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Predicting Memory-Based Consumer Choices From Recall and Preferences

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We present a two-stage model of consumer brand choice using behavioral measures of both brand memory and preference. This model outperforms standard models accounting for preferences alone in predicting memory-based choices, and also sheds new light on the mechanism by which brand memory is translated into purchase behavior.

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EXTENDED ABSTRACT

Consumers often need to make choices when some or all of the information relevant to the decision is not physically present. To deal with this, they need to retrieve the necessary information from their own memory (Lynch, 1982), e.g. a list of brands within a category, prior experiences with a brand, and knowledge about key attributes of certain products. The processes mediating consumer recall, and their downstream effects on consumer choice, have been subject to intense study by consumer researchers. An extensive literature in consumer research strongly indicates a positive role of memory in consideration and choices. Brands that have higher awareness or accessibility are more likely to be chosen (Hoyer & Brown, 1990; Posavac, Sanbonmatsu, & Fazio, 1997). Furthermore, increasing brand accessibility or strengthening category-brand association boosts the likelihood of consideration and choice for a brand of interest (Nedungadi, 1990; Posavac, Sanbonmatsu, Cronley, & Kardes, 2001).

To date, however, it remains challenging to understand and predict how effects of marketing actions on memory are translated into actual behavior. In particular, what is the nature and force of processes by which stronger brand memory leads to more choices of the brand? Could brand memory be a proxy for preference or a component of preference? Do brand memory and preference operate independently? Without such mechanistic insights, it is difficult for marketers to predict or validate consumer memory measures with actual purchase data, or to estimate the return on investment (ROI) of an advertising campaign that is projected to increase brand awareness (Rust, Lemon, & Zeithaml, 2004).

Accordingly, we sought to take a step toward addressing these questions by building on influential multi-stage decision-making models (Manski, 1977; Manzini & Mariotti, 2014; Roberts & Lattin, 1991) that explicitly capture process-level insights into memory-based choices. Specifically, our model (hereafter called two-stage model) incorporates both recall and evaluation as sequential stages in the decision-making process as follows. Prompted with the category cue, the agent is assumed to first construct a menu by retrieving a set of relevant brands from memory, and the inclusion of a certain brand is determined probabilistically by the strength of the category-brand association. Next the agent makes a choice based on relative preferences for the brands on the menu.

To test this model, we collected independent datasets for brands from two product categories (fast food restaurants and running shoes) in order to define three measures: (1) brand accessibility, the percentage of participants recalling the brand of interest when prompted with a category cue; (2) brand preference, the percentage of participants choosing the brand of interest in stimulus-based choices or SB-C (with a menu listing a large number of brands in a category); and (3) memory-based brand choices or MB-C, the percentage of participants choosing the brand of interest in memory-based choices (category cue only, no menu). We then used these measures as the input to our proposed model to compute predicted memory-based choice probabilities for all brands.

Predictions of MB-C probabilities for brands were generated from the proposed two-stage model, as well as models using preference or memory information alone. These predictions were then compared against the empirically measured MB-C probabilities in our sample (Figures 1A-C). A quantitative examination of predic-

tions from different computational models shows that the two-stage model robustly outperformed models using preference or memory information alone in both categories (Figures 1D) (Fast food: memory + preference $R^2 = 0.937$; preference-only $R^2 = 0.455$; memory-only $R^2 = 0.803$) (Running shoes: memory + preference $R^2 = 0.993$; preference-only $R^2 = 0.859$; memory-only $R^2 = 0.593$). Non-overlapping 95% confidence intervals indicated that the differences in prediction performance between the memory + preference model and the other two models were statistically significant (Figure 1D).

These findings echo and extend the extensive prior literature on the influence of memory on brand choice processes (Coates, Butler, & Berry, 2006; Nedungadi, 1990; Posavac et al., 1997). Importantly, our study proposes and validates a simple mechanism by which higher accessibility of brand memory translates into advantages in memory-based consumer choices, which is independent with preference. In this mechanism, the key component mediating the effect of memory is the intermediate step of internal menu generation in the proposed two-stage model. The higher the accessibility of a brand, the more likely it will be included in the internal menu.

This component in the two-stage model is closely related to the substantial literature on consideration sets (Manzini & Mariotti, 2014; Shocker, Ben-Akiva, Boccara, & Nedungadi, 1991). In particular, the second stage of our two-stage model that expresses the problem as a preference-based choice from a given choice set (menu) resembles previous models in this literature (Manski, 1977; Roberts & Lattin, 1991; Shocker et al., 1991). The key conceptual differences, however, lie in how the intermediate menus are generated. Most extant studies on consideration sets did not focus on memory factors; instead, they modeled the formation of consideration sets in choice problems as a rational, voluntary choice based on a tradeoff between the potential benefit and the cost of considering one more option (Brown & Wildt, 1992; Hauser, 2014; Roberts & Lattin, 1991). In contrast, our models describe menu generation as probabilistic processes governed by the strength of category-brand associations, and hence the composition of the choice set is less of an active choice by the agent. It is worth pointing out that highlighting the role of memory does not necessarily contradict the possible existence of consideration sets generated from voluntary inclusion/exclusion of options; rather, it is much more appropriate to view the two accounts as complementary. It will be fruitful in future work to combine both aspects in a single model of memory-based choices.

By linking brand memory and brand choice in a predictive model, our approach presents both conceptual and methodological advances capable of estimating the impact of changing brand awareness and accessibility on market performance. Furthermore, it also offers a flexible toolkit for brand managers to evaluate marketing campaigns in a wide variety of competitive landscapes.

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