



Understanding health decision making: An exploration of homophily

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ABSTRACT

The phenomenon of homophily first was described in Lazarsfeld and Merton's classic 1954 friendship analysis as a tendency for friendships to form between those who are alike in some respect. Although theories of decision making address a host of factors that affect the process, the influence of individuals with homophilic ties remains unaccounted for and unexplained. The purpose of this paper is to review theories relevant to decision making and describe what is known about the relationship between homophily and health care decision making. Further, we provide new evidence suggesting the influence of homophily on decision making in results from a randomized, multi-center clinical trial of American men with localized prostate cancer. A diverse sample of 293 men with a new diagnosis of localized prostate cancer reported relevant personal factors influencing the care management decision before randomization to a decision aid or usual care, between 2013 and 2015. Among these personal factors were the level of influence or importance ascribed to various individuals at the time of the treatment decision. One month later, participants reported how prepared they were for decision making. 123 men (42%) reported friends and/or coworkers as information sources, of which 65 (53%) indicated that friends and/or coworkers influenced the care decision. Men who reported friends/coworkers as information sources had significantly higher one-month preparation scores. Our review of decision making theories and practical applicability suggests the influence of homophilic relationships manifests in health care decision making. Faced with a list of options to manage health conditions, decision makers turn to known individuals in their environments, particularly those individuals with whom the decision maker can identify. Clinicians may solicit information from patients about influential others and explain how that support fits into the health decision at hand without dishonoring the importance of the homophilic relationship.

1. Introduction

Health care providers and researchers have studied health decision making in those at risk for adverse health outcomes and in those with particular diagnoses. Significant, and sometimes unexpected, influence of individuals in the decision maker's environment has been documented, yet current theories of decision making are inadequate to fully describe, explain or predict this phenomenon. Since the mid-20th century, descriptive decision theory primarily has sought to understand the actions of decision makers through the application of probability theory to the decision-making process. More recent theories of decision making address the influence of individual and contextual factors on the decision-making process, yet the mechanisms by which interpersonal relationships influence health care decision making have not been elucidated.

The sociological phenomenon of homophily, meaning *love of the same*, underlies the common proverb “birds of a feather flock together.”

Homophily first was described in Lazarsfeld and Merton's classic 1954 analysis of friendship as “a tendency for friendships to form between those who are alike in some respect” (p. 23). The tenets of homophily suggest that higher rates of contact and communication occur between individuals who are similar to each other than between dissimilar individuals. In a seminal review paper, McPherson et al. (2001) documented the systematic observation of homophily in studies of group formation beginning in the 1920s. Subsequent studies have described homophily in multiple circumstances such as sales and advertisement, sociology, anthropology and health care.

Improved understanding of the role that homophily may play, mediating the influence of personal contacts on health care decision making, has the potential to inform decision support interventions and expand the theoretical basis for clinical practice. The purpose of this paper is therefore to (a) review existing theories relevant to health decision making; (b) describe what is known about the relationship between homophily and health care decision making; (c) provide new

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evidence suggesting the influence of homophily on decision making in results from a randomized, multi-center clinical trial of men with localized prostate cancer; and (d) discuss the implications of these findings for patient education and support during health care decision making.

2. Background

The interdisciplinary field of decision science is principally concerned with two questions. First, it seeks to understand how decisions should be made. Second, it seeks to understand how decisions are actually made. Theories that address the question of how decisions should be made typically assume ideal conditions; these theories are known as normative (or prescriptive) decision theories (Yates, 1990). In contrast, theories that address the question of how decisions are actually made are known as descriptive decision theories. Several theories may be used for both normative and descriptive purposes (Kahneman and Tversky, 1979); however, given our focus on treatment decision making in the health care setting, we have limited our discussion of decision theories to those with descriptive purposes.

2.1. Classical decision theories

Descriptive decision theory can be traced as far back as the 18th century, when the mathematician Daniel Bernoulli published his hypothesis of risk assessment and utility (Busemeyer, 2015). Bernoulli's hypothesis stated that decision makers evaluate a prospect according to both the risks associated with selecting that prospect and its subjective value (Yates, 1990). Classical decision theory views Bernoulli's hypothesis as axiomatic (Tversky, 1975) and consequently treats decision making as a rational, analytic process.

Expected Utility Theory (von Neumann and Morgenstern, 1953) is a classical decision theory that posits that when rational decision makers are faced with a choice, they will prefer the option that offers the highest expected utility, which is defined as the value of each outcome weighted by the probability it will occur. The principal critique of this theory has been that individuals often make choices that seem irrational from a purely mathematical standpoint (Kahneman and Tversky, 1979).

Kahneman and Tversky (1979) Prospect Theory was an adaptation of Expected Utility Theory that sought to explain irrational decisions. Specifically, in Prospect Theory, the certainty effect states that the response to a loss is more extreme than the response to a gain. According to this theory, the expected utility of each outcome is weighted not by its probability, but by a decision weight based on a normalized scale that excludes impossible events, over-weights low probabilities and under-weights moderate and high probabilities (Tversky and Kahneman, 1981). In 1981, Tversky and Kahneman expanded upon these ideas and described a theory of Behavioral Decision Making that incorporated the potential influence of context into the propositions of Prospect Theory. According to the theorists, the context of a decision—its *decision frame*—can mediate a decision maker's interpretation of the decision and its subsequent outcomes. The decision frame may be influenced by the way in which a decision is portrayed (such as whether each option is described in terms of its potential losses or gains) or by the decision-maker's personal characteristics and norms.

Yates (1990) further explicated and refined classical decision theory in his seminal text *Judgment and Decision Making*. In this work, Yates described the importance of coherence to the decision-making process. According to Yates, a coherent likelihood judgment is a human judgment that does not violate the principles of probability theory (p. 118). Yates argued that if a person's likelihood judgments are incoherent, he or she is likely to make faulty decisions with potentially detrimental consequences. To illustrate this concept, he provided the example of an individual who overestimates the proportion of the population that both has cancer and tests positive for it. The individual in the example has accurate information regarding the proportion of the population

that has cancer and the proportion of the population that tests positive for cancer; nevertheless, the individual estimates that the proportion of the population that falls into both categories exceeds the product of the two individual proportions. This is a violation of probability theory, which states that for two independent events *A* and *B*, the probability of both *A* and *B* occurring is equal to the product of the probabilities of *A* and *B* occurring (Pagano and Gauvreau, 2000). An individual who perceives his or her risk for an adverse event to be greater or lower than it is, certainly may make suboptimal decisions based on that perceived risk. However, classical decision theory fails to address the psychological and sociological factors that may contribute to an individual's incoherent likelihood judgments.

2.2. Contemporary decision theories

Models of decision making developed later in the 20th century largely account for the influence of personal, psychological and sociological factors on the decision-making process. In these models, concepts such as memory and emotion are viewed as important to decision making; as such, these models offer a tacit acknowledgement of the tendency of individuals to make decisions that may seem irrational from a purely probabilistic perspective.

Janis and Mann (1976) Conflict Theory Model of Decision Making is focused on the influence of emotion on decision making and posits that psychological stress imposes limitations on the decision-making process. According to the model, psychological stress during decision making primarily results from the potential for decisions to lead to (a) material and social losses; and (b) the loss of reputation and self-esteem. When faced with psychological stress, the decision maker seeks to cope by resolving the decision as quickly as possible, which may result in errors in decision making. The decision maker is influenced by his or her awareness of the risk associated with making the decision, hope of finding a preferred choice and perception of the amount of time that is available to deliberate.

Building on Janis and Mann's work, O'Connor developed a measure of decisional conflict (O'Connor, 1995) and then the Ottawa Decision Support Framework (ODSF) (O'Connor et al., 1998). The ODSF has been used widely by health scientists seeking to develop decision aids and other decision support tools (Stacey et al., 2017) and addresses health decisions in which the risks and benefits of each choice are uncertain or sensitive to the decision maker's values or preferences. According to the ODSF (O'Connor et al., 1998), health decisions are influenced by the patient's and health care provider's sociodemographic and clinical characteristics and by the patient's (a) perception of the decision, including knowledge, expectations, values and decisional conflict; (b) perception of important others, including norms, pressure, support and decision-making role; and (c) resources to make and implement a decision, including personal and external resources. The perception of important others and required resources (e.g., meaningful information) are factors aligned with homophily, notably when important others become reliable, trusted information sources.

In 2006 (Elwyn et al.), and then updated in 2009 (Elwyn et al.), the International Patient Decision Aids Standards (IPDAS) Collaboration put forth criteria for assessing the quality of decision support technologies. High quality decision aids should include some method to help patients personally consider and value key aspects of the decision. Fagerlin et al. (2013) extended this position and described the theoretical foundations upon which value clarification components of decision support should be built. The authors argued that decision making is a process and personal value clarification is relevant to not only the primary decision maker but also to family and providers.

2.3. Shortcomings of existing theories and models

Although classical and contemporary theories of decision making address a host of factors that affect the decision-making process, the

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