Toward an Integrative Conceptualization of Maladaptive Consumer Behavior

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ABSTRACT Consumer research has explored several dimensions of maladaptive decision-making, including compulsive consumption and behavioral addiction. Here we propose extending this work by integrating knowledge and approaches from proximal disciplines. First, we consider the neural mechanisms responsible for a range of reward-based decision-making. Neuroscientific studies have defined generalizable models of how behaviors may transition from goal-directed choices toward habits in ways that facilitate maladaptive choices. Second, we explore findings from psychiatry and clinical psychology showing that behavioral addictions frequently co-occur with other disorders. Drawing on recent work, we outline ways to take advantage of this "comorbidity" to draw inferences about common mechanisms and to enhance relevant models of brain and behavior. Collectively, this allows us a multilayered framework with meaningful promise for untangling the complex mechanisms around maladaptive choices in consumer settings. Furthermore, it highlights opportunities for firms and individuals to ameliorate the harm that these choice patterns can create.

"I know I shouldn't buy this, but I'm just addicted!" While we joke about problematic decision-making in everyday life, truly maladaptive behaviors can have a meaningful destructive impact on individuals and societies. This is reflected in policies that set boundaries for legal businesses that can facilitate addiction, like gambling or tobacco. However, society has struggled with extending such interventions to other consumption settings, such as social media or shopping. Our struggle to address maladaptive behavior in these domains "at the top" may be aided by expanding our studies "at the bottom" to identify and understand the roots of compulsion and addiction.

Addiction-susceptible consumption can be defined via a spectrum of behaviors from "illicit" (e.g., cocaine or opioid abuse) consumption to "licit" (e.g., eating or shopping) consumption (Litt, Pirouz, and Shiv 2011). Legal products with known biological mechanisms for harm, such as alcohol or tobacco, fall somewhere in the middle. We focus on the licit maladaptive behaviors most central to marketplace-facilitated consumption, such as compulsive buying/shopping, hoarding, gambling, and technology-driven addictions. Several related fields have struggled to establish frameworks encompassing these problematic decision patterns. We view this as an opportunity for increased collaboration between marketing, computational psychiatry, and neuroscience.

Consider two principal complexities in this domain. First, consumers may make the same decision for different reasons. Take two shoppers purchasing an expensive jacket. One had been saving for this splurge, which represents a desirable purchase aligning with a need for work apparel. When they next encounter another attractive jacket, they will recognize that it has little additional benefit for their fulfilled goals. The other shopper may have felt that they "couldn't help themselves," with consumption reflecting relief at giving in to a compulsion rather than joy at acquiring a reward. Afterward, they may recognize that the purchase reflects a failure of self-control.

While firm sales data may highlight their similarities, a growing literature in neuroscience offers novel opportunities for differentiating these shoppers. Goal-oriented behavior is linked to a computational framework often labeled "model-based" learning, whereas habits are hypothesized to

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Issue Editors: Shailendra Pratap Jain and Martin Reimann

JACR, volume 6, number 3. Published online May 20, 2021. https://doi.org/10.1086/714364

develop via "model-free" learning (Drummond and Niv 2020). These models estimate latent parameters (Daw et al. 2011) that can be used to identify separable downstream consequences of the same choice. Adaptive behavior involves a balance between the two strategies. The first shopper's approach might be considered model-based decision-making related to an awareness of the larger context, including higher-level goals. The second shopper, who "couldn't help" making the purchase, may be prone to follow a model-free process related to the direct reward in the moment; overreliance on this approach would be considered detrimental.

A second complexity arises from "comorbidity": the coexistence of two or more conditions or disorders, either simultaneously or sequentially (Kessler et al. 1994). Comorbidity of many debilitating psychiatric and neurochemical disorders (e.g., attention deficit and hyperactivity, drug addiction, depression) is prevalent across the population (Kessler et al. 1994) and is expressed across one's lifetime (Caspi et al. 2020). Notably, several maladaptive but licit consumer behaviors are comorbid with these conditions and other addictions. By leveraging comorbidities of licit maladaptive choice, we can draw on clinical research and neurobehavioral models used to identify dimensions of mental disorders (Wang and Krystal 2014; Huys, Maia, and Frank 2016) and discover clues to the central mechanisms involved. For example, research connecting mood and anxiety disorders, which frequently co-occur with addiction (Volkow, Koob, and McLellan 2016; Robbins, Vaghi, and Banca 2019), would also be central to understanding harmful marketplace-based behavior (Rook 1987; Hirschman 1992).

Identifying deficits in behavior is facilitated by the mapping of a fully functioning system (Lee 2013). We propose integrating advances in psychiatry and neuroeconomics with consumer research to better understand the substrates of decision-making in externally valid settings.

CONSUMER BEHAVIOR APPROACHES TO MALADAPTIVE DECISION-MAKING

Consumer research has made significant progress in understanding maladaptive consumption. In qualitative studies, its conceptualization has been heavily influenced by medical models and descriptions of addiction. Hirschman (1992) described compulsive consumption as akin to drug addiction in both etiology and lived experiences. Her interviews with addicted and nonaddicted drug users found that addicts all exhibited a pattern of serial and/or simultaneous addiction. The study highlighted two central themes that have carried through such research—the importance of comorbid addictions and the role of personal crises in shaping them.

Similarly, Faber et al. (1995) found that while multiple disorders occurred in some individuals simultaneously, they manifested in others serially, with one disorder emerging after a previous one had been established or after the initial disorder had been controlled. Cotte and Latour (2009) noted that despite substantial differences from "off-line" gambling, the experiences of online gamblers were remarkably similar to Hirschman's themes. More recently, Cross, Leizerovici, and Pirouz (2018) examined hoarding behavior and found that disruptions were evident across multiple stages of consumption, showing that the breadth of such disorders extends beyond specific deficits.

Synthesizing factors suggested by the qualitative work, Valence, d'Astous, and Fortier (1988) developed the first compulsive buying scale, identifying four independent dimensions—a tendency to spend, feeling an urge to buy or shop, postpurchase guilt, and family environment. Faber and O'Guinn (1992) established the scale's discriminant validity, using it to predict purchasing behavior and associated personality dimensions, with an incidence of 2%–8% of US consumers. Beyond this, DeSarbo and Edwards (1996) found two consumer segments corresponding to compulsive buying for "internalizing" reasons, such as attempts to build self-esteem, and for "externalizing" reasons related more to circumstances, such as desired ownership.

More recently, Ridgway, Kukar-Kinney, and Monroe (2008) constructed a multidimensional survey to isolate the roles of obsessive-compulsive disorder (OCD) and impulse control in compulsive buying. The scale predicted self-reported and actual purchases, and the data revealed a nonlinear relationship between the compulsive buying index and various experiential aspects of compulsive consumption. Negative feelings, arguments with family, and the hiding of purchases increase exponentially at the index's high end, with an inflection point that clearly distinguishes compulsive from noncompulsive buying. The index's significant correlation with an obsessive-compulsive inventory motivated identifying additional relationships between compulsive purchasing and other disorders.

Consumer research is now tackling how technology contributes to maladaptive consumer behavior (Andreassen et al. 2016). Beyond binge-watching and social media overuse, the smartphone has emerged as a potent source or amplifier of behavioral addictions (Gutiérrez, Rodríguez de Fonseca, and Rubio 2016). Some users might find comfort in the device itself, through relief of stress or escape from a negative

state at the time of use (Melumad and Pham 2020). In addition, certain traits, such as materialism and social interaction anxiety, can increase compulsive smartphone usage (Lee et al. 2014). Technology has also increased opportunities for problem gambling (Cotte and Latour 2009). Indeed, "gambling disorder" is the only licit and non-substance-related addiction listed in the category of "Substance-Related and Addictive Disorders" in the current version of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-V*; American Psychiatric Association 2013). This reflects at least some underlying biological overlap with other addictions (Robbins and Clark 2015), offering another starting point for building frameworks through comorbidities.

An emergent theme here is the increasing variety of consumption opportunities, with some related behaviors evolving more destructively than others. Reflecting earlier calls for broader theories (Faber et al. 1995), it remains important to develop a science of maladaptive behavior that can account for this range and is flexible enough to facilitate further expansion over time.

NEURAL MODELS OF DECISION PROCESSES

Neuroeconomics research has made meaningful strides in identifying the decision-making process as it unfolds. These findings highlight two brain regions that play critical reward-related roles in choice: the ventromedial prefrontal cortex (vmPFC) and ventral striatum (Plassmann et al. 2015). We emphasize a key theme in neuroscience that we seek to leverage: the very same decision can arise from at least two (computationally, psychologically, and neurally) distinct pathways.

Complementing this knowledge, we can map many suboptimal decision patterns to deficits or differences in brain regions. For example, damage to the vmPFC is associated with impaired decision-making in the Iowa Gambling Task, which focuses on the learning of reward patterns to try and make monetary gains while avoiding losses (Bechara, Tranel, and Damasio 2000). Lesions in the vmPFC also disrupt the ability to choose the best available option (Camille et al. 2011). In nonlab settings, the vmPFC and striatum have been connected with binge eating (Foerde et al. 2015) and gambling (Miedl, Büchel, and Peters 2014) among other disorders. Beyond circuitry representing reward, the insula is central to decision-making and critical for self-awareness, homeostatic balance, arousal, and disgust (Wicker et al. 2003; Reimann et al. 2012). Damage to the insular cortex inhibits the ability to curb addictive behaviors like smoking, making it a central target for understanding the turning point from functional to maladaptive choice patterns (Droutman, Read, and Bechara 2015).

Yet a focus on specific brain regions may not always reveal the underlying strategies guiding behavior. Frequently, decision-making requires context-dependent reinforcement learning, in which beliefs update with new information or the consequences of one's actions (Sutton and Barto 2018). Using a strategy that reflects the structure of the current context and allows for goal-directed behavior means that an individual is engaged in active deliberation and is capable of flexibly adapting behavior as the environment changes (Dolan and Dayan 2013). Such reinforcement learning algorithms have been described as model based (e.g., O'Doherty, Cockburn, and Pauli 2017) because possible actions are considered given a constructed representation of the current environment, akin to the modeling of possible outcomes.

In contrast, a model-free strategy is habitual and driven by more simplistic reward-dominated representations of past experience without consideration of more complex representations of the environment (Daw et al. 2011). Model-free behavior merely recognizes a particular situation, leading to a corresponding learned (or habitual) action. Its upside is the ability to react quickly; its downside is behavioral rigidity. Intuitively, there is value in both model-based and model-free behavioral control (Dolan and Dayan 2013). In healthy individuals, behavior frequently reflects a mix of these two often complementary strategies (Gershman, Markman, and Otto 2014; Collins and Cockburn 2020). It is thus not surprising that there is meaningful overlap between the brain areas involved with "reinforcement" learning, "decision" and "value" (fig. 1; more details may also be found in the appendix, available online).

Notably, a model-based strategy is prospective, versus model-free's retrospective engagement with one's environment. These models illustrate ways to think about multiple choices over time, a critical element for the pursuit of long-term goals since they require repeated successful behavior (Woolley and Fishbach 2016; Khan, Fishbach, and Dhar 2019; Cornil, Gomez, and Vasiljevic 2020). This framework is complementary to the extensive consumer behavior research on subliminal effects on goal pursuit (Chartrand et al. 2008), given that the neuroscience tool kit offers unique insight into (un)consciousness (Plassmann and Mormann 2017).

Efforts to differentiate model-based and model-free strategies can help address whether there are measurable individual differences related to internal factors like reward sensitivity or memory that can be observed externally as different choices and long-term outcomes (Browning et al. 2015;

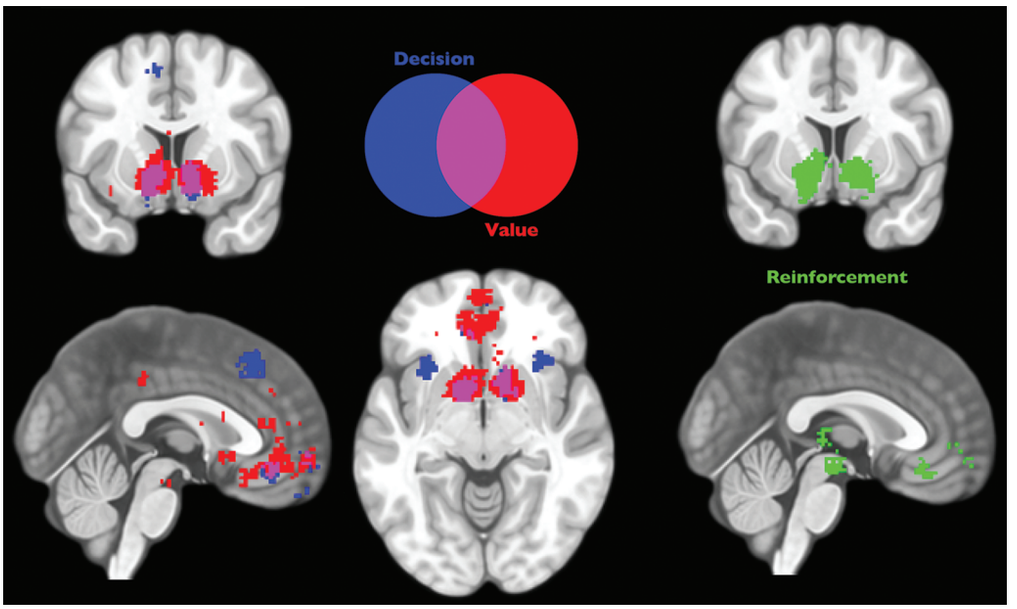

Figure 1. Meta-analysis from more than 14,000 functional magnetic resonance imaging (fMRI) studies. *Left*: "Value" (red) and "decision" (blue) and their overlap with prominent centers of activity in the ventral striatum and ventromedial prefrontal cortex. *Right*: "Reinforcement" (green). Data for the automated meta-analysis of fMRI data are freely available at http://www.neurosynth.org/.

Doll et al. 2015). This includes susceptibility to addiction (Redish, Jensen, and Johnson 2008) and, by extension, maladaptive patterns of choice. By showing how learning may be insufficiently updating the model-based/model-free strategy balance, this framework can demonstrate mechanisms by which habits may persist even if their outcomes are no longer beneficial. For example, stress can amplify problematic patterns of consumer decision-making, and it has been found to disturb the balance between strategies by constraining model-based but not model-free control on behavior (Otto et al. 2013).

PSYCHIATRIC MODELS AND COMORBIDITIES WITH MALADAPTIVE CONSUMPTION

Though psychiatric studies of addiction target medically defined outcomes, the issues that they face reflect those in consumer research. The mapping between mechanism and behavior is rarely one-to-one (Huys et al. 2016), and the construct of addiction is far from uniform. Indeed, the *DSM* (American Psychiatric Association 2013) is built around symptom-based patterns for diagnostic classification. Thus, common symptoms across *DSM* disorders make clustering of multiple diagnoses more likely. Conversely, because of the wide range of ways that these disorders are expressed, different individuals can receive the same diagnosis even if they have few or no overlapping symptoms (Gillan and Daw 2016).

There is now a push to characterize more objective and biologically based measures that play a role across the traditional categories of maladaptive mental disorders, including addiction (Wang and Krystal 2014). Remarkable progress has been made in understanding the neurobiology behind the transition from initial drug consumption to illicit substance abuse. Over time, the drive toward the positive experience of drug taking, like drinking beer with friends for enjoyment, is replaced with drug seeking, or a drive toward ending the negative effects of withdrawal, like drinking beer because you need it to function. This transition from goal-directed to more habitual control (fig. 2; more details may also be found in the appendix) has key biomarkers (Tricomi, Balleine, and O'Doherty 2009), and the computational formalizations of model-based/model-free strategies offer parameters for quantifying the extent of this transition or the severity of drug use behavior (Belin et al. 2013; Voon et al. 2015). Pursuing this has been beneficial for psychiatry and offers insights for how pathologies manifest in commercial settings.

Understanding addiction to illicit substances has created the ability to map the components and phases of addiction (across the licit to illicit spectrum) to concrete parameters

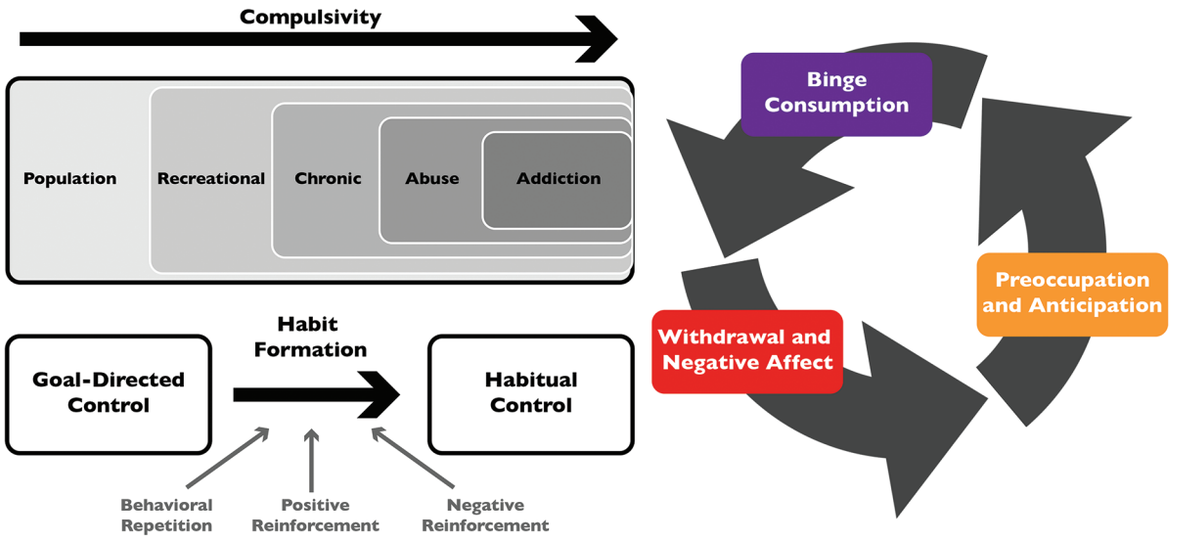

Figure 2. *Left*: Transition from goals to habits and their role in addiction. This transition can be modeled as a progression from goal-directed control to habitual control, with increasing compulsivity. The top half of the figure, summarizing how various portions of the population demonstrate different levels of compulsivity, is modified from Belin et al. (2013). The bottom half of the figure, showing the importance of repetition and reinforcement in the transition, is modified from de Wit (2018). *Right*: Three core components of the "cycle of addiction" as conceptualized in Volkow, Koob, and McLellan (2016).

in formal models (Redish et al. 2008; Wang and Krystal 2014). This addresses the problem that a deficit in a particular parameter might manifest itself in various behaviors beyond the addiction-related ones. It is in this exact domain that we find tremendous potential for future consumer research on licit substances and for expanding its conceptualization in ways that affect other fields (MacInnis et al. 2020).

Another component of addiction models is homeostatic imbalance, such as withdrawal, pain, or stress (e.g., fig. 2). These concepts relate to the idea of "interoception" and are frequently linked with the insula (Craig 2009), which has been characterized as crucial addiction circuitry (Naqvi and Bechara 2009). If insula activity signals an imbalance, it would direct individuals toward consumption that would restore the balance, negating neural computations that favor self-control (Bechara et al. 2019). This push for homeostasis may make it harder for goal-directed control to prevail over more habitual model-free behavior (Redish et al. 2008). Interestingly, recent marketing research suggests that in positive circumstances insula activity motivates "relief" from an urge, such as motivating the satiation of curiosity (Wiggin, Reimann, and Jain 2019). Thus, by drawing from these addiction models, we can expand the view of the neural circuitry that helps explain consumption phenomena as well as the motivational drives that may best support successful intervention.

Disorder comorbidity means that, as serious consideration of behavioral addictions has increased (Grant et al. 2010), so have discussions on the extent of the shared biology between such addictions (Petry, Zajac, and Ginley 2018). For example, there is growing evidence that OCD increases the chances of developing behavioral addictions (Ridgway et al. 2008; Andreassen et al. 2016). One plausible connection underlying these phenomena is differences in brain structure that manifest over time (Caspi et al. 2020). More broadly, the prevalence of OCD in the general population (2.5%–3%) implies significant society-level costs (Robbins, Vaghi, and Banca 2019) and also makes it a nontrivial component of marketplace behavior.

BUILDING A MARKETING-CENTERED INTEGRATED FRAMEWORK

Consumer research proactively pursues frameworks that unify seemingly disparate phenomena as a path forward for the growth and impact of the field (MacInnis et al. 2020). The study of maladaptive consumption warrants a place in these efforts. Despite their differing research agendas, the domains of consumer research, neuroscience, and psychiatry are all interested in the latent cognitive processes that lead to disordered and maladaptive behaviors—and in the disruption of these processes.

As in most forms of consumer choice, context is critical for understanding licit behavioral addictions. However, many metrics tracking choice outcomes lack sufficient contextual information to distinguish typical and problematic behaviors. Access to the mechanisms of addiction may improve our ability to identify and adequately consider at-risk consumers (Pechmann et al. 2011), allowing us to define behavioral metrics that isolate elements of concern and design appropriate interventions. As an example of such crossovers, there is evidence that warning messages emphasizing social costs can reduce several harmful behaviors (Murdock and Rajagopal 2017). Neural data have shown promise in improving the efficacy of these messages (Falk and Scholz 2018). Another application might be problematic overconsumption like hoarding, which is sometimes stigmatized as self-control failure but is more productively recognized as a clinical disorder (Mataix-Cols and Fernández de la Cruz 2018).

Pursuing an integrated framework spotlights ethical considerations (additional discussion of this topic can also be found in the appendix). Could introducing and encouraging certain types of model-free buying behaviors early in life facilitate the engagement of this same circuitry in maladaptive forms of behavior later on, like a "gateway drug"? As an extreme interpretation, if maladaptive consumption is connected with addiction, certain lines of marketing research could be accused of furthering the firm's interests at the expense of consumer welfare. Indeed, the increasing public awareness of and efforts to combat "big sugar's" marketing suggest substantial risks for firms in these arenas.

As noted, a range of licit to illicit external stimuli trigger maladaptive choices, raising both legal and moral considerations. It is easily recognized that firms should not promote illicit and illegal cocaine consumption, but more nuance arises for banks that legally promote licit credit card spending (Feinberg 1986). If one considers how the licit to illicit spectrum informs the perceived severity of an outcome, the risks of how addictive consumer behaviors can be framed as socially acceptable, as when social media influencers share their "hauls" from shopping sprees, are highlighted (Ellis 2019). A more comprehensive understanding of behavioral addiction would help address these ethical issues.

By delving into the neurobiological mechanisms driving maladaptive consumption, we can identify novel interventions that address causes, not merely symptoms. Improved linkage between neurobiological, psychiatric, and behavioral characterizations may also allow us to communicate more accurately, reducing the influence of misleading addiction buzzwords in many consumers' lives. In addition, we can illuminate how specific maladaptive behaviors may be exacerbated by other disorders, supporting the development of better choice architecture that avoids triggering these interactions. By acknowledging the significance of these patterns, we offer more flexibility in addressing them proactively and defining ways for firms to support consumer welfare.

MOVING FORWARD ON ADDICTION AND MALADAPTIVE CONSUMPTION: BRIDGES BETWEEN DISCIPLINES

We believe that maladaptive consumption presents an arena of "boundary-breaking" opportunity in consumer research (MacInnis et al. 2020; Reimann and Jain 2021). Recent interdisciplinary advances make it possible to unpack the components of cognition that contribute to these different kinds of detrimental decisions.

These multilevel advances currently span neuroscience to psychiatry to public policy and demonstrate that despite the inherent challenges of studying maladaptive behavior, consilience is possible. For example, as illustrated in this special issue, existing theories of how the brain makes decisions can be extended to maladaptive environments (Turel and Bechara 2021). Much of the research outlined in our article illustrates that consumers' ability to avoid harmful behavior rests largely on their capacity to be prospective. It is interesting to consider when and how improved prospection could affect smoking cessation (Vogel and Pechmann 2021) or reduction of smartphone usage (Zimmerman 2021). There is also a clear link to ethical dilemmas that cross social as well as legal judgments, as highlighted by the findings that alcohol consumption, which affects one's prospective capacity, affects perceived culpability for other harmful behavior (Galoni, Goldsmith, and Hershfield 2021).

Understanding how humans contend with the internal tension between goals and habits is a shared goal for many academic disciplines. Similarly, it seems commonly understood across disciplines that most maladaptive behavior involves some rigidity in thinking, in behavior, or in both. Much of this work has been facilitated by convergence around formal models of mind, brain, and behavior. Thus, we advocate for the usage of these models as a flexible common "language" that can connect findings into a more nuanced and encompassing representation of maladaptive decision-making while also offering mechanisms for intervention and remediation in ways that support consumer welfare.

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