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The Concept of Wicked Problems:

Improving the Understanding of Managing Problem Wickedness in Health and Social Care

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1. Introduction

Editors of three scientific journals point out in their recent joint editorial that "…health care leaders at all levels are faced with some of the most complex and challenging problems confronting leaders" (Hutchinson et al. 2015, 3021). More precisely, they write of *wicked problems* and call for moral courage in tackling problem wickedness. As researchers deeply involved with wicked problems, we share this view and strive to further process the significance of wicked problems in managing health and social care. Our aim is to increase the understanding of the sources of problem wickedness, and to explore the implications for leaders in health and social care.

This article consists of four main sections. In the first section, we will define the concept of wicked problems in detail. We also consider the conceptual criticism and provide examples of wicked problems found in the health and social care sector. The second section scrutinizes the conceptual expansions of wicked problems, such as the *super wicked problem*, *wicked ethics*, and the *wicked game*, and assesses their relevance from the health and social care perspective. In the third section, we will deepen the theoretical foundations of the concept of wicked problems by affiliating wicked problems to the complexity science framework. As complexity can be a source of problem wickedness (see Zellner and Campbell 2015), this is an essential aspect of the analysis. The fourth section focuses on the leaders' point of view. Hutchinson et al. (2015) point out the challenge of

defining leadership "when there are no easy answers." We conclude with a summary of key insights.

2. Defining a Wicked Problem

The concept of wicked problems[1] already has a fifty-year history. In 1967, an esteemed systems scientist, C. West Churchman, hosted a seminar series at the University of California, Berkeley[2]. In his account of what occurred, Skaburskis (2008) reports how German-born faculty member Professor Horst W.J. Rittel made a presentation at one seminar session that included a description of the differences between social and technical problems, using what came to be known as the ten main features of wicked problems. Churchman himself became interested in the concept and wrote a guest editorial titled *Wicked Problems* for *Management Science* (Churchman 1967)[3]. This was the first reference to wicked problems in the academic literature. Rittel took several years to present his arguments in article form, but finally in 1973, with his colleague Melvin M. Webber, he published the seminal article *Dilemmas in the General Theory of Planning* in *Policy Sciences*.[4] Today, (June 7, 2017) Google Scholar records more than 10 000 citations of the article. Although there are major continental differences on the level of awareness about the concept of wicked problems (Xiang 2013), the overall interest in the concept "seems greater than ever"[5] (McCall and Burge 2016, 200; Danken, Dribbisch, and Lange 2016). This is understandable, as the problems we face seem to be in increasing numbers wicked by their very nature (Raisio and Lundström 2015). The dilemma, however, is that these problems are often thought to be tamer than they really are, or the problems are understood as wicked, but even then, the chosen approaches are more like approaches required to address so-called *tame problems* (Rittel and Webber 1973; Raisio 2009).

Rittel and Webber noted that, "the problems that scientists and engineers have usually focused upon are mostly 'tame' or 'benign' ones" (1973,160). The concept of tame problems offers a form of counterpart to the concept of wicked problems. Tame problems can be defined thoroughly and permanently. There is little or no ambiguity. It is relatively easy to reach a common understanding of such problems, so conflict situations are rare. In addition, it is obvious when a tame problem has been solved; there is a clear end solution and its accuracy can be evaluated objectively. Solving a tame problem is in practice a repetition, in the sense that someone with enough expertise and specialization and using proven solution processes could repeatedly solve similar problems (King 1993; Roberts 2000). It is often also the case that one can start solving tame problems from the beginning, without any major impact, as if the process took place in laboratory conditions. Overall, solving a tame problem can be understood as a rather linear process proceeding step-by-step from problem definition, through gathering information and analysis, to identifying different solutions, after which the best solution to the problem is identified and then implemented (Conklin 2005). Think for example of an experienced mechanic fixing a familiar model of car.

Wicked problems resist such approaches, as is clear from the ten characteristics attributed by Rittel and Webber (1973) to such issues (see Table 1). Owing to the explicit overlapping between the different characteristics, several researchers have condensed them further (see e.g., Conklin 2005; Norton 2012; Xiang 2013). However, Danken, Dribbisch and Lange (2016, 16–17) critique the lack of a clear-cut definition for the concept, as well as the fragmented debate on problem wickedness. Their systematic quantitative literature review strives to collate the existing academic literature so that, "we as scholars know what we are talking about when we talk about wicked problems" and thus would be "able to enter more purposefully into a discussion on their

management." Three dominant and interrelated thematic clusters of wicked problems' core characteristics emerge from the above review: the challenge of problem definition; non-resolvability; and multi-actor environments.

1. There is no definitive formulation of a wicked problem. Different approaches to the problem see it differently. Different proposed solutions reflect the fact that it is defined differently.
2. There is a 'no stopping rule'. Unlike in an experiment where you can stop natural processes and control variables, you cannot step outside a wicked problem or stop it to contemplate an approach to answering it. Things keep changing as policy makers are trying to formulate their answers.
3. Solutions are not true or false, rather they are good or bad. There is no right answer, and no-one is in the position to say what is a right answer. The many stakeholders focus on whether proposed solutions are ones they like from their point of view.
4. There is no test of whether a solution will work or has worked. After a solution is tried, the complex and unpredictable ramifications of the intervention will change the context in such a way that the problem is now different.
5. Every solution is a 'one-shot operation'. There can be no gradual learning by trial and error, because each intervention changes the problem in an irreversible way.
6. There is no comprehensive list of possible solutions.
7. Each wicked problem is unique, so that it is hard to learn from previous problems because they were different in significant ways.
8. A wicked problem is itself a symptom of other problems. Incremental solutions run the risk of not really addressing the underlying problem.
9. There is a choice about how to see the problem, but how we see the problem determines which type of solution we will try and apply.

10. Wicked societal problems have effects on real people, so one cannot conduct experiments to see what works without having tangible effects on people's lives.

Table 1. The ten original characteristics of wicked problems (Rittel & Webber 1973)

The challenge of problem definition refers to the cognitive uncertainty (van Bueren, Klijn, and Koppenjan 2003) and the content complexity (Stoppelenburh and Vermaak 2009) related to problem wickedness. Wicked problems are by nature so multidimensional, interrelated, and ambiguous that understanding them is a considerable challenge. The major uncertainty arises from a lack of knowledge or understanding of the problem and also the solutions; the identification of cause-effect relationships is a particularly challenging exercise (McCall and Burge 2016). *Non-resolvability* refers to the chronic nature of wicked problems. As Danken, Dribbisch and Lange (2016, 16–17) write, "scholars hold that any attempt to resolve [wicked problems] may exacerbate the problem, reveal new aspects of the problem, and/or generate additional, often unanticipated problems." This is to be understood as a problem of demarcation (see Skaburskis 2008). Waves of consequences can be such that the comprehensive evaluation of solutions becomes virtually impossible (McCall and Burge 2016).

Multi-actor environments refer to the social complexity related to problem wickedness (Conklin 2005). When scholars refer to social complexity, they usually speak of the range of people involved and their diversity, which means the actors concerned have a variety of worldviews, political agendas, educational and professional backgrounds, responsibilities, and cultural traditions. This diversity makes the extent of social complexity within the wicked problem overwhelming in most cases (Weber and Khademian 2008). These multi-actor environments include strategic and

institutional uncertainty (van Bueren, Klijn, and Koppenjan 2003). Strategic uncertainty arises from the presence of a multitude of actors each with their own perceptions of the problem and the solution, creating many different and sometimes conflicting strategies. Institutional uncertainty develops from the existence of many different arenas—from the local to the global—where wicked problems are discussed. Danken, Dribbisch and Lange (2016, 28) use the three thematic clusters to devise the following formulation of the concept of wicked problems: "[wicked problems] are chronic public policy challenges that are value-laden and contested and that defy a full understanding and definition of their nature and implications."

One significant question debated is the issue of degrees of wickedness. For example, Conklin (2005) considers that problems can be wicked even if they do not include all the original ten features. For Southgate, Reynolds and Howley (2013), while some characteristics might not be as clear as others, it is the sum of these individual characteristics that make the problems wicked. Norton (2012, 450) highlights the involvement of conflicting values as the underlying unifying threat of all the characteristics of wicked problems: "while the characteristics [Rittel and Webber] list for wicked problems are quite disparate, the class of wicked problems are all expressions of diverse and conflicting *values and interests*, which cause individuals to view problems very differently" (italics in the original). For Head (2008, 103) this "divergence and fragmentation of viewpoints, values, strategic intentions," alone might not be enough to make a problem wicked, and an additional high level of "complexity of elements, subsystems and interdependencies," and "uncertainty in relation to risks, consequences of action, and changing patterns" is required. These three dimensions of a problem's wickedness are depicted in Figure 1 in the form of a Wickedness Cube[6]. The cube works as a simplified illustration, highlighting the ideal models of three different

types of problems[7]. The differentiation of problem types is not as clear-cut in reality as it appears in the cube and in the ideal types described. Boundaries of the ideal types most often blur due to situational dynamics. Problem types are not static but constantly re-evaluated as part of the dynamic, complex contextual variations.

Tame problems are situated in the bottom left rear corner of the cube. These are issues that can be examined through a reductionist approach. They can be broken into parts and fixed in isolation from other problems. Tame problems are also issues that "enjoy consensus" (King 1993, 106), in the sense that they are convergent. Additionally, the consequences of solving a tame problem are *known*; for individuals who specialize in solving a particular tame problem, there is no uncertainty around what will happen. In addition, so-called *messes*[8] are added to the cube and situated at the center of the model. Messes can be understood as clusters of problems that cannot be solved in isolation. As King (ibid.) states "messes demand a commitment to understanding how things going on here-and-now interact with other things going on there-and-later." A systemic approach is needed. This means examining patterns of interaction among the different parts of the problem as well in other, related problems. To illustrate the point, a human mission to Mars is necessarily messier than fixing a car; however, it is still an issue on which consensus could eventually be achieved, at least on some level. After enough time studying the problem, we can for example begin to agree on appropriate strategies to go forward. Messes call for interdisciplinarity, which aids not only in formulating solutions, but also in reducing the uncertainty related to the messes. This uncertainty can be depicted as *unknown knows*, meaning that we may not have the knowledge of risks, consequences of actions, or changing patterns, but some other experts might (see Aven 2015).

Wicked problems are situated close to the top right front corner of the cube. These are emergent issues, meaning that even examing patterns of interaction is not enough, as interaction can cause emergent outcomes; the end result is more, or less, than its parts. A holistic approach is needed. Wicked problems are also depicted as divergent issues: "The more it is studied the more people of integrity and intellect inevitably come to different solutions" (King 1993, 112). No study is then sufficient to prompt a broad and sustained consensus. In addition, uncertainty is high, because events that can emerge are *unknown unknowns*, that is, completely unknown, for example, to scientific communities (see Aven 2015). The issue of how to confront such wicked problems is examined in detail in Chapter 5.
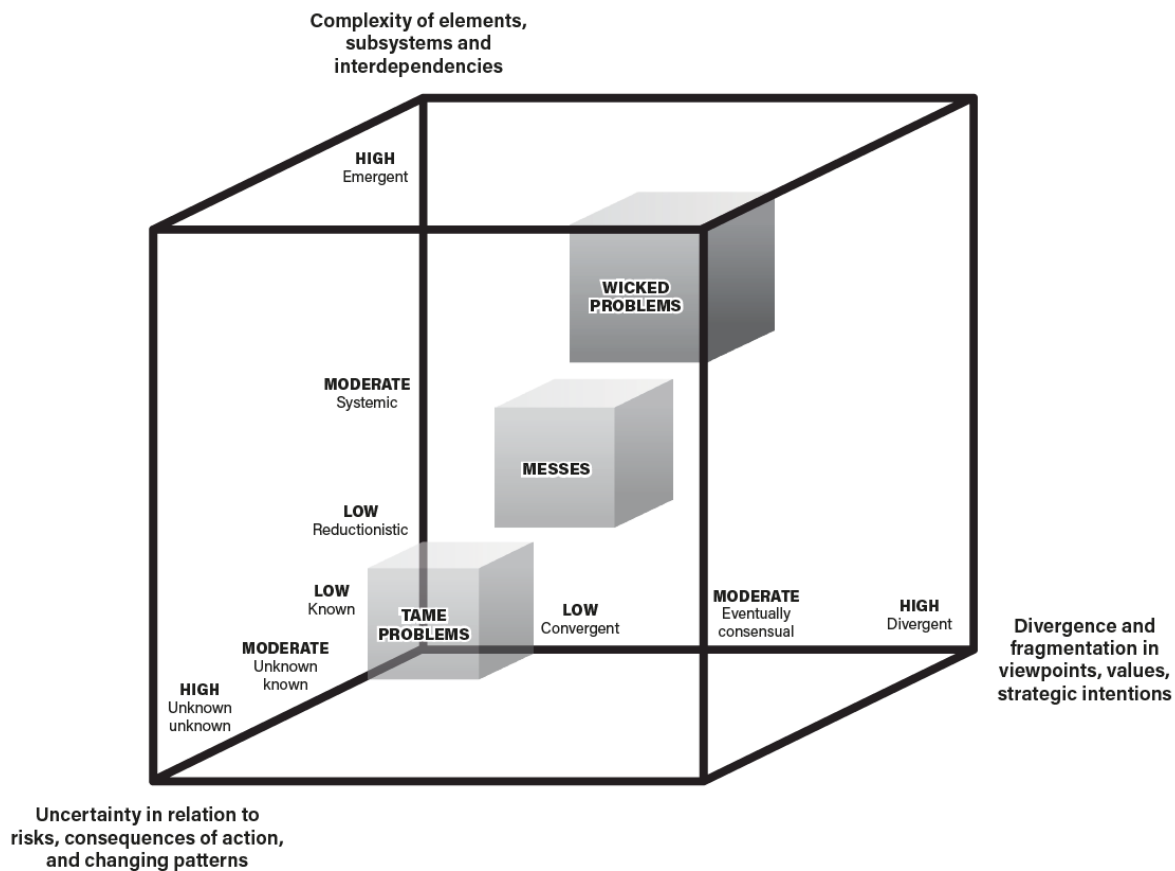

Figure 1. A Wickedness Cube.

The very concept of wicked problems has also been criticized: For example, Peters (2017) cautions against conceptual stretching, as it might eventually make the concept of wicked problems analytically meaningless, that is, the analytical capacity of the concept becomes undermined. McCall and Burge (2016, 201) consider that various articles with a critical outlook "portray attempts at hostile takeovers of wicked problems theory by rival theories." An example of such is Coyne's much cited article (2005), which analyzes the concept from the perspectives of phenomenology and poststructuralism. Based on the analysis, Coyne (2005) considers that almost every problem can be seen to have the character of a wicked problem, making wickedness the norm. McCall and Burge (2016), however, consider these attempts incompatible with the notions of wicked problems. In their own critical outlook, they strive to improve— property by property— the understanding of the strengths and weaknesses of the concept. Among some interesting conclusions McCall and Burge (2016), for example, redefine the role of trial and error as well the accountability of the individuals trying to tackle wicked problems to move those aspects into a more moderate direction.

Over the last few decades, the concept of wicked problems has been used to describe and explain various societal and organizational issues. Most often these have been issues related to environmental resource management, security and defense, and health and health care. In addition, issues of social care and social policy such as poverty, unemployment, and social exclusion are featured in scholarly articles on wicked problems (see, Danken, Dribbisch, and Lange 2016). To highlight the sector of health and social care, wicked problems have been examined, in relation to the following issues among others: child abuse (Devaney and Spratt 2009), wellbeing (Bache, Reardon, and Anand 2016), reforming health care (Vartiainen 2008; Raisio 2009), mental health

policy (Hannigan and Coffey 2011), euthanasia (Raisio and Vartiainen 2015), health promotion (Signal et al. 2013), fragmentation of care (Shaw and Rosen 2013) and institutional abuse (Burns, Hyde, and Killett 2013).

3. Conceptual Expansions

As a fashionable and still timely concept, the notion of wicked problems has inspired various expansions. The best known is that of the *super wicked problem*, coined by Levin et al. (2012, 127–128). To justify the *super* prefix, the authors defined four additional features of wickedness: Time is running out; those seeking to end the problem are also causing it; no central authority; and policies discount the future irrationally. The issue of climate change has been identified as a super wicked problem (see Lazarus 2009; Levin et al. 2012). For example, for Pollitt (2016, 78), climate change is the "ultimate wicked issue." Peters (2017) considers the concept of the super wicked problem to be useful, as the four additional features denote a clearly separate category of policy problems. Super wicked problems are then distinguished from different policy issues more easily than traditional wicked problems. Peters (2017, 392) particularly highlights the *time element* as a factor of differentiation.

The concept of the super wicked problem can be particularly useful to describe issues in the context of health and social care. Issues like addressing climate change necessitate multi-sectoral and multi-level governance, in which the "health community has a vital part to play" (Watts et al. 2015, 1862). As Pollitt (2016, 78) states, climate change is a highly interconnected issue that "will directly affect a vast range of government functions, from building regulations to flood defences; from agricultural policy to public health; from border controls to emergency services, and from

energy policy through transport policy to the insurance industry and international diplomacy." Climate change will influence health care systems and the health of populations, but the health community can also be part of the solution. The public health perspective on climate change can, for instance, be more tangible than often convoluted environmental concepts and issues. In addition, health professionals already have considerable experience of working on issues such as tobacco usage and HIV/AIDS infection, where they confront what Watts et al. call "powerful entrenched interests" (2015, 1862, 1905). However, despite the super wicked nature of the issue, there is still not enough awareness of climate change as a health issue.

The *wicked game* is one of the recent additions to the conceptual toolbox. The concept has been used in the contexts of urban planning (Lundström et al. 2016) and smart specialization (Lundström and Mäenpää 2017). The wicked game emphasizes the dynamic nature of working with wicked problems. Wicked problems are then not just an abstract issue. As Lundström and Mäenpää (2017, 2) state, "we are all part of the game and can discover some new and interesting ways to understand the wickedness." To concretize the wicked game, Lundström et al. (2016) and Lundström and Mäenpää (2017) use the juxtaposition of a tame game and wicked game, as depicted in Table 2.

	Tame game	Wicked game
Rules	Strictly defined set of rules for all situations that can occur. Rules are	No coherent set of rules, everybody can play the game by their own rules. Rules are organic.

	known by every player. Rules are mechanical.	
Players	Limited number of participants recognized by everyone.	Players change all the time. Everyone who is involved in the game is a potential player.
Playing field	Can be defined precisely.	Networked and complex, the spatial scale is relative and can vary.
Practice	Repetition can help one to develop skills. The more you play, the better you get. There is often the possibility of a return tie.	No-one can master a wicked game because the game, the rules, and the players change constantly. There is no possibility of a return tie.
Ending point	The game has a clear end point. Answers are right or wrong.	The game does not end. Answers are better, worse, satisfying or good enough.

Table 2. Characteristics of a tame game and wicked game (Lundström et al. 2016; Lundström & Mäenpää 2017).

In the context of health and social care, the concepts of the tame and the wicked game could have value when planning and implementing various reforms. Often these reform processes resemble more tame games than wicked ones; their distinct features include linear progression, authoritative strategies, and the quick identification of problems (see Vartiainen 2005; Raisio 2009). For example, the number of the participants in a planning process is often limited. In Finland, reform processes are mainly controlled by a select few MPs and ministry officials. Not only municipalities

and the organizations that provide services, but also the citizens who should be at the center of any process reforming services for their benefit are excluded from the planning processes. Residents, municipal decision-makers, and representatives of many organizations are then mere pawns that the state's long arm moves according to its current agenda and political interest.

Wicked ethics appears to be the most relevant conceptual addition in relation to health and social care. Heimer (2013) raises the issue of wicked ethics to illustrate the dilemmas in relation to macro-level official ethics and micro-level ethics on the ground, in the context of the practice of ethics in HIV research. Official ethics are then ethics inherent in the likes of official regulations, policies, and operating procedures. Regulators attempt to produce universal solutions and to ensure uniformity across different settings. The idea of ethics on the ground relates more to ethics in action, that is, the ethical problems faced by individual professionals. These are less routinized, more local and beyond the purview of the administration. According to Heimer (2013, 377), "official ethics puts blinders on our eyes." Official ethics can abstract out the wickedness, raising the need for ethics on the ground, that is, for sensitivity and adaption to local conditions. This can become more problematic when the issue at hand includes dimensions that "exhibit high degrees of psychosocial sensitivity." In these situations, problems may not only become wicked, but also *unspeakable* (Grant-Smith and Osborne 2016, 46). If a problem becomes unspeakable, some aspects of that problem can become inaccessible, making it even more wicked.

4. Integration of Wicked Problems and Complexity

Wicked problems and complexity are intertwined. In recent articles, wicked problems have been combined with a *complex systems,* or *complex adaptive systems* (CAS)[9] perspective to offer insight

into the nature of such wicked problems (Waddock et al. 2015; Zellner and Campbell 2015). Complex systems and wicked problems seem to have many similar characteristics or properties: defining the problem or its boundaries is difficult; both require a holistic approach; both are characterized by non-linear dynamics; there are no definitive resolutions or outcomes; they seem to follow some kind of pattern, yet remain unpredictable; they are very sensitive to initial conditions and path dependence (see, e.g., Cilliers 1998; Rittel and Webber 1973; Waddock et al. 2015; Zellner and Campbell 2015).

Conceptually both wicked problems and complexity stem from a similar world view, the *paradigm of conscious complexity* (see Table 3). Whereas wicked problems are most often contrasted with tame ones, conscious complexity is contrasted with the *paradigm of order* (Geyer and Rihani 2010). This notion is also in line with the recent conceptualization of tame games and wicked games (Lundström et al. 2016; Lundström and Mäenpää 2017). In an orderly world, where given causes lead to known effects at all times and in all places, processes flow along predetermined orderly paths and the future can be predicted, we play tame games. In the orderly world, players are limited and known, rules are certain and the playing field is constant and definable. In a world defined by conscious complexity, wicked games become the reality. Games are at the same time orderly and chaotic. The playing field, the space of possibilities, can be partially modeled, but actual outcomes are always uncertain (Puustinen and Lehtimäki 2016). In a complex world, filled with wicked problems and games, the players try to interpret, to make sense of, their surroundings to achieve a collective and common understanding of the situations they face at any given time (see e.g., Hanén 2017; Puustinen 2017). And it is actually the interpretation itself that makes the

situation even more complex, as is exemplified by the defining features of wicked problems (see Table 1).

ORDERLY WORLD (Adapted from Geyer and Rihani 2010, 13)	CONSCIOUS COMPLEXITY (Adapted from Geyer and Rihani 2010, 29)
Order: given causes lead to known effects at all times and in all places	**Partial order:** systems exhibit both orderly and chaotic behaviours
Reductionism: the whole is the sum of its parts, no more and no less (the system is reducible to its parts)	**Reductionism and holism:** some phenomena are reducible, others are not (always more or less than the sum of its parts)
Predictability: once global behaviour is defined, the future can be predicted by applying the appropriate inputs to the model	**Predictability and uncertainty:** can be partially modelled, predicted, and controlled
Determinism: processes flow along orderly paths that have clear beginnings and rational ends	**Probabilistic:** general boundaries, but within these boundaries precise outcomes are always uncertain
	Emergence: systems exhibit elements of co-evolution, adaption and emergence
	Interpretation: actors are aware of themselves, the system and their history and strive to interpret and direct the system

Table 3. From order to conscious complexity (original table Puustinen and Lehtimäki 2016).

In their typology of problems in health and social care settings, Glouberman and Zimmerman (2002) differentiate between simple, complicated and complex problems[10]. The term *complex*

problem is used as a synonym for wicked problem. A *simple problem* equates to what we previously called a tame problem. A *complicated problem* is somewhere in between, akin to the messes described above. In a health care setting, complicated heart surgery may be an example of a complicated, but not a complex problem. According to Glouberman and Zimmerman (2002), we often make the mistake of confusing these different kinds of problems, and hence apply the wrong solutions. Simple or tame problems are easy to detect, and also to handle. But differentiating between a complicated and a complex problem can be more difficult. The sophistication of the models and theories suitable to address complicated problems, such as heart surgery, will often fail if we try to apply them to complex, or wicked problems (ibid.). Wiping out measles globally or implementing nationwide health care reform are good examples of wicked problems.

Wicked problems also pose knowledge challenges because they are unstructured, in that their causes and effects are extremely difficult to identify and model. The wicked problem space comprises multiple, overlapping and interconnected, embedded subsets of problems; and finally they are relentless (Weber and Khademian 2008). An incorrect definition or diagnosis of a problem often leads to, and is characterized by, ignorance of some essential features of the case at hand. This in turn may lead to ignorance of complexity, because we prefer to simplify the world and particularly the problems around us to make it easier to cope with the complexity we face (see also Waddock et al. 2015). Complexity thinking, or sciences, offer assistance in defining problem wickedness, for example by using the concept of *fundamental complexity* as outlined by Cramer (1979, 138), "A system is fundamentally complex if, by a multiplicity of structures or through unfolding of new structures, the number of the parameters to be determined becomes larger than the possibility of measuring or coordinating these parameters." The characterization of wicked

problems suggests they are often fundamentally complex, since the number of parameters to be measured in order to understand the problem in its entirety becomes larger than the chance of measuring those particular problem characteristics.

It is quite clear from the complexity perspective that we cannot measure everything. Our understanding and knowledge is always limited (Cilliers 2005), but understanding the fundamentals of complexity and applying "the art of reasoning with complexity" (Zellner and Campbell 2015) would reduce the danger of misdiagnosing a problem and using the incorrect tools. In institutional settings, such as health and social care, the art of reasoning with complexity requires actors make sense of the situation. Sense making in organizations is fundamentally a social and systemic process that takes place via communication and interaction, and it is always ambiguous (Weick 2015; Weick, Sutcliffe, and Obstfeld 2005). It is also always about action, about making sense of what is going on, and what should be done next (Weick, Sutcliffe, and Obstfeld 2005). Sense making resonates well with the art of reasoning with complexity, in that it is about finding out what kind of a problem we face, and what might be done next, without ignoring the complexity of problem wickedness. When dealing with wicked problems, ambiguity is permanent, but interpretations of the wickedness are impermanent (see e.g., Weick 2015). Hence, dealing with complex, wicked problems is about the practice of understanding and managing ambiguity.

5. Implications for Management and Leadership

The question of how to manage wicked problems and complexity in public organizations has been analyzed in numerous publications. Danken, Dribbisch and Lange (2016) summarize the proposed

approaches in their literature review. Two extensive intertwined thematic clusters shine through. The first is *cross-boundary collaboration*, which includes such approaches as involving multiple stakeholders, promoting dialogue and deliberation, and applying modes of network governance. A second thematic cluster highlights *the role of leadership and management*. Leaders and managers should be able differentiate between different types of problems. They should also understand that tackling wicked problems necessitates the involvement of various stakeholders. Additionally, they should acquire new skills, especially those associated with collaborative governance.

However, Termeer et al. (2015) note that the literature on wicked problems emphasizes *how-to-do* action strategies. In addition, observing and enabling are also necessary. The notion of *observing* in this case refers to the ambiguous nature of wicked problems and the many alternative ways of perceiving problem wickedness. *Enabling* refers to the governance system as a whole and in its capacity to create conditions for both observing and action. For Termeer et al. (2015, 682, 684–686) "to deal wisely with wicked problems" requires these three dimensions to be part of four different governance capabilities, which are, *reflexivity* ("to deal with the variety of possible perspectives on wicked problems and to prevent tunnel vision"), *resilience* ("to adapt to a constantly changing flow of problem definitions, solutions, and context conditions", *responsiveness* ("to react to changing demands while striking a balance between different public values") and *revitalization* ("to unblock unproductive patterns in the governance process").

When managing problem wickedness in health and social care, the focus should be on networks and collaborative governance rather than on hierarchies and authoritarian leadership. For example, Ferlie et al. (2010) conclude that the existence of wicked problems supports the wisdom of

constructing networks. Roberts (2000) makes a similar kind of an argument by asking why we always need to realize the prospects of networks and collaboration by first failing in other strategies, that is, in authoritarian or competitive ones. Newman and Head (2017, 423) write about shortcomings in information-based strategies, emphasizing that collecting extensive data does not help decision-makers reduce complex societal problems to "tame, technical puzzles." For example, evidence-based policymaking would then always lag behind in the attempt to address wicked problems.

Nevertheless, Daviter (2017, 584) asks an important question: "If wicked problems cannot be solved [see Table 1], what should the governance of wicked problems aim to accomplish?" Emphasizing that there must be a better understanding of the alternatives, Daviter identifies *three different strategies of problem governance*: problem-solving, coping, and taming with the aims of resolving, reflecting, and reducing respectively. The three strategies have contrasting intellectual premises and practical implications and, according to Daviter (ibid.), in essence, no strategy is better than any other. Instead of one correct strategy, the question is then more about the trade-offs between the different strategies, and if the different kinds of wicked problems require different kinds of responses.

Problem-solving strategies include (often overly optimistic) holistic approaches such as whole-of-government and collaborative or network governance. According to Daviter (2017, 578) these strategies "aim to resolve wicked problems as comprehensively as possible." However, the literature rarely explicitly defines the stopping rule, that is, what would be a sufficient level of goal attainment. In addition, these holistic strategies include major challenges for resolving wicked

problems, such as collective action problems and gridlocks. As for coping strategies, these "aim to reflect the fragmented, uncertain, and ambiguous nature of wicked problems by relying on a more disjointed and tentative process of formulating policy responses" (ibid.). Such incremental and less coherent approaches are then not seen negatively, but as a natural approach that views wicked problems as essentially a never-ending process. In taming strategies, the aim is "to reduce wicked problems to make them more controllable and manageable" (ibid.). Such strategies often unnecessarily reduce the complexity of the situation, hence ignoring some essential features of the complex whole. However, they do facilitate quick and efficient decision-making, but with the risk of volatile results, as interdependencies are neglected, and the problem reflectivity decreased (see, e.g., Hanén 2017; Puustinen 2017). For example, Conklin (2005) highlights various taming strategies, such as freezing the problem definition prematurely, or assuming that the problem is the same kind as was faced before.

All the aforementioned strategies of taming, coping and problem-solving were also presented in Raisio (2009), where the planning of the Finnish national health service reform was analyzed from the perspective of problem wickedness. The study highlighted that the wickedness was in the most part noted, but it was not taken as seriously as it should have been. A taming strategy was clearly present, in that the problems were defined by a few people, who then attempted to implement a linear solution. In addition, the conflict between the coping and problem-solving strategies emerged from interviewees' statements that no-one could have taken everything into consideration, and others to the effect that if the approach had been truly holistic, perhaps nothing would have happened. The situation poses a dilemma over which approach is preferable: a swift taming approach with possible volatile results, an incremental approach with only small

incremental changes, or a holistic problem-solving approach targeting fundamental change, but which may never happen. Daviter (2017) notes how these alternative strategies and related trade-offs need to be better understood.

6. Conclusions

The significance and use of the concept of the wicked problem seem to grow year by year. As a concept it has not, however, become static, but has both been challenged and developed. The concept of wicked problems does not exist in isolation, but is a part of similar frameworks, such as that of complexity sciences. As the world becomes more networked and as the quantity of information as well as the speed of its transfer grows, the complexity and wickedness gain strength (see Say and Pronk 2012). Increased connectivity means small local level triggers can have powerful unintended and unforeseeable wave-like consequences throughout the system. The quantity of information and the speed of data flows, in turn, bring significant challenges to our ability as humans to address the complexity of the operating environment.

The increase in wickedness and complexity should be acknowledged more than it is currently in management theory and practice. There should, for example, be more empirical research on managing problem wickedness in the context of social and health care. In addition, the connections between the theoretical framework and the existing management culture need to be strengthened. As pointed out in Raisio and Lundström (2015, 4) "through theory-practice dialogue…a more in-depth understanding of complexity, chaos, and wickedness could be obtained." However, when in the worst case, these concepts are used only as window-dressing; nothing really changes.

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[1] Some academics also refer to a *theory of wicked problems* (e.g., McCall and Burge 2016).

[2] The seminar series was a part of Churchman's research project, funded by NASA, which explored how the technology from the US space program could be transferred to the context of urban problems (Skaburskis 2008).

[3] Skaburskis (2008, 277) points out that it might have actually been Churchman who gave wicked problems their striking name: "At the end of Rittel's presentation, West Churchman responded with that pensive but expressive movement of voice that some may well remember, 'Hmm, those sound like wicked problems.'"

[4] Note, Rittel had also published an article in the Norwegian journal *Bedriftsøkonomen* in 1972, which received considerably less attention (see Rittel 1972).

[5] It is important to note that regardless of the attention the concept of wicked problems has received since its first publication, it was not the sole factor in the paradigm shift of that time; consider for example, Herbert Simon with his suggestion of "bounded rationality" and Charles E. Lindblom with his approach of "muddling through." Scholars have considered just what influenced the popularity of the wicked problem concept: for Zellner and Campbell (2015, 488) "one source of the article's power is its unequivocal writing and explicit argument: that we have tried to confront (urban) social problems with the wrong tools because we have misunderstood the very nature of the problems." Skaburskis (2008, 279) sees the contribution in "the clarity, directness and timing of [Rittel's] message".

[6] Inspired by Fung's Democracy Cube (Fung 2006).

[7] In the Wickedness Cube, only tame problems, messes, and wicked problems are illustrated. They are depicted as ideal types. For example, Alford and Head (2017) present a two-dimensional matrix encompassing nine different problem types.

[8] Originally coined by Ackoff (1974).

[9] The study of complex adaptive systems has been popular since the establishment of the renowned Santa Fe institute. However, complexity thinking has existed far longer. For instance, well-known examples of complexity thinkers include Mary Parker Follett (see Mendenhall, Macomber, and Cutright 2000) and Carl von Clausewitz (see Hanén 2017).

[10] See also Snowden and Boone (2007) whose *Cynefin* framework differentiates between simple, complicated, complex, and chaotic domains.