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COMMENTARY

ADDICTION SSA

Commentary on Motschman *et al.*: Moving behavioral economic demand into the real world means moving beyond single schedules of reinforcement

Recent research demonstrates that alcohol demand collected via ecological momentary assessment (EMA) can predict clinically relevant drinking behavior in a real-world context. Important extensions of this work should evaluate demand in a global environment by moving beyond single schedules of reinforcement and incorporate these methods to study relative value in context.

Applications of behavioral economic demand in addiction science have flourished over the past decade. This growth stems from the development [1] and refinement [2] of rapid assessment methods with key advances in the quantitative methods used to evaluate demand data [3, 4]. These demand methods are used to characterize the consumption of a good across a range of prices or constraints on consumption, a goal of behavioral scientists dating back to at least the 1970s in the cardinal work on demand conducted by Howard Rachlin [5]. Analysis of value using a demand curve perspective is hypothesized to separate distinct behavioral mechanisms—demand intensity and demand elasticity—characterizing allocation of behavior under differing conditions of constraint. Research using demand procedures has demonstrated their use in diverse areas of public health and policy by showing the concurrent and prognostic validity of demand indices in predicting substance use risk [6, 7] and the sensitivity of demand procedures to experimental manipulations evaluating novel interventions [8] and simulating policy changes [9–11].

Motschman *et al.* [12] advance this literature by showing how alcohol demand collected via ecological momentary assessment (EMA) can predict clinically relevant drinking behavior in a real-world context. Historically, demand measures have been collected in laboratory environments or under hypothetical conditions apart from specific, real-world drinking events. Here, Motschman *et al.* [12] show that brief demand measures collected before and at the time of assessment were generally strong predictors of drinking behavior, most notably at the momentary level (as compared to between-person group average level). These findings contribute to the broader literature by evaluating these within-time, momentary predictions in a real-world environment.

The next and necessary step for demand research to advance real-world applicability is measuring demand and consumption in a more global context. To date, the vast majority of research using demand procedures considers the consumption of these commodities in isolation of the availability and consumption of alternatives (e.g. closed economies). This focus parallels a historic emphasis in preclinical self-administration studies on value measured via a single manipulated commodity (or "single-schedules of reinforcement"). Recent preclinical work has demonstrated the problems with this approach by showing that the value of a commodity is highly dependent on concurrently available options and, in doing so, emphasized the importance of using choice procedures with concurrently available and manipulatable alternatives to understand value in context [13–16]. The findings of these choice studies are also consistent with theoretical models of addiction that emphasize reward value should be considered a context-dependent, rather than absolute measure, with the broader implication that drug use can be goal directed and sensitive to environmental rather than exclusively biological factors [17] (see also the discussion in Epstein [18] on the importance of complementary theories).

Emerging studies have begun to incorporate these more complex choice arrangements in demand research providing a roadmap for their future implementation. For example, cross-commodity procedures have shown how the presence of alternative commodities can alter consumption of a good of interest, such as the impact of legalization on cannabis purchases in competing licit and illicit markets [9]. An extension of these cross-commodity procedures, the Experimental Tobacco Marketplace allows participants to allocate behavior across multiple concurrently, manipulated commodities, therefore, modeling the real-world point-of-sale marketplace and offering a model for how tobacco or nicotine product relative value is influenced by simulated policy conditions [19]. Incorporation of these methods in the broader demand literature closely models the real-world nature of choice, decision-making, and reward. Findings using these methods may also challenge existing models in demand science such as predictions made by the absolute nature of unit price and expected value, and therefore, advance method and model building appreciating relative value

in context (see discussion in Smith *et al.*) [15]. Ultimately, the methods described by Motschman *et al.* [12] are well equipped to expand to this multidimensional space where research would (likely) generate novel perspectives and tests for theory and clinical prediction.

KEYWORDS

Behavior, behavioral economics, choice, demand, reinforcement, reward, value

DECLARATION OF INTERESTS

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AUTHOR CONTRIBUTIONS

Justin C. Strickland: Conceptualization; writing - original draft.

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Justin C. Strickland

Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Email: jstric14@jhmi.edu

ORCID

Justin C. Strickland https://orcid.org/0000-0003-1077-0394

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