

Going Social with the Systems Approach

The significance of social dynamics as a social determinant of health

The Wellesley Institute engages in research, policy and community mobilization to advance population health.

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Introduction

Wellesley Institute's vision of a healthier and more equitable Greater Toronto Area for all challenges us to diversify and explore innovative approaches to the way we think about health and its determinants.

One of the outstanding challenges policy researchers face is to establish a deeper theoretical understanding of the connections between complex social determinants and health inequities. Better and more complete conceptual models could improve researchers' ability to quickly and effectively identify social problems, gather meaningful evidence, and support strategic policy responses (Whitehead et al., 2004, Petticrew et al., 2004).

Systems Thinking

A familiar framework for studying the social determinants of health is the systems-thinking approach. Wellesley's work on systems thinking has helped make the connections between different social determinants and their effects on health (Mahamoud et al., 2013). The systems approach acknowledges health as an emergent property of the inter-relations between various system components (Sterman, 2006, Diez Roux, 2011). Out of the complex interactions between biology, the environment, and the interrelations between people and institutions, over time, health-states and health inequities emerge as predictable outcomes of the system's design (Sterman, 2002).

The application of systems thinking as a public health tool to understand social determinants of health and health inequities is still in early days of development. While the approach has helped public health researchers to study the relationships between different social determinants (Mahamoud et al., 2013), researchers still struggle to articulate the roots of exactly how those relations give rise to health disparities. As such, there is a lot of progress to be made before this tool reaches its potential for modelling the effects of social policy.

An important conclusion of the systems approach is that the underlying determinants of health disparities may be structurally embedded in a system's dynamic complexity (Sterman, 2002). System dynamics refer to the complex interactions between system components over time. System dynamics, even in simple systems, are highly complex, involving negative and positive feedback loops that are often non-linear and delayed in time. Problems arise because the dynamic complexity of systems surpasses our mental models and our ability to understand them. As a result, the counterintuitive behaviour arising from such complex dynamics is often falsely attributed to individual actors in the system; whereas a more accurate depiction would be to attribute the outcomes to the whole system's design. The consequence is that many social inequities exhibit policy resistance; policy interventions are often ineffective and can have unintended effects. The idea that dynamic complexity can lead to policy resistance has been echoed by many academics working on theory to describe the determinants of health. Link and Phelan's (1995) theory of the "fundamental causes" of health and disease, for instance, captures the notion that the determinants underlying health inequities may be embedded in the system's complex dynamics (Diez Roux, 2011). Link and Phelan argue, that as long as fundamental causes exist, such as income inequality or discrimination, despite interventions, the dynamics of the systems will shift and work through alternate mechanisms to impact health and manifest health inequities (Link and Phelan, 1995).

Working with the premise that a dynamic complexity is a core element of cracking the problem of policy resistance, an important next step in developing systems theory for public health is to work on better understanding a system's dynamical qualities.

The Social Factor in System Dynamics

When describing a system's dynamics, an important and often neglected distinction to make is whether those dynamics are controlled by social actors or not. We often talk about systems dynamics, their levers and feedback loops as if they are cogs in a machine. However, social components of a system, unlike non-social components, think, feel, anticipate and act with intention. Social agents, such as people, organizations and institutes, filter information through a set of perceptual biases, emotional filters, value judgements, cognitive calculations to interact with the world in goal-oriented manner.

Due to being social, the dynamics of a social system (as opposed to a non social system) uniquely exhibit social interactivity (Fong et al., 2003). Interactive means that the system's behaviour is sensitive to the nature of relationships between actions within interactions, including the timing, spacing, contingency and other relational qualities between actions. For example, imagine two hypothetical neighboring cities. City A announces its intention develop a poverty strategy. Soon after, City B follows suit. Given the quick timing of City B's response, City A perceives this as a sign of solidarity and, in response, invites City B to collaborate in planning efforts. The outcomes of this interaction depended, and will continue to depend, on the perceived quality of interactivity between the two cities. If the actions of City B had been delayed, or had been carried out differently as compared to the action of City A, the consequences may have been different. The perception of social coherence and social responsivity play an important role in social interactivity. In this example, it was critical in the formation of partnership. This sensitivity to the relationships between actions within an interaction is a trademark of social interactivity. Non-social components of systems, on the other hand, simply react to changes in the system, they do not intentionally respond, adapt or interact.

In systems involving social agents, dynamics may take on unique qualities, meanings and properties. Before we further explore what "social" means for systems dynamics and how this might affect how we think about social inequities, we first review the contextual factors that need to be considered when interpreting the behaviour of systems. How social factors influence health depend on the level of analysis, as well as the temporal and spatial parameters that shape the system's dynamical nature.

Context

Level of Analysis

From physiological pathways to the political and economic systems that shape our social environments, social processes influence health on multiple levels. At the most granular level, the impact of social factors on health has a lot to do with stress. Chronic stress can lead a higher risk for psychiatric, infectious, metabolic and coronary diseases (Miller et al., 2009). Healthy relationships help people regulate stress (for review see Cohen, 2004, Holt-Lunstad et al., 2010, Kawachi and Berkman, 2000), whereas toxic social relationships will not only cause stress but can also cut off alternate social pathways for achieving good

health. Being part of a social group can also help regulate the effects of stress on health. Belonging to a group with a common culture or shared purpose provides individuals with a sense of belonging and accomplishment (Greenaway et al., 2015, Caputo, 2003). On the negative side, social exclusion from groups can lead to chronic stress and adverse health impacts (Slavich et al., 2010).

It is also important to consider the health impacts of the interactions that occur between groups. Social problems that threaten health require inter-organizational, inter-sectoral, and inter-disciplinary collaboration to achieve an efficient and cohesive response and solution (Deken and Lauche, 2014, Jarzabkowski et al., 2012, Gkeredakis, 2014, Boin and Bynander, 2015). The inter-sectoral collaborations of our health care systems, for instance, help define the resilience of that system to changing demand, and determine the sequence of care people receive and its impacts on health outcomes (Bolland and Wilson, 1994). At the top of the hierarchy of social structures impacting health are political processes. The “trickle-down” consequences of dominant ideologies, and the political actions associated with them, have the potential to influence social dynamics and associated health outcomes at multiple levels of the system. Policies influencing the “fundamental causes” of health, such as anti discrimination legislation, will help shape the system’s dynamics to flatten out mechanisms that lead to health disparities (Navarro et al., 2006).

Time and Space

The simple dimensions of time and space are critical in defining system dynamics. At a basic level, the closer in space and time two individuals are, the more likely they are to interact and influence one another’s health. Time and space, also affect the ability of players in the system to gain knowledge about the nature of causal relationships in the system (Gkeredakis, 2014). Time delays between making a policy decision and its effects on the system are particularly problematic. For instance in efforts for large scale integration, such as the integration between the development of a public policy and the future monitoring and development of that policy, the large time scales, and physical distances among coordinating parties makes it difficult to conceptualize and assess the interactions. On the other hand, understanding interdependencies of coordinating a more localized effort, as in a single policy development process, is much less challenging.

Spacing and timing can also help inform the strategic alignment of various moving parts in a system. Examples include the importance of nourishing the growth of a child’s social skills during the specific critical periods of their development (e.g. Watson, 1966), or seizing a policy window to gain entrance for a particular policy issue (Howlett, 1998). These windows represent changes within some part of the system that create an opportunity for another part of the system to align.

Social Dynamics

In the study of social determinants of health, social players sit at the levers of a system’s dynamics. It follows that those system’s dynamics will be, to some degree, socially interactive. Although formal definitions and conceptualizations of social dynamics vary, some basic components, and their potential impacts on health disparities, are considered here; these include relational schema, social synchrony, social feedback processing, and coordination.

Relational Schemas

The way a social agent interacts, and the way that agent expects the social interaction to unfold can be referred to as their relational schema (Baldwin, 1992). For organizations or inter-sectoral efforts, schema may be formalized in contracts or protocols (Jarzabkowski et al., 2012, Gkeredakis, 2014).

In a system, an agent's relational schemas are not unique to them, but can also represent shared characteristics with others around them. Group level factors influencing social development can lead to population-level patterns in relational schema, this is often thought of as an important component of culture. For instance, Stephens, Markus and Phillips (2014) suggest that there exists "social class cultures," and that individuals' relational schema can vary based on the income class that they are in. The different schemas are thought to reflect adaptations to living with a certain amount of financial resource. For instance, a middle or upper class individual has a financially secure lifestyle which affords independence and the pursuit of personal goals and interests. Socially, this translates to feeling more in control, being less empathetic, and more likely to attribute characteristics to individual factors (Kraus et al., 2012). An individual with low income on the other hand, living with financial insecurity, tends to have a strong communal sense of self, and a tendency to follow social "rules" that can reliably lead to financial stability (Stephens et al., 2014).

When thinking about health equity issues, relational schemas that vary depending on one's social position could potentially have a complex influence on a system's social dynamics. Population differences in relational schemas could manifest both in a different quality of social dynamics across populations, as well as influence the dynamics between members of different groups or cultures. When people of different backgrounds and cultures come together, how their relational schemas align, may affect the outcomes of the interaction, and subsequently the impacts of that interaction on health.

Social Congruency

A very basic predictor of how a social interaction will unfold is whether relational schemas align. Structural congruency represents the meeting distinct processes, in this case relational schemas, on some common ground (Auvray et al., 2009). I will refer to this concept as social congruency, to reflect the fact that we are thinking about a special case of congruency characterizing social dynamics. Social congruency between two people in social interaction leads to social coherence, defined as an observable agreement between the behaviours of two or more agents (Di Paolo, 2000).

Social congruency and coherence play a much greater role in our social lives than most people recognize. Although people do not consciously process it, social coherence can be sensed, and there is substantial evidence to show that it frequently impacts our social decisions and outcomes.

When asked about their sense of social coherence, or "togetherness" in a social interaction, people can accurately judge the interactional synchrony between themselves and their partner, operationalized as the degree of coincidence between each other's body movements and vocal boundaries (Condon and Ogston, 1966). Furthermore, more synchronous interactions are linked with pro-social outcomes including greater perceived social rapport (Bernieri 1988), trust (Launay et al., 2015), cooperation (Wiltermuth and Heath, 2009), affiliation (Hove and Risen, 2009), attraction (Grammer et al., 2000), satisfaction in relationships (Julien et al., 2000), measures of social attention (Macrae et al., 2008), mutual gains in negotiation (Maddux

et al., 2008) and social attachment (Isabella and Belsky, 1991). Social coherence essentially reflects a great advantage in optimizing social interactions. Interactions with high levels of coherence are much more likely to succeed than interactions with low levels of coherence.

It stands to reason that interacting pairs with different relational schema will be less likely to have successful interactions, as compared to individuals with similar relational schema. If relational schemas do indeed vary by social and demographic characteristics such as class and culture as suggested by (Stephens et al., 2014), this would create a disadvantage for any members of non-dominant groups, as their interactions with members of the dominant group (i.e. the group with power) are less likely to succeed than interactions between members of the same group.

This could further be compounded by another level of group influence on the perception of social synchrony. There is evidence showing that if a person identifies as being part of a group, their coherence with a partner depends on whether they perceive them to be part of that group too (Kesebir, 2012, Lumsden et al., 2012a, Miles et al., 2011). For instance, Miles et al. (2011) found that the placement of study participants in colour coded groups influence the level of interactional synchrony they had with a confederate, depending on whether they were matched or mismatched with the participant's colour grouping. In addition, Lumsden (2012a) found that the perception of synchrony by third party observers depends on the perception of the relative racial attributes of each member in the pair. Observers viewing mixed race dyads perceived less synchrony between them than observers viewing racially homogenous dyads (Lumsden et al., 2012b). This suggests that, regardless of whether a social partner's relational schema is actually different from one's own relational schema or not, perceived superficial differences between them could artificially give rise to incongruent social relations.

Because social coherence can give rise to a feedforward dynamic, its effects are particularly powerful. Coherence acts like social glue: being part of a group will influence the likelihood of creating interactional synchrony, and interactional synchrony will influence your perception of being part of a group (Kesebir, 2012, Wiltermuth and Heath, 2009). Thus, in the context of system dynamics, synchrony represents a dynamic quality that can modulate the strength of the relations between the different parts of the system. Furthermore, the effects of social synchrony go far beyond the dyadic, one-on-one relationship. Going "viral," group-think, herding, beehives, are all expressions or metaphors that reflect to the tendency for people to get swept up in group processes, to act as a superorganism (Kesebir, 2012, Raafat et al., 2009). In a system where social agents are manning the systems processes, social synchrony can be a powerful, rapid way of aligning and accelerating otherwise disparate systems connections. The fact that certain groups may be disadvantaged in such fundamental processes could have pervasive detrimental effects on the health equity of those groups.

Social Feedback Processing

Social agents behave in a goal directed manner. Social interaction, like any other goal directed behaviour, can be thought of as a motor control loop, where motor signals are sent out to achieve a social goal and social feedback is used to evaluate the efficacy of the initial behaviour in reaching that goal (Wolpert et al., 2003). In registering social responses as "rewards" or "punishments," social feedback informs the person about the consequences and errors of their social actions (Balleine and Dickinson, 1998). This

cognitive ability consequently enables the individual to build theories and expectations about their social environment and flexibly control and modify their social behaviour to gain control over social outcomes (Wolpert et al., 2003, Brown and Brüne, 2012). Social feedback processing essentially enables learning in social situations, the formation of social skill, and the sharpening of social influence. For instance, social feedback forms the basis of building and perfecting a Theory of Mind, which refers to the ability to literally “build a theory” about someone else’s mind in order to predict and influence their actions and reactions (Adolphs, 2006). As a critical feature of social learning, social feedback processing represents a primary mechanism through which behavioural tendencies, like relational schema can be transmitted from individual to individual, thereby forming the basis of group or population level trends.

Social feedback processing, like so many other social processes, appears to also rely on social congruency, coherence and synchrony (Coussi-Korbel and Frigaszy, 1995, Laland, 2004). Given the group level influences on social congruency discussed above, it is possible that non-dominant groups experience disparities in the degree to which they learn to read and influence members of the dominant group, which inevitably would lead to power, and health inequities.

Coordination

One of the key features of a system involving social agents is the ability for those agents to coordinate, to adopt new behaviours that help achieve coherence with other system components (Di Paolo, 2000). Coordination is not something that is merely designed and carried out (Gkeredakis, 2014). Rather it is interactive, it constitutes a temporally unfolding and contextualized process of regulating a collective performance (Faraj and Xiao, 2006).

Coordination is a process of learning and adjusting behaviour and as such necessarily relies on social feedback processing, which in turn relies on social congruency. Therefore the ability to coordinate with others is also likely depend on group level factors. It follows, that system agents will have an easier time achieving coordination with social partners with which they experience high levels of structural congruency than with those with whom they are misaligned. Coordination forms the bedrock for partnerships, collaborations and the formation of social networks. It is essential to the fabric of one’s social capital. If individuals belonging to certain groups are disadvantaged with respect to their ability to coordinate with groups composing the dominant class or culture, there is a high risk of social capital disparities leading to health inequities.

Summary

Social agents are featured actors in systems impacting health and disease. The evidence that relational schema, social congruency and social coherence are influenced by group level characteristics, suggests that access to social resources that rely on social dynamics could vary unequally across groups. Members of marginalized groups, who are likely to have very different relational schema from the dominant culture, will be, as a consequence, more likely than other groups to experience low social coherence with members of the dominant culture. Marginalized groups could suffer health disparities through the cascading effects of disadvantaged social influence on the levers affecting the social determinants of health.

For members of marginalized groups, being persistently socially incongruent with the members of

the dominant culture is likely to have multiple effects on health. Vital social processes affecting health at various levels depend on social dynamics being congruent to even get off the ground. Interpersonal processes such as social learning, theory of mind, negotiation and the development of social skills could be disadvantaged if one's relational schema are incongruent with those of the dominant class (Coussi-Korbel and Fragaszy, 1995). The act of coordination, critical to so many inter-sectoral collaborations, interpersonal connections and the ability to participate politically and economically, similarly relies on monitoring synchrony and coherence (e.g. Maddux et al., 2008, Wiltermuth and Heath, 2009). The social capital that connects individuals with important resources impacting health depend on these multilevel social processes.

Conclusion

The systems approach to solving social problems is crucial for thinking through policy interventions. Policy resistance, where a policy intervention has unintended effects, sometimes even exacerbating problems, is something we want to avoid. Building better models that account for various types of systems dynamics in a complex system can help us better predict outcomes of system interventions. From an equity perspective, system dynamics that have the potential to systemically bias interactions at all levels in favor of a dominant group, class or culture is a serious problem.

Unconscious discrimination or bias, for obvious reasons, is particularly dangerous. If we cannot readily observe it, it is difficult to regulate. The acknowledgement of unobservable, subtle and systemic discrimination is not new. Yet because of inherent difficulties in creating policy to address forces that are not easily observable, we have seen little progress on this issue.

Most policies addressing inequities focus on observable acts of discrimination, perhaps because it is more straight forward to address issues that can be easily observed. Of course, policies that address more blatant forms of discrimination, often involving legal actions, are not adequate for addressing more indirect forms of inequities. In fact harsh punishments for offensive treatment, and “zero tolerance policies,” often have the effect of creating tension between groups, potentially exacerbating the social incongruencies that precipitate the problems in the first place (Bond and Haynes, 2014).

Addressing inequities in social dynamics is exceptionally challenging but crucial to address. Because social dynamics are subtle and their effect is cumulative over time, disparities arising from these mechanisms are difficult to trace back to any identifiable event. Consequently, inequities deeply embedded in decision making structures and the distribution of power within a system go completely unnoticed. Social dynamics are policy resistant because traditional rule-oriented policy approaches are simply not suited to the task of addressing inequities embedded in dynamic, multifaceted relationships. New approaches are required.

As a starting point, creating solutions for correcting the inherent biases of everyday social dynamics requires an understanding the mechanisms underlying the problem. More research is needed in this area. Secondly, we need to acknowledge that a different type of policy solution may be needed to address the subtle cumulative impact of inequities in social dynamics. If systemic inequities are only addressed when they are the clear result of an identifiable action or practice, then we are destined to continue to ignore an abundance of social problems emerging from inequitable system dynamics. Rather than relying on policies that invoke rule-based and punitive approaches to inequities, which is bound to invoke policy

resistance, a preventative approach may be the best way forward (Bond and Haynes, 2014). Social policy makers and researchers need to get creative, because solutions to this problem are not likely to fit neatly into our traditional notions of policy intervention. Policies and strategies which implement incentives for collaboration, culture sharing, social inclusion, and social network formation between different social groups, cultures and classes may be helpful in preventing and alleviating disparities. Policies and research initiatives that enhance our capacity to identify and monitor exclusion and bias are also needed. While policies that address blatant biases are critical in fighting for systemic equity, a proactive policy focus on preventing the subtle effects of bias in social interaction is important to consider as well.

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