

**DECISION MAKING PROCESSES IN SOCIAL CONTEXTS\***

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## **ABSTRACT**

Over the past half-century, scholars in the interdisciplinary field of Judgment and Decision Making have amassed a trove of findings, theories, and prescriptions regarding the processes ordinary people enact when making choices. But this body of knowledge has had little influence on sociology. Sociological research on choice emphasizes how features of the social environment shape individual behavior, not people's underlying decision processes. Our aim in this article is to provide an overview of selected ideas, models, and data sources from decision research that can fuel new lines of inquiry on how socially situated actors navigate both everyday and major life choices. We also highlight opportunities and challenges for cross-fertilization between sociology and decision research that can allow the methods, findings, and contexts of each field to expand their joint range of inquiry.

## INTRODUCTION

Over the past several decades, there has been an explosion of interest in, and recognition of the importance of, how people make decisions. From Daniel Kahneman's 2002 Nobel Prize for his work on "Heuristics and Biases," to the rise in prominence of Behavioral Economics, to the burgeoning policy applications of behavioral "nudges" (Kahneman 2003; Camerer & Loewenstein 2004; Shafir 2013), both scholars and policy makers increasingly focus on choice processes as a key domain of research and intervention. Researchers in the interdisciplinary field of Judgment and Decision Making (JDM)—which primarily comprises cognitive science, behavioral economics, academic marketing, and organizational behavior—have generated a wealth of findings, insights, and prescriptions regarding how people make choices. In addition, with the advent of rich observational data from purchase histories, a related line of work has revolutionized statistical models of decision making that aim to represent underlying choice process.

But for the most part these models and ideas have not penetrated sociology.<sup>1</sup> We believe there are several reasons for this. First, JDM research has largely been focused on contrasting how a fully informed, computationally unlimited (i.e., "rational") person would behave to how people actually behave, and pointing out systematic deviations from this normative model (Loewenstein 2001). Since sociology never fully embraced the rational choice model of behavior, debunking it is less of a disciplinary priority.<sup>2</sup> Second, JDM

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<sup>1</sup> A notable exception is Herb Simon's concept of "satisficing," which many influential sociological works—especially in the subfield of economic sociology—have incorporated into models of action and behavior (e.g., Baker 1984; Granovetter 1985; Uzzi 1997; Beckert 1996).

<sup>2</sup> Although rational choice has had a strong influence sociological research—for example, Coleman's (1994) *Foundations of Social Theory* has almost 30,000 citations and there is a journal, *Rationality and Society*, devoted to related topics—this framework never overtook the discipline as it did economics.

research is best known for its focus on problems that involve *risk*, where the outcome is probabilistic and the payoff probabilities are known (Kahneman & Tversky 1979, 1982, 1984), and *ambiguity*, where the outcome is probabilistic and the decision-maker does not have complete information on payoff probabilities (Ellsberg 1961; Einhorn & Hogarth 1988; Camerer & Weber 1992). In both these cases, there is an optimal choice to be made, and the research explores how people's choices deviate from that answer. But most sociological problems—such as choosing a romantic partner, neighborhood, or college—are characterized by *obscurity*: there is no single, obvious, optimal, or correct answer.

Perhaps most critically, the JDM literature has by and large minimized the role of social context in decision processes. This is deliberate. Most experiments performed by psychologists are designed to isolate processes that can be connected with features of decision tasks or brain functioning; it is incumbent on researchers working in this tradition to “de-socialize” the environment and reduce it to a single aspect or theoretically predicted confluence of factors. Although there is a rich body of work on how heuristics are matched to particular decision environments (Gigerenzer & Gaissmaier 2011), these environments are by necessity often highly stylized laboratory constructs aimed at exerting control over key features of the environment.<sup>3</sup> This line of work intentionally de-emphasizes or eliminates aspects of realistic social environments, which limits its obvious relevance for sociologists.

Finally, there is the challenge of data availability: sociologists typically do not observe the intermediate stages by which people arrive at decision outcomes. For example, researchers can fairly easily determine what college a person attended, what job they

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<sup>3</sup> While this is accurate as a broad characterization, there are studies that examine decision-making “in the wild” through observation or field experiments (e.g., Camerer 2004; Barberis 2013).

chose, or whom they married, but they rarely observe how they got to that decision—that is, how people learned about and evaluated available options, and which options were excluded either because they were infeasible or unacceptable. But such process data can be collected in a number of different ways, as detailed later in this article. Moreover, opportunities to study sociologically relevant decision processes are rapidly expanding, owing to the advent of disintermediated sources like the Internet and smart phones, which allow researchers to observe human behavior at a much finer level of temporal and geographic granularity than ever before. Equally important, these data often contain information on which options people *considered*, but ultimately decided against. Such activity data provide a rich source of information on sociologically relevant decision processes (Bruch *et al.* 2016).

We believe that the time is ripe for a new line of work that draws on insights from cognitive science and decision theory to examine choice processes and how they play out in social environments. As we discuss in the next section, sociology and decision research offer complementary perspectives on decision-making and there is much to be gained from combining them. One benefit of this union is that it can deepen sociologists' understanding of how and why individual outcomes differ across contexts. By leveraging insights on how contextual factors and aspects of choice problems influence decision strategies, sociologists can better pinpoint how, why, and when features of the social environment trigger and shape human behavior. This also presents a unique opportunity for cross-fertilization. While sociologists can draw from the choice literature's rich understanding of and suite of tools to probe decision processes, work on decision-making can also benefit from sociologists' insights into how social context enables or constrains behavior.

The literature on judgment and decision-making is enormous; our goal here is to offer a curated introduction aimed at social scientists new to this area. In addition to citing recent studies, we deliberately reference the classic and integrative literature in this field so that researchers can acquaint themselves with the works that introduced these ideas, and gain a comfortable overview to it. We highlight empirical studies of decision making that help address how people make critical life decisions, such as choosing a neighborhood, college, life partner, or occupation. Thus, our focus is on research that is relevant for understanding decision processes characterized by obscurity, where there is no obvious correct or optimal answer. Due to its selective nature, our review does not include a discussion of several major areas of the JDM literature, most notably Prospect Theory, which focuses on how people can distort both probabilities and outcome values when these are known (to the researcher) with certainty; we also do not discuss the wide range of anomalies documented in human cognition, for example mental accounting, the endowment effect, and biases such as availability or anchoring (Tversky & Kahneman 1973; Kahneman & Tversky 1973, 1981; Kahneman *et al.* 1991).

The balance of the article is as follows. We first explain how decision research emerged as a critique of rational choice theory, and show how these models of behavior complement existing work on action and decision-making in sociology. The core of the paper provides an overview of how cognitive, emotional, and contextual factors shape decision processes. We then introduce the data and methods commonly used to study choice processes. Decision research relies on a variety of data sources, including results from lab and field experiments, surveys, brain scans, and observations of in-store shopping and other behavior. We discuss their relative merits, and provide a brief introduction to

statistical modeling approaches. We close with some thoughts about opportunities and challenges for sociologists wanting to incorporate insights and methods from the decision literature into their research programs.

## **SOCIOLOGICAL AND PSYCHOLOGICAL PERSPECTIVES ON DECISION PROCESSES**

To understand how sociology and psychology offer distinct but complementary views of decision processes, we begin with a brief introduction to the dominant model of human decision-making in the social sciences: rational choice theory. This model, endemic to neoclassical economic analyses, has permeated into many fields including sociology, anthropology, political science, philosophy, history, and law (Coleman 1991; Gely & Spiller 1990; Satz & Ferejohn 1994; Levy 1997). In its classic form, the rational choice model of behavior assumes that decision makers have full knowledge of the relevant aspects of their environment, a stable set of preferences for evaluating choice alternatives, and unlimited skill in computation (Samuelson 1947; Von Neumann & Morgenstern 2007; Becker 1993). Actors are assumed to have a complete inventory of possible alternatives of action; there is no allowance for focus of attention or a search for new alternatives (Simon 1991, p. 4). Indeed, a distinguishing feature of the classic model is its lack of attention to the process of decision-making. Preference maximization is a synonym for choice (McFadden 2001, p. 77).

Rational choice has a long tradition in sociology, but its popularity increased in the 1980s and 1990s, partly as a response to concern within sociology about the growing gap between social theory and quantitative empirical research (Coleman 1986). Quantitative data analysis, despite focusing primarily on individual-level outcomes, is typically conducted without any reference to—let alone a model of—individual action (Goldthorpe



1996; Esser 1996). Rational choice provides a theory of action that can anchor empirical research in meaningful descriptions of individuals' behavior (Hedström & Swedberg 1996). Importantly, the choice behavior of rational actors can also be straightforwardly implemented in regression-based models readily available in statistical software packages. Indeed while some scholars explicitly embrace rational choice as a model of behavior (Hector and Kanazawa 1997; Kroneberg and Kalter 2012), many others implicitly adopt it in their quantitative models of individual behavior.

### **Beyond Rational Choice**

Sociologists have critiqued and extended the classical rational choice model in a number of ways. They have observed that people are not always selfish actors who behave in their own best interests (England 1989; Margolis 1982), that preferences are not fixed characteristics of individuals (Lindenberg and Frey 1993; Munch 1992), and that individuals do not always behave in ways that are purposive or optimal (Somers 1989; Vaughan 1998). Most relevant to this article, sociologists have argued that the focus in classical rational choice on the individual as the primary unit of decision-making represents a fundamentally asocial representation of behavior. In moving beyond rational choice, theories of decision-making in sociology highlight the importance of social interactions and relationships in shaping behavior (Pescosolido 1992; Emirbayer 1997). A large body of empirical work reveals how social context shapes people's behavior across a wide range of domains, from neighborhood and school choice to decisions about friendship and intimacy to choices about eating, drinking, and other health-related behaviors (Carrillo *et al.* 2016; Perna and Titus 2005; Small 2009; Pachucki *et al.* 2011; Rosenquist *et al.* 2010).

But this focus on social environments and social interactions has inevitably led to

less attention being paid to the individual-level processes that underlie decision-making. In contrast, psychologists and decision theorists aiming to move beyond rational choice have focused their attention squarely on how individuals make decisions. In doing so, they have amassed several decades of work showing that the rational choice model is a poor representation of this process.<sup>4</sup> Their fundamental critique is that decision-making, as envisioned in the rational choice paradigm, would make overwhelming demands on our capacity to process information (Bettman 1979; Miller 1956; Payne 1976). Decision-makers have limited time for learning about choice alternatives, limited working memory, and limited computational capabilities (Miller 1956; Payne *et al.* 1993). As a result, they use heuristics that keep the information-processing demands of a task within the bounds of their limited cognitive capacity.<sup>5</sup> It is now widely recognized that the central process in human problem solving is to apply heuristics that carry out highly selective navigations of problem spaces (Newell & Simon 1972).

However, in their efforts to zero in on the strategies people use to gather and process information, psychological studies of decision-making have focused largely on individuals in isolation. Thus, sociological and psychological perspectives on choice are complementary in that they each emphasize a feature of decision-making that the other field has left largely undeveloped. For this reason, and as we articulate further in the

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<sup>4</sup> The best-known critique of the rational choice model within JDM comes from the “Heuristics and Biases” school of research (Tversky 1972; Kahneman & Tversky 1979; Tversky & Kahneman 1981). Their studies show that decision makers: (1) have trouble processing information; (2) use decision-making heuristics that do not maximize preferences; (3) are sensitive to context and process; and (4) systematically misperceive features of their environment. Since then, a large body of work provides convincing evidence that individuals are “limited information processing systems” (Newell & Simon 1972; Kahneman 2003).

<sup>5</sup> Heuristics are “problem-solving methods that tend to produce efficient solutions to difficult problems by restricting the search through the space of possible solutions, on the basis of some evaluation of the structure of the problem” (Braunstein 1972, p. 520).

conclusion, we believe there is great potential for cross-fertilization between these areas of research. Because our central aim is to introduce sociologists to the JDM literature, we do not provide an exhaustive discussion of sociological work relevant to understanding decision processes. Rather, we highlight studies that illustrate the fruitful connections between sociological concerns and JDM research.

In the next sections, we discuss the role of different factors—cognitive, emotional, and contextual—in heuristic decision processes.

### **THE ROLE OF COGNITIVE FACTORS IN DECISION PROCESSES**

There are two major challenges in processing decision-related information: first, each choice is typically characterized by multiple attributes, and no alternative is optimal on all dimensions; and, second, more than a tiny handful of information can overwhelm the cognitive capacity of decision makers (Cowan 2010). Consider the problem of choosing among three competing job offers. Job 1 has high salary, but a moderate commuting time and a family-unfriendly workplace. Job 2 offers a low salary, but has a family-friendly workplace and short commuting time. Job 3 has a family-friendly workplace but a moderate salary and long commuting time. This choice would be easy if one alternative clearly dominated on all attributes. But, as is often the case, they all involve making tradeoffs and require the decision maker to weigh the relative importance of each attribute. Now imagine that, instead of three choices, there were ten, a hundred, or even a thousand potential alternatives. This illustrates the cognitive challenge faced by people trying to decide among neighborhoods, potential romantic partners, job opportunities, or health care plans.

We focus in this section on choices that involve deliberation, for example deciding where to live, what major to pursue in college, or what jobs to apply for.<sup>6</sup> (This is in contrast to decisions that are made more spontaneously, such as the choice to disclose personal information to a confidant [Small & Sukhu 2016].) Commencing with the pioneering work of Howard & Sheth (1969), scholars have accumulated substantial empirical evidence for the idea that such decisions are typically made *sequentially*, with each stage reducing the set of potential options (Swait 1984; Roberts & Lattin 1991, 1997). For a given individual, the set of potential options can first be divided into the set that he or she knows about, and those of which he or she is unaware. This “awareness set” is further divided into options the person would consider, and those that are irrelevant or unattainable. This smaller set is referred to as the *consideration set*, and the final decision is restricted to options within that set.

Research in consumer behavior suggests that the decision to include certain alternatives in the consideration set can be based on markedly different heuristics and criteria than the final choice decision (e.g., Payne 1976; Bettman & Park 1980; Salisbury & Feinberg 2012). In many cases, people use simple rules to restrict the energy involved in searching for options, or to eliminate options from future consideration. For example, a high school student applying to college may only consider schools within commuting distance of home, or schools where someone she knows has attended. Essentially, people favor less cognitively taxing rules that use a small number of choice attributes earlier in the

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<sup>6</sup> The decision strategies presented in this section are sometimes known as “reasons” heuristics (c.f., Gigerenzer 2004) because they are the reasons people give for why they chose the way that they did. As such, they are less applicable in situations where people have few if any options. For example, a person evicted from their home may have a single alternative to homelessness: staying with a family member. In this case, the difficulty of the decision is not information processing.

decision process to eliminate almost all potential alternatives, but take into account a wider range of choice attributes when evaluating the few remaining alternatives for the final decision (Liu & Dukes 2013).

Once the decision maker has narrowed down his or her options, the final choice decision may allow different dimensions of alternatives to be compensatory; in other words, a less attractive value on one attribute may be offset by a more attractive value on another attribute. However, a large body of decision research demonstrates that strategies to screen potential options for consideration are non-compensatory; a decision-maker's choice to eliminate from or include for consideration based on one attribute will not be compensated by the value of other attributes. In other words, compensatory decision rules are "continuous," while non-compensatory decision rules are discontinuous or threshold (Swait 2001; Gilbride & Allenby 2004).

### **Compensatory Decision Rules**

The implicit decision rule used in statistical models of individual choice and the normative decision rule for rational choice is the *weighted additive* rule. Under this choice regime, decision-makers compute a weighted sum of all relevant attributes of potential alternatives. Choosers develop an overall assessment of each choice alternative by multiplying the attribute weight by the attribute level (for each salient attribute), and then sum over all attributes. This produces a single utility value for each alternative. The alternative with the highest value is selected, by assumption. Any conflict in values is assumed to be confronted and resolved by explicitly considering the extent to which one is willing to trade off attribute values, as reflected by the relative importance or beta coefficients (Payne *et al.* 1993, p. 24). Using this rule involves substantial computational

effort and processing of information.

A simpler compensatory decision rule is the *tallying* rule, known to most of us as a “pro and con” list (Alba & Marmorstein 1987). This strategy ignores information about the relative importance of each attribute. To implement this heuristic, a decision maker decides which attribute values are desirable or undesirable. Then she counts up the number desirable versus undesirable attributes. Strictly speaking, this rule forces people to make trade-offs among different attributes. However, it is less cognitively demanding than the weighted additive rule, as it does not require people to specify precise weights associated with each attribute. But both rules require people to examine *all* information for each alternative, determine the sums associated with each alternative, and compare those sums.

### **Non-Compensatory Decision Rules**

Non-compensatory decision rules do not require decision makers to explicitly consider all salient attributes of an alternative, assign numeric weights to each attribute, or compute weighted sums in one’s head. Thus they are far less cognitively taxing than compensatory rules. The decision maker need only examine the attributes that define cutoffs in order to make a decision (to exclude options for a conjunctive rule, or to include them for a disjunctive one). The fewer attributes that are used to evaluate a choice alternative, the less taxing the rule will be.

*Conjunctive* rules require that an alternative must be acceptable on one or more salient attributes. For example, in the context of residential choice, a house that is unaffordable will never be chosen, no matter how attractive it is. Similarly, a man looking for romantic partners on an online dating website may only search for women who are within a 25-mile radius and do not have children. Potential partners who are unacceptable

on either dimension are eliminated from consideration. So conjunctive screening rules identify “deal-breakers”; being acceptable on all dimensions is a necessary but not sufficient criterion for being chosen.

A *disjunctive* rule dictates that an alternative is considered if *at least one* of its attributes is acceptable to chooser *i*. For example, a sociology department hiring committee may always interview candidates with four or more *American Journal of Sociology* publications, regardless of their teaching record or quality of recommendations. Similarly (an especially evocative yet somewhat fanciful example), a disjunctive rule might occur for the stereotypical “gold-digger” or “gigolo,” who targets all potential mates with very high incomes regardless of their other qualities. Disjunctive heuristics are also known as “take-the-best” or “one good reason” heuristics that base their decision on a single overriding factor, ignoring all other attributes of decision outcomes (Gigerenzer & Goldstein 1999; Gigerenzer & Gaissmaier 2011; Gigerenzer 2008).

While sociologists studying various forms of deliberative choice do not typically identify the decision rules used, a handful of empirical studies demonstrate that people do not consider all salient attributes of all potential choice alternatives. For example, Krysan and Bader (2009) find that white Chicago residents have pronounced neighborhood “blind spots” that essentially restrict their knowledge of the city to a small number of ethnically homogeneous neighborhoods. Daws and Brown (2002, 2004) find that, when choosing a college, UK students’ awareness and choice sets differ systematically by socioeconomic status. Finally, in a recent study of online mate choice, Bruch and colleagues (2016) build on insights from marketing and decision research to develop a statistical model that allows for multistage decision processes with different (potentially noncompensatory) decision

rules at each stage. They find that conjunctive screeners are common at the initial stage of online mate pursuit, and precise cutoffs differ by gender and other factors.

## **THE ROLE OF EMOTIONAL FACTORS IN DECISION PROCESSES**

Early decision research emphasized the role of cognitive processes in decision-making (e.g., Newell & Simon 1972). But more recent work shows that emotions—not just strong emotions like anger and fear, but also “faint whispers of emotions” known as *affect* (Slovic *et al.* 2004, p. 312)—play an important role in decision-making. Decisions are cast with a certain valence, and this shapes the choice process on both conscious and unconscious levels. In other words, even seemingly deliberative decisions, like what school to attend or job to take, may be made not just through careful processing of information, but based on intuitive judgments of how a particular outcome feels (Loewenstein & Lerner 2003; Lerner *et al.* 2015). This is true even in situations where there is numeric information about the likelihood of certain events (Denes-Raj & Epstein 1994; Windschitl & Weber 1999; Slovic *et al.* 2000). This section focuses on two topics central to this area: first, that people dislike making emotional tradeoffs, and will go to great lengths to avoid them; and second, how emotional factors serve as direct inputs into decision processes.<sup>7</sup>

### **Emotions Shape Strategies for Processing Information**

In the previous section, we emphasized that compensatory decision rules that involve tradeoffs require a great deal of cognitive effort. But there are other reasons why people avoid making explicit tradeoffs on choice attributes. For one, some tradeoffs are

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<sup>7</sup> There is a rich literature in sociology on how emotions are inputs to and outcomes of social processes (e.g., Hochschild 1975; Scheff 1988). While this work has not historically been integrated with psychology (Turner and Stets 2014, p. 2), this may be a fruitful direction for future research.



more emotionally difficult than others, for example the decision whether to stay at home with one's children or put them in day care. Some choices also involve attributes that are considered sacred or protected (Baron & Spranca 1997). People prefer not to make these emotionally difficult tradeoffs, and that shapes decision strategy selection (Hogarth 1991; Baron 1986; Baron & Spranca 1997). Experiments on these types of emotional decisions have shown that, when facing emotionally difficult decisions, decision-makers avoid compensatory evaluation and instead select the alternative that is most attractive on whatever dimension is difficult to trade off (Luce *et al.* 2001; Luce *et al.* 1999). Thus, the emotional valence of specific options shapes decision strategies.

Emotions concerning the set of all choice alternatives—specifically, whether they are perceived as overall favorable or unfavorable—also affects strategy selection. Early work with rats suggests that decisions are relatively easy when choosing between two desirable options with no downsides (Miller 1959). However, when deciding between options with both desirable and undesirable attributes, the choice becomes harder. When deciding between two undesirable options, the choice is hardest of all. Subsequent work reveals that this finding extends to human choice. For instance, people invoke different choice strategies when forced to choose “the lesser of two evils.” In their experiments on housing choice, Luce and colleagues (2000) found that when faced with a set of substandard options, people are far more likely to engage in “maximizing” behavior and select the alternative with the best value on whatever is perceived as the dominant substandard feature. In other words, having a suboptimal choice set reduces the likelihood of tradeoffs on multiple attributes. Extending this idea to a different sociological context, a

woman confronted with a dating pool filled with what she perceives as arrogant men may focus her attention on selecting the least arrogant of the group.

### **Emotions as Information**

Emotions also serve as direct inputs into the decision process. A large body of work on perceptions of risk shows that a key way people evaluate the risks and benefits of a given situation is through their emotional response (Slovic *et al.* 2004; Slovic and Peters 2006; Loewenstein *et al.* 2001). In a foundational and generative study, Fischhoff *et al.* (1978) discovered that people's perceptions of risks decline as perceived benefits increase. This is puzzling, because risks and benefits tend to be positively correlated. The authors also noted that the attribute most highly correlated with perceived risk was the extent to which the item in question evoked a feeling of dread. This finding has been confirmed in many other studies (e.g., McDaniel *et al.* 1997). Subsequent work also showed that this inverse relationship is linked to the strength of positive or negative affect associated with the stimulus. In other words, stronger negative responses led to perception of greater risk and lower benefits (Alhakami & Slovic 1994; Slovic & Peters 2006).

This has led to a large body of work on the *affect heuristic*, which is grounded in the idea that people have positive and negative associations with different stimuli, and they consult this “affect pool” when making judgments. This shortcut is often more efficient and easier than cognitive strategies such as weighing pros and cons or even disjunctive rules for evaluating the relative merits of each choice outcome (Slovic *et al.* 2004). Affect—particularly how it relates to decision-making—is rooted in dual process accounts of human behavior. The basic idea is that people experience the world in two different ways: one that is fast, intuitive, automatic, and unconscious, and another that is slow, analytical,

deliberate, and verbal (Evans 2008; Kahneman 2011). A defining characteristic of the intuitive, automatic system is its affective basis (Epstein 1994). Indeed, affective reactions to stimuli are often the very first reactions people have. Having determined what is salient in a given situation, affect thus guides subsequent processes, such as information processing, that are central to cognition (Zajonc 1980).

Over the past two decades, sociologists—particularly in the study of culture—have incorporated insights from dual process theory to understand how actions may be both deliberate and automatic (e.g., Vaisey 2009). Small and Sukhu (2016) argue that dual processes may play an important role in the mobilization of support networks. Kroneberg and Esser (Kroneberg 2014; Esser and Kroneberg 2015) explore how automatic and deliberative processes shape how people select the “frame” for making sense of a particular situation. Although some scholars debate whether automatic and deliberative processes are more like polar extremes or a smooth spectrum (for an example of this critique within sociology, see Leschziner and Green 2013), the dual process model remains a useful framework for theorizing about behavior.

## **THE ROLE OF CONTEXTUAL FACTORS IN DECISION PROCESSES**

Sociologists have long been interested in how social environments—for example, living in a poor neighborhood, attending an affluent school, or growing up in a single-parent household—shape life outcomes such as high school graduation, non-marital fertility, and career aspirations (Sharkey and Faber 2014; Lee *et al.* 1993; Astone and McLanahan 1991). Social environments shape behavior directly through various forms of influence such as peer pressure and social learning, and indirectly by dictating what

opportunities or social positions are available (Blalock 1984; Manski 2000; Schelling 1971). But while the sociological literature on contextual effects is vast, the subset of that work which focuses on decisions emphasizes the causes or consequences of those decisions more than the processes through which they are made.

Decision researchers devote considerable attention to contextual effects, but typically “context” in this field refers to architectural features of *choice environments* such as the number of alternatives; whether time pressures limit the effort that can be put into a decision; and what option is emphasized as the default. (In the world, of course, these features are socially determined. But this is less emphasized in decision research, much of which occurs in a laboratory setting.) The overwhelming finding from these studies is that people’s choices are highly sensitive to context. This insight has led to an influential literature on the “Construction of Preferences” (see Sidebar) as well as a great deal of interest in policy interventions that manipulate features of choice environments (Thaler and Sunstein 2008; Shafir 2013). Recently, decision researchers have begun to look at how decisions are shaped by more explicitly social environments such as poverty (e.g., Mullainathan and Shafir 2013). In this section, we discuss how four aspects of social context—what opportunities are available, the importance of the “default” option, time pressure and constrained resources, and the choices of others—shape decision processes.

### **Choice Sets and Defaults**

A classic assumption of conventional choice models is that the ratio of choice probabilities for any two options is independent of what other options are available (Luce 1959). (In the literature on statistical models of choice, this is known as the principle of *Independence of Irrelevant Alternatives* [IIA].) But it is well established that people’s choices

depend heavily on the *relative* merits of a particular set of options rather than their absolute values (Tversky & Simonson 1993). For example, people tend to avoid more extreme values in alternatives (the “compromise effect”); thus, adding a new option to the mix can lead choosers to shift their views about what constitutes a reasonable choice (Simonson 1989; Simonson & Tversky 1992). In a similar vein, a robust finding is that adding a new “asymmetrically dominated” alternative – one dominated by some items in the set but not by others – can actually *increase* the choice probabilities of the items that dominate it. Such a “decoy effect” (Huber *et al.* 1982) should be impossible under IIA, and in fact violates *regularity* (i.e., new items cannot increase probabilities of existing ones). Both of these effects have been attributed to the fact that people making choices are trying to justify them based on reasons (Simonson 1989; Dhar *et al.* 2000); changing the distribution of options may alter how compelling a particular reason might be.

Choice outcomes are also highly influenced by what option is identified as the “default.” Defaults are whatever happens in a decision if the chooser “decides not to decide” (Feinberg & Huber 1996). Defaults exert a strong effect on people’s choices, even when the stakes of the decision are high (Johnson *et al.* 1993; Johnson & Goldstein 2013). Defaults also tap into other, well-established features of human decision making: procrastination, bias for the status quo, and inertial behavior (Samuelson & Zeckhauser 1988; Kahneman *et al.* 1991). In recent years, manipulating the default option—for example making retirement savings or organ donation something people opt out of rather than opt into—has been identified as a potentially low cost, highly impact policy intervention (Shafir 2013). Defaults are also of potentially great sociological interest. A number of sociological studies have theorized about how people “drift” into particular outcomes or situations (e.g., Matza

1967); defaults exist in part because choices are embedded in specific environments that emphasize one set of options over others.<sup>8</sup>

### **Scarcity and Social Influence**

A number of recent studies examine how conditions of *scarcity*—with regard to time, resources, and energy—shape decision-making. Consistent with studies of cognitive effort and decision-making, a variety of experimental results demonstrate that time pressure reduces people’s tendency to make tradeoffs (Wright & Weitz 1977; Edland 1989; Reiskemp & Hoffrage 2008). This finding is especially interesting in light of recent line of work by Shah *et al.* (2015), who show via experiments that resource scarcity forces people to make tradeoffs, e.g., “If I buy dessert, I can’t afford to take the bus home.” Weighing tradeoffs is cognitively costly; they deplete people’s resources for other decision tasks, which overall reduces their ability to engage in deliberative decision-making (Pocheptsova *et al.* 2009). Given the fact that people living in conditions of extreme scarcity are typically limited in both time and financial resources, a cognitive perspective suggests that they are “doubly taxed” in terms of cognitive effort, and offers important insights in understanding how conditions of poverty shape, and are shaped by, people’s choices (Bertrand *et al.* 2004). In short, the context of poverty depletes people’s cognitive resources in an environment where mistakes are costly (Mullainathan & Shafir 2013, Gennetian & Shafir 2015).

There are also a small number of studies that examine how the actions of other people influence decision processes. They focus on the role of *descriptive norms* (Cialdini 2003; Cialdini & Goldstein 2004), which are information about what other people are

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<sup>8</sup> We are grateful for conversations with Rob Sampson and Mario Small that led to this insight.

doing. The key finding is that people are more likely to adopt a particular behavior—such as conserving energy in one’s home or avoiding changing sheets and towels at a hotel—if they learn that others are doing the same (Goldstein *et al.* 2008; Nolan *et al.* 2008). The more similar the comparison situation is to one’s own, the more powerful the effect of others’ behavior on one’s own. For instance, people are more likely to be influenced if the descriptive norm references their neighbors or others who share social spaces (Schultz *et al.* 2007). The finding that descriptive norms are most powerful when they are immediate is reinforced by a study of charitable giving, which shows that people’s behavior is disproportionately influenced by information about what others have given, especially the most recent, non-specified donor (Shang & Croson 2009).

This work on social influence is consistent with a classic literature in sociology that emphasizes how people’s beliefs about the sort of situation they are in shape their behavior (e.g., Thomas & Znaniecki 1918; Goffman 1974). Social cues provide information about what choices are consistent with desired or appropriate behavior. For example, a classic study demonstrates that whether a Prisoner’s dilemma game was presented to research subjects as a simulated “Wall Street” or “Community” shaped subsequent playing decisions (Lieberman *et al.* 2004; Camerer & Thaler 1993). In other words, there is an interpretive component to decision-making that informs one’s views about the kind of response that is appropriate.

## **STUDYING DECISION PROCESSES**

Psychologists have devised a number of techniques to shed light on human decision processes in conjunction with targeted stimuli. *Process tracing* is a venerated suite of

methods broadly aimed at extracting how people go about acquiring, integrating, and evaluating information, as well as physiological, neurological, and concomitants of cognitive processes (Svenson 1979; Schulte-Mecklenbeck *et al.* 2010). (Note that this approach is quite different from what political scientists and sociologists typically refer to as process tracing [Mahoney 2012; Collier 2011].) In a classic study, Lohse & Johnson (1996) examine individual-level information acquisition using both computerized tracing and eye-tracking across multiple process measures (e.g., total time, number of fixations, accuracy, etc.)

More recently, the use of unobtrusive *eye-trackers* has allowed researchers to discern which information is being sought and assimilated in the sort of stimuli-rich environments that typify online interactions, without querying respondents' knowledge or intermediate goals (Duchowski 2007, Wedel & Pieters 2008). Also, it has recently become possible to use *neuroimaging* techniques like PET, EEG, and fMRI (Yoon et al. 2006) to observe decision processes *in vivo*, although at a high cost of invasiveness. Such studies offer the benefit of sidestepping questions about, for example, the emotional reactions experienced by decision-makers, by observing which portions of the brain are active when information is being accessed and processed, as well as final decisions arrived at.

### **Stated and Revealed Preferences**

While not directly focused on the process of decision-making (i.e., in terms of identifying decision strategies), a large literature assumes a linear compensatory model and aims to capture the weights people ascribe to different choice attributes (see Louviere *et al.* 1999 for a broad overview; also Train 2009). These methods, long known to social scientists (Samuelson 1948; Manski and McFadden 1981; Bruch and Mare 2012), rely on



both field data—where the analyst records decision-makers’ “revealed preferences” as reflected in their actions—and choice experiments, where analysts enact control over key elements of the decision environment through vignettes. Stated choice experiments have two advantages that are relevant in modeling choice processes: their ability to (1) present decision-makers with options unavailable in practice or outside their usual purview; and (2) record multiple (hypothetical) choices for each decision-maker, even for scenarios like mate choice or home purchase that are made few times in a lifespan. The downside is that they are difficult to fully contextualize or make incentive-compatible; for example, experiment participants are routinely more willing to spend simulated experimental money than their own hard-won cash (Carlsson & Martinsson 2001).

Among the main statistical methods for enacting choice experiments is *conjoint analysis* (Green and Srinivasan 1978, Green *et al.* 2001), a broad suite of techniques, implemented widely in dedicated software (e.g., Sawtooth), to measure stated preferences and how they vary across a target population. Conjoint works by decomposing options into their *attributes*, each of which can have several *levels*. For example, housing options each provide cooking facilities, sleeping quarters, bathrooms, among other attributes, and each of these varies in terms of their quality levels (e.g., larger vs. smaller; number overall; and categorical attributes like type of heating, color, location, etc.) The goal of conjoint is to assign a utility or *part-worth* to each level of each attribute, with higher numbers representing more preferred attribute levels; for example, one might say that, for families with several children, a home with four bedrooms has a much higher utility than one with two. Conjoint approaches can be—and have been (Wittink & Cattin 1989; Wittink *et al.*

1994)—applied to a wide range of settings where it is useful to measure the importance of specific choice attributes.

Field data such as residential, work, or relationship histories have the advantage of reflecting actual choices made in real contexts (Louviere *et al.* 1999). However, such data suffer from several drawbacks: (1) variables necessarily covary (i.e., higher neighborhood prices correlate with levels of many attributes at once); (2) we cannot infer how people would respond to possible novel options, like affordable, diverse neighborhoods that may not yet exist; and (3) each person typically makes just one choice. Such problems are exacerbated when researchers cannot in principle know the entire “consideration set” of options available and actively mulled over by each decision-maker, which is typically the case in sociological applications.<sup>9</sup> When such confounds are present in field data, conjoint and other experimental methods allow researchers to control and “orthogonalize” the attributes and levels used in choice experiments, to achieve maximal efficiency and avoid presenting each participant with more than a couple of dozen hypothetical choice scenarios (Chrzan & Orme 2000).<sup>10</sup>

Two other choice assessment methods deserve brief mention, as they leverage some of the best features of experimental and field research: natural experiments and field experiments. In a natural experiment, an event exogenous to the outcome of interest affects

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<sup>9</sup> Newer online data sources—for example, websites for housing search and dating—generate highly granular, intermediate data on consideration sets. This parallels a revolution that occurred among choice modelers in marketing 30 years ago: the introduction of in-store product code scanners and household panels whose longitudinal histories provided information not only on which options were eventually chosen, but also which were actually available at the time of purchase, but rejected.

<sup>10</sup> A review of the vast choice experiment design literature is beyond the scope of this article, but turnkey solutions for designing, deploying, and estimating discrete choice models for online panels are commercially available (e.g., Sawtooth Software’s “Discover”).

only certain individuals, or affects different individuals to varying degrees. One example is the effect of natural disasters, like the 2005 flooding of New Orleans in the aftermath of Hurricane Katrina, on migration decisions (Kirk 2009). In field experiments, researchers exert control over focal aspects of people's choice environments. Although it may seem difficult to study sociologically relevant choice processes this way, the use of web sites as search tools enables a nontrivial degree of experimental control over choice environments (see, for example, Bapna *et al.* 2016).

### **Statistical Models of Choice Processes**

The bedrock formulation of statistical analyses of choice is the *random utility model*, which posits that each option available to a decision-maker affords a certain value ("utility"), which can be decomposed into that explicable by the analyst and a ("random") error (Ben-Akiva & Lerman 1985; Train 2009).<sup>11</sup> The former can be related through regression-based techniques to other observed covariates on the options, decision-maker, and environment, whereas the latter can be due to systematically unavailable information (e.g., income or education) or intrinsic unobservables (e.g., the mood of the decision-maker). Of particular importance is McFadden's *conditional logit* model (McFadden 1973),<sup>12</sup> which allows attributes of options to vary across choice occasions (e.g., prices or waiting times for different transportation modes; neighborhoods or room sizes for renting vs. buying a home; etc.) Because this model is supported in much commercial statistical

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<sup>11</sup> There is an enormous literature on the analysis of *discrete choice* data—items chosen from a known array with recorded attributes. Our treatment here is necessarily brief and highly selective. For more comprehensive introductions to this topic, we refer the reader to the many treatments available (e.g., Ben-Akiva & Lerman 1985, Hensher *et al.* 2005, Louviere *et al.* 2000, Train 2009).

<sup>12</sup> Empirical work typically refers to this as the *multinomial* logit model, although economists often distinguish the latter as applicable to when attributes change for the *decision-maker* (e.g., age, income), not the options themselves.

software, and converges rapidly even for large data sets, it is by far the most widely deployed in choice applications.

Statistical models of choice have been grounded primarily in rational utility theory, with concessions towards efficient estimation. As such, the utility specifications underlying such models have tended to be linear, to include all available options, and incorporate full information on those options. Much research reveals not only the psychological process accuracy, but the statistical superiority, of relaxing these assumptions by incorporating limits on information, cognitive penalties, and nonlinear/noncompensatory utility. For example, the formal incorporation of consideration sets into choice modeling (Horowitz, & Louviere 1995; Louviere, Hensher, & Swait 2000, section 10.3) has demonstrated superior fit and predictive accuracy for explicit models of *exclusion* of certain options from detailed processing, with some analyses (see Hauser & Wernerfelt 1990) attributing in excess of 75% of the choice model's fit to such restrictions. Similarly, lab studies have confirmed that decision-makers wish to conserve cognitive resources, and formal statistical models (e.g., Shugan 1980, Roberts & Lattin 1991) have attempted to account for and measure a "cost of thinking" or consideration from real-world data.

However, despite a decades-deep literature on noncompensatory evaluation processes (Einhorn 1970), the practical estimation of such models is largely in its infancy, due to complexities of specification and data needs (e.g., Elrod et al. 2004). Although nonlinearity can be captured using polynomial functions of covariates, these impose smoothness of response; by contrast, conjunctive and disjunctive processes impose cutoffs beyond which evaluation is either wholly positive or insurmountably negative (Bruch *et al.*, 2016). We view the development of this area as critical to the widespread acceptance of

formal choice models to social scientists and sociologists in particular, who typically wish to know which neighborhoods we would *never* live in, jobs we would *never* take, etc.

### **CHALLENGES AND OPPORTUNITIES FOR FUTURE RESEARCH**

Sociology has long been interested in individuals' choices and their implications for social life, and there is renewed interest in theories that can explain human action (e.g., Kroneberg 2014; Gross 2009). Our hope is that this review enables interested scholars to pursue a more nuanced and structurally accurate representation of the choice process. Greater insight into human behavior will also allow for greater insights into the dynamic relationship between micro- and meso-level processes and their larger-scale implications (Hedstrom and Bearman 2009). Consider how choice sets are constructed in the first place. People may rule out certain options due to preferences, affordability and/or time constraints—classic cognitive, temporal, and economic variables—but also the anticipation of unfair treatment or discrimination. For example, a high school student searching for colleges may eliminate those that are too expensive, too far from home, or are perceived as unwelcoming. Identifying the criteria through which people rule themselves (or others) out can illuminate more precise mechanisms through which people's actions shape, and are shaped by, larger-scale inequality structures.

We also believe that many of the data limitations that hampered sociologists' ability to study decision processes in the past are becoming far less of an issue. This is due at least in part to increasingly available data sources that can aid sociologists in studying choice processes. These so-called "big data" are often *behavioral* data: specific actions taken by individuals that can shed light on processes of information search, assimilation, and choice.

Moreover, the online environments through which we increasingly communicate and interact enable not only observational “field” data, but also targeted, unobtrusive experiments where the decision environment is directly altered. The latter possibility offers greater precision than ever before in isolating both idiosyncratic and potentially universal features of behavior, as well as better understanding the interplay between context and human action.

However, existing approaches from marketing and psychology are often not suited to sociological inquiry directly out of the box, creating both challenges and opportunities for future work. For example, most extant models were designed to capture more prosaic decisions, like supermarket shopping, where attributes are known, options are stable, and “stakes” are modest. Although some choices of sociological interest may fit this pattern, most do not. For example, many pivotal life decisions—purchasing a home (where sellers and buyers must agree on terms); college admissions; dating and marriage decisions; employment offers—require a *partnership*, wherein each decision maker must “choose you back.” Sociologists must therefore be circumspect in applying models developed for choice among “inert” options (such as flavors of yogurt) to the data they most commonly analyze.

The fact that so many sociological choices are characterized by *obscurity* (i.e., there is no obvious or single optimal choice to be made) is also a good reason to proceed with caution in applying ideas from JDM to sociological research. Take, for example, the literature discussed earlier on interventions that manipulate people’s default option. It is one thing to encourage healthier eating by putting apples before chocolate cake in the cafeteria line; it is quite another to nudge someone towards a particular neighborhood or school. Sociologists rarely have a clear sense of what choice will be optimal for a group of

people, let alone particular individuals. On the other hand, few would argue that growing up surrounded by violence isn't universally harmful (Harding 2009; Sharkey et al. 2013). Policies can only be improved by a more nuanced understanding of how choices unfold in particular environments, and how the default options are shaped by contextual factors.

Thus, this challenge also creates the opportunity to build knowledge on how heuristics operate under conditions of obscurity. JDM research has largely focused on documenting whether and how heuristics fall short of some correct or optimal answer. In sociology, by contrast, we typically lack a defensible metric for the "suboptimality" of decisions. While some decisions may be worse than others, it is impossible to know, for example, whether one has chosen the "right" spouse or peer group, or how to set up appropriate counterfactual scenarios as yardsticks against which specific decisions could be dispassionately assessed. By branching into decision domains where the quality or optimality of outcomes cannot be easily quantified (or in some cases even coherently conceptualized), sociologists can not only actively extend the range of applications of decision research, but also break new theoretical ground.

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## **SIDEBAR 1: THE CONSTRUCTION OF PREFERENCES**

Decision researchers have amassed several lines of evidence to suggest that, rather than being stable constructs that are retrieved on demand, preferences are constructed in the moment of elicitation (Lichtenstein & Slovic 2006; Bettman, Luce, and Payne 1998). This finding is echoed in studies of judgments and attitudes, which are also sensitive to contextual cues (Ross and Nisbett 1991; Schwarz 1999, 2007). Preference variation can be generated from simple anchors or changes in question wording (e.g., Mandel & Johnson 2002). A classic finding is that people exhibit *preference reversals* when making multiattribute choices; in one context they indicate a preference of A over B, but in another context they indicate they prefer B over A (e.g., Cox & Grether 1996; Seidl 2002). Several theories have been put forward to explain this effect (see Lichtenstein & Slovic 2006, Chapter 1 for a review and synthesis). One explanation is that people's preferences, attitudes, judgments reflect what comes to mind; and what is salient at one time point may not be salient at another (Higgins 1996; Schwarz, Strack, and Mai 1991).