societies

MDPI

Article

Complexity Theory in Health Promotion Research: Four Essential Principles Based on Niklas Luhmann's Systems Theory

Dan Grabowski [1,*], Jens Aagaard-Hansen [1], Morten Hulvej Rod [2] and Bjarne Bruun Jensen [1]

[1] Health Promotion Research, Steno Diabetes Center Copenhagen, Copenhagen University Hospital, Borgmester Ib Juuls Vej 83, 2730 Herlev, Denmark
[2] National Institute of Public Health, University of Southern Denmark, Studiestræde 6, 1455 København, Denmark
* Correspondence: dan.grabowski@regionh.dk

Abstract: Complexity-oriented approaches built on complexity theories are not widely used in health promotion research. The field of health promotion faces significant difficulties in explaining and addressing unforeseen impacts and side effects due to the widespread tendency to implement health promotion initiatives that are considered best practices. It is important to theoretically embrace the fact that we operate in a complex world and that we, therefore, need to redefine our approaches by acknowledging the complexities involved in promoting health. In this theoretical paper, we propose a set of four complexity-oriented principles for health promotion research based on Niklas Luhmann's systems theory: (1) direct transfer of health knowledge and health competencies is impossible; (2) all individuals and social entities are fundamentally different from each other; (3) the individual's sense of health-related meaning determines what is deemed relevant; and (4) it is essential for communication to meet expectations if it is to be observed. The set of principles presented in this article can be applied to research projects intended to explore and address challenges related to complexity in health promotion settings. It can be used as a lens through which to observe health promotion practice. If health promotion research wants to address the field that we have defined for ourselves as extremely complex and unaddressed by anyone else, we need to embrace approaches that actually do this—by providing health promotion research with a formal framework appropriate to its existing main purposes and concerns.

Keywords: complexity; sociology; health promotion; systems theory; research principles

Citation: Grabowski, D.; Aagaard-Hansen, J.; Rod, M.H.; Jensen, B.B. Complexity Theory in Health Promotion Research: Four Essential Principles Based on Niklas Luhmann's Systems Theory. *Societies* **2023**, *13*, 253. https://doi.org/10.3390/soc13120253

Academic Editors: Joana Torres and Isilda Rodrigues

Received: 13 September 2023
Revised: 23 November 2023
Accepted: 5 December 2023
Published: 6 December 2023

1. Introduction—Health Promotion and Complexity

In a review of the use of complexity-oriented approaches in health promotion research, Keshavarz Mohammadi concluded that theory-based complexity-oriented approaches have not been greatly appreciated in health promotion research and that although this area of research includes a variety of complexity-related theories, tools, and frameworks, they have been used to a very limited extent [1]. Keshavarz Mohammadi states that only very few studies have demonstrated any comprehensive awareness of the range of available complexity approaches and/or the skills needed to apply them. Many studies have not provided systematic arguments for their approach and selection of available frameworks and approaches [1]. As the field of health promotion faces significant difficulties in explaining unforeseen impacts and side effects due to the widespread tendency to continuously try to replicate health promotion initiatives that are considered best practices—when developing new projects or trying to adapt existing ones—it is increasingly recognized that we need to redefine our approaches by acknowledging the complexities of health and wellbeing [2,3]. Keshavarz Mohammadi concluded that, despite the growing and now

widespread awareness of the need to embrace complex challenges by using actual complexity theories and approaches, complex interventions rarely employ genuine complexity theories to understand, reflect on, and develop the future of health promotion and health promotion research [1].

The attention given to the need to focus on complexities in health promotion is not, however, a very recent development. In 2000, McQueen focused on the emergence of complexity by highlighting the need for more appropriate, analytical approaches. Furthermore, he found it worrisome how under-appreciated the complexity issue was in relation to concerns with evidence, suggesting that we, rather than retreating to traditional and limited ways of understanding what constitutes evidence, should look towards analytical frameworks that recognize the complexity of the field because there are no easy answers to complex human phenomena [4].

In 2011, Tremblay and Richard discussed complexity as a potential new overarching paradigm for the entire health promotion discipline [5]. They discussed that the implementation of a complexity paradigm would provide health promotion with an updated framework that would sit well among its already existing main visions and main focus areas. In a related discussion about inequalities in health, which is another cornerstone of health promotion research, Eckersley [6] reflected on our understanding of human societies as complex systems. He stressed that complexity science implies that it is a mistake to focus too heavily on one or a few factors when we are trying to understand patterns and trends in population health. Instead, we need to look at entire systems rather than breaking them down into components, which is what researchers tend to do in their quest to understand isolated phenomena [6].

Based on Latour's actor–network theory, Bilodeau and Potvin operationalized their take on complexity by proposing a sociologically informed methodological framework to address the complexity of public health interventions [7]. They presented a three-point methodological guideline: (1) the researcher's task consists of documenting the events that transform the network and intervention; (2) events must be ordered chronologically to represent the intervention's evolution; and (3) a broad range of data is needed to capture complex interventions' evolution [7]. This operationalization of a complexity-oriented theory is an interesting step towards using complexity theory actively in health promotion research. But what constitutes complexity, or, put differently, how is complexity defined in the broader literature? Stewart concluded that social processes are far too complex for traditional complexity theory to deal with without thoroughly incorporating sociological theories [8]. He discussed the difficulties of establishing complexity models for processes involving ongoing interpretation, arguing that the notions of system and environment need extensive remodeling in social studies. In doing that, he presented and discussed several definitions of complexity: Cohen and Stewart suggested a rather simple definition of complexity: "*We may tentatively define the complexity of a system as the quantity of information needed to describe it*" [9] (p. 20). Coveney and Highfield [10] (p. 6) offered a different kind of definition: "*. . .complexity is the study of the behaviour of macroscopic collections of (basic but interacting units) that are endowed with the potential to evolve*". In writing specifically about organized social complexity, La Porte ventured the following definition: "*the degree of complexity in organized social systems. . . .is a function of the number of system components, the relative differentiation or variety of these components, . . .and the degree of interdependence among these components*" [11] (p. 6). These definitions are just a few of many, and as such, they are not presented here in an attempt to lay out the entire landscape of complexity theories. They do, however, represent many of the typical elements implicitly touched upon in the health promotion examples discussed above: (1) Complexity is related to the quantity of interacting elements and the ensuing need for information and communication. (2) Complexity is related to collections of interacting units that evolve. (3) Complexity is related to the number of system components and the differentiations and interdependence of these components.

As these different but not unrelated definitions of complexity show us, it takes a complex theory to incorporate all of them in a way that is capable of addressing the outlined complexity issues in health promotion research, which is the aim of our current paper.

A sociological theory that has the potential to encompass all of these elements in the context of the outlined health promotion research challenges is Niklas Luhmann's systems theory. Luhmann describes how the basic rationale for the existence of social systems is the reduction of complexity, which is understood as the infinite horizon of possibilities of action and experience, which is extremely complex. Human action implies an actualization of some of these possibilities out of this horizon and is necessarily contingent [12]. As the horizon of possibilities is infinite, it must be filtered to prevent it from overburdening the individual. Luhmann designates this filtering function as complexity reduction, which is undertaken by social systems. By reducing complexity, social systems make human action possible [13].

Luhmann himself wrote the following: "*We will call an interconnected collection of elements "complex" when, because of immanent constraints in the elements' connective capacity, it is no longer possible at any moment to connect every element with every other element*" [14] (p. 24). Luhmann elaborated on the definition by stating that complexity means "*. . .being forced to select; being forced to select means contingency; and contingency means risk*" [14] (p. 25). Among several essential elements of Luhmann's theory, this inability to connect every element with every other element and the ensuing forced selections and choices are exactly what we see in the increasingly complex healthcare systems with increasingly complex health information and health communication. Thus, we need to understand the mechanisms of complexity if we are to navigate within it.

In the present theoretical article, we will use Luhmann's definition of social complexity as our main theory. While presenting selected elements of Luhmann's theory, we will highlight four elements that we propose are essential principles of complexity-oriented health promotion research that will help us understand and actively work with health promotion practice. Subsequently, we will discuss the overall potential and barriers associated with employing Luhmann's theory.

In a discussion of Luhmann's applicability to public health research, Meyer, Gibson, and Ward have performed a somewhat similar theoretical exercise. In doing so, they focused on system differentiation, communication, polycontexturality, and especially structural coupling. Based on Luhmann's theories, they present compelling arguments on how social systems theory provides a foundation from which to understand the problematic communication between competing sectors. As such, they operate on a rather macro-sociological level as they discuss the difficulties of trying to disseminate public health research into policy and practice [15].

In our paper, we will aim to include more discussions on micro-sociological elements in terms of what complexity means for individual people and micro-relational interactions, while also focusing directly on health promotion research rather than the broader scope of public health research.

2. Luhmann's Theory as Complexity-Oriented Principles for Health Promotion Research

Luhmann's theory is complex and multifaceted, and it contains a myriad of interconnected and interdependent concepts. Therefore, our presentation of the selected elements with the most relevance for health promotion research is the result of rigorous theoretical discussions about Luhmann's theory as well as the theory's applicability to health promotion research.

As a part of this process, we have also had to exclude several theoretical elements. This is not necessarily because we think that the excluded elements are unimportant, but in order to stay theoretically focused, we have had to be very specific in selecting the elements that we find are most relevant when developing principles for health promotion research.

Luhmann's theory takes its point of departure from the distinction between psychological and social systems. What Luhmann called psychological systems is in fact the consciousness of what others might call persons, individuals, or subjects, whereas he described social systems as the communication in either interactions, organizations or societies. He depicted the distinction and the two types of systems as follows: "*The former* [psychological systems] *operates on the basis of consciousness, the latter* [social systems] *on the basis of communication. Both are circularly closed systems, each of which can apply only its own mode of autopoietic reproduction. A social system cannot think; a psychological system cannot communicate. Seen causally, there are nonetheless immense, highly complex interdependencies. Closure in no way means that there are no causal relations or that such relations cannot be observed or described by an observer*" [16] (p. 165).

The consciousness of psychological systems and the communication of social systems do not have direct access to each other [14,17]. This means that psychological systems do not communicate, but are limited to observing communicative social systems, just as social systems are limited to observing psychological systems. The systems are therefore closed and autopoietic, which means that each system continually self-interprets and self-reflects on the basis of its own self-produced contents.

Box 1. Principle number one.

The distinction between psychological and social systems forms the basis of our complexity-oriented health promotion principle number one. This principle will enable us to view the relationship between any social system in the domain of health and health promotion as an entity operating on the basis of something fundamentally different than the operating element of any psychological system. For health promotion research and practice, this means that promoting health is a process of communicating information that will never be understood in the form it is communicated. We will call this principle: **Direct transfer of health knowledge and health competencies is impossible.**

That people do not communicate is one of the key points in understanding why Luhmann's theory is relevant when looking at how individuals, (health) organizations, and institutions understand each other and construct meaning on the basis of uncertainty and risk brought on by the inevitable contingencies caused by complexity. The inability to comprehend the basic element of the other kind of system is a way of viewing the issue of the co-evolution of the social and the individual. In Luhmann's case, one key fixture is each system's unique environment (which, in Luhmann's terms, is everything outside the system), which in turn, makes every system equally unique: "*The environment is a system-relative situation. Every system removes only itself from its environment. Therefore, the environment of each system is different. And thus the unity of the environment is constituted by the system*" [14] (p. 185).

Box 2. Principle number two.

The notion that every system has a unique environment that is different from all other systems' environments forms the basis of our complexity-oriented health promotion principle number two. This theoretical innovation enables us to view every person as different from everyone else, because any psychological system observing its environment is observing something slightly different than what everyone else is observing. This is important to bear in mind in health promotion, as everyone will observe health and/or health-related information or action in a slightly different way than his or her peers will—and the messages will therefore mean something different in the context of the different environments. We will call this principle: **All individuals and social entities are fundamentally different from each other.**

The notion that the systems are closed means that the consciousness that perpetually recreates the way we (as psychological systems) interpret and understand ourselves in the context of our own unique environment always comes from within the system itself.

Consciousness never comes from the outside, as psychological systems never derive consciousness from other psychological systems or social systems. They are therefore closed when it comes to this operational element. It is this self-reference that makes it possible for systems to continually separate themselves from their environment.

The psychological system will autopoetically keep producing the consciousness needed to maintain a sense of meaning, while at the same time observing and trying to make sense of the environment. Here, we reach the paradox that while the systems are closed when it comes to their self-reference, they are at the same time open when it comes to observing the environment. The concept of observation is therefore essential to how systems evolve and change.

When continually attempting to understand—and create meaning based on—the environment, the system needs to self-reference so that it can perpetually recreate its own self-understanding [18]. It is based on self-understanding and sense of meaning that any ensuing observations are made. The concept of meaning is thus of great importance to systems theory, especially regarding the co-evolution of psychological and social systems, because every system operates on the basis of its own meaning: "*At any time the one kind of system is the necessary environment of the other. This necessity is grounded in the evolution that makes these kinds of systems possible. Persons cannot emerge and continue to exist without social systems, nor can social systems without persons. This co-evolution has led to a common achievement, employed by psychological as well as social systems. Both kinds of systems are ordered according to it, and for both it is binding as the indispensable, undeniable form of their complexity and self-reference. We call this evolutionary achievement 'meaning'*" [14] (p. 59). In other words, the co-evolution of the individual and the social is highly dependent on the continual construction of meaning, which is highly dependent on the structures of observation.

Box 3. Principle number three.

The concept of meaning forms the basis of our complexity-oriented health promotion principle number three: This is essential to understanding how and why the individual person is able to maintain his or her own horizon of meaning despite the complexity pressures of the environment. Translated into a health promotion context, we can view this continually self-referenced meaning as the person's (the psychological system's) sense of him- or herself as being a more or less healthy or unhealthy individual, depending on what is deemed meaningful. This meaning will accordingly be more or less established as the individual self-understanding that defines how and when the health promoting environment is seen as more or less meaningful. We will call this principle: **The individual's sense of health-related meaning determines what is deemed relevant.**

Based on the assumption that both psychological and social systems use meaning in their self-reference and perpetually try to make sense of each other, we want to understand how they in fact influence each other. For social systems to influence psychological systems, and vice versa, the systems need to create noise that enables other systems to notice them. For psychological systems to be influenced by the communication in social systems (and vice versa), they must recognize them as relevant enough to observe—and observing them then has to make sense for the constantly self-reproducing meaning within the system itself [14,19].

Observing communication from different (though sometimes very similar) social systems represents a high level of complexity in relation to continually having to make choices, as the individual psychological system is exposed to numerous systems on an everyday basis, and all of these social systems (relations, organizations, and societies) operate with different meanings that are continually changing.

The very basic operation performed when observing entails making a distinction, and this distinction is contingent and therefore associated with uncertainty and risk [20]. When a psychological system observes something, it is automatically not-observing something else. Or, rather, it is not-observing the rest of the environment. This means that when anyone is observing something health-related in any given setting, they are automatically not-observing something else in relation to the issue. The same applies to a social system (a

school, class, local community, or individual interaction) observing a psychological system. By analyzing how, where, and why these distinctions are made, we can analytically sharpen our focus on why people observe what they observe and, perhaps more importantly, why they do not observe what they do not observe. Why does a certain way of observing and understanding health or each other as either healthy or unhealthy offer meaning to some observing systems and not to other observing systems?

The observation of health and healthy behavior can (and will) be carried out and constructed anywhere, as distinctions can be made anywhere. Luhmann adapts this understanding of distinctions in his definition of observing systems: "*Observing means making a distinction and indicating one side (and not the other side) of the distinction*" [16] (p. 85). The important thing here is the role of the observer, without which there would be nothing.

To further elaborate on the concept of observation, we must move beyond it to what Luhmann called 'expectational structures': "*For psychological systems, we understand expectations to signify a form of orientation by which the system scans the contingency of its environment in relation to itself and which it then assumes as its own uncertainty within the process of autopoietic reproduction*" [14] (p. 268).

These expectational structures constitute a way of navigating the complex environment of possible observations. By ascribing expected meaning to different contexts or relations, a system will have an idea about where it will most likely be able to observe meaning in relation to itself or in relation to any given prior observation. With these expectational structures, Luhmann described how expectations are tied to persons, roles, programs, and values, respectively. These expectations are bundled together and provide identifiable perspectives that make it possible to know where to observe meaningfully. This is an important theoretical element to consider when researching how, where, and why people acquire health knowledge and develop or change health behavior.

For health promotion to be able to actively change expectational structures among social entities (which is essentially at the heart of health promotion), it is therefore necessary to fit into the existing structures. Once the health promotion communication has been observed and meaningfully understood by people or social entities as something that fits within existing expectational structures, it will be possible to try to transform or change the expectational structures—and thereby change the boundaries for future observations.

Box 4. Principle number four.

The conceptual innovation of expectational structures forms the basis of our complexity-oriented health promotion principle number four: In order for health promotion initiatives to be observed and meaningfully understood by people or social entities, health promotion initiatives and interventions need to fit into the existing expectational structures that are tied to relevant persons, roles, or relational constructs. We call this principle the following: **It is essential for any communication to meet expectations if it is to be observed.**

To sum up, we have now presented the most important elements of Luhmann's theory and highlighted four principles that can be used actively in complexity-oriented health promotion research:

1. Direct transfer of health knowledge and health competencies is impossible.
2. All individuals and social entities are fundamentally different from each other.
3. The individual's sense of health-related meaning determines what is deemed relevant.
4. It is essential for communication to meet expectations if it is to be observed.

We argue that, taken together, these four principles constitute a full framework that can be used when health promotion researchers aim to understand the complexities of social processes as well as inspire and motivate the development and implementation of new initiatives and interventions.

3. Discussion: Complexity Theory to Understand Practice

In Peter Stewart's discussion of the use and potentials of complexity theories [8], he concluded that social processes are far too complex for traditional complexity theory to deal with without thoroughly incorporating sociological theories. In the present paper, we do this by discussing the potential application of Luhmann's theories to health promotion and by presenting four concrete, theoretically informed principles of complexity-oriented health promotion research.

One way to view the complex area of health promotion is as a complex network of observing systems in a perpetual process, where each system is continuously being forced to make selections, which then creates expansive contingencies and, therefore, risks. Approaching this from the perspective of health promotion research could potentially entail studying the observational distinctions made by systems that are trying to create meaning from the complex environment. The inability to observe and understand everything and the ensuing forced selections and choices are exactly what happens in increasingly complex healthcare systems with increasingly complex health information and health communication, which force individuals and societies to make more or less unsubstantiated choices regarding their own health and the health of others.

But how do we, as researchers, best observe observers' observations? Or to pose that question in slightly less abstract terms: How do we study how target groups make distinctions when trying to create meaning in relation to health and how they manage (or do not manage) to meaningfully change health behavior in an attempt to avoid risk? This essential research ambition is at the very heart of our motivation to create complexity-oriented principles for health promotion research. We need better tools to observe and describe individuals' and groups' understandings of health-related risks, so that we can use these understandings as a platform to develop health-promoting initiatives.

We know that significant health promotion problem areas such as childhood overweight and obesity are caused by a complex interplay between genetic, behavioral, cultural, economic, and environmental factors [21,22]. Furthermore, we know that relatively complex multicomponent behavior-change interventions are somewhat effective in achieving small reductions in body weight status in children of all ages in the short term. We also know that no single approach has succeeded in producing any kind of significant or lasting effect [23]. We argue that a major part of this health promotion challenge lies in the lack of direct access between the consciousness of psychological systems and the communication of social systems. This is where our first principle comes into play. The notion that direct transfer of health knowledge or health competencies must be accepted as fundamentally impossible means that we should focus on the apparent contingencies instead of focusing on how to create something that is impossible. This changes the lens through which health promotion researchers as well as health promotion practitioners observe this challenge and the frustrations that are continuously created owing to the failures to accomplish an impossible task. Focusing on identifying contingencies is a way of accepting (and working with) complexity rather than trying to eliminate it.

To further explore the case of childhood obesity introduced above, we can look at the complex intra-familial dynamics at play in families enrolled in childhood obesity interventions [24]. In these families, we see numerous examples of how individual members within the family create significantly different meaning based on their individual observations of the family social system, which will always be a very significant part of the environment of the psychological systems that constitute the individual family members. In this connection, it is important to bear in mind that the individual psychological system will always be in the environment of the family social system and that there will be smaller intra-relational social systems in the family that also operate in the environment of the family social system.

This is a good example of the applicability of our second complexity principle, which is that all individuals and social entities are fundamentally different from each other even when they are exposed to the same health promotion settings and share the same family history and cultural background. In apparently coherent families, we see structures

of observation that are so fundamentally different that opposing health perceptions are created within the same family [24]. The important point here is that each family member's close environment will always be different from the other's environment because they are in each other's environment, which then creates different self-perceptions and therefore also different structures for observing health and obesity in the family. Adhering to this research principle is important for health promotion researchers because it eliminates the risk of assuming that people from the same family need the same kind of health promotion initiative or that they will automatically be able to relate to the same approaches. This is, of course, not only relevant in relation to family dynamics but also equally relevant when working with other groups, where there could be a tendency to view and treat every member of the group as identical regarding their health actions, understandings, and preferences.

To actively understand and make long-term use of any health-promoting initiative or intervention, individuals or groups need to continually recreate their own self-understanding and sense of meaning. Without a sense of meaning, no one can relate to anything. Our third principle highlights the notion that an individual's sense of his or her own health determines what is deemed relevant, and it is closely related to this constantly self-referencing self-understanding. Staying within the theme of childhood obesity interventions, many families experience severe difficulties when trying to create meaning from the communication they receive in the social systems of the obesity clinic, school, daycare, mass media, and sometimes even from other families in their local environment. Different people identify with very different things, and the ensuing health identities play a significant role in what is deemed important and relevant enough to observe and relate to [25]. Following this third principle in health promotion research means acknowledging the role of identities in how individuals and groups can acquire health knowledge and make health behavior changes accordingly.

An important point here is the fact that, according to Luhmann, systems tend to increase their own internal complexity in an effort to reduce the complexity in the environment. For families observing any kind of health communication, this means that the pressure created by increased complexity in the environment creates a demand for increased internal complexity within the family as well as in the individual family members. This could lead to an unintended overload of misguided health information directed at the family, causing an unnecessary increase in internal complexity.

This lack of capacity to observe the full complexity of the environment is the cornerstone of the co-evolution of the social and the individual. Here, we find the reason for the complex development of individual and societal health behavior, as every system must continually choose where to observe among the multitude of potential observations. Every family struggling with childhood obesity issues is (in their own way) trying to observe the problem area (as they see it) as the multitude of health-related communications in an environment that is different from every other family's environment—and the observational selections that they make could always be made differently.

Our fourth principle, concerning how communication needs to fit into expectational structures if it is to be noticed and meaningfully observed, can also be elaborated on by keeping our focus on families with children in obesity treatment. In these families, there are highly complex expectations regarding health in general and obesity interventions in particular [25,26]. It is not important whether these are distinctly positive or negative expectations; the important thing is what is deemed relevant to observe, or, put differently, what the families expect could have anything to do with health in the context of their family. It is important to remember that these expectational structures are a way of navigating the complex environment of possible sources of health information. By ascribing expected meanings to different organizations, institutions, or relations, any given family will have pre-structured ideas about where it is most likely that it will be able to observe meaning in relation to itself or in relation to any given prior observation. The expectations are often tied

to specific persons, roles, programs and values that the individual family sees as authentic and thereby particularly relevant [27].

The third principle concerning meaning and the fourth principle concerning expectational structures may seem like two sides of the same thing, and that is exactly what they are. The two are interdependent, and they are also different theory-informed ways of looking at how individuals or groups relate to health promotion and acquire health knowledge. Focusing on complex self-referential meaning-making is one way to look at the psychological system's individual health identification, whereas looking at the expectational structures is a way to identify ways of communicating that fit among these structures in an effort to balance inner and outer complexity.

Eckersley wrote that we need to look at entire systems to avoid the mistake of focusing too heavily on one or a few factors when trying to understand patterns and trends in population health [6]. Looking at entire systems is, according to Luhmann, rarely possible, and, therefore, not a completely accurate way of describing the issue at hand. What we need to do is study how the systems observe and make sense of each other. This is right at the heart of why Luhmann's theories are highly appropriate for health promotion research. They enable us to look directly at the complex observation-based interplay of systems that affect the lives of individuals, families, and groups of people on a daily basis and are theoretically constructed in a manner that can encompass this complex interplay by focusing explicitly on why and how distinctions are made.

With respect to operationalizing a complexity-oriented approach, the suggestion made by Potvin and Bilodeau can serve as a good reference point [7]. They suggested that (1) the researcher's task consists of documenting the events that transform the network and intervention; (2) events must be ordered chronologically to represent the intervention's evolution; and (3) a broad range of data is needed to capture complex interventions' evolution. When we look at their first two points through the Luhmann lens, it becomes clear that when researchers observe health behavior or health communication among people, they are also observing these people observe. The very basic operation when observing entails making a distinction. Therefore, observing distinctions is key to establishing the role of complexity in health promotion research. If we, as researchers, can observe and describe distinctions among psychological systems as well as social systems, we can also pinpoint how the systems influence each other's distinctions, and in doing so, we are describing the co-evolution of the systems and thereby also potentially the evolution of any given intervention. Regarding Bilodeau and Potvin's third point, it is indeed very important to use complex datasets to adequately analyze complex phenomena. As such, focusing on observational distinctions fits well with Potvin and Bilodeau's theoretical anchoring in the actor-network theory and adds to the scope by emphasizing the focus on relational interplay.

In our childhood obesity example, the families are clearly operating in a field with a multitude of health risks that are often perceived as impossible to navigate. Luhmann's theory enables us to focus on the fact that increased complexity means that people are forced to select, that selection means contingency, and that contingency means risk [14]. If we base our research on the four complexity-oriented principles, we will be able to reduce risk by constantly focusing on acknowledging and balancing complexity by designing interventions that make selection easier, rather than unrealistically trying to reduce the complexity itself.

Working with Luhmann's often abstract theories in a practice-oriented field of research poses a challenge that does indeed entail a relatively high level of interpretation. Looking at our proposed principles in the context of the case presented above, it is, however, clear that our use and interpretation of Luhmann are in line with how other researchers have adapted his theories to understand practice-related mechanisms. Vanderstraeten states that what Luhmann's theory offers is a framework within which a reconceptualization of socialization that takes both individual persons and social systems into account is possible. Through a Luhmann lens, socialization is not merely the inculcation of societal values and

norms nor the realization of individual potential. How an individual develops and how the potential of an individual changes depends upon the social systems in which he or she is involved [28]. This is basically another way of describing how social interactions and exposure to societal communication form the difference between possibility and reality, and it is this difference that constitutes the potential effects of health promotion and health communication in a process signified by the risks associated with uncertainty and constant selection.

Meyer, Gibson, and Ward describe how health exists outside the boundaries of the healthcare system and therefore constitutes a polycontextural reality. Drawing on Luhmann's systems theory, they explore the extent to which public health initiatives can span other systems [15]. This approach to addressing social determinants of health across systems is very much at the core of the complex genetic, behavioral, cultural, economic, and environmental factors challenges related to childhood obesity. This idea of a polycontextural society becomes relevant when analyzing the lack of meaningful communication between monocontextural systems, which therefore end up being incomprehensible for individuals trying to create health-related meaning.

4. Conclusions: A Complexity-Oriented Approach to Health Promotion Research

Based on our experience with health promotion research and our reading of the complexity literature and Luhmann's theory, we propose a set of four complexity-oriented principles for health promotion research based on Niklas Luhmann's systems theory: (1) direct transfer of health knowledge and health competencies is impossible; (2) all individuals and social entities are fundamentally different from each other; (3) the individual's sense of health-related meaning determines what is deemed meaningful and thereby relevant; and (4) it is essential for communication to meet expectations if it is to be observed.

In our presentation of principles and theory as well as in our discussion in relation to the childhood obesity example, we have focused explicitly on the areas of psychological and social systems. This does not, in any way, mean we do not acknowledge the importance of biological or environmental factors. They are simply outside the scope of the present paper.

As pointed out by Tremblay and Richard, integrating a complexity paradigm would provide health promotion with a formal framework appropriate to its existing main purposes and concerns [5]. If we, as health promotion researchers, truly want to address the field that we have defined for ourselves as extremely complex and unaddressed by anyone else, we need to embrace approaches that actually do this, thereby providing health promotion research with a formal framework appropriate to its existing main purposes and concerns.

This set of principles constitutes an innovation, and as such, it needs refinement and further development. It needs to be discussed and challenged by scholars of health promotion research before we can move on to a more hands-on outline of how our principled approach will materialize in the form of concrete methodologies. This is not, by any means, an easy task. Trying to operationalize abstract complexity theory and thereby bridge the gap from theory to research practice and further to health promotion practice will be difficult. This is in line with the conclusions from Meyer, Gibson, and Ward in their exploration of the applicability of Luhmann's theories to the field of public health research [15].

This does not, however, change the overall conclusion that complexity theory in the form of research principles has clear potential when it comes to enabling health promotion research to potentially address the field that we have defined for ourselves as extremely complex and unaddressed by anyone else.

Author Contributions: Conceptualization, D.G.; methodology, D.G., J.A.-H. and B.B.J.; formal analysis, J.A.-H., M.H.R. and B.B.J.; writing—original draft, D.G.; writing—review and editing, J.A.-H., M.H.R. and B.B.J. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Keshavarz Mohammadi, N. Diffusion of complexity science into health promotion research and practice: Foundations for a complex future. *Health Promot. Int.* **2021**, *36*, 1213–1218. [CrossRef] [PubMed]
2. Gugglberger, L. Can health promotion also do harm? *Health Promot. Int.* **2018**, *33*, 557–560. [CrossRef] [PubMed]
3. Keshavarz Mohammadi, N. One step back toward the future of health promotion: Complexity-informed health promotion. *Health Promot. Int.* **2019**, *34*, 635–639. [CrossRef] [PubMed]
4. McQueen, D.V. Perspectives on health promotion: Theory, evidence, practice and the emergence of complexity. *Health Promot. Int.* **2000**, *15*, 95–97. [CrossRef]
5. Tremblay, M.-C.; Richard, L. Complexity: A potential paradigm for a health promotion discipline. *Health Promot. Int.* **2011**, *29*, 378–388. [CrossRef] [PubMed]
6. Eckersley, R. Beyond inequality: Acknowledging the complexity of social determinants of health. *Soc. Sci. Med.* **2015**, *147*, 121–125. [CrossRef] [PubMed]
7. Bilodeau, A.; Potvin, L. Unpacking complexity in public health interventions with the Actor–Network Theory. *Health Promot. Int.* **2016**, *33*, 173–181. [CrossRef] [PubMed]
8. Stewart, P. Complexity theories, social theory, and the question of social complexity. *Philos. Soc. Sci.* **2001**, *31*, 323–360. [CrossRef]
9. Cohen, J.; Stewart, I. *The Collapse of Chaos: Discovering Simplicity in a Complex World*; Penguin: New York, NY, USA, 1995.
10. Coveney, P.; Highfield, R. *Frontiers of Complexity: The Search for Order in a Chaotic World*; Faber and Faber: London, UK, 1995.
11. La Porte, T. Complexity: Explication of a concept. In *Organized Social Complexity: Challenge to Politics and Policy*; La Porte, T.R., Ed.; Princeton University Press: Princeton, NJ, USA, 1975; pp. 3–39.
12. Krause, D. Luhmann-Lexikon. In *Eine Einführung in das Gesamtwerk von Niklas Luhmann*; Lucius & Lucius: Stuttgart, Germany, 2005.
13. Valentinov, V. The Complexity–Sustainability Trade-Off in Niklas Luhmann's Social Systems Theory. *Syst. Res. Behav. Sci.* **2014**, *31*, 14–22. [CrossRef]
14. Luhmann, N. *Social Systems*; Stanford University Press: Palo Alto, CA, USA, 1995.
15. Meyer, S.; Gibson, B.; Ward, P. Niklas Luhmann: Social Systems Theory and the Translation of Public Health Research. In *The Palgrave Handbook of Social Theory in Health, Illness and Medicine*; Collyer, F., Ed.; Palgrave Macmillan: London, UK, 2015.
16. Luhmann, N. *Theories of Distinction*; Stanford University Press: Palo Alto, CA, USA, 2002.
17. Luhmann, N. What is communication? *Commun. Theory* **1992**, *2*, 251–259. [CrossRef]
18. Luhmann, N. *Essays on Self-Reference*; Columbia University Press: New York, NY, USA, 1990.
19. Luhmann, N. Complexity and Meaning. In *The Science and Praxis of Complexity*; United Nations University: Tokyo, Japan, 1985; pp. 99–104.
20. Spencer-Brown, G. *Laws of Form*; Bohmeier Verlag: Leipzig, Germany, 2009.
21. Lobstein, T.; Baur, L.; Uauy, R. Obesity in children and young people: A crisis in public health. *Obes. Rev.* **2004**, *5*, 4–85. [CrossRef] [PubMed]
22. Williams, E.P.; Mesidor, M.; Winters, K.; Dubbert, P.M.; Wyatt, S.B. Overweight and obesity: Prevalence, consequences, and causes of a growing public health problem. *Curr. Obes. Rep.* **2015**, *4*, 363–370. [CrossRef] [PubMed]
23. Ells, L.J.; Rees, K.; Brown, T.; Mead, E.; Al-Khudairy, L.; Azevedo, L.; McGeechan, G.J.; Baur, L.; Loveman, E.; Clements, H.; et al. Interventions for treating children and adolescents with overweight and obesity: An overview of Cochrane reviews. *Int. J. Obes.* **2018**, *42*, 1823–1833. [CrossRef]
24. Hoeeg, D.; Christensen, U.; Grabowski, D. Intra-familial health polarization: How diverse health concerns become barriers to health behavior change in families with pre-school children and emerging obesity. *Sociol. Health Illn.* **2020**, *42*, 1243–1258. [CrossRef] [PubMed]
25. Grabowski, D. Health Identity: Theoretical and empirical development of a health education concept. *J. Sociol. Res.* **2015**, *6*, 141–157. [CrossRef]
26. Hoeeg, D.; Christensen, U.; Lundby-Christensen, L.; Grabowski, D. Contextual Complexities in Implementing a Family-Based Childhood Obesity Intervention: The Perspectives of Enrolled Children and Their Parents. *Children* **2020**, *7*, 267. [CrossRef] [PubMed]

27. Hoeeg, D.; Mortil, A.M.A.; Hansen, M.L.; Teilmann, G.K.; Grabowski, D. Families' Adherence to a Family-Based Childhood Obesity Intervention: A Qualitative Study on Perceptions of Communicative Authenticity. *Health Commun.* **2020**, *35*, 110–118. [CrossRef] [PubMed]
28. Vanderstraeten, R. Autopoiesis and socialization: On Luhmann's reconceptualization of communication and socialization. *Br. J. Sociol.* **2000**, *51*, 581–598. [CrossRef] [PubMed]