social systems. Second, we can predict the continued failure of our academic endeavors of the social/behavioral sciences if we do not develop more effective tools for developing our theories. Third, IPA provides a compass—a new conceptual tool for developing theories that are more Systemic and so more likely to be effective in practical application and more likely to support the evolution of our social systems.

On the level of the individual person, information that is Systemically interconnected becomes a source of creativity, such as Luhmann’s “zettelkasten” which helped him to develop new insights (MK 2007). Therefore, to support greater individual creativity and success, we should develop theories which are more complex and more Systemic.

One idea that we have not explored in this paper that is worthy of some mention is the difference between local and non-local stability. Considering, in a very brief and partial way, how a theory of society might be stable in the immediate vicinity of time and/or space, while causing greater instability in more distant realms. For example, Ohm’s law may be used with great reliability to design electrical circuits in a cell phone. However, it cannot predict what the phone will be used for or what the ideas communicated over the phone may lead to.

From the insights developed in this paper, it seems clear that our sciences should push to increase the Complexity of our theories by creating theories that include a larger number of concepts. Not, as some may suggest, to develop theories of greater parsimony. The more we push our Conceptual Systems to greater Complexity, the more those theories will reflect the complexity of the larger global system. In the long run, the high Complexity of those theories will impel us to reconsider their concepts and structure. And, as we reconsider those theories, we will create something new based on those new insights.

It is important to note that simply having "new insights" will not suffice. Modern approaches advocate data-driven research to generate insight while postmodern approaches advocate creativity. So, we have new insights every day without improving our theories in any way that is meaningful for the larger society. The insights to which we refer are those that can only be co-generated through a combination of perspectives. Of structure and content—of data and logics.

Another important contribution this paper makes is the new insight into the coevolution of theories and society. We may never win that particular "race to increased complexity" because the world, as Luhmann made clear, will always be more complex than the conceptual system. However, we may be able to catch up for a little while. And in that process, individual scholars may be able to develop more enduring theories such as some developed from the scientific revolution.

In order to have theories which endure, they must have a core of concepts that are highly Systemic. That is to say, have a high level of causal interconnectedness. Theories of this kind are highly effective in practical application. There are the kinds of theories that support rapid and effective change and so support the evolution of our society. A key point that bears brief clarification here is that the theory must have causal connections between its concepts. By pushing ourselves to think in terms of causal relationships we gain greater clarity (Johnson-Laird 1980). Indeed, causality is the best path for scientific understanding (Pearl 2000).

One way to achieve this kind of theory is through the integration of existing theories. In our traditional print media, our academic journals, this has been achieved only in a fragmented way. There has been no clear progress. Instead, we suggest that teams of scholars collaborating with an online platform such as Kumu https://kumu.io or Insight Maker https://insightmaker.com/ will improve the ability of science to create more Systemic theories and serve as a "science accelerator" for the creation of theories across all disciplines that are more enduring (less fragile) and have a greater impact on our lived world.

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