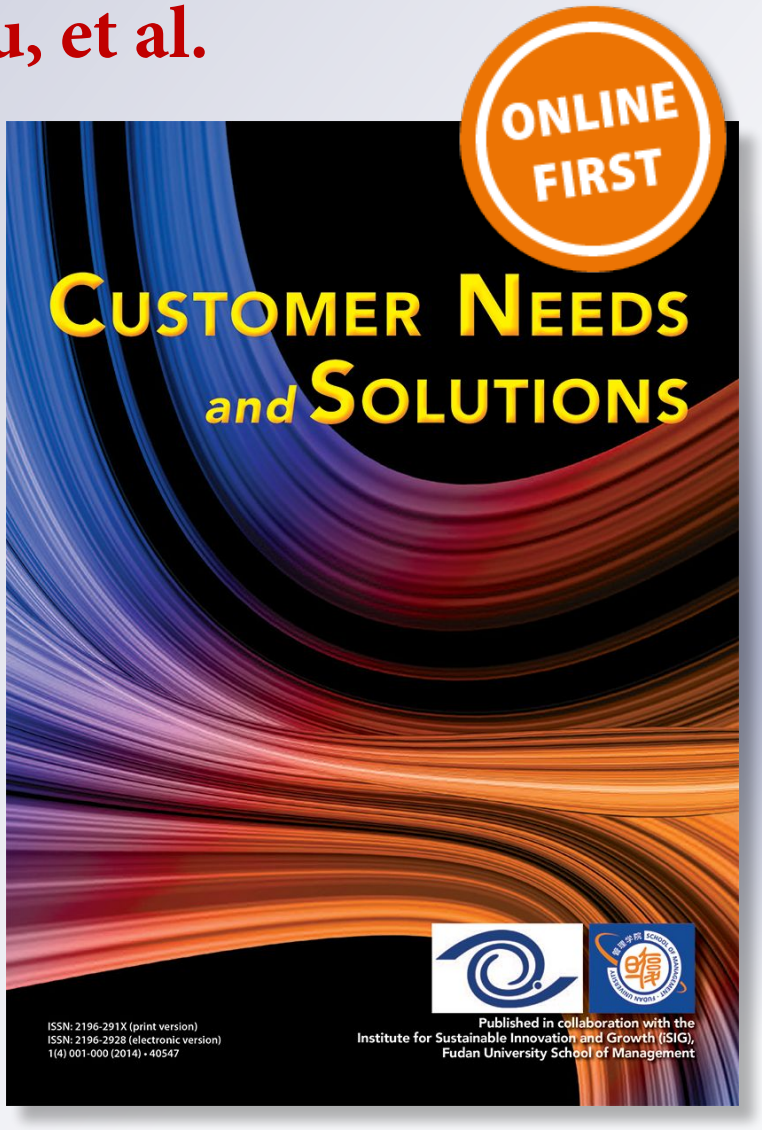
How Context Affects Choice

Raphael Thomadsen, Robert P. Rooderkerk, On Amir, Neeraj Arora, Bryan Bollinger, Karsten Hansen, Leslie John, Wendy Liu, et al.

Customer Needs and Solutions

ISSN 2196-291X

Cust. Need. and Solut.
DOI 10.1007/s40547-017-0084-9



Springer

Customer Needs and Solutions
https://doi.org/10.1007/s40547-017-0084-9

RESEARCH ARTICLE

How Context Affects Choice

Raphael Thomadsen[1] · Robert P. Rooderkerk[2] · On Amir[3] · Neeraj Arora[4] · Bryan Bollinger[5] · Karsten Hansen[3] · Leslie John[6] · Wendy Liu[3] · Aner Sela[7] · Vishal Singh[8] · K. Sudhir[9] · Wendy Wood[10]

Abstract Due to its origins in the literature on judgment and decision-making, context effects in marketing are construed exclusively in terms of how choices deviate from utility maximization principles as a function of how choices are presented (e.g., framing, sequence, composition). This limits our understanding of a range of other relevant context effects on choice. This paper broadens the scope of context effects to include social (e.g., with friends or family) and situational factors (e.g., location (home/store), time, weather).We define contexts as any factor that has the potential to shift the choice outcomes by altering the process by which the decision is made. We use this lens to integrate the psychology literature on habitual choice, System I and II decision-making, and a recent stream of empirical work that involves social and situational effects into the scope of context effects. We distinguish between exogenous and endogenous context effects, based on whether the decision-maker chooses the context. We then discuss issues of empirically identifying context effects when using either experimentally generated data or naturally occurring secondary data. We conclude with a discussion of trends and opportunities for new research on context effects.

Keywords Context dependence · Choice · Behavioral decision-making · Consumer behavior · Moderating variables · Information processing

1 Introduction

Fueled by a substantial amount of empirical research across several fields, including law, economics, psychology, marketing, and organizational behavior, it is now widely accepted that choices are susceptible to contextual influences [31, 40, 42, 57, 80, 81, 84, 91]. At the same time, there is much less agreement within and across fields on what constitutes contextual influence. In the rich tradition of choice modeling within marketing, context typically refers to the composition of the choice set. Here, so-called context effects describe the notion that choice is influenced by the composition of the choice set beyond the mere presence of the alternatives [64, 91]. A well-known example is the compromise effect [70], which states that items tend to gain market share when they become (closer to) the middle option of a choice set. Yet,

This paper is based on the presentations and discussions in the "How Context Affects Choice" workshop at the 2016 Choice Symposium held at Lake Louise, AB, Canada.

✉ Raphael Thomadsen
thomadsen@wustl.edu

Robert P. Rooderkerk
rooderkerk@rsm.nl

[1] Olin Business School, Washington University in St. Louis, St. Louis, MO, USA

[2] Rotterdam School of Management, Erasmus University Rotterdam, Rotterdam, The Netherlands

[3] Rady School of Management, UC San Diego, La Jolla, CA, USA

[4] Wisconsin School of Business, University of Wisconsin, Madison, WI, USA

[5] Fuqua School of Business, Duke University, Durham NC 27708, USA

[6] Harvard Business School, Boston, MA, USA

[7] Warrington College of Business, University of Florida, Gainesville, FL, USA

[8] Leonard N. Stern School of Business, New York University, New York, NY, USA

[9] Yale School of Management, Yale University, New Haven, CT, USA

[10] Department of Psychology and Marshall School of Business, University of Southern California, Los Angeles, CA, USA

Published online: 25 November 2017

many researchers in marketing use the term context more broadly to include social context (e.g., joint vs. individual consumption; [85]), situational context (e.g., occasions/activities which activate different needs/goals; [34]), and interruptions to the choice process [51]. In addition, other research streams seem to have their own associations when it comes to context. For instance, in the literature on memory and cognition, context can refer to the sentence a focal word appears in [6] or the environment in which specific episodes or information where encoded [73]. As another example, Lubow et al. [54] uses preexposure to the stimulus or the environment as a context effect.

In this paper, we provide a formal definition of context in the domain of choice that transcends a specific academic field. We believe that a unified definition will spur more interdisciplinary research on the context dependence of choices. At the same time, we focus the definition of context to exclude competing, but distinct, drivers of choice such as preference heterogeneity or incentives. A broader definition of context allows researchers to answer questions such as: How do contexts affect choices? What types of contexts are most important in choice? Are some choices more affected by context than others? What are the suitable methodologies to uncover context effects? Answers to these basic questions are a key to enhancing our understanding of how people make choices and how researchers and managers should account for the role of context in their analyses.

An improved understanding of context dependence is also important for the statistical and predictive validity of choice models. While there is a large stream of literature in psychology that studies the role of context in choices, relatively few quantitative marketing or empirical economics papers explicitly account for the influence of the context in their choice estimations. However, as Swait et al. [79] note, omitting relevant contexts from the estimation of a predictive choice exercise leads to a "Lucas-like 'context critique'" [55] where a researcher's prediction of consumer behavior will only be correct if the context of the choice is similar enough. Hence, they argue that "[To be policy sensitive]…ultimately then, development of predictive models should aim not just at the incorporation of context effects, but the very modeling of context itself." Similarly, because observed choice behavior is a function of both preferences and context effects, preference measurements will be biased when researchers do not account for context effects. From a social engineering point of view, if one wants to create nudges to get consumers to take actions that are good for them (such as saving or eating healthier) then one needs to understand which contexts will nudge people in which ways [63]. Thus, understanding the role of context on choices is very important to a wide range of researchers.

While the economics and quantitative marketing literature have historically ignored context effects, there is a growing recognition that such effects are important, and a growing body of economics-focused literature that accounts for context effects is emerging (e.g., [4, 32, 34, 41, 64]. In addition, differences in choice behavior due to variations in socioeconomic contexts across countries have been the focus of recent work in marketing in emerging markets and developing countries (e.g., [58, 76]).

This paper has several goals. First, we formally define what a context is, which allows us to classify different types of context effects. We believe that such a classification could stimulate cross-disciplinary research by creating a common understanding of what context effects are and where we should expect to find them. Viewing context effects as ad hoc, instead of systematic, restricts the adoption of the effects to researchers studying a (very) specific context. In contrast, if it is clear which settings result in systematic and substantial context effects, then researchers and decision-makers can properly account for such effects in a wider range of situations. For example, researchers studying any phenomena could add suitable controls regarding the contexts in their data. Doing so would also generate more insights into the magnitude and variability of each specific context effect, teaching us more about the nature of the effect. Such knowledge would also be very useful for managers and public policy makers, who—because they cannot account for all potential effects of context on business and/or society—would like to know when, and which, context effects are likely to have a first-order impact in the settings that are most relevant.

The second goal of this paper is to shed more light on where context effects take place in the consumer decision-making process. Are they a part of System 1 (fast and more intuitive) or System 2 (more deliberative) [39, 74]? We argue that they can take place in both. In addition, we postulate that contexts can affect *whether* the decision-maker will follow the System 1 versus System 2 route to making a choice.

Naturally, researchers require changes in context to identify the effect of the context on choice. In light of this observation, a third goal of the paper is to introduce the distinction between exogenous and endogenous changes in context. The former, which are initiated by a party other than the decision-maker (e.g., researchers, firms), are most commonly studied. Typically, this is done with the use of stated choice experiments. For instance, design researchers can manipulate the composition of the choice set to which respondents are exposed [64, 67]. However, endogenous context changes—those initiated by the decision-maker—are not uncommon in practice. Consumers can decide to hide product information online, change the size of the consideration set in an online comparison tool, and create habits while making choices, etc. Such endogenous context changes are part of revealed preference data that are increasingly analyzed to study context effects. We discuss the implications of this distinction in context changes for

researchers analyzing context effects and practitioners aiming to capitalize on these effects. One specific area we highlight is the challenges in empirically identifying context effects in stated and revealed preference data.

Our final goal is to discuss trends that could spark more interdisciplinary research on context dependence in choice. In addition, we provide recommendations for academics and practitioners.

Our paper follows in the footsteps of Swait et al. [79], who within the flexible random utility maximization framework called for more contextual models of disaggregate choice and builds on Ben-Akiva et al. [7], who formalized the fact that context and choice process interact, equating context with social networks and the marketplace. We will take an even broader perspective to contexts, while simultaneously focusing its definition.

The rest of this paper is organized as follows. In the next section, we provide a formal definition of context in the domain of choice. In Section 3, we discuss the System 1 versus System 2 location of context effects. Section 4 introduces the distinction between exogenous and endogenous contexts. In Section 5, we briefly describe the challenges researchers face when trying to identify context effects. Section 6 describes some trends that we believe may foster more research on context dependence. Finally, we provide recommendations for researchers and practitioners in Section 7.

2 Defining Context

As a starting point, we seek to define what context means. While many papers have focused on a narrow set of contextual phenomena (such as choice set composition effects in marketing), we believe there are many ways by which contexts affect choices. For example, locations, activities, and consumption environments can trigger habits and other automatic processes to impact choice (Huang et al. 2016).The social network within which a choice is made (e.g., a family) may change the decision context [7]. Habits form as consumers repeat responses and learn mental associations between features of the performance context and rewards [88]. Decisions of others might shape ones' decisions [10, 27], or the presence of default options may affect ones' choices [38]. Taking a wider perspective leads us to define contexts as follows:

> Contexts are factors that have the potential to shift the choice outcome by altering the process by which the decision is made.

We want to be careful to define what this definition includes and what it does not. Aspects of the choice environment that merely affect the preferences for the underlying attributes of the product (or choice alternatives in non-product settings)[1]would not be considered context effects. On the other hand, aspects of the choice environment that move a person from using a utility maximization-based choice method to an emotionally driven choice method would be considered as contexts.

As an example of a trigger for a context effect, an end-of-aisle display is unlikely to affect a consumer's utility for a product, but can remind or inform the consumer of the presence of the product and put the product into a consumer's consideration set [21]. Similarly, cuing a customer to consider the tradeoffs between a new product and an existing product can lead to a comparative decision process, while listing only benefits of a new product can lead to a consumer focusing only on the benefits of a new product versus a no-purchase alternative [66]. As another example, encouraging a customer to make a shortlist when choosing from many options may not change the perceived utility of the options, but can nevertheless change the choice outcome by introducing evolving acceptance thresholds into the decision-making process [52].

Importantly, not every aspect of the shopping behavior represents context effects; rather, factors that affect choices by changing the *incentives* of the consumers are *not context effects*. A change in the price of the product which leads to different products delivering the highest utility for consumers, and thus a changed choice, is not a contextual effect. Similarly, rainy weather leading a consumer to buy an umbrella is not a contextual effect, because the rainy weather directly impacts the utility that the consumer gets from the umbrella, without changing the process by which the utility is derived. This is not to say that weather cannot create a context effect for consumers; for example, if consumers form habits based on whether the weather is sunny, that would be a context effect, as would a short-term shock in sunny weather that led to increased solar panel sales due to projection bias, as found in Lamp [48]. Finally, varying availability of products due to changes in choice set composition would not form a contextual effect, even if it changes choices, when these shifts in choices are merely the result of a favorite option no longer being available. However, choice set availability could form a context effect to the extent that it influences choice by changing the relative position of options, as opposed to their absolute attribute values. For example, changes in choice set availability that influence choice by shifting which products are in the middle of the pack (i.e., "compromise" options; [70]) would be considered a context effect.

Another important observation is that *context effects* are also *not the same as preference heterogeneity*. They could give rise to similar choice patterns but they represent distinct factors [36]. Whereas preference heterogeneity captures

[1] In some cases, the line between innate preferences and other decision processes might be blurred, such as under the theory of context-dependent constructed preferences [8].

differences in preferences across individuals independent of (or conditional on) context, context captures how individual-level preferences are adjusted by the environment at the time of the decision. Given that many of the same choice patterns could be explained by preference heterogeneity or context dependence, it is important to control for one when measuring the other. This may pose additional restrictions with respect to the ideal research design, something we discuss in Section 5. In the case of choice set composition effects, Hutchison et al. [36] argue that a combination of within- and across-subject data is needed to tease the two apart.

Of course, the nature and level of context dependence itself could be heterogeneous across individuals. Such heterogeneity in context susceptibility may reflect, for example, heritable differences [72]. Using a classic twin study design, Simonson and Sela find a large heritable effect on, for example, preferences for compromise (but not asymmetrically dominating) options. Typically, experimental studies investigating specific context effects introduce moderators or boundary conditions to investigate heterogeneity in the effect. For example, Karmarkar and Bollinger [41] find that licensing effects from bringing reusable grocery bags only lead to an increase in indulgent purchases for those households without children. Researchers have begun to look at the higher-order constructs underlying context dependence. For instance, using fMRI, Hedgcock and Rao [33] study the neurobiological underpinnings of the attraction effect. They find that an individual's trade-off aversion promotes the attraction effect.

The advent of more advanced techniques for modeling choices (e.g., Bayesian statistics) also greatly facilitates the modeling of heterogeneous context dependence in choice models (e.g., [5, 64]). In the domain of choice set composition effects, Zeithammer et al. [91] argue that even when models of context dependence may differ, they should all attempt to control for heterogeneity of the context-independent part of preference while simultaneously investigating the heterogeneity in context-dependent adaptation of these preferences. The model introduced by Boldt and Arora [9] to study dyadic compromise effects is one of the few examples that does both.

3 Locating Context Effects: System I Versus System II

3.1 The Presence of Context Effects in both Systems of Thought

Ben-Akiva et al. [7] highlight the importance of considering choice as an interaction between the choice process and the choice context. We take a similar view that context affects the choice process in which decision-makers engage. To pursue this further, we can ask about what types of mental processes are impacted by context effects. More specifically, are context effects more tied to the System 1 (fast, intuitive, automatic) or System 2 (slow, deliberative, reasoning) way of thinking [39, 74]? It is tempting to view context effects as a purely heuristic, System 1, phenomenon. Following this perspective, context effects are regularly equated with deviations from rationality [87]. Moreover, their mere nature implies a more contextualized way of reasoning. However, Evans [23] argues that there is a false belief that Type 1 processes are responsible for cognitive biases, whereas Type 2 processes are for normatively correct responding. Relatedly, Lee et al. [49] find that higher-order cognitive processes lead to lower consistency in consumer decisions than automatic affective responses. Furthermore, consumers continue to believe in the efficacy of deliberation even when performance benefits from more habitual, System 1 processes [13]. In addition, Evans [23] argues it is a fallacy to think that Type 1 processing is more contextualized while Type 2 processing is more abstract. Models on the psychology of reasoning [25, 46] recognize that the context can influence System 2 as well as System 1 processing. In line with this stream of thought, we also argue that context effects can occur in both systems of decision-making.

We turn to the compromise effect for illustration. Representing a deviation from the rational theory of choice, compromise effects are regularly classified as examples of irrational behavior. However, Wernerfelt [87] shows that compromise effects can be compatible with rationality when they are seen as a manifestation of consumers using marketing offerings to infer utilities. Consistent with this dual interpretation, we show how the same compromise option can be chosen when a decision-maker uses screening rules (more heuristic, more System 1) versus when (s)he engages in extensive compensatory decision-making (more elaborate, more System 2), factoring in the direct (added) value of a compromise option. Figure 1 presents a hypothetical choice set of three apartments offered to students that differ in their distance from campus (in miles) and in their condition (indicated by stars). Consider two strategies. The first strategy is a form of an elimination-by-aspects (EBA) strategy [83]. When choosing from the choice set, the student decides to discard apartments that are the least attractive on a given attribute. This strategy results in the elimination of alternatives A and C, resulting in a choice for the compromise apartment B. For the second strategy, the student integrates all the information into an overall value judgment of each alternative, weighing his/her preference for proximity to campus versus the state of the apartment. In doing so, (s)he may come to realize that apartment B represents a compromise option compared to the more extreme alternatives A and C. If the student directly

Apartment A	Apartment B	Apartment C
Distance from campus: 5 miles	Distance from campus: 10 miles	Distance from campus: 15 miles
Condition: ***	Condition: ****	Condition: *****

Notes. The example is inspired by Simonson and Nowlis (2000). The condition attribute would be a star rating of the condition of the apartment as judged by a rental agency, where more stars reflect a better condition.

Fig. 1 Hypothetical apartment choice. *Notes*. The example is inspired by Simonson and Nowlis [71]. The condition attribute would be a star rating of the condition of the apartment as judged by a rental agency, where more stars reflect a better condition

factors this compromise into their value judgments, the perceived value for apartment B increases, leading to its choice.[2] Note that the two strategies, which are quite different from one another, represent the two different systems of decision-making but result in the same choice and the same influence of the context on choice.

3.2 The Exclusive Presence of (Specific) Context Effects

In contrast to the view that the same context effect can occur under both systems, other researchers have suggested that (certain) context effects only occur in one of the two systems. Building on the dual-system theory of judgment and decision-making [14, 39, 60], Dhar and Gorlin [20] suggest that certain context effects can be attributed primarily to System 1 (those that make options stand out intuitively), whereas others arise from System 2 ways of choosing (those that change the degree of concern for justification or those that help people justify their choices). They argue that since the defining property of System 1 versus 2 processing is the degree to which they engage working memory, one can hypothesize how the context effects will change with conditions such as the limited availability of cognitive resources. This allows researchers to test where specific context effects take place. Indeed, Pocheptsova et al. [61] find that when System 2 is hindered by resource depletion, the compromise effect diminishes, while the attraction effect, another famous context effect, greatly increases, concluding that while the compromise effect is a System 2 effect, the attraction effect is a more perceptual System 1 context effect. Consequently, it may be possible to distinguish the types of contexts that would affect each system by their processing nature; while some contexts may serve as automatic perceptual cues (e.g., dominance or salience), others may require extra processing to have an impact (e.g., relative magnitudes, ranges of alternatives, etc.).

3.3 Context as a Determinant of the System of Thought

Contexts can also affect which specific evaluative system the decision-maker will follow. For example, Sela and LeBoeuf [66] examine how consumers decide whether to buy an upgrade. In the case of an upgrade, a consumer has two options: upgrade or stay with the status quo. Typically, upgrades offer pure improvements, so there are no benefits of the status quo beyond price (i.e., the upgrade offers the same features offered by the status quo option, as well as some new features that are not included in the status quo). That makes the upgrade a classic focal product. Sela and LeBoeuf show that framing the decision context as an upgrade, as opposed to an economically equivalent choice between two vertically differentiated options, leads consumers to excessively focus on evaluating the new product in isolation (e.g., what is good or bad about it, or how much they want the new product) and to insufficiently engage in product comparison (e.g., how it is better or worse than the status quo option, or whether the added benefit justifies the cost). However, prompting consumers to think comparatively, by asking them to compare the new versus current features of the products they have, leads to consumers comparing the products directly, thereby altering their decision about whether to upgrade. In this case, the effect of context (framing as upgrade vs. two vertically differentiated options) on evaluation specifically affects comparisons and appears to go beyond a System 1 versus System 2 classification. In fact, even under careful deliberation (i.e., when consumers are asked to carefully analyze the decision and to list pros and cons for upgrading), unless they are specifically prompted to engage in comparison, consumers tend to insufficiently compare and consequently fail to fully appreciate the extent of overlap between the upgraded option and the status quo product.

Although some contexts may initially have an effect on System 2 processing, decision-makers may also learn, through repeated exposure, to use more heuristic or System 1 solutions to familiar contextual configurations. In other words, repeated exposure to a certain context may shift the decision-maker from System 2 to System 1. For example, repeatedly making

[2] One could argue that the EBA strategy is rather conscious and intentional, and as such should be characterized as Type 2 processing. However, Shah and Oppenheimer [68] classify it as a heuristic that examines fewer cues, integrates less information, and examines fewer alternatives than under a fully compensatory model in System 2. In addition, both intuitive (System 1) and deliberate (System 2) thinking can be conscious and nonconscious in nature (Evans and [24]).

choices from a "compromise set" or from a trinary choice set that includes an asymmetrically dominated decoy may lead decision-makers to learn a context-specific choice heuristic (e.g., they always choose the middle option, or the asymmetrically dominating option, respectively). In such cases, they learn to construct choices as opposed to preferences [1]. However, Amir and Levav also find that the automaticity stops when the context changes. This may have some adverse effects for the decision-maker. Amir and Levav show that, when the context changes, consumers have a hard time making new decisions, even if the change in context came from the removal of irrelevant (never chosen) options.

Finally, Kahneman and Frederick [39] argue that both systems interact. System 1 proposes an answer or solution based on quick, intuitive reasoning. Next, System 2 monitors System 1's performance by evaluating the suggested solution and then either supporting it or pushing for a better one. Dhar and Gorlin [20] suggest that System 2 is less likely to override System 1 when System 1 generates a strong intuition in favor of one option. This line of thought suggests another way in which context could influence the reliance on System 1 versus 2; when a context increases the intuition that a specific option is the best choice, the decision-maker relies less on System 2. For example, when a choice set contains a clear compromise option that is highlighted as such (see Fig. 2 for an example), this reduces the need for System 2 to be activated.

Fig. 2 Highlighting the compromise option (coffee chain in Japan, 2013)

4 Exogenous Versus Endogenous Changes in Context

Note that while contexts may originate from the choice environment exogenously, they may also be chosen by the decision-maker. The traditional view is that contexts are exogenous. For example, in Huang et al. [34], context in the form of consumers' hourly activities and their accompanying beverage consumption needs evolve exogenously, but the response to these contexts are a function of both past and expected future contexts and consumption. Alternatively, firms and public policy makers can change the contextual cues, by changing which products are presented to consumers, the order they are presented in, the allowed size of an online comparison set (few or many items), the salience of a status-quo option (e.g., a cell phone provider listing the current contract vs. not), and so on. For example, consistent with previous work documenting the impact of situational influences on eating behavior [16, 17, 28], John et al. [37] find that two contextual factors—cup size and service style—affect consumers' purchasing and consumption of sugary drinks. Firms can also communicate external reference prices or describe the choice in a certain way that cues different choice processes. Similarly, researchers can manipulate many of these contexts as well. This approach has been taken in stated choice experiments attempting to identify context effects.

Sometimes contexts are more endogenous, as when a person himself creates a context of choice. Choosing and shaping contexts is proving to be an important component of self-regulation, in which people meet long-term goals by forming habits that are reliably triggered by the contexts of their lives [26].

The ways that contexts trigger habits are illustrated with a cognitive decision task by Neal et al. [59]. For participants with strong running habits, thoughts of running quickly came to mind after exposure to the location where they usually run. However, exposing participants to their goals for running do not bring to mind thoughts of exercise. In contrast, for people who do not run as often and therefore have weak habits, thoughts of running come more quickly after exposure to their goals but not by exposure to the location where they have previously run. Contexts thus quickly activate a practiced habitual response. Habit discontinuity research further highlights the importance of contexts for habit performance. Wood et al. [89] showed that university students who transferred universities and had a habit of running were able to maintain this habit if their location of exercise remained stable (e.g., the gym or outside), but lost the habit if they moved the location of where they did their exercise.

Following these results, consumers can intentionally create habits or routines that allow them to make good choices with lower mental costs. People who score high on scales of self-control appear to be especially able to do this. They select into contexts that enable them to readily meet their goals [22]. They also form habits so that contexts automatically activate goal-consistent responses [26]. Thus, people who are high in self-control exercise regularly and eat healthfully by forming exercise and diet habits that automatically trigger beneficial behaviors and reduce their experience of temptations to act otherwise.

In sum, consumers can consciously create good habits by repeatedly engaging in the desired activity in a specific context. Of course, they can also create bad habits—often unconsciously—by repeated engaging in an undesired activity in a

particular context. Further, endogenous changes in context do not have to be habit or goal related. Karmarkar and Bollinger [41] find that the use of reusable grocery bags leads consumers not only to purchase more environmentally friendly goods on the occasions they bring the reusable bags, but also to purchase more indulgent items on those occasions, providing evidence for priming and cross-domain licensing effects.

The view that goals can have an effect on the choice for a specific context can also be found in Dellaert et al. [19]. Focusing on choice set composition, they argue that activated goals have an effect on the resulting choice set (context) by imposing attribute-driven constraints (e.g., only consider diet sodas when pursing a weight-loss goal). However, they argue that the reverse can also hold. When a choice context makes goal attenuation impossible, this may lead the decision-maker to revise his or her goals. They argue that, in general, conflicts between context and activated goals can be resolved through either (a) a revision of attribute constraints (changing the context) or (b) a revision of goals.

5 Identification and Estimation of Context Effects

An important aspect of uncovering context effects is that the effect be (i) identified and (ii) estimated efficiently. We discuss identification and estimation of context effects first in stated choice experiments that are most commonly used to identify the traditional presentational context effects identified in the judgment and decision-making literature. These settings often deal with exogenous context changes, initiated by the researcher, to identify the effect of the context. Next, we discuss how uncovering effects is further complicated when using revealed preference data, in which context changes are typically endogenous.

5.1 Identification and Estimation of Context Effects in Stated Choice Experiments

In line with the call by Kivetz et al. [45] for a synthesis of constructed and inherent preferences, the influence of contexts on choices needs to be identified vis-à-vis context-independent preferences. Moreover, identification of a context effect requires variation in the underlying context factor. In the simplest of cases, it is necessary that the context factor is sometimes present and at other times absent. For a between-subject design, this can be accomplished with relative ease. Examples include lab and field experiments where individuals are randomly assigned to a treatment condition in which the context factor is present or the control condition in which the context factor is absent. However, ideally, context effects could be detected at the individual level to account for their heterogeneity across the population of interest [91]. This presents significant design challenges: first, context effects at the individual level rely on a within-subject design and a statistical model. Estimation efficiency for such a situation refers to the ability of the underlying statistical design to uncover the context effect with precision. The literature on designing choice experiments offers a useful direction in this regard [3, 35, 43, 47, 53, 62, 65, 90]. The key observation in this literature is that the covariance matrix of the estimates of the model parameters in a choice model is a function of the model parameters. Unlike in linear regressions, where the form of the covariance matrix ($\sigma^2(X'X)^{-1}$) implies that the efficiency of a design is independent of the expected coefficients, choice designs cannot be optimized without a prior estimate of the model parameters. A widely used measure to evaluate design efficiency of choice experiments is *D* efficiency [3, 35] and design algorithms based on this measure are available in statistical packages such as SAS.

We use the well-known compromise effect to illustrate the importance of design efficiency to uncover an individual-level effect that relies on a within-subject design. Three alternative approaches have been proposed to formally model the compromise effect [44, 64, 69], each using a within-subject design and a statistical model. All three approaches suggest the inclusion of additional parameters $\{\alpha\}$ to capture context dependent compromise effects that tend to shift context-independent preferences $\{\beta\}$ in a systematic way.

For all of the existing statistical models that help uncover compromise effects, little is known about how to design experiments that efficiently estimate both $\{\alpha\}$ and $\{\beta\}$. For example, both Kivetz et al. and Sharpe et al. use ad hoc designs that efficiently estimate $\{\beta\}$ in their empirical investigation of compromise effects. Rooderkerk et al. manually adjust a design procedure in SAS that maximizes *D* efficiency to allow for choice sets with asymmetrically dominating options, facilitating the identification of the attraction effect. However, in all cases, no attention is paid to the efficiency of estimation of $\{\alpha\}$, the context effect parameter. We feel that the existing literature on choice designs has much to offer when designing studies to uncover context effects. Future research should develop procedures for optimizing the design of choice sets that allow for the efficient estimation of among other compromise effects ([9]). Failure to use an efficient design may result in a researcher concluding that a context effect is absent when, in reality, it is present. Similar in spirit to Liu and Arora [4], which develops optimal design criteria for choice models that account for consideration effects, within-subject context effect designs deserve further academic consideration as well.

In addition to enabling identification of context effects, within-subjects designs are known to increase precision and power [56]. However, they have some disadvantages as well; they can lead to carry-over effects such as fatigue and learning. These factors lead the response to a current choice setting (focal context) to be dependent on a previous choice setting

(past or background context) [56]. This poses some challenges when it comes to their design and the resulting estimation. An interesting example of how to deal with this can be found in Ataman et al. [5]. They use a balanced Latin square design [11] to control for order effects. In addition, they adopt a dynamic choice model to control for learning and fatigue during estimation of the local (focal choice set composition) and background (choice set composition of previous choice sets) context effects.

5.2 Identification and Estimation of Context Effects on Revealed Choice Data

We next consider identification of context effects using naturally occurring revealed preference data in recent empirical research. Much of this research relies on observable exogenous variations in context to identify the context effect. For example, Huang et al. [34] use variation in activities, social settings, and other factors to identify context effects. Gardete [27] identifies social context effects by observing airline purchases of individuals who are in the line of sight of those making choices.

Recently, several studies have estimated context effects by using field experiments to generate useful exogenous variation (e.g., [30, 78]). Echoing the recent call for more behavioral field experiments [29, 75], we note the potential for field experiments to result in the ideal combination of exogenous context changes and revealed preference data, balancing internal and external validity with respect to the causal mechanisms of context effects.

In other settings, reasonable assumptions (either explicit or implicit) are made to estimate context effects. Karmarkar and Bollinger [41] make a reasonable exclusion restriction that a reusable grocery bag does not actually increase utility for indulgent food items to establish the context effect of a reusable grocery bag on the indulgent purchase. Similarly, even when Rooderkerk et al. [64] use choice experiments, they make implicit assumptions about distances in the attribute space between products in order to disentangle utility effects from context effects.

The identification discussion above focuses on exogenous context effects. As we described in the last section, the contexts themselves may be endogenous. In such cases, a research analyst should take this self-selection into account when empirically investigating the role of context in choice. This could be achieved through the use of a clear exclusion restriction that affects context choice but not choice within the context. For example, in the setting of Huang et al. [34], people who make healthy choices may be doing so because they generally place themselves in activity contexts where healthy choices (e.g., exercise or visiting healthy restaurants) are made. While Huang et al. treat the contexts as exogenous, future research should consider features of the data that can allow the context choice itself to be modeled.

6 Trends that Could Foster Research on Context Effects

We now discuss a few trends that can facilitate research on context effects in choice.

6.1 Technological Advancements in Measuring Contexts and Decision Processes

Our ability to measure contexts has also improved dramatically over time. For example, we now have the ability to have subjects wear technology that can measure many aspects of the area and provide us with information about the location and immediate surroundings of where they are when they make decisions [2], the weather conditions they face [50], or their heart rhythm [82]. As many people have adopted wearable technology that can measure these things, we may even be able to start measuring these effects without having their measurement (and therefore their presence) be salient to the subjects, allowing us to get an undistorted view of what is driving choices (since the known presence of such devices in itself may lead to context effects). If we can get large scale datasets with these variables, we can also measure which dimensions of context seem to be most important for different types of decisions. This allows us to go beyond lab settings that merely measure whether a particular contextual effect occurs and instead use the magnitudes of the effects to parse out which contextual cues researchers—including those who only care about contextual effects as controls for studies on other topics—should focus on most.

Technology cannot only get us better measures of context, but it can also help narrow down the process that consumers use in making decisions. For example, eye-tracking technology has helped researchers and firms understand which products on the store shelf are likely to get attention and which are not and which layouts might increase the amount of products that are considered by the consumers, as well as how much attention consumers give to focal products [15]. Similarly, researchers have used eye tracking to understand how different aspects of advertising affect the recall and the process with which consumers engage with the ad (see [86] for a summary).

6.2 Big Data: Connecting Contexts to Choices

The advent of big data, especially mobile data with location and time, integrated with data from Internet-of-Things sensors, and the increasing ability to fuse data sources that use individual surveys or social media postings, helps researchers

measure and understand contexts better than ever before. By tying contexts to empirical datasets of frequent consumption choices, more detailed studies of context effects using revealed preference data become feasible.

As data increase in size and scope, the ability to detect context effects will also increase due to increase in statistical power. Given the increased statistical power, researchers should be encouraged to explore and detect not just one "main" effect but rather emphasize and analyze how this effect varies across contexts (different populations, markets, product categories, time, etc.). This is in line with the view that it is much more interesting to analyze the variation in a certain effect across contexts than it is to test whether or not an effect is "significant" [18]. In the era of big data, any effect can be made statistically significant (with enough data). Therefore, emphasis should be on studying variation in effects across contexts.

Further, our ability to easily and quickly manipulate contexts of actual or experimental choices in online or mobile settings should help continue the expanding study of how contexts affect choices. Particularly helpful are the advances in the ability to conduct A/B testing on different online groups or even in natural store settings for choices where the consumers are not aware that they are part of an experiment.

7 Recommendations

Why does it matter whether some factors that affect choices are context effects while others are not? To understand that, we must consider which groups might benefit from a deeper understanding of the choice process. We focus on three groups: academic marketing researchers, consumers, and managers.

While academic marketing research has traditionally been divided into empirical and behavioral groups, this separation is artificial and increasingly outdated. First, "empirical" researchers often study the behavior of consumers, and "behavioral" research generally involves estimating effects of psychological phenomena using data and advanced empirical methods. Fortunately, the lines are increasingly blurring. For example, more and more studies fuse secondary and experimental data to deepen our understanding of behavioral phenomena (e.g., [41]). Moreover, standard choice models are increasingly expanded to account for behavioral effects (e.g., [4, 64]). Because we study the same phenomena, we need to build bridges between the different research styles in order for knowledge to disseminate more broadly and rapidly across disciplines, including marketing, psychology, economics, sociology, and transportation. Most "empirical" and much "behavioral" research already incorporates factors that shift consumer incentives into current analyses, at least to the extent that is feasible. Further, most marketers, regardless of their research focus, understand that there are factors that can affect choices beyond incentives. However, if we cannot categorize and characterize what the largest of these effects are, and when we should expect each to occur, it might become intractable to include these effects into a choice model.

Consumers and firms can also benefit from understanding the role of contexts in choices. Sometimes, contextual cues that affect choices are created exogenously. However, often either the consumers or the marketers determine the contextual cues that affect choices, and understanding the full impact of these decisions is important to both parties. If consumers are more aware of the types of contextual factors that shift their choices, they may be able to make better choices by recognizing when marketers are manipulating their decision process, at least in the case of System 2 processing. On the other hand, consumers can train themselves to use contextual cues to create automatic processes that allow them to make more efficient decisions, to the extent that making decisions through a conscious process can be costly. Further, if consumers are aware that they may not always be primed to make comparative decisions, then they can train themselves to recognize this and use a better decision-making process.

Marketers also need to recognize the importance of how contexts affect choices. For example, a charity letter fundraising to help poor elderly women in India performs differently depending on whether the letter says that a person was comfortable but had a loss versus just states that the person became destitute with no background [78]. Similarly, a pitch earned more money if the requested money was stated on a monthly versus daily rate. Further, many studies have shown that creating decoys or changing consumers' reference points change the way consumers make decisions, and firms can capture many of these gains. Understanding how contexts affects choices can also change the ways firms target customers. For example, the context of when and where consumers grew up has been shown in multiple studies to affect consumers' long-term preferences [12, 32, 77]. Thus, it may be more important to target consumers based on the neighborhoods they grew up in than in the neighborhoods in which they currently reside.

In sum, while researchers are fairly adept at describing the exogenous context of the data, they mostly do not engage in estimating it, both for lack of available data and for lack of attention. At the same time, researchers do tend to generalize their results beyond their data's contexts. With the advent of technology and availability of data sources and quantities, we urge researchers to not only look for what is robust across contexts, but to also attempt to measure and estimate the effects of the contexts themselves. As noted above, this will most likely require attention in the design of research that enables this type of estimation. For example, experiments

may require both a between- and a within-mixed design, followed by more sophisticated estimation methodologies than are currently commonly used. Secondary data collection may require the collection of additional non-standard parameters, such as measurements of what the customer actually looked at, or which family member watched the particular ad and where they focused on the screen when it aired. These examples suggest that first and foremost, researchers need to be aware of the pivotal nature and role of context in generating consumer behavior.

8 Contribution Statement

The notion that choices are context dependent is well established across many fields. However, there is less consensus within and across disciplines on what can be considered as context and what cannot. In this paper, we broaden the notion of context dependence to include contexts beyond merely choice set composition, yet focus its definition to exclude incentives, by defining contexts as factors that have the potential to shift the choice outcome by altering the process by which a decision is made. We also address where context effects take place in the consumer decision-making process. We discuss the difference between changes in contexts that are initiated by the decision-maker and those initiated by another party (e.g., marketers). We then discuss advances in how to measure context effects. We end with a discussion of trends that could foster more research on the context dependence of choice behavior.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

1. Amir O, Levav J (2008) Choice construction versus preference construction: the instability of preferences learned in context. J Mark Res 45(2):145–148. https://doi.org/10.1509/jmkr.45.2.145
2. Andrews M, Luo X, Zheng F, Ghose A (2016) Mobile ad effectiveness: hyper-contextual targeting with crowdedness. Mark Sci 35(2): 218–233. https://doi.org/10.1287/mksc.2015.0905
3. Arora N, Huber J (2001) Improving parameter estimates and model prediction by aggregate customization in choice experiments. J Consum Res 028(2):273–283. https://doi.org/10.1086/322902
4. Arora N, Henderson T, Liu Q (2011) Non-compensatory dyadic choices. Mark Sci 30(6):1028–1047. https://doi.org/10.1287/mksc.1110.0667
5. Ataman MB, Rooderkerk RP, Otter T (2017) Context dependence in stated choice experiments, Working Paper
6. Barsalou LW (1982) Context-independent and context-dependent information in concepts. Mem Cogn 10(1):82–93. https://doi.org/10.3758/BF03197629
7. Ben-Akiva M, de Palma A, McFadden D, Abou-Zeid M, Chiappori P-A, de Lapparent M, Durlauf SN et al (2012) Process and context in choice models. Mark Lett 23(2):439–456. https://doi.org/10.1007/s11002-012-9180-7
8. Bettman JR, Luce MF, Payne JW (1998) Constructive consumer choice processes. J Consum Res 25(3):187–217. https://doi.org/10.1086/209535
9. Boldt L, Arora N (2017) Dyadic compromise effect. Mark Sci 30(3):436–452
10. Bollinger B, Gillingham K (2012) Peer effects in the diffusion of solar photovoltaic panels. Mark Sci 31(6):900–912. https://doi.org/10.1287/mksc.1120.0727
11. Bradley JV (1958) Complete counterbalancing of immediate sequential effects in a Latin square design. J Am Stat Assoc 53(June):525–528. https://doi.org/10.1080/01621459.1958.10501456
12. Bronnenberg BJ, Dubé J-P, Gentzkow M (2012) The evolution of brand preferences: evidence from consumer migration. Am Econ Rev 102(6):2472–2508
13. Carden, Lucas, Wood, Wendy, Neal, David T., Pascoe, Anthony. (2017) "Incentives Activate ControlMindset: Benefits Deliberate Behaviors but Impedes Habit Performance." Journal of the Association forConsumer Research, 2(3).
14. Chaiken S (1980) Heuristic versus systematic information processing and the use of source versus message cues in persuasion. J Pers Soc Psychol 39(5):752–766
15. Chandon P, Wesley Hutchinson J, Bradlow ET, Young S (2009) Does in-store marketing work? Effects of the number and position of shelf facings on brand attention and evaluation at the point of purchase. J Mark 73(6):1–17. https://doi.org/10.1509/jmkg.73.6.1
16. Chandon P, Ordabayeva N (2009) Supersize in one dimension, downsize in three dimensions: effects of spatial dimensionality on size perceptions and preferences. J Mark Res 46(6):739–775. https://doi.org/10.1509/jmkr.46.6.739
17. Cheema A, Soman D (2008) The effect of partitions on controlling consumption. J Mark Res 45(6):665–675. https://doi.org/10.1509/jmkr.45.6.665
18. Cumming G (2014) The new statistics: why and how. Psychol Sci 25(1):7–29. https://doi.org/10.1177/0956797613504966
19. Dellaert BGC, Swait J, Vic Adamowicz WL, Arentze TA, Bruch EE, Cherchi E, Chorus C, Donkers B, Feinberg FM, Marley AAJ, Court Salisbury L (2017) Individuals decisions in the presence of multiple goals, forthcoming in Customer Needs and Solutions
20. Dhar R, Gorlin M (2013) A dual-system framework to understand preference construction processes in choice. J Consum Psychol 23(4):528–542. https://doi.org/10.1016/j.jcps.2013.02.002
21. Eliaz K, Spiegler R (2011) Consideration sets and competitive marketing. Rev Econ Stud 78(1):235–262. https://doi.org/10.1093/restud/rdq016
22. Ent MR, Baumeister RF, Tice DM (2015) Trait self-control and the avoidance of temptation. Personal Individ Differ 74:12–15
23. Evans JSBT (2012) Questions and challenges for the new psychology of reasoning. Think Reason 18(1):5–31. https://doi.org/10.1080/13546783.2011.637674
24. Evans JSBT, Stanovich K (2013) Dual-process theories of higher cognition: advancing the debate. Perspect Psychol Sci 8(3):223–241
25. Evans JSBT, Handley SJ, Harper CNJ (2001) Necessity, possibility, and belief: a study of syllogistic reasoning. Q J Exp Psychol Sect A 54(3):935–958
26. Galla BM, Duckworth AL (2015) More than resisting temptation: beneficial habits mediate the relationship between self-control and positive life outcomes. J Pers Soc Psychol 109(3):508–525
27. Gardete P (2015) Social effect in the in-flight marketplace: characterization and managerial implications. J Mark Res 52(3):360–374. https://doi.org/10.1509/jmr.13.0527

28. Geier A, Wansink B, Rozin P (2012) Red potato chips: segmentation cues can substantially decrease food intake. Health Psychol 31(3):398–401. https://doi.org/10.1037/a0027221
29. Gneezy A (2017) Field experimentation in marketing research. J Mark Res 54(1):140–143. https://doi.org/10.1509/jmr.16.0225
30. Gneezy A, Gneezy U, Laura D (2014) Reference-dependent model of the price-quality heuristic. J Mark Res 51(April):153–164
31. Griffin D, Liu W, Khan U (2005) A new look at constructed choice processes. Mark Lett 16(3-4):321–333. https://doi.org/10.1007/s11002-005-5895-z
32. Hansen K, Singh V, Kahn R (2016) Aging and decision making: evidence from a mundane activity, mimeo
33. Hedgcock W, Rao AR (2009) Trade-off aversion as an explanation for the attraction effect: a functional effect magnetic resonance imaging study. J Mark Res 46(February):1–13. https://doi.org/10.1509/jmkr.46.1.1
34. Huang G, Khwaja A, Sudhir K (2015) Short-run needs and long-term goals: a dynamic model of thirst management. Mark Sci 34(5):702–721. https://doi.org/10.1287/mksc.2015.0939
35. Huber J, Zwerina K (1996) The importance of utility balance in efficient choice designs. J Mark Res 33(3):307–317. https://doi.org/10.2307/3152127
36. Hutchison JW, Kamakura WA, Lynch JG Jr (2000) Unobserved heterogeneity as an alternative explanation for 'reversal' effects in behavioral research. J Consum Res 27(December):324–344. https://doi.org/10.1086/317588
37. John LK, Donnelly GE, Roberto CA (2017) Psychologically informed implementations of sugary drink portion limits. Psychol Sci 28(5):620–629. https://doi.org/10.1177/0956797617692041
38. Johnson EJ, Goldstein D (2003) Do defaults save lives? Science 302(5649):1338–1339. https://doi.org/10.1126/science.1091721
39. Kahneman D, Frederick S (2002) Representativeness revisited: attribute substitution in intuitive judgment. In: Gilvich T, Griffin D, Kahneman D (eds) Heuristics of intuitive judgment: extensions and applications. Cambridge University Press, New York
40. Kahneman D, Tversky A (1984) Choices, values, and frames. Am Psychol 39(4):341–350. https://doi.org/10.1037/0003-066X.39.4.341
41. Karmarkar U, Bollinger B (2015) BYOB: how bringing your own shopping bags leads to treating yourself and the environment. J Mark 79(4):1–15. https://doi.org/10.1509/jm.13.0228
42. Kelman M, Rottenstreich Y, Tversky A (1996) Context-dependence in legal decision making. J Leg Stud 25(2):287–318. https://doi.org/10.1086/467979
43. Kessels R, Goos P, Vandebroek M (2006) A comparison of criteria to design efficient choice experiments. J Mark Res 43(3):409–419. https://doi.org/10.1509/jmkr.43.3.409
44. Kivetz R, Netzer O, Srinivasan V (2004) Alternative models for capturing the compromise effect. J Mark Res 41(August):237–257. https://doi.org/10.1509/jmkr.41.3.237.35990
45. Kivetz R, Netzer O, Schrift R (2008) The synthesis of preference: bridging behavioral decision research and marketing science. J Consum Psychol 18:179–186
46. Klauer KC, Musch J, Naumer B (2000) On belief bias in syllogistic reasoning. Psychol Rev 107(4):852–884. https://doi.org/10.1037/0033-295X.107.4.852
47. Kuhfeld WF, Tobias R (2005) Large factorial designs for product engineering and marketing research applications. Technometrics 47(2):132–141
48. Lamp S (2015) Projection bias in solar electricity markets, Working Paper
49. Lee L, Amir O, Ariely D (2009) In search of homo economicus: cognitive noise and the role of emotion in preference consistency. J Consum Res 36.2:173–187. https://doi.org/10.1086/597160
50. Li C, Luo X, Cheng Z, Wamg X (2017) Sunny, rainy, and cloudy with a chance of mobile promotion effectiveness. Mark Sci 36(5):762–779. https://doi.org/10.1287/mksc.2017.1044
51. Liu W (2008) Focusing on desirability: the effect of decision interruption and suspension on preferences. J Consum Res 35(4, December):640–652
52. Liu W, Simonson I (2017) Sequential shortlists, working paper
53. Louviere JJ, Woodworth GG (1983) Design and analysis of simulated consumer choice or allocation experiments: an approach based on aggregate data. J Mark Res 20(November):350–367. https://doi.org/10.2307/3151440
54. Lubow RE, Rifkin A, Alek M (1976) B The context effect: the relationship between stimulus preexposure and environmental preexposure determines subsequent learning. J Exp Psychol Anim Behav Process 2.1:38
55. Lucas RE (1976) Econometric policy evaluation: a critique. Carn-Roch Conf Ser Public Policy 1:19–46. https://doi.org/10.1016/S0167-2231(76)80003-6
56. Lynch JG Jr (2015) Handout 10: within subjects ANOVA—omnibus analysis and contrasts. Teaching Note
57. Mailath GJ, Postlewaite A (2003) The social context of economic decisions. J Eur Econ Assoc 1(2/3):354–362. https://doi.org/10.1162/154247603322390991
58. Miller G, Mobarak AM (2015) Learning about new technologies through social networks: experimental evidence on nontraditional stoves in Bangladesh. Mark Sci 34(4):480–499. https://doi.org/10.1287/mksc.2014.0845
59. Neal DT, Wood W, Labrecque JS, Lally P (2012) How do habits guide behavior? Perceived and actual triggers of habits in daily life. J Exp Soc Psychol 48(2):492–498. https://doi.org/10.1016/j.jesp.2011.10.011
60. Petty RE, Cacioppo JT (1986) The elaboration likelihood model of persuasion. In: Berkowitz L (ed) Advances of experimental social psychology. Academic Press, San Diego, pp 123–205
61. Pocheptsova A, Amir O, Dhar R, Baumeister RF (2009) Deciding without resources: resource depletion and choice in context. J Mark Res 46(2):344–355. https://doi.org/10.1509/jmkr.46.3.344
62. Qing Liu and Neeraj Arora (2011) "Efficient choice designs for a consider-then choose model," Marketing Science, 30(2): pp 321–338.
63. Ratner RK, Soman D, Zauberman G, Ariely D, Carmon Z, Keller PA, Kim BK, Lin F, Malkoc S, Small DA, Wertenbroch K (2008) How behavioral decision research can enhance consumer welfare: from freedom of choice to paternalistic intervention. Mark Lett 19(3-4):383–397. https://doi.org/10.1007/s11002-008-9044-3
64. Rooderkerk RP, van Heerde HJ, Bijmolt T (2011) Incorporating context effects into a choice model. J Mark Res 48(4):767–780. https://doi.org/10.1509/jmkr.48.4.767
65. Sándor Z, Wedel M (2002) Profile construction in experimental choice designs for mixed logit models. Mark Sci 21(4):455–475
66. Sela A, LeBoeuf RA (2017) Comparison neglect in upgrade decisions. J Mark Res 54(August):556–571. https://doi.org/10.1509/jmr.14.0394
67. Sela A, Berger J, Liu W (2009) Variety, vice, and virtue: how assortment size influences option choice. J Consum Res 35(6, April):941–951
68. Shah AK, Oppenheimer DM (2008) Heuristics made easy: an effort reduction framework. Psychol Bull 134(2):207–222. https://doi.org/10.1037/0033-2909.134.2.207
69. Sharpe KM, Staelin R, Huber J (2008) Using extremeness aversion to fight obesity: policy implications of context dependent demand. J Consum Res 35(October):406–422. https://doi.org/10.1086/587631
70. Simonson I (1989) Choice based on reasons: the case of attraction and compromise effects. J Consum Res 16(September):158–174. https://doi.org/10.1086/209205

71. Simonson I, Nowlis SM (2000) The role of explanations and need for uniqueness in consumer decision making: unconventional choices based on reasons. J Consum Res 27(1):49–68
72. Simonson I, Sela A (2011) On the heritability of consumer decision making: an explanatory approach for studying genetic effects on judgment and choice. J Consum Res 37(6):951–966
73. Smith SA, E Vela (2001), Environmental context-dependent memory: a review and meta-analysis, Psychon Bull Rev, 8 (2), 203–220, https://doi.org/10.3758/BF03196157
74. Stanovich KE, West RF (2000) Individual differences in reasoning: implications for the rationality debate? Behav Brain Sci 23(5):645–665. https://doi.org/10.1017/S0140525X00003435
75. Sudhir K (2016) Editorial: the exploration-exploitation tradeoff and efficiency in knowledge production. Mark Sci 35(1):1–9. https://doi.org/10.1287/mksc.2015.0974
76. Sudhir K, Talukdar D (2015) The 'Peter Pan syndrome' in emerging markets: the productivity-transparency trade-off in IT adoption. Mark Sci 34(4):500–521
77. Sudhir K, Tewari I (2015) Long term effects of 'prosperity in youth' on consumption: evidence from China. Working Paper, Yale School of Management
78. Sudhir K, Roy S, Cherian M (2016) Do sympathy biases induce charitable giving? The effects of advertising content, Mark Sci, forthcoming
79. Swait J, Adamowicz W, Hanemann M, Diederich A, Krosnick J, Layton D, Provencher W, Schkade D, Tourangeau R (2002) Context dependence and aggregation in disaggregate choice analysis. Mark Lett 13(3):195–205. https://doi.org/10.1023/A:1020262503119
80. Tetlock PE (1985) Accountability: the neglected social context of judgment and choice. Res Organ Behav 7:297–332
81. Thaler RH (1999) Mental accounting matters. J Behav Decis Mak 12(3):183–206. https://doi.org/10.1002/(SICI)1099-0771(199909)12:3<183::AID-BDM318>3.0.CO;2-F
82. Time.com (2017) Apple-watch is getting way better heart-rate monitoring. Appeared online on September 12, 2017
83. Tversky A (1972) Eliminations by aspects: a theory of choices. Psychol Rev 79(4):281–299. https://doi.org/10.1037/h0032955
84. Tversky A, Simonson I (1993) Context-dependent preferences. Manag Sci 39(10):1179–1189
85. Wakefield KL, Inman JJ (2003) Situational price sensitivity: the role of consumption occasion, social context and income. J Retail 79(4):199–212. https://doi.org/10.1016/j.jretai.2003.09.004
86. Wedel M, Pieters R (2008) A review of eye-tracking research in marketing. Rev Mark Res 4, Naresh K. Malhotra, ed. Armonk, NY: ME Sharpe, 123-147
87. Wernerfelt, Birger (1995), "A rational reconstruction of the compromise effect: using market data to infer utilities," Journal of Consumer Research, 21 627–633.
88. Wood W, Rünger D (2016) Psychology of habit. Annu Rev Psychol 67:289–314
89. Wood W, Tam L, Guerrero M (2005) Changing circumstances, disrupting habits. J Pers Soc Psychol 88(6):918–933
90. Yu J, Goos P, Vandebroek M (2009) Efficient conjoint choice designs in the presence of respondent heterogeneity. Mark Sci 28(1):122–135
91. Zeithammer R, Otter T, Rooderkerk RP (2017) Modeling context effects in choice: a critical review. Working Paper