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Relationality and Social–Ecological Systems: Going Beyond or Behind Sustainability and Resilience

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Abstract: Sustainability and resilience are most often thought of as systems concepts that evaluate the state and function of objects of interest as well as the system as a whole. In this article, we shift the focus toward the "space in between"—i.e., the relationships among objects in the system. The article develops the concept of relationality, which provides a new lens to understanding what social and material processes drive or impede the functioning and sustainability of a social–ecological system (SES). Relationality seeks to understand a system not so much as a set of interacting objects but a web of relationships. By foregrounding relationships, we are better able to understand the rich ground of practice that guides a system in ways that the formal rational designs do not explain. Several examples are drawn from the literature that suggests how a relational analysis might proceed and what social–ecological phenomena we can better explain by this means. The article ends with a note on how the promise of relational analyses also bears in it its challenges.

Keywords: social ecology; relationality; relational

1. Introduction

In describing his intellectual and methodological approach, the sociologist, Pierre Bourdieu suggested that students shift their focus from studying the traditional objects of investigation to studying the spaces in between them [1]. The world, he suggests, is not simply a system of objects but a network of relationships between and among these objects. For example, systems research conventionally involves isolating a particular system and taking it as an objective of inquiry—but, Bourdieu might ask, what of relations between different systems? As an example, he described the inadequacy of studying wealth as merely a financial condition (i.e., monetary capital) and proposes a network of inter-relating and multiple forms of capital. Thus, persons and groups are empowered not just by financial capital but also, the social, cultural, symbolic (to which, we add, the ecological). These resources, moreover, do not simply act independently but rather in interacting fashion. The same holds true for studying objects within a system (e.g., groups in society, species in an ecosystem)—we are urged to examine the transactions, interactions, and other inter-relationship between these objects. And, so, he proposed shifting our attention to the relationships themselves.

It is this idea of foregrounding the relational that we bring to the study of social–ecological systems. The concept of relationality is one that we will use as an alternative, or rather a complement, to the conventional approach of rational analysis and management of these systems.

The conventional approach is to take an object of study and to analyze its properties. This applies to entire systems as well, where the aggregate system itself is the object of study. As an example, consider the concepts of sustainability and resilience, which are, for the most part, systems concepts (e.g., [2]). While each pertains to different aspects of a system, both concepts are about describing and measuring certain systemwide properties. These measurements can pertain to the system taken as a whole—e.g., biodiversity index, primary productivity, carbon footprint, etc. It is also possible to

view the system as a group of objects—e.g., an ecosystem populated with different species. In this case, one measures properties and assesses the health and viability of these different objects. This suggests certain operational strategies for managing these systems, which often takes the form of a rational practice of maintaining or optimizing the objective measures of these individual objects or of the system as a whole.

There are apparent limitations to the objectivist frame of study, as is the case with any analytic. First, it exhibits a penchant for fine-grained analysis of the individual object (e.g., a tree, a species) taken on its own and decontextualized. This leads to modes of understanding where, for example, we define a hummingbird by describing its species, rather than knowing it as a particular living thing in its particular environment. A different view would understand how it is influenced and defined by other things around it (and vice-versa). Secondly, the objectivist view privileges the objectively measurable (which means, physical) dimensions of a milieu, foregoing nonmaterial dimensions related to meaning and value. On the other hand, a different view would hold the cultural, symbolic, and other nonmaterial aspects of interaction in equal footing with the material.

The ecological point of view moves us beyond studying each individual object on its own to considering the inter-relationship among objects in a system. An ecosystem is a web of living and nonliving objects interacting in complex ways. Early ecologists (e.g., [3]), attempted to portray relationships across individuals or groups through terms like commensalism and symbiosis. A key idea is that, in ecosystems, things do not exist on their own but necessarily interact with others. To be sure, the ecological framework still maintains its primary focus on the individual object (e.g., a particular species) but considers the survival and welfare of that object as it interacts with other parts of the ecosystem. The relational perspective that we develop herein focuses squarely on the relationships themselves, understanding the whole not so much as a system of objects but a network of relationships. The ecological view emphasizes material processes, such as flows of matter and energy. These are crucial elements of relationship, it is true, but not the only ones.

In striving to move away from the ecologists' tendency to privilege material processes over the socio-cultural (and the Chicago School's human ecological penchant for privileging the economic), Alihan and colleagues proposed a new framework, which they referred to as social ecology, that emphasized the mutual interdependence of different dimensions of a system [4,5]. While a heterogeneous field of study, most approaches coming under the term, social ecology, emphasizes the multidimensional nature of social–ecological systems. Some, such as the Vienna school of social ecological thought, emphasize the hybridity of such systems [6]. Moreover, social ecology pays closer attention to transactions between humans and their environment [7,8].

More recent work by SES (social-ecological systems) scholars have begun expanding the ambit of the social ecological approach. By focusing on the resilience of SES, scholars have begun to look beyond system states and into processes, such as adaptive governance, which emphasize how systems are co-managed by stakeholders [2,9]. Others have emphasized interaction, in the way of conflict resolution and participatory decision-making [10]. These interactions can occur between humans and nonhumans and, moreover, allow the semiotic as well as the physical (e.g., [11]).

Still, extant approaches pay scarce attention to the relational dimension. As an example, Ostrom's social–ecological systems framework focuses mainly around system rules and entities. It includes, in its list of variables, the idea of interaction between system objects, but its notion of interaction is similar to the exchange processes modeled in social network theory. Furthermore, Ostrom's model aims at a formal conceptual structure and a listing of variables and not as much a theory linking or explicating their action. This relative theory-neutral stance allows the model a healthy kind of generality, but at the same time stops short of more richly describing social and other interactions [12]. What is needed is a theory of relationality, and this article is but an initial sketch of what such a theory (or theories) might be. At the same time, we recognize that subsequent work, building on Ostrom's SES framework, does begin looking at elements of practice, such as informal rules and social norms (e.g., [13]). Others have begun examining the role of trust, a relational concept, as a driver of these systems (e.g., [14]).

Often, it is the "social" component of SES that confounds researchers. This means that we need to describe (if not model) not just material processes but also the cognitive, cultural, and semiotic. An SES does not just exhibit certain material properties, it also has a meaning that is as much a part of its reality as the physical. We need a general but explicit theoretical approach to understanding relationship. This means going beyond evaluating properties of the individual object and or processes of material exchange. Instead, relationship is a complex intermingling of things. And an important part of relationship touches on identity—i.e., who I am in relation to another and vice-versa.

The framework of relationality addresses, in part, the tendency toward strong ontological assumptions found in Cartesian thought. The relational view says that we are not simply autonomous, cognitive subjects [15]. Rather, we are defined by the relationships we have with other persons and things. The post-Cartesian turn is evident in the SES scholarship, as well, especially among researchers who study indigenous practices and ways of knowing (e.g., [9,11]). Some of the case studies provide striking examples of indigenous communities whose world view is not one of the autonomous, liberal subject but the relational one—e.g., the Teduray forest dwellers of the Philippines, whose governing ethic was described as "caring for your neighbor's gall bladder" [16]. Rather than observing the properties or function of systems, as the concepts of sustainability and resilience tend to, relationality looks closer, focusing on the relationships that constitute and drive the system. It is the relational that operates behind or within the system that systems-focused analytics like vulnerability and resilience can fail to recognize.

2. Conceptualizing Relationality

For clarity's sake, scholars often pit contrasting concepts in opposition to each other in order to better elucidate their differing meanings. This is a temporary strategy—temporary because, as we will discuss later in this article, we will undo the idea of a strong opposition between concepts and instead speak to the dialectical relationship between them. To be sure, many scholars make the mistake of never going beyond the false opposition (e.g., pitting post-positivist and quantitative approaches against each other).

But, for the moment, let us think in terms of contrasts. We start with the conventional notion of a rational system for SES management, where we focus our attention to the task of measuring system properties and, then, finding strategies for maintaining or maximizing such measures. As Weber pointed out, the ethic of rationalization can take on a system of accounting [17]. To be sure, this does not limit the rational strategy to one of measuring and maximizing monetary capital, but is applicable to other forms of capital, as well. But these approaches tend to devolve into translating complex properties into one or a few summative measures that characterize the health of the system as a whole. The idea of environmental system services is an example of this, with the default operation of translating value into utility (most easily expressed as money).

But what if we focus on, as Bourdieu suggests, the spaces in between the objects of study? What if we examine, first, transactions between objects and, secondly, how each object is affected by the others? What if we focus not on object but, in a word, relationship? This brings up the problem of defining what a relationship is. We begin with a rudimentary definition of relationality, which is an analytical framework wherein the primary focus is on the relationships between an individual (or group) and other individuals (or groups) in a socio-ecosystem, and the system is understood not so much as a collection of objects but a web of relationships. These relationships, moreover, are heterogeneous, connecting human and nonhuman, animate as well as inanimate, things. Elsewhere, social–ecological systems have been described using the language of assemblage, which is "the process of coming together of heterogeneous elements into dynamic, provisional, revisable wholes in a given context" [18]. But "coming together" means inter-relating, in some fashion, which brings us back to the need to take a relational perspective [19].

The early ecologists framed this web of relationships mainly in terms of material/energy exchange. But more recent scholarship from SES scholars have made it clear that these webs of relationships are

social and cultural as well. For example, Winter, Lincoln, and Berkes [20] adapt the original idea of keystone species to the biocultural realm, discussing how some key social actors drive the workings of a social-ecological system. In describing the functional role of say, the kalo (or taro) plant as a keystone element in Hawaiian society, these researchers essentially are describing its relationship with other elements of the system. This type of relational description informs the present work. Scholars have pointed out that these webs are also patterns of power relationships—e.g., some have combined a political ecological lens to better analyze power relations [21].

The relational perspective is about describing relationships, not things or states of the system. But what do we mean by the word, relationship? How do we define and operationalize it? One can take a process view and examine transactions (or flows) between objects in a system. But relationship goes beyond transactions (which are almost always defined as material or energy flows). In a socio-economic system, relationship also encompasses the non-material (social, cultural, ideational) dimensions. Relationality also focuses on meaning—i.e., how the meaning or identity of something in a system depends on others in the system. So then, we must understand relationship as encompassing the material (e.g., activities and mass/energy exchange) and the non-material (i.e., identity and meaning). So being, a system is described as the pattern that results from the working and reworking of relationships and, when the SES becomes predictable, takes on the essence of an institution [19].

More recent work by SES scholars have begun examining transactions between actors in a system that are not limited to resource exchange. Some are beginning to focus on power and knowledge dynamics in social–ecological systems (e.g., [22,23]). Likewise, complex system perspectives on social–ecological systems point out how complex behavior is understood by going beyond analysis of an individual component and focusing on interactions [24]. Emerging work from anthropologists and other social scientists pay close attention to cultural and cognitive aspects of the SES, along with the material (e.g., [25]). The turn toward relational thinking has drawn momentum from SES scholars who underscore going beyond early attention to property rights regimes to understanding social–ecological systems as institutions—i.e., patterned interactions (e.g., [26]). The present work builds on these foundations.

Likewise, resilience scholars have begun studying the effect of relationships. For example, Nkhata, Breen, and Freimund [27] posit that resilient systems result from the presence of relational capital and connectedness (between actors, institutions, etc.). Cote and Nightingale suggest that researchers "go beyond an emphasis on 'rules' and institutional designs that reflect logics of economic maximization, and to broaden our consideration to subjective identities and affective relationships" [28]. The nature of social ties is strongly implicated in some of the resilience scholarship, especially that on adaptive governance [29].

Defining and operationalizing relationality will necessarily be an ongoing task of research. For now, we can employ a rudimentary three-part conceptualization of relationality, as follows (adapted from Lejano, 2008 [30]). For simplicity's sake, let us for now focus only on dyadic relationships (i.e., between two entities). We will refer to participants in relationship-building as selves and others.

A relationship can be understood and described in three parts:

first, the activities and identity of self on it's own;
second, the activities and identity of self vis-a-vis another;
and third, the joint activities and identity of self-and-other.

This is most easily understood in terms of human relationships, of course. But, as we will see, this can be used to describe relationships among humans and nonhumans as well. Maybe the easiest way to illustrate the above dimensions of relationship is by taking the example of self and one's pet. It is not enough to describe each individual on its own. One would also like to describe how one reacts to the other's presence and actions and vice-versa. Moreover, I and my pet are not just interacting individuals; walking through the park, we become an inseparable team. And the two of us relate to others, as well, beginning with the sunlit patch of grass which holds us in its embrace. What takes

place includes the emotional, psychological, and symbolic. It is useful to adapt, to relational analysis, the idea of co-evolution, which is a biological concept describing how genetic changes in one species can transpire in response to changes in another species [31]. Social ecologists have taken this idea of co-evolution and expanded it to include social and institutional interactions, as well (e.g., [32]).

Describing activities and identities require describing a multitude of things, including flows of material and energy, qualitative depictions of meaning and identity, and others. While certainly not a complete and final theory of relationality, the above sketch at least provides a starting point upon which to build.

3. Operationalizing Relationality

Up to this point, we have conceptualized relationality as distinctly different from conventional systems-descriptive and systems-optimizing approaches such as sustainability and resilience. In reality, the relational perspective complements these conventional approaches and can be integrated into them.

For example, the relational perspective adds to how we analyze resilience. A focus on relationality brings different aspects of a situation to the forefront of the analysis of resilience. As an example, Lejano (2018) [33] examined the resilience of urban communities to extreme weather events and climate change. The literature on resilience might focus primarily on system states such as disruptions to productivity, population displacement, etc. and variables that determine the vulnerability of a population such as poverty, literacy, and others. But the relational view, while acknowledging the importance of the conventional analysis, examines how relationships among actors affects vulnerability. In case studies examined, Lejano (2018) [33] observed that connectedness, or the degree to which a person or group had institutional and social ties to others and help providers, was a key factor. Much of the problem begins with persons or groups that are isolated from networks of communication, resources, and aid. This type of analysis leads to reforms that aim at reconnecting the vulnerable to these networks.

Similarly, the relational view is something that can enhance how we study and promote sustainability. Take the example of urban ecological habitat, which are often undervalued in land use decision-making. These resources have to justify themselves to survive the steady encroachment of urban development and, often, they are disadvantaged by the fact that these are not valued in the property market. The growing field of environmental system services is one attempt to address this void, but it is constrained to still reducing the value of the ecological habitat to measures of worth expressed in monetary value, which captures but one dimension of the true value of these resources. For example, consider how a space such as Central Park in New York might be valued by estimating its effect on values of adjacent properties. Such an analysis would miss the big picture, which is that the park has become a part of who New Yorkers understand themselves to be. People identify with the park, and they have established rich relationships with it. Sustaining these resources means being better at describing these relational ties.

An example of how relationality enhances our analysis of sustainability is found in Lejano et al. (2019) [34]. The case study revolved around coastal mangrove and semi-tropical habitat in Hoi Ha Wan, Hong Kong, which is threatened by plans to allow developers to build new housing in this protected area. The analysis involved, first, describing the resources themselves—its species, its unique qualities, and the fact that it is one of a diminishing mangrove habitat in this cosmopolitan city. The analysis also involves the second dimension of the relational framework, which is inquiring into what this resource means vis-à-vis the community around it and the city at large. This second dimension brings out accounts from residents and others in the area of how they have interacted with the place. A primary school administrator describes how it has become a living laboratory for their students, a precious local place where elementary school children could discover mangrove, coral reef, mudskippers, and other precious living things. An urban resident describes her joy at stumbling across the rocks and discovering this tiny jewel of a place. Another describes the importance of discovering, within this habitat, traces of the old rock trailways laid down by the original Hakka settlers long ago. Connections have formed between the habitat and others around it. And the analysis would also include consider

the meaning of the habitat and the surrounding community taken together—jointly, they constitute a unique place that draws people to it for its peacefulness and beauty. The habitat and the communities around it have developed a system of relationships or what is referred to elsewhere as structures of care [30].

The point is that much of the richness of these social ecologies would not be realized through the conventional ways we analyze resilience and sustainability. It is when we put a primary focus on the relational that foregrounds these realities. So being, relationality as an analytical framework need not supplant extant ways of examining sustainability and resilience but rather complement them.

The study of relationship is fraught with complexity. While a preliminary attempt has been made in this article to sketch what relational research might look like, much more work will be needed in the coming years to better define what relational analysis should entail. For now, it suggests that qualitative analysis is needed along with the quantitative. In some of the research cited above, inquiring into relationships often meant simply asking stakeholders what the other (e.g., a habitat, a species) means to them and how they interact with the other in the everyday. Some of the 'data' that results takes on a narrative form (i.e., people recounting stories to us). The challenge with data of this sort is the plurivocity of narratives [35]. That is, if one were to interview a hundred New Yorkers about what Central Park means to them, one might get a hundred distinct storylines (many of them overlapping, to be sure, but each somehow differing from the others in small but important ways).

Finally, we note how the relational perspective affords new insights about ecological management. Sometimes, resource management regimes do not conform to formal program templates, and describing these nondescript institutions is a challenge [36]. In Lejano (2008) [30], a case study of a turtle management program was described wherein the system regularly departed from the formally prescribed rules and roles. Rather than follow the turtle egg harvesting ban to the letter, occasional harvesting was allowed, and the research traced the logic of this to the complex web of relationships in the place. Relationality can be a powerful framework for studying institutions, especially those that elude formal description.

4. Conclusions

Relationality, to sum up, entails analyzing the relationships that form between something or someone and another and examining how these relationships drive system function. An ecosystem (or, more comprehensively, a socio–ecosystem) should be understood as a web of relationships. This necessarily goes beyond conventional social network analysis, which depicts a system as a constellation of things or actors connected together by a system of ties. A relational analysis focuses less on the structure of the network (i.e., things tied together in a pattern of linkages) but on the relationships themselves that constitute each link. Contrast this with a common type of social network analysis where a link might be expressed as a 0,1 variable with a relational analysis where we find a rich description of such a link. These descriptions can include non-material as well as material dimensions of relationship.

At its core, social network analysis is a relational theory, which is open to qualitative as well as quantitative description of ties between members of a network [37]. Take, for example, Crona et al's narrative description of norm diffusion between a fisher and his friend [38]. But the main interest of much of social network analysis is the external configuration of ties and not the "stuff" of ties themselves—e.g., cohesion between actors might be described by measures of centrality and density [39]. What the present treatment adds to social network analysis, however, is a more explicit definition and treatment of relationship and, secondly, the idea of relationality, which depicts how institutions emerge from the working and reworking of relationships. This fills a gap in social network analysis, which has, so far, not addressed the semiotic, identity-related aspects of relationship.

This opens up the analytical space to rich modes of description of relationships. We are not limited to only considering material exchange, as in the ecologists' descriptions of commensalism and symbiosis [40]. We are not limited to only considering the exchange of utility, an example of the latter being common-pool resource theory which models ties as repeated games [41]. We should be open to

complex, sometimes moving, narratives about ties that bind us to others. Consider Leopold's loving description of the coastal environment, which is undoubtedly his way of sharing his relationship with that place [42]. Or consider Goodall's endearing account of David Greybeard, the chimpanzee, whom she at one point refers to as her friend [43]. But this poses more challenges, one being the inherent anthropocentrism of any such analytic. While the person may be able to describe her relationship with a nearby freshwater marsh, the nonhuman cannot describe these relationships from its own perspective. Almost universally, it is the human who speaks for the nonhuman (although some strive to allow the nonhuman some voice, as in Hinchcliffe et al., 2005 [44]).

Other questions that need to be worked on include the fundamental question of how to make use of the relational approach. How can the analysis of relationship be applied to land use decision-making, especially when the latter may favor solely quantitative measurement approaches (and, in many cases, property valuation)? How can it be used to manage socio-ecosystems? And how can relationality be used to characterize complex systems where formal design templates and principles do not suffice (e.g., [36])?

Most immediately, how can SES scholars use relational approaches in their study of resilience? While this is an open question for future work, we can already note how some scholars have begun analyzing mechanisms by which social relationships increase resilience. For example, Aldrich and Meyer (2015) [45] focus on mechanisms by which different forms of social capital are activated during disaster response and recovery. Others have translated processes of social resources and social exchange into measurable variables [46]. Some, on the other hand, have used qualitative approaches to describing relationships and their effect on resilience—e.g., see Goldstein et al. (2015) [47] for a narrative approach.

While these challenges cannot be understated, we nevertheless point to what is missing when we ignore the relational. Consider the ties between a human community and a nearby ecological habitat, and how these existing relationships can be tapped to build support for protection of the habitat and even active involvement of the community in nurturing it. Consider how the innate empathy of a person for others can figure in building movements to prevent the loss of habitat around the arctic circle. And, on the other side, consider the relentless destruction of ecological habitat that results when decision-making devolves into one-dimensional calculations of utility—examples of this being the tragic loss of old growth forest in the Amazon or U.S. Pacific Northwest due to clearcutting and logging. As some ecological habitat experts propose, future solutions may in fact require the realignment of relationships among policy actors and going beyond the one-size-fits-all approach of formal rule regimes [48].

We are, by now, accustomed to understanding social–ecological systems in relational terms (e.g., [27]). What remains is to more rigorously conceptualize relationality and translate this idea into practice. The hope is that relationality, as a conceptual device, be deployed to explain social-ecological phenomena that are, otherwise, often of a complexity to be simply ineffable.

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