



# Do decision-making structure and sequence exist in health online social networks?



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## ABSTRACT

Decision-making process has been explained through several models over the years. Among these, the rational and anarchical models have emerged as important representations of decision-making dynamics. The rational model and its variants of decision making emphasize recognized phases and sequence among them, while anarchical models focus on the lack of structure and sequence in many real-world decision-making contexts. In order to observe the existence of these phases and their sequence, it is critical to choose non-trivial situations in which the underlying dynamics of decision-making process are readily visible. To this end, we consider decision-making (DM) in Health Online Social Networks (HOSN) and verify the existence of recognized phases and the sequence in which these phases are reached. We use netnography to explore the potential of HOSN as a support tool for decision-making process. Our results confirm, extend, as well as challenge existing knowledge. Results confirm that HOSN support and empower users during their decision-making process in three specific key phases that include Intelligence, Design and Choice. We extend existing knowledge by suggesting two new phases in the decision making process that is integral to HOSN conversations, namely emotional support and sharing experiences. Our results challenge purely rational and anarchical models by recognizing the interweaving of anarchical decision sequences within the structure of rational decision making phases. These results have significant practical implications for the design of HOSN that support blended decision making processes by leveraging the wisdom of crowds.

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## 1. Introduction

The making of decisions is ubiquitous across time and space and pervades every facet of our lives. While some decisions are made autonomously without much thought, the significance of the consequence (e.g., health-related) and existing constraints (e.g., time) generally dictate the extent of decision maker involvement and resources that are allocated to any given decision-making situation. The extent of involvement in the decision-making process clearly also depends on the relative importance of such decisions – for example, the flavour choice for the next chewing gum pack to be consumed most likely receives a trivial amount of decision-making resource when compared against that for a serious health-care related decision. The latter is more interesting from a decision-making perspective since the decision-maker is forced to be involved in the process, and the finer details of the process

are more pronounced. Since health is of paramount importance, related decisions are oftentimes made with input from as many credible sources as is possible with the goal of minimizing risk while simultaneously improving the odds of better outcome. Moreover, health care decisions are complex by nature that necessitates a concomitant increase in information needs [6].

There is clearly a surge in interest among researchers and practitioners on issues associated with healthcare and recent explosion of social media-related activities as is evident from recent publications. As noted by Ellingsen and Monteiro [17], an integrated healthcare information system that seamlessly incorporates and delivers relevant information is necessary for improving healthcare delivery performance. Regardless of advances in related technology, when faced with a decision-making situation, it is not unreasonable to assume that the core processes that the stakeholders use to make decisions may not necessarily be disparate across domains. The involvement intensity is bound to vary depending on its *perceived* significance to the decision maker. However, from a research perspective, it is necessary to find evidence in reality to confirm the existence of a common core, albeit their social/behavioural nature. Health-related issues bring forth the nuances of the decision-making process that can be readily observed.

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With the explosion of online social networks (OSN) and the potential wealth of information contained therein, we consider OSN as a support tool for decision-making (e.g., [16,69]). We study health-related decision-making situations that involve interactions with online social networks that are especially relevant for digital natives (e.g., [70]). Our choice of the health domain in OSN is primarily driven by its significance to decision makers, and therefore the higher revelation probability of finer decision-making details.

The classical literature on decision-making models alludes to the existence of rational and sequential as well as anarchical processes in traditional settings. We suspect that the dynamics may not necessarily be the same in health online social network (HOSN) environments that incorporate the participation of online ‘advisors,’ since this moderating effect could potentially disrupt decision-making structure and sequence. We therefore study the influence of online ‘advisors’ on decision-making in HOSN environments. Specifically, we consider decision-making dynamics in health online social networks (HOSN) to (a) determine what decision-making stages are supported by HOSN, (b) identify any construct(s) that may not have been identified before in this context, and (c) verify if either rational or anarchical decision-making model is followed, with the exclusion of the other. On a related note, we are also interested in identifying the biases and strengths [59] of the human psyche that could be attenuated or enhanced through appropriate design of HOSN [34].

To operationalize the study, we use Netnography [37] to observe, elicit, and understand the problems and requirements of HOSN support for decision-making. Specifically, we evaluate the existence of the five decision-making phases (discussed in Section 2) and the sequence in which these phases are reached, if any.

The rest of the paper is organized as follows: We discuss necessary background and related literature in Section 2. We discuss the research problems, requirements and associated questions in Section 3. We then narrow our focus to HOSN and discuss our results and findings from our netnographic analysis in Section 4. We conclude the paper with a brief discussion on the contributions of this study in Section 5.

## 2. Background and related literature

We provide necessary background in this section to understand and appreciate the need for this study. To this end, we begin with a brief discussion on the essence of decision-making processes. We follow this with discussion on the different phases that are deemed to exist in decision-making processes. We then introduce online social networks, with specific emphasis on health online social networks and how it relates to stakeholder decision support.

### 2.1. Decision-making (DM)

Orlovsky [53] defines DM as the act of a binary preference with a set of alternatives that are formulated and suggested to the decision-making person as their rational choices. According to Simon [63], DM involves choosing issues that require attention, finding adequate courses of action, and choosing an alternative as the final decision. Lendel [43] describes DM as a cognitive process that results in a final choice. It can be a selection of course of actions or opinions. The DM process starts with the reason for doing something in order to reach a decision. Beach [3] comments on DM research by highlighting the fact that decision theories have exclusively focused on choice – the selection of the best option or alternatives from a choice set containing two or more options – and that this is an incomplete view of the decision-making paradigm. From these definitions, we observe that the three main characteristics of DM theory to include: decision maker in the process of decision-making (cognitive process), alternatives (courses of action or opinion), and decision (final choice).

### 2.2. Decision making phases

Simon [62] suggested that the decision-making process can be structured and ordered in three phases: intelligence, design, and choice. Huber and McDaniel [75] extended this model by adding two other phases: implementation and monitoring. The sequential model developed by Cooke and Slack [12] uses Simon’s model to explain decision-making as a cyclical process that focuses around the problem. The problem solving process in their theory is not reflected in three distinct phases of the Simon model, but a continuous process of identifying the best alternatives and course of actions. The Mintzberg et al. [49] model follows linear design from Simon’s rational decision-making process and reflects chaotic elements and incoherent phases of decision making. In this model, the decision maker comes with recognition of a problem or tangible request that requires an action, with the solution coming in a manner of different stages that do not necessarily follow a sequence.

Unlike rational and sequential models, decision-making theories emerged into an anarchical problem-solving process that is driven by events. There is no sequence for decision phases and there is no established process to follow. There are chaotic and incoherent phases of decision making that build on need. In other words, this model argues for a free decision-making process that is more intuitive than rational [42]. The decision-making process driven by events is similar to Cohen et al.’s [10] garbage can model of decision choice. The four streams that interplay in Cohen’s garbage can model are problems, solutions, participants, and choice opportunities.

Cohen et al. [10] contradict the sequential modeling theory and state that DM streams are inconsistent and inter-correlate with each other like a vortex with no apparent structure or sequence. Langley et al.’s [42] convergence process is another approach in which a decision follows a trajectory and contrasts with sequential theory models. The decision comes in a more integrative way as the construction of issues. Rather than work backwards from the decision, this model works its way forward to a decision. The main weakness of these models is the loss of structure as well as poor description of what happens and how the decision maker reaches a particular idea.

Sinclair and Ashkanasy [64] developed a model of integrated analytical and intuitive decision-making that supports two mechanisms of decision-making: first, Langley et al. [42] and Cohen et al. [10] view of the decision-making process as following an intuitive behaviour that is driven by events; and second, rationality in a decision-making process that is believed to be structured and logical towards problem solving. Complexity is explained through associations and metaphors of phases.

To summarize, there are two main streams of models on decision-making: rational and anarchical, where the former emphasizes structure and sequence while the latter claim the lack of structure as well as sequence in the decision-making process.

The establishment of decision-making theory goes back to the beginning of the 20th century. It is an obvious concern that with the involvement of technology and online interfaces, some of the models may not necessarily remain relevant to the current problem-solving environment. Another issue with the research conducted in the early last century lies in the methodology – a majority of these were conducted through interviews or organizational observations. This is a distant view on a real-time DM process. To understand the relationship between the decision maker and the process, the researcher needs to be involved in the actions of adopting phenomenological perspective. At the same time, to understand some global decisions, the researcher is required to zoom out and observe the overall phenomenon which might require an additional study into the history or expertise of the decision makers. The choice between either a closer look or a distant perspective depends on the purpose of the study, but what is obvious is the need to update the decision-making research view to incorporate

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