A Goal-Based Model of Product Evaluation and Choice

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The authors propose a goal-based model of product evaluation and choice. The model is intended to account for the role of momentary goal activations in relatively straightforward product evaluation and choice processes. It contributes by (a) providing a coherent and consistent account for goal-based product evaluations/choices, (b) providing a theory of the way goal activation influences product evaluation and choice, and (c) generating predictions about novel phenomena, moderators, and boundary conditions in the area of goal-based product evaluations and choices.

Consumer choice has traditionally been studied from a multi-attribute utility perspective. In its most common form, this perspective posits that (1) the utility of a product equals the sum of the utilities of the product’s attributes and that (2) choice is determined by a comparison of the summed utilities (Green and Srinivasan 1978; Guadagni and Little 1983; Johnson 1974; Lancaster 1966; Troutman and Shan- teau 1976). Underlying this perspective are several assumptions (van Osselaer et al. 2005): First, consumers value attributes or attribute levels. Second, the value of an attribute or attribute level is relatively stable. Third, the value of an attribute or attribute level is completely extraneous. There is no accounting for taste.

The assumptions underlying the multi-attribute utility perspective have allowed researchers to gain considerable insight into the choice process, but the assumptions also have some limitations. First, consumers value products for the benefits they afford, not the attributes they contain (e.g., consumers value the alertness afforded by the caffeine in coffee, not the caffeine per se). Clearly, correlations between product attribute levels and experienced benefits allow models based on attribute levels to approximate the benefit-based choice process. Yet a model that explicitly relies on consumption benefits should more accurately reflect the reasons for choice. Thus, an improved model of product evaluation (i.e., the perceived attractiveness of a product prior to choice) and choice should incorporate the idea that the main carriers of value are consumption benefits. Such a model should also incorporate the idea that benefits are often not experienced at the time of product evaluation and choice. That is, product evaluation and choice involve a prediction that certain benefits will be experienced during consumption.

Second, many authors have shown systematic violations of the assumption that the utility of attribute levels is stable. For example, the utility of a product depends heavily on the presence of the other products in a consumer’s choice set (Huber, Payne, and Puto 1982). These violations have led to extensions of the standard multi-attribute model that can account for choice set effects (Tversky and Simonson 1993). Yet recent findings in the literature on goals as knowledge structures show that product evaluations and choices deviate systematically from stable utility even when a choice set is stable (Brendl, Markman, and Messner 2003; Cunha, Janiszewski, and Laran 2008; Fitzsimons, Charttrand, and Fitzsimons 2008). This instability has been attributed to the temporary activation of goals. Thus, an improved model of product evaluation and choice should incorporate the idea that temporary variations in goal activations affect product evaluation and choice.
Third, whereas the traditional multi-attribute utility perspective treats the utility of attributes as a given that can only be measured, other streams of research suggest that shifts in preferences can be explained and predicted. For example, experiments on goal satisfaction and frustration show systematic preference shifts when a goal is satisfied or frustrated (Bargh et al. 2001; Laran and Janiszewski 2009). In addition, research on consumer learning explains systematic changes in predictive associations from product characteristics to consumption benefits (Janiszewski and van Osselaer 2000; van Osselaer and Alba 2000, 2003; Laran, Janiszewski, and Cunha 2008). Changes in predictive associations lead to changes in product evaluations over time (van Osselaer 2008). Thus, an improved model of product evaluation and choice should be able to account for such changes in tastes.

In this article, we propose a goal-based model of product evaluation and choice. The model assumes that product evaluations and choices are motivated by consumers’ expectations about the benefits of consuming a product. These benefits function as goals whose importance depends on their momentary activation in memory. Shifts in goal activation and in expectations drive temporary but systematic variations in product evaluation and choice. Thus, product evaluation and choice depend on the extent to which a product is expected to be a good means for achieving a consumer’s active goals.

The goal-based choice model is designed to account for deviations from the traditional multi-attribute utility perspective. Its primary domain is the empirical literature on goals as knowledge structures as it pertains to consumers’ perspective. It is expected to be a good means for achieving a consumer’s evaluation and choice, by more traditional models of consumer evaluation and choice, (b) providing a theory of the way goal activation influences product evaluation and choice that is both more specific (i.e., explicit about the underlying mechanisms) and broader in scope (i.e., focuses on more than one phenomenon at a time) than existing work, and (c) generating predictions about novel phenomena, moderators, and boundary conditions in the area of goal-based product evaluations and choices. Because it is necessarily a stylized and reduced description of an immensely complex realm of behaviors, we do not claim that this model accounts for each and every finding within its intended domain. We accept that the model accounts only for relatively straightforward product evaluation and choice processes (and not higher-order inferences, goal setting, planning, reasoning processes, and emotions).

The article is organized as follows. In the next section, we give a general overview of the structure and workings of the goal-based choice model. Following this general overview, we discuss each equation in the model. For the core equations in the model, we (a) discuss the processes described by the equation, (b) show how the processes described by the equation explain existing empirical results from the literature on goals as knowledge structures, and (c) provide new predictions generated using that equation. We conclude with (a) a summary, (b) a discussion of the relationships between the goal-based choice model and other models of consumer evaluation and choice, (c) a discussion of the model’s level of analysis and domain, (d) a discussion of the model’s limitations, and (e) an overview of possible extensions to the model.

MODEL OVERVIEW

Definitions

Our model will explain how relationships between means and goals contribute to choices from among the means. A necessary precursor to the discussion of the model is a definition of goals, means, and choice. We define a goal as a motivational, cognitive concept that encourages behavior. Goals are characterized by two fundamental motivational forces—positive affect associated with behavioral outcomes and the deprivation of resources (see Veltkamp, Aarts, and Custers [2009] for an extended discussion). First, goals represent desirable outcomes (i.e., outcomes associated with positive affect) that can be achieved through behavior (Custers and Aarts 2005). In our conceptualization, goals are positive outcome dimensions that can refer to a diverse set of needs. For example, needs can be psychological (e.g., need for achievement, closure), social (e.g., status), emotional (e.g., happiness, excitement, relaxation), hedonic (e.g., pleasure), or physiological (e.g., hydration, alertness). Goals can operate at different levels of abstraction, from rather general (e.g., the goal to be happy) to more specific (e.g., goal to eat less fatty foods). The second motivational force underlying goals is the deprivation of resources that results in a deficit state (Cannon 1932; Maslow 1943). For example, the lack of the resources needed to satisfy a need (e.g., water to satisfy the need for hydration) increases the motivation to satisfy the corresponding goal (e.g., hydration goal). Thus, insufficient resource levels encourage goal activation and corrective action.

Means are behaviors, products, and services that allow a person to pursue one or more goals. Choice is the selection of one or more means from a larger set of available means, along with the associated intent of performing the means behavior or consuming the means product/service. Means can be described holistically (e.g., a glass of water) or piecemeal (e.g., a drink of water), in recognition that a consumption choice can be made once (e.g., “I’ll have a glass of water”) or in part (e.g., “I will have another sip from my glass of water”). It is also the case that any behavior can be decomposed into a series of smaller behaviors (e.g., consuming a glass of water requires locating a glass, finding a water source, filling the glass, etc.). We do not model this more task-oriented series of behaviors.

In the context of this article, we focus specifically on product means and consumption-benefit goals. (To the extent that consumption benefits are desirable outcomes that motivate consumers’ product evaluations and choice behavior, consumption benefits can be considered a subcategory of...
goals.) Goals in our model are always positive but may refer to the avoidance of a negative consumption outcome. For example, not falling asleep while behind the wheel of a car is a benefit, a positive goal whose achievement can be facilitated by the choice of a means such as drinking a cup of coffee but also frustrated by the choice of a glass of wine. We expect that the model generalizes beyond product means and consumption-benefit goals, but those situations remain largely outside the scope of this article.

Basic Assumptions and Processes

The goal-based choice model begins with a few basic assumptions about consumer decision processes. First, the model assumes that consumers evaluate products, referred to as means, and that a means is more likely to be chosen as it is evaluated more highly. Second, the evaluation of a means depends on the extent to which the means is predicted to help or hinder the attainment of a number of goals (e.g., consumption benefits) and on the decision weights of those goals. This conceptualization is consistent with standard multi-attribute attitude models (Rosenberg 1956; Sheth and Talarzyk 1972) in which the evaluation of an object depends on the importance of valued states (i.e., decision weights of goals) and the perceived instrumentality of the object for achieving the valued states (i.e., the extent to which the means is predicted to help or hinder the attainment of a number of goals; see the “Final Observations” section). Thus, the basic structure of the decision algorithm is quite standard and compatible with existing multi-attribute models of product evaluation and choice.

However, whereas previous models have generally contented themselves with estimating importances and perceived instrumentalities, the goal-based choice model seeks to explain and predict situational and temporal variations in these importances and instrumentalities. The model holds that two, partially interdependent, memory-and-learning processes underlie importance weights and perceived instrumentalities. In turn, these weights and instrumentalities determine the evaluation of means. Figure 1 provides a simplified schematic representation of the model.

The first process is grounded in the conceptualization of goals as knowledge structures (Kruglanski 1996; Kruglanski et al. 2002). Goals are represented in an ongoing memory activation process in which internal states or external stimuli activate the cognitive representations of goals and available means. Activation of goals and means determines the accessibility of goals and means in memory, that is, the speed and ease with which goals and means are recognized or recalled (e.g., in a lexical decision task). Most importantly, goal activation also determines the weights of goals in the evaluation of a means, with more highly activated goals gaining a greater weight in the evaluation. In addition to explaining and predicting variations in goal importance or decision weights, the memory activation process also provides a (highly simplified) description of evaluation set formation. That is, means activation influences which means are likely to be retrieved from memory, and to be evaluated, when decisions are memory based. Thus, whereas existing multi-attribute models have tended to take the selection of products to be evaluated as a given, the goal-based choice model explicitly takes this issue into consideration.

The second process is grounded in models of predictive associative learning (van Osselaer 2008). Whereas the memory activation process drives goal importances (i.e., decision weights), this process describes the development and evolution of predictive associations that encode the perceived instrumentalities of means for achieving goals. Determining predictions about the extent to which consuming a product (means) will satisfy or frustrate goals, these predictive associations are learned according to a simple learning rule. Predictive associations are learned through goal-specific feedback and are updated according to the difference between the anticipated and experienced level of goal achievement.

Model Concepts and Model Flow

The goal-based choice model represents three types of concepts as nodes in a connectionist network: means (products), goals (benefits), and an outcome node that represents the overall evaluation. Similar to other concepts in declarative memory (Anderson et al. 2004), the activation of goals and means nodes consists of two parts, base-level activation and incoming activation from other nodes. In the case of goal nodes, incoming activation can come from means nodes or from situational cues. In the case of means nodes, incoming activation can come from goal nodes or situational cues. The evaluation node is a simple output node whose value depends on (1) predictive associations between the means and the goals and (2) the activation of the goals.

The model operates by decision episode. That is, the model divides the flow of behavior into chunks consisting of a single decision or choice. Our main focus is on the decisions consumers make and how they learn from the consumption experiences that result from those decisions. See the “Final Observations” section for a discussion of how the model could accommodate learning by observation.

In each decision episode, there are five subtasks. First, means are selected for evaluation. In stimulus-based decisions, the model simply evaluates all presented means. In memory-based decisions, the model searches memory for means and retrieves means depending on their activation in memory. In mixed (stimulus-based and memory-based) decisions, the model assumes that consumers first evaluate the presented means and then search memory for additional means. The second subtask is to assess the goal outputs or weighted instrumentalities for each goal given the to-be-evaluated means. These weighted instrumentalities reflect both the extent to which the consumer expects the attainment of the goal to be helped or hindered by the means (i.e., instrumentality, encoded by a predictive association) and a goal’s weight or importance in the decision (determined by the activation of the goal in memory). The third subtask is to combine the goal outputs into a means evaluation by summing up the goal outputs. The fourth subtask is to com-
pare the evaluations of the considered means and make a decision. The fifth subtask is to update all the activations and association strengths in the model.

**EVALUATION AND CHOICE**

As mentioned above, we assume that consumers evaluate means and that they do so according to a simple and quite standard evaluation rule. That is, the evaluation of a means \( i \) \((v_i)\) depends on the extent to which means \( i \) is predicted to help or hinder the attainment of a goal \( j \) \((p_{ij}; \text{i.e., the perceived instrumentality of consuming means } i \text{ for attaining goal } j)\) weighted by the importance of the goal \((g_j)\), summed across goals, or

\[
v_i = \sum_j (g_j \times p_{ij}).
\]  

(1)

Thus, the evaluation of a means is simply the sum of the means’s goal-weighted instrumentalities. The evaluations of means \((v_i)\) are compared to yield a choice. We assume that the choice probability is a monotonic function of the ratio between a mean’s evaluation and the evaluations of the other means. In the next section, we discuss how goal importances change over time.

**GOAL ACTIVATION**

In the literature on goals as knowledge structures, goal activation has mostly been considered as a determinant of goal accessibility in memory (Dijksterhuis, Chartrand, and Aarts 2007; Kruglanski 1996; Kruglanski et al. 2002). In addition, goal activation has been linked to persistence in pursuing a goal (Fitzsimons et al. 2008; Koo and Fishbach 2010; Laran et al. 2008; Shah and Kruglanski 2002; Zhang et al. 2011). There is also evidence that goals with higher levels of activation are weighted more heavily in the evaluation and choice of a product means (Bargh et al. 2001; Laran et al. 2008; Laran and Wilcox 2011). This leads to a critical feature of the goal-based choice model; goal activation determines goal importance or weight.

The activation of a goal \( j \) \((g_j)\) depends on four things (see fig. 2 for a visual overview and table 1 for a summary of symbols used in the figure and equations). First, there is a base level of goal activation \((bg_j)\) that does not depend on incoming activation from other concepts in memory (Anderson et al. 2004). The base level activation of a goal has two additive components: it is the sum of chronic goal activation \((cg_j)\) and temporary goal activation \((tg_j)\). Chronic goal activation \((cg_j)\) represents a longer-term, relatively stable component of goal activation. Chronic goal activations account for stable differences across goals and across individuals in the importance weights and accessibility of particular goals. These may be influenced by personal background, social class, and culture. Temporary activation \((tg_j)\) is a consequence of directly priming the goal, goal activation during the previous decision episode, goal (non)achievement, and the time between decision episodes. Second, there is incoming activation from the current situation or context \((sitg_j)\). Third, there is incoming activation that spreads from activated means \((m_i)\) to goals \((g_j)\) over means-to-goals activation associations \((mg_{ij})\). Fourth, goal activation depends on the activation of other goals at the same level. Specifically, goal activation can be modeled as

\[
g_j = \frac{\exp(\theta \times [bg_j + sitg_j + \sum_i m_i \times mg_{ij}])}{\sum_j \exp(\theta \times [bg_j + sitg_j + \sum_i m_i \times mg_{ij}]^j)}.
\]  

(2)

The sources of goal activation can be illustrated with an example. Consider a middle-class, American preteen and her need for social status. The social status goal will have a chronic base level of activation that depends on her background (e.g., family relationships, school experiences, friendships), social class (e.g., middle-class Hispanic), and culture (e.g., Western). The activation of the social status goal will temporally fluctuate owing to the direct priming of status (e.g., exposure to advertising stressing status) and goal non-achievement (e.g., recent failures to achieve status). Situational cues (e.g., socializing with an in-group), exposure to means (e.g., status-branded goods), and other competing goals (e.g., belongingness) will also influence the activation of the social status goal. Thus, in the context of this example,
the activation of the social status goal is rather dynamic (i.e., often changing from minute to minute).

In the following paragraphs, we will discuss the properties of equation 2. We will explain how each element contributes to goal activation and, hence, the decision weight of the goal. In addition, we will briefly discuss empirical evidence consistent with each element of the model and explore some new predictions one can make based on the model.

**Goal Activation Is Relative**

The first characteristic of the model is that goal activation \( (g_j) \) is relative (e.g., as the activation of a preteen’s status goal increases, the relative activation of the achievement, belongingness, and safety goals will decline). Goal \( j \)’s activation is determined by taking the (transformed) sum of goal \( j \)’s base level activation \( bg_j \), incoming situational activation \( sitg_j \), and incoming activation from means \( S_i m_i \times mg_{ij} \), and dividing that (transformed) sum by the aggregate \( \Sigma m_i \times mg_{ij} \) of similar sums for all the goals. This division keeps the aggregate of all goal activations \( g_j \) constant at one. Thus, if one of the activation components of a specific goal is increased, the goal will take a larger share of the activation available for all goals. Consequently, the specific goal will have a higher weight, and all other goals will have a lower weight, in the evaluations of product means.

The property of relative goal activation is realistic and desirable for several reasons. First, it represents the fact that goal activation resources are limited and that trade-offs are made between goals. If one goal becomes more important, other goals have to become less important. Second, the property is also consistent with our conceptualization of goal activation as a decision weight, with decision weights adding up to one. To distinguish it more clearly from its components, and to highlight its relative nature, we will often refer to goal activation \( (g_j) \) as relative goal activation.

Indirect evidence for the relative nature of goal activation in consumers’ product evaluations was provided in a seminal article by Brendl, Markman, and Messner (2003). These authors showed that people with an increased desire to eat decreased their evaluations of nonfood items relative to people with a lower desire to eat. Presumably, people with a strong desire to eat had a highly activated eating goal. This increased the weight of the eating goal in their product evaluations. By the relative nature of goal activation, the increased activation, and weight, of the eating goal should also have decreased the activation of other goals (such as the goal to look good or be clean). The reduced weights of the other goals (look good, be clean) led to lower evaluations of products, such as shampoo, that satisfied the other goals. Thus, the relative nature of goal activation in the goal-based choice model allows it to account for Brendl et al.’s devaluation effect.

Direct evidence for the relative nature of goal activation consists of the measured activation of competing goals (Laran and Janiszewski 2009; Shah, Friedman, and Kruglanski 2002; Shah and Kruglanski 2002). First, Laran and Janiszewski (2009) show that increasing the activation of a pleasure goal reduces the activation of a competing health goal. Second, Shah and colleagues show that priming a task goal, in addition to a focal goal, reduces the accessibility of the focal goal as well as commitment and tenacity regarding the focal goal (Shah et al. 2002; Shah and Kruglanski 2002). It should be noted that the activation of task goals can facilitate the activation of higher-level goals (Shah et al. 2002; Shah and Kruglanski 2002). These hierarchy effects are not captured by the goal-based choice model, which looks at a horizontal level of benefits in product evaluation and choice (see the “Final Observations” section for a discussion of multilevel goal systems such as means-end chains).

The implication of the assumption that goal activation is
relative is that anything that increases the activation of one goal (a) decreases the evaluations of products that serve other active goals but (b) increases the evaluations of products that frustrate those other goals. For example, anything that ever so subtly activates an *experience a pleasant taste* goal would reduce the activation of the goal to be alert (assuming it is also an active goal), leading to lower evaluations of coffee and higher evaluations of wine, even if both products are considered equally tasty. Likewise, anything that decreases the activation of one goal (a) increases the evaluations of products that serve other active goals but (b) decreases the evaluations of products that frustrate those other goals (Laran and Janiszewski 2009). For example, reduced activation of a taste goal would increase the activation of the goal to be alert, leading to higher evaluations of coffee and lower evaluations of wine. Thus, relative goal activation effects are not limited to devaluation effects (but may also be positive) and can result from many more sources of activation than those explored in the literature (Brendl et al. 2003). We discuss a number of these effects when we discuss the different sources of activation.

Although our focus is on consumption benefit goals, it is interesting to note that relative goal activation may force trade-offs between different classes of goals. To appreciate this prediction, consider consumption goals (e.g., the goal to experience a pleasant taste or to be healthy when choosing between foods) and decision process goals (e.g., limit decision effort, improve accuracy, justification, accountability; Bettman, Luce, and Payne 1998). As the relative activation associated with a consumption goal increases, activation associated with decision process goals should decline (Laran 2010; Russo et al. 2008) and vice versa (Sela, Berger, and Liu 2009). In effect, highly activated consumption goals should encourage more unmonitored decision making (that is, less strongly driven by, e.g., desires to limit effort or to improve accuracy, justification, or accountability). Moreover, the satisfaction of these consumption goals should reduce their activation. This should allow unsatisfied decision process goals to have more weight in the next decision episode, even if this decision involves totally different products. Alternatively, an increased focus on decision process goals should reduce the relative importance of consumption

### TABLE 1
SYMBOLS USED IN THE MODEL

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Used in equation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goals:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$bg_j$</td>
<td>Base level goal $j$ activation</td>
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</tr>
<tr>
<td>$cg_j$</td>
<td>Chronic goal $j$ activation</td>
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</tr>
<tr>
<td>$tg_j$</td>
<td>Temporary goal $j$ activation</td>
<td>2, 5</td>
</tr>
<tr>
<td>$dtg_j$</td>
<td>Direct temporary goal $j$ activation</td>
<td>5</td>
</tr>
<tr>
<td>$sitg_j$</td>
<td>Situational goal $j$ activation</td>
<td>5</td>
</tr>
<tr>
<td>$g_j$</td>
<td>Relative goal $j$ activation</td>
<td>1, 2, 5, 7, 8, 9</td>
</tr>
<tr>
<td>$g'_j$</td>
<td>Relative goal $j$ activation excluding incoming activation from the means</td>
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</tr>
<tr>
<td><strong>Means:</strong></td>
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<td></td>
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<td>Base level means $i$ activation</td>
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</tr>
<tr>
<td>$cmi_i$</td>
<td>Chronic means $i$ activation</td>
<td>3</td>
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<td>$tmi_i$</td>
<td>Temporary means $i$ activation</td>
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<td>$sitmi_i$</td>
<td>Situational means $i$ activation</td>
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</tr>
<tr>
<td>$mi_i$</td>
<td>Total means $i$ activation</td>
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<td>$mg_{ij}$</td>
<td>Means $r$ goal activation association</td>
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<td>$gm_{ji}$</td>
<td>Goal $r$ means activation association</td>
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<td>$pi_{ij}$</td>
<td>Means $r$ goal predictive association</td>
<td>1, 9</td>
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<td>Means evaluation</td>
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<tr>
<td><strong>Choice:</strong></td>
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</tr>
<tr>
<td>$c_i$</td>
<td>Choice of means</td>
<td>7, 8, 9</td>
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<tr>
<td><strong>Constants:</strong></td>
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<tr>
<td>$\theta$</td>
<td>Goal focus</td>
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<tr>
<td>$\gamma$</td>
<td>Rate of updating $tg_j$ due to satisfaction/frustration</td>
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</tr>
<tr>
<td>$\phi$</td>
<td>Growth rate of $tg_j$</td>
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<td>$\xi$</td>
<td>Mean focus</td>
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<td>$\zeta$</td>
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<td>$\beta$</td>
<td>Learning rate $pi_{ij}$</td>
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<tr>
<td>$\kappa$</td>
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</tr>
<tr>
<td>$ITI$</td>
<td>Intertrial interval</td>
<td>5, 6, 7, 8, 9</td>
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<tr>
<td><strong>Feedback:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$fb_{ij}$</td>
<td>Feedback: goal satisfaction or frustration</td>
<td>5, 7, 8, 9</td>
</tr>
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</table>
goals and may lead to the selection of an option that has insufficient benefits. Subsequently, satisfaction of the decision process goals may allow the relative importance of the consumption goals to increase. In effect, the consumer may use two decision episodes to make a double choice, the first choice driven by process goals and the second choice by consumption goals.

Relative goal activation should have an important influence on decision consistency (e.g., variety seeking, framing effects, prediction-decision consistency). Even if a focal consumption goal’s sources of activation are constant across several decision episodes, the activation of secondary consumption/process goals can vary and affect product evaluation and choice. Thus, decision inconsistency is not random error but an orderly response to relative goal activations (Geyskens et al. 2008; Laran and Janiszewski 2009). Each situation, or each choice, alters the relative activation of goals and the evaluations of the available products. The interesting issue may not be the instability in choices but that consumers in some cases do buy the same products over and over again. A summary of hypotheses concerning relative goal activation is provided in table 2.

**Goal Focus (θ)**

In our model, the sum of a goal’s base level activation \( b_g \), incoming situational activation \( s_i g_g \), and incoming activation from means \( \Sigma m_i \times mg \_g \), is transformed by multiplying the sum with a scaling parameter \( \theta (\theta \geq 0) \) and exponentiating the result. This transformation reflects the idea that the intensity of competition between goals can vary. As \( \theta \) becomes larger, the activation of the goal with the highest sum of base-level activation, situational activation, and means-based activation asymptotes to one, and all other goals go toward zero. This means that in terms of goal activation, the winner takes all and the consumer’s evaluation or choice is driven completely by the winning goal. As \( \theta \) approaches zero, all goals are activated equally, regardless of their base-level, situational, and means-based activations. Thus, all goals are weighted equally in a consumer’s decision. Psychologically, the \( \theta \) parameter could be referred to as goal focus. If goal focus is high, a consumer’s evaluation or choice is influenced by only one or only a few highly activated goals. If goal focus is low, a consumer is influenced by many goals of approximately equal importance at the same time. (Note that it is not possible to model goal focus by using the \( \theta \) parameter without exponentiation. Without exponentiation, varying the \( \theta \) parameter would not influence relative goal activation \( g \).)

To the best of our knowledge, goal focus is a new construct in the literature on goals as knowledge structures. As such, existing empirical research has not systematically explored differences in goal focus. Yet there are parallel concepts in the attention models of neural functioning that suggest that this construct has nomological validity. For example, the zoom lens model (Eriksen and St. James 1986) and biased competition model (Desimone and Duncan 1995) of attention propose that selective attention is achieved through a narrowing of attentional focus, a process that is supported by physiological and neurological (Beck and Kastner 2009; Müller et al. 2003) evidence. There is also evidence that neural networks need to be able to fluctuate between high and low levels of focus in order to respond to sensory information and exert motor control (Fukai and Tanaka 1997).

The goal focus construct suggests new hypotheses about antecedents of competition between goals in goal activation. For example, we predict that goal focus depends on the type of decision process used by consumers. Reflecting Loew-

**TABLE 2**

**PROPOSITIONS AND HYPOTHESES ABOUT RELATIVE GOAL ACTIVATION**

<table>
<thead>
<tr>
<th>P1:</th>
<th>Goal activation is relative.</th>
</tr>
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<tr>
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<tr>
<td>H1.3:</td>
<td>Increasing the activation of one benefit goal decreases evaluations of means that serve other goals (Brendl et al. 2003).</td>
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<tr>
<td>H1.4:</td>
<td>Increasing the activation of one benefit goal increases the evaluation of means that frustrate other goals (a revaluation effect).</td>
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<tr>
<td>H1.5:</td>
<td>Decreasing the activation of one benefit goal will increase the evaluation of means that serve other goals (Laran and Janiszewski 2009).</td>
</tr>
<tr>
<td>H1.6:</td>
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<tr>
<td>H1.7:</td>
<td>Increasing (decreasing) the activation of benefit goals will increase (decrease) the activation of process goals (e.g., limit decision effort, improve accuracy, justification, accountability) in a current choice.</td>
</tr>
<tr>
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<td>Satisfying (frustrating) the activation of benefit goals will increase (decrease) the activation of process goals (e.g., limit decision effort, improve accuracy, justification, accountability) in subsequent choices.</td>
</tr>
<tr>
<td>H1.9:</td>
<td>H1.1–H1.6 are not limited to increases or decreases in goal activation due to goal satisfaction, goal frustration, or goal deprivation but also occur when goal activation is influenced by any other factor in the goal-based model.</td>
</tr>
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</table>

**Note.**—Hypotheses that have been empirically tested are noted by a citation.
ensteinn’s (1996) suggestion that visceral processes lead to attentional narrowing, we expect that consumers are likely to show high goal focus when visceral factors are involved. Only one goal may be highly activated at a time and dominate consumers’ evaluations and choices. For example, dehydrated, hungry, or sexually aroused consumers may rely on an evaluation and choice process that focuses on one visceral goal (rehydration, food consumption, or sex) at the expense of all other goals.

We do not expect, however, that all less deliberative decision processes are necessarily characterized by high goal focus. Based on the argument that less deliberative decision processes rely on parallel processing, it is possible that these processes can weight many different goals simultaneously (Dijksterhuis 2004; Sloman 1996). In contrast, more deliberative decision processes, due to their serial nature, may weight only very few goals (Gollwitzer 1993, 1999). Thus, it seems possible that for nonvisceral goals (e.g., status) that are pursued using nondeliberative processes, goal activation may be more evenly spread among goals and might respond in a more gradual fashion to increases in activation of competing goals. For example, we predict that priming a goal would lead to more gradual decreases in activation of competing goals when consumers are under a heavy cognitive load than when they are under a light cognitive load. In addition, we expect more gradual devaluation effects when priming a goal under a heavy cognitive load than under a light cognitive load.

We also predict that goal focus differs between people. For example, Meyers-Levy’s (1989) processing selectivity hypothesis holds that male consumers tend to focus on fewer cues than females when processing information. It is possible that male consumers tend to place substantial weight on a few highly activated goals, whereas female consumers weigh goals more equally (i.e., males might have a higher level of goal focus). These differences in goal focus should be exemplified by different response tendencies to a changing environment. For females, any change in a goal’s base-level activation would have a moderate impact on the importance of that goal in product evaluation and choice. For males, however, the winning goal takes all. For example, if a change in a goal’s base-level activation is strong enough to make that goal’s sum of base level activation, incoming situational activation, and incoming activation from means higher than the equivalent sum for other goals, the changed goal becomes the winner and completely drives product evaluations. However, if the change is not strong enough to make the goal the winner, the goal remains unimportant. Thus, whereas females’ evaluations should respond more gradually to changes in their environment, males should either respond strongly (a goal that carried almost no weight becomes all important) or not at all.

Six situational factors influence behavior in a way that could be interpreted as goal focus. First, Fishbach and Labroo (2007) show that people in a positive mood are more likely to pursue an activated goal than people in a neutral or negative mood. Second, Shah et al. (2002) show that people in a depressed mood have less goal focus, whereas people in an anxious mood have more goal focus. Third, research by Grant and Tybout (2008) suggests that a focus on the past narrows goal focus, whereas a focus on the future broadens goal focus. Fourth, people in an implemental mindset are more goal focused than people in a deliberative mindset (e.g., Fujita, Gollwitzer, and Oettingen 2007). Fifth, people who focus on commitment to a goal exhibit more goal focus than people who focus on goal progress (Fishbach and Dhar 2005, 2008). Sixth, Baumeister, Muraven, and Tice (2000) argue that people can actively try to manage goal focus, especially when dysfunctional goals are active, but that fatigue reduces a person’s ability to manage goal focus. Finally, it is possible that individual differences in goal focus may have neural correlates. For example, Bechara and Damasio (2005; Damasio 1994) argued that consumers with damage to ventromedial prefrontal cortex often have difficulty making decisions because they go back and forth between the pros and cons. These people may be unable to decide which of the pros and cons are most important, leading to indecisiveness. Patients with damage to ventromedial prefrontal cortex seem to behave as if they had a very low $\theta$. They seem to weight all goals equally, not allowing one or a few active goals to guide behavior. Thus, it is possible that individual and situational differences in goal focus depend on differences in functioning of the ventromedial prefrontal cortex. Furthermore, depressed dopamine or serotonin levels can encourage people to single-mindedly pursue a goal, often resulting in self-destructive behavior (e.g., overeating, sexual misconduct, substance abuse; Askenazy et al. 2000; Hyman and Melenka 2001; Peacock 2000). A summary of hypotheses concerning goal focus is provided in table 3.

**Base-Level Activation ($bg$).**

As is common in activation theories of declarative storage, activation sources can be divided into base-level activation ($bg$) and incoming activation from other concepts (Anderson et al. 2004). However, unlike activation theories such as Anderson’s ACT-R (Anderson et al. 2004), we distinguish between two components of base-level activation: chronic goal activation ($cg$) and temporary goal activation ($tg$).

**Chronic Goal Activation ($cg$).** Chronic goal activation encodes chronic differences in goal activation, goal accessibility, and the weight or importance of a goal in consumers’ evaluations and choices of products. This is the stable, context-independent component of goal activation that bears some similarity to the stable weight or importance factor in traditional multi-attribute utility theories. Thus, the goal-based choice model holds that, ceteris paribus, higher chronic activation of a goal corresponds to a higher weight or importance of that goal in a consumer’s product evaluations and choices. Chronic activation is an important source of stability in consumers’ preferences and purchase behavior.

Several authors have documented the existence and influence of chronic goal accessibility (i.e., activation; Bargh
There are fewer active, competing goals. Another way to discourage choice of products that serve a chronic goal is to take away other sources of activation of the chronic goal, for example by keeping consumers away from situations that would further activate the chronic goal. Finally, it should be noted that satisfaction of the chronic goal will only temporarily dampen the relevant behavior. Chronic goal activation implies a persistent urge to engage in the choice of products or behaviors that satisfy the chronic goal.

**Temporary Goal Activation (tg).** Temporary goal activation (tg) encodes temporary differences in goal activation that are not due to incoming activation from means or situational cues. Together with incoming activation, these temporary differences in base level activation explain much of the apparent fickleness in consumers’ product evaluations and choices. Consumers’ evaluations and choices vary over time because different goals are differentially activated over time. We argue that these changes in activation are accompanied by changes in the decision weights of the goals involved, leading to differences in the evaluations and choices of products that satisfy or frustrate the achievement of those goals.

One source of temporary goal activation (tg) is the direct exposure to stimuli representing a goal (Ratneshwar, Pechmann, and Shocke 1996). For example, Macrae and Johnston (1998) showed how priming the goals of helpfulness, politeness, rudeness, and hostility encourage the execution of corresponding behaviors. In consumer research, priming an enjoyment goal encouraged people to choose a fun restaurant, whereas priming a status goal encouraged people to choose an elegant restaurant (Laran et al. 2008, study 1). Similarly, priming creativity increased preference for an Apple Corporation product but decreased preference for an IBM Corporation product (Dalton et al. 2007, study 1). Likewise, priming a thrift (prestige) goal increased preference for economy-priced (quality-priced) products (Chartrand et al. 2008, study 4). Finally, priming the desire to enhance
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one’s self-worth increased one’s preference for prestigious items relative to less prestigious items (Dalton 2007).

Temporary goal activation (tgj) is also influenced by goal (non)achievement, goal activation during the previous decision episode, and the time between decision episodes. We will elaborate on these influences when we discuss the equation governing the dynamics of temporary goal activation.

Finally, Bargh and his colleagues (Bargh et al. 1986; Bargh and Barndollar 1996) provide empirical evidence supporting the additive nature of the chronic and temporary activation of concepts in memory. The main implication is that chronic and temporary base-level activations are inter-changeable. Less of one can be compensated by more of the other to yield the same behavioral effect. Thus, there is empirical support for the additive combination of chronic and temporary goal activation to form base-level activation. Of course, statistical interaction effects between chronic and temporary goal activation on behavior can still occur due to the relative nature of goal activation, due to the role of goal focus, and due to ceiling- and floor-like effects. For example, some products are so unattractive relative to other products that increased chronic or temporary activation of supporting goals has little effect on choice. In such situations, relatively high levels of both chronic and temporary activation may be needed for the product to be chosen.

Incoming Activation from Situational Cues

Incoming activation from the current situation or context to goal jsitgj encodes the influence of one or more situational cues on the activation of a goal that is associated with the situational cue(s). It is distinct from the direct exposure to stimuli representing a goal (which is a component of temporary base-level activation, tgg) because situational activation does not involve direct representations of the goal concept but the activation of contextual cues that are associated with the goal concept. Thus, the goal-based choice model holds that the activation of situational cues (a) leads to activation of associated goals, which (b) makes those goals more important in consumers’ decisions, which in turn (c) leads to more favorable evaluations and increased choice of products that have positive predictive associations with those goals and (d) leads to less favorable evaluations and decreased choice of products that have negative predictive associations with those goals.

Ample evidence suggests that activating situational cues leads to increased choice of behavioral means that help to satisfy goals related to the situational cues (Belk 1975; Markman and Brendl 2005). For example, being exposed to a picture of a library (i.e., situational cue) reduces the volume of a person’s voice (i.e., a means to achieve goals associated with the concept of a library; Aarts and Dijksterhuis 2003). Likewise, exposure to a business-related item (e.g., black-leather portfolio), as opposed to a non-business-related item (e.g., a backpack), results in a person’s being more competitive in an ultimatum game (Kay et al. 2004). Similarly, thinking about a friend, as opposed to a coworker, increases a person’s willingness to be helpful (Fitzsimons and Bargh 2003). In addition, there is empirical evidence that these behavioral effects are mediated by the activation of the goals related to the situational cues (Fitzsimons and Bargh 2003; Kay et al. 2004). More closely related to consumer behavior, Brendl, Markman, and Higgins (1998) find that students in a bursar’s office (a situational cue that activates a goal to pay tuition) will pay more for a raffle with a tuition waiver (a means with a strong positive predictive association to the tuition paying goal) as the prize ($1.52) as opposed to an equivalent cash prize ($0.93).

The goal-based choice model, thus, holds that some of the instability in a consumer’s product evaluations and choices is caused by environmental cues that activate related goals. As consumers are exposed to different environments, and different cues within those environments, different consumption benefits receive more or less weight in evaluation and choice because they are differentially associated with different environmental cues. This is the case because decision weights depend directly on goal activations which are influenced by incoming activation from situational cues. Thus, a markdown tag may activate a thrift goal, increasing the importance of price, and leading to the choice of cheaper items; seeing a fit person may activate a health goal and promote the purchase of healthy products; a sunny day may activate the desire for fun, leading to the consumption of products that provide fun. Furthermore, the increased importance of the situationally activated goal should lower consumers’ evaluations of products frustrating that goal. The markdown tag should lead to lower evaluations of expensive items, the fit person should engender lower evaluations of unhealthy products, and the sunny day reduces evaluations of utilitarian products that are the opposite of fun. Due to the relative nature of goal activation, situational sources of goal activation should also affect the evaluations of products that are unrelated to the situationally activated goal. For example, encountering a fit person should reduce the evaluations of food products that are filling but not especially healthy or unhealthy.

Situational cues also have the potential to increase uncertainty about the direction of behavior. When situational cues activate a variety of competing goals, instead of a single goal, many different products beget similar evaluations. The implication is that busy or enriched environments might result in decision paralysis or choice deferral owing to the leveling of relative goal activations. This might be especially true for consumers who exhibit low goal focus.

Incoming Activation from Means

Incoming activation from means (Σm × mgj) encodes the influence of the activation of means (mj) on the activation of goals over incoming means to goal associations (mgj). Several researchers have documented the effects of means activation on goal activation, resulting in the choice of means that are instrumental for the activated goal(s). For example, Shah and Kruglanski (2003) find that priming a means (e.g., study) activates a goal (e.g., being educated) and that the increased activation of the goal leads to in-
creased persistence in pursuing the activated goal. In the consumer realm, Chartrand et al. (2008) primed people with means that were effective for saving money (e.g., retailers Walmart, Kmart, and The Dollar Store) or effective for achieving status (e.g., retailers Tiffany, Neiman Marcus, and Nordstrom). The thrill (prestige) means primes increased preference for economy-priced (quality-priced) merchandise over quality-priced (economy-priced) merchandise.

These findings are consistent with our assumption that part of the instability in consumers’ product evaluations and choices is caused by the fact that the products themselves influence the activation of goals and, by extension, the evaluation of the products. Products (i.e., means) can be activated in several ways, for example, through priming but also by being present in the consumer’s perceptual field or by being retrieved from memory. As a result, product means in the consumer’s evaluation set (which are present in the perceptual field or are successfully retrieved from memory) are usually highly activated. This activation spreads to associated goals, increasing their activation and, hence, the relative importance of these goals in a consumer’s product evaluation and choice. Thus, product evaluations and choices vary across situations because the products that happen to be present or retrieved in a situation determine which consumption benefits (goals) are activated, and weighted, in the particular situation. We note that the potential influence of means availability on the perceived value of the means is at odds with the assumption of stable preference functions (i.e., the mere presence of a means should not increase its value).

The strong effects of visceral stimuli (e.g., drugs, attractive people) on behavior may be driven not only by high goal focus but also by strong means to goal activation associations (mgij). Perceiving a visceral stimulus may very strongly activate a goal satisfied by that stimulus (e.g., the goal to get high or have sex), which may then come to dominate all other goals (especially under high goal focus).

The incoming activation (\(\sum m_i \times mg_{ij}\)) from means to goals over means-to-goal activation associations (mgij) allows the goal-based choice model to explain consumers’ tendency to mimic other consumers’ choices. For example, Tanner et al. (2008) show that perceiving a person eating a food item increases the likelihood that the same type of item will be chosen and consumed. The goal-based choice model accounts for such effects because perceiving a product means increases its activation (mi). Through means-to-goal activation associations (mgij), this activation is fed through to related goals, making those goals more important in choice. For example, perceiving a person drinking coffee activates the coffee means. The coffee means then activates the goal to be alert via the activation association from coffee to the alertness goal. The increased activation of the goal to be alert makes being alert more important in the evaluation of different drinks. This, in turn, increases the evaluation of coffee. The result, in most situations, is an increase in the choice and consumption of coffee. Thus, our model does not presume a direct perception-behavior link but assumes that mimicry can be the result of a (probably at least partially subconscious) decision process involving goals (Dijksterhuis et al. 2005; Janiszewski and van Osselaer 2005). This assumption implies that mimicry effects should depend on the other factors in the model. For example, if other goals that are not related to the perceived means are highly active or if the perceived means does not have strong means-to-goal activation associations, the mimicry effect should be smaller.

Relatedly, the incoming activation (\(\sum m_i \times mg_{ij}\)) from means to goals over means-to-goal activation associations (mgij) allows the goal-based choice model to explain several known context effects. Perceiving a product means should not only affect the evaluation of that means, via increased goal activation, but also of other means that are related to the same goal. For example, adding coffee to a choice set activates the goal to be alert, making that goal more important. This effect should not only increase the evaluation of coffee, but should also increase the evaluation of other products that help the consumer to be alert (e.g., caffeinated cola). This means-to-goal activation process may account for unexpected priming effects like food consumption activating a pleasure goal which in turn increases the desire for a massage (Wadhwa, Shiv, and Nowlis 2008), fearful stimuli (which may activate a safety goal) increasing the desire for social goods (Griskevicius et al. 2009), and bikinis (which may activate a desire goal) influencing impatience (Van den Bergh, Dewitte, and Warlop 2008). Because of the relative nature of goal activation, the means-to-goal activation process can also make goals that are unrelated to the activated means less important, leading to lower evaluations of products that satisfy those unrelated goals.

Incoming activation (\(\sum m_i \times mg_{ij}\)) from means to goals over means-to-goal activation associations (mgij) also allows the goal-based choice model to account for the classical asymmetric dominance effect (Huber et al. 1982; Simonson 1989). This effect occurs when (a) one option, A, scores high on one attribute/benefit/goal dimension (dimension 1) and lower on a second dimension (dimension 2), (b) another option, B, scores low on dimension 1 but high on dimension 2, and (c) a third option, C, is added that is similar to option B but scores slightly lower than B on both dimensions. This implies that C still scores much higher on dimension 2 than option A and much worse on dimension 1. Thus, B dominates C but A does not dominate C, hence asymmetric dominance. The asymmetric dominance effect refers to the fact that adding option C leads to an increase in preference for the most similar option, B, relative to option A. Our model explains this effect because C’s presence in the perceptual field activates means C, C’s activation association to goal (i.e., dimension) 2 feeds this activation forward to goal 2, which therefore becomes more important relative to goal (dimension) 1. This makes option B more attractive relative to option A.

Interestingly, a seminal paper by Fishbach, Friedman, and Kruglanski (2003) suggests that positive means-to-goal activation associations are not only formed when means satisfy goals. Positive means-to-goal activation associations are
equally formed when means frustrate goals. For example, exposure to fattening food (means) increases the activation of a weight-watching goal. That is, activation of a means increases the activation of a goal whose satisfaction is actively frustrated by consuming the means, because consuming fattening food clearly has a negative effect on the achievement of a weight-watching goal. Thus, the association that represents the influence of means activation on goal activation is positive even if the means frustrates the goal.

Our assumption of separate means-to-goal activation associations ($m_{g_i}$) and instrumentalities ($p_{m}$, which are essentially means-to-goal predictive associations) is important and not obvious. Whereas the literature on goals as knowledge structures provides precisely little guidance about the nature of goal-related associations and often seems to assume (implicitly) that only one type of association exists, empirical results suggest that it is necessary to assume separate types of associations. Specifically, whereas Fishbach et al. (2003) showed that activation of a means (e.g., a fattening food) increases the activation of a goal (e.g., a weight-watching goal) whose satisfaction is actively frustrated by the means, the activation of the means decreases choice of that means (see also Zhang, Huang, and Broniarczyk 2010). If the positive means-to-goal activation association were the only association type, one would expect that if a means activates a goal (which as a goal is necessarily something desirable), the probability of the means being chosen should increase. However, Fishbach et al. (2003) showed that not to be the case. Thus, there has to be a negative, inhibitory connection between the temptation means (e.g., a fattening food) and the goal (e.g., weight watching) that exists alongside the positive, excitatory connection that led to increased goal accessibility (i.e., a fattening food could activate the weight-watching goal).

In the goal-based choice model, these phenomena are accounted for by the assumption that there are two types of associations from means to goals. First, there are activation associations from means to goals that are always positive, so that a means (e.g., a Twix bar) that frustrates the achievement of a goal (e.g., health) develops a positive means-to-goal activation association. This positive association increases the importance of the goal in the consumer's decision. Second, there are predictive associations that can be positive or negative. A predictive association becomes positive when consumers learn that consumption of a means (e.g., an apple) helps to satisfy a goal (e.g., health). This association increases the evaluation of the means on that goal dimension. The predictive association becomes negative as consumers learn that consumption of a means (e.g., a Twix bar) inhibits the achievement of a goal (e.g., health). In the latter case, the predictive association decreases the evaluation of the means on that goal dimension.

Assuming positive activation associations from means to frustrated goals has important implications. First, the presence of a means may not only increase the attractiveness of other products that satisfy the same goals (Chartrand et al. 2008) but may also increase the attractiveness of products that satisfy goals that are frustrated by the means. For example, for people who perceive that certain cell phone operators frustrate service-related goals, priming those operators’ brand names may increase the attractiveness of nontelematic products that are seen to provide good service, while decreasing the attractiveness of nontelematic products providing bad service. This would be the case because the cell phone operator activates the service goal over its means-to-goal activation association, making service more important in the consumer’s evaluations and choices.

Second, observing a person consuming a product may lead to antimimicry (Johnston 2002) if the product frustrates goals. For example, seeing someone consume cheap vodka from a plastic bottle may activate a status goal (i.e., a goal that is frustrated by the consumption of vodka in plastic bottles) and decrease the attractiveness of cheap vodka and other status-reducing products instead of inciting mimicry. Third, positive activation associations from means to frustrated goals should affect products that are unrelated to the frustrated goals. By the relative nature of goal activation, adding a means to the choice set (e.g., cheap vodka in a plastic bottle) decreases the importance of nonstatus goals, reducing positive evaluations of otherwise positively evaluated products that are irrelevant for status but also moderating negative evaluations of otherwise negatively evaluated products that are neither positively nor negatively related to status.

Finally, the fact that a positive association is formed from a means to a goal both when the means satisfies and when the means frustrates the goal has some interesting implications for self-control. Consider situations in which behavior is modified by engaging in opposing behaviors. People who crave an unhealthy snack are told to eat something healthy (e.g., fruit, vegetable, grain). Similarly, people who worry that they might drink too much alcohol are told to substitute a nonalcoholic beverage (e.g., water, juice, soda) on some pours. To the extent that these opposing behaviors (e.g., eating a carrot) actively frustrate the opposing goal (e.g., craving for a sweet snack), they should become more strongly associated with the goal. The implication is that the opposing behavior (e.g., eating a carrot) will start to activate the opposing goal (e.g., craving sweets) in those situations where the opposing goal was previously not active (i.e., only the health and hunger goals were previously active). In effect, the performance of opposing behaviors may ultimately increase the frequency of the unwanted behaviors. This process could explain why consideration of a healthy menu item sometimes increases the tendency to consume a more indulgent menu item (Wilcox et al. 2009) or the eating of a healthy food can make one hungrier (Finkelstein and Fishbach 2010). The healthy menu item activates the indulgence goal. A summary of hypotheses concerning the influence of goal activation on behavior is provided in table 4.
MEANS ACTIVATION

Activation of a means \((m_i)\) is important in the goal-based choice model for two reasons. First, as mentioned in the previous section, means activation (through means-to-goal memory activation associations \(mg_{ij}\)) codetermines which goals will become active. Thus, the activation of a means has an influence on the weight of the different benefits in a consumer’s evaluation of products in the evaluation set. Second, means are not always vividly present in a consumer’s perceptual field (i.e., not all decisions are stimulus based). In many situations, some or all of the products that a consumer evaluates have to be retrieved from memory (i.e., in mixed stimulus-based-and-memory-based or purely memory-based decisions). To account for these situations, the goal-based choice model allows means activation to determine whether or not a means will enter the evaluation set. That is, a means that is more highly activated in memory is more likely to come to mind, and be evaluated, than a means that is less highly activated. Thus, whether or not a product is retrieved from memory, and by extension whether or not the product is evaluated and considered as an option for choice, depends on the product’s activation.

Means activation can be modeled as depending on three sources of activation.

\[
m_i = bm_i + sitm_i + \sum_j g' \times gm_j. \tag{3}
\]

First, there is a base level of activation \((bm_i)\) that depends on chronic means activation \((cm_i)\) and temporary means activation \((tm_i)\). Chronic means activation \((cm_i)\) reflects the longer-term, relatively stable activation level of a means, accounting for stable differences across individuals in the accessibility of particular means (that are not caused by reoccurring incoming activation from, for example, goals or the choice situation). Temporary means activation \((tm_i)\) is a consequence of direct means priming, presence in the perceptual field, retrieving the means from memory, means activation during the previous episode, and the time between decision episodes. Second, means can receive incoming activation from the current situation or context \((stim)\). Third, means can be activated through incoming activation that spreads from activated goals to means over activation as-
associations from goals to means \((gm_i)\), with higher goal activations and stronger goals-to-means associations leading to stronger incoming activation to means.

We can again illustrate the components of this equation with the example of a preteen seeking social status. Independent of the activation of the social status goal, the preteen could have chronically high activation of the means cosmetics, diet pills, and a cell phone. Additional temporary activation of means could occur as a consequence of perceptual exposure (e.g., seeing a peer with press-on nails makes the press-on nails means more activated), situational or contextual cues (e.g., a lunchtime conversation about vacation experiences makes an exclusive summer camp worthy of consideration even when summer camp is not mentioned directly), or goal-to-means priming (e.g., activation of an achievement goal could increase the activation of studying). The likelihood of acting on any one of these means will depend on the array of means in the evaluation set, relative goal activations, and the strength of predictive associations (i.e., perceived instrumentality) from the means to the goals.

In equation 3, goal activation \(g'_j\) is the same as goal activation \(g_j\) in equation 2, with the exception that it excludes the part of \(g_j\) that is due to incoming activation from the means (i.e., \(\sum m_i \times mg_i\)). Including incoming activation from the means in the calculation of \(g'_j\) would make the definition of means activation circular. That is, in order to determine goal activation one would have to know means activation and in order to know means activation one would have to know goal activation. In the following paragraphs, we will elaborate on the properties of equation 3.

Base-Level Activation

Just like goal activation, means activation sources are divided into base-level activation \((bm_i)\) and incoming activation from other concepts represented in memory. Also similar to goal activation, base-level activation of means has two additive components: chronic means activation \((cm_i)\) and temporary means activation \((tm_i)\).

**Chronic Means Activation.** Chronic means activation encodes relatively stable differences in means activation that are not due to incoming activation. That is, chronic means activation reflects stability in means activation that is independent of people finding themselves in similar situations over time (which would be captured by situational incoming activation, \(sima_i\)) or of specific associated goals being consistently highly activated (which would be captured by incoming activation from goals, \(\sum mg_i \times gm_i\)). Means that have high chronic activation are consistently highly accessible in memory and will, therefore, be more likely to enter the consumer’s evaluation set. Chronic means activation \((cm_i)\) has been implicated as a causal agent in compulsive behavior (Maltby and Tolin 2003), obesity (Volkow and Wise 2005), and drug addiction (Kalivas and Volkow 2005). That is, specific compulsive behaviors, food products, and drugs are consistently highly activated, making them come to mind often.

Although dark side consumer behaviors such as overconsumption of unhealthy foods and drugs should be an important focus of consumer researchers, we have found no research in the consumer behavior area that directly addresses chronic activation of products. This is surprising because we constantly observe dark side behaviors involving the chronic accessibility of certain products. The goal-based choice model also suggests that chronic means activation may have positive effects. For example, healthy, beneficial products (e.g., exercise, fruit, vegetables) can be chronically accessible. Through products’ means-to-goals activation associations \((mg_i)\), chronic means activation may also lead to relatively stable differences in the activation of goals and, hence, influence the decision weights of different benefits in a consumer’s choice. That is, products that obsessively occupy consumers’ minds will determine which benefit goals (e.g., indulgence goals versus health goals) will be weighted more heavily in consumers’ decisions. To obtain the positive effect, it is important that beneficial goals (e.g., health goals) be made salient during learning, as beneficial means can be associated not only with goals satisfied by those means (e.g., health goals) but also with goals actively frustrated by those means (Fischbach et al. 2003).

**Temporary Means Activation.** Temporary means activation \((tm_i)\) can be increased by direct exposure to the means. A means can be present in a consumer’s perceptual field or can be primed at a conscious or subconscious level. According to the goal-based choice model, the increased activation resulting from means priming affects whether the means enters the evaluation set in memory-based or mixed decisions. Temporary means activation also affects choice of the more highly activated means by increasing the activation of associated goals. That is, increasing the temporary base-level activation of a product means \((tm_i)\) in a stimulus-based choice situation affects choice of that product because it increases the importance of benefits associated with the product. We discussed evidence for the spread of activation from means to goals when we elaborated on incoming activation to goals from means. Other relevant findings show the relationship between direct exposure to a means and choice. For example, Karremans, Stroebe, and Claus (2006) found that subconscious priming of means led to increased choice of the primed means. In the consumer realm, Wansink and his colleagues (Painter, Wansink, and Hieggelke 2002; Wansink 1994; Wansink, Painter, and Lee 2006) found that making food items more salient (i.e., increasing their level of activation) led to greater consumption of those food items. Milligan and Hantula (2005) found that prompts in a pet supermarket (i.e., suggesting possible products for purchases) increased sales by 300%–400%. Tanner et al. (2008) showed that observing a person eating a certain food item (e.g., goldfish crackers, animal crackers) increased the likelihood that the same type of food item would be chosen and consumed.
These findings, seen through the prism of the goal-based choice model, have interesting implications for self-control. For example, they suggest that anything that makes vice products less salient (i.e., less highly activated) in a consumer’s perceptual field, can decrease the consumer’s temptation to choose those products (if the products are associated with indulgence goals). This can be done, for example, by moving the product out of sight or using packaging that obstructs the look and smell of the product (Raynor et al. 2004). Thus, reducing the perceptual salience of vice products is an alternative to the often-advocated self-control strategy of highlighting the negative consequences of giving in to temptation.

An alternative strategy to increase self-control and promote virtuousness behaviors is to make virtuous products and actions salient. For example, recent attempts at changing the lunchtime eating habits of school-aged children have emphasized creating a menu with multiple healthy alternatives (e.g., Jamie Oliver’s Healthy Schools Project). In another domain, a master’s thesis supervised by one of us showed that printed toilet paper reminding people to wash their hands increased hand alcohol usage in an academic hospital by a third (van Schie and Wiesman 2005). Interestingly, a similar campaign promoting safe sex in prisons produced little more than newspaper headlines deploring prisoners getting “sex lessons in the toilet” (Telegraaf 2009).

In light of the goal-based choice model, this should not have been a surprise. Temporary means activation wears off fast. Thus, whereas the hospital campaign activated the beneficial means (washing hands) seconds before the relevant choice, temporary means activation (condom) and the opportunity to execute the behavior (condom use) were too separated in time in the prison campaign.

Temporary means activation (tm) is also influenced by recent consideration or retrieval of a means in the same or a previous decision episode. We will elaborate on these influences when we discuss the equation governing the dynamics of temporary means activation.

Incoming Activation from Situational Cues

Incoming activation from the current situation or context to means i (sitmi) encodes the influence of one or more situational cues on the activation of a means that is associated with the situational cue(s). To illustrate, walking past a bar (i.e., situational cue) should activate means (e.g., cigarettes, beer) that are associated with a bar (Higgins, Rholes, and Jones 1977). This increases the likelihood that the means will enter the evaluation set. In addition, the activation of the means, through means-to-goals activation associations, activates goals related to the means. This, then, increases the importance of associated goals in the choice among evaluated means, which affects evaluation and choice of the activated means (see, e.g., Lee and Labroo [2004] for a demonstration of an associated cue affecting the evaluation of a product). Thus, walking by a bar not only makes a smoker consider smoking a cigarette, it can also remind the smoker about the benefits of smoking (e.g., relaxation, pleasure), which further increases the chance that the smoker will smoke. In addition, due to the relative nature of goal activation, the activation of goals associated with smoking should decrease evaluations of products that serve goals other than the goals associated with smoking a cigarette. Beyond smoking frequency (Carter and Tiffany 1999), similar processes may explain how contextual cues trigger cravings for food and drugs (Poulos, Hinson, and Siegel 1981) and predict instances of binge eating (Jansen, Broekmate, and Heymans 1992) and binge drinking (Rankin, Hodgson, and Stockwell 1983).

The effects of situational cues on the accessibility of means, as well as the effects of situational cues on the evaluation and choice of associated means, are illustrated in recent findings by Berger and Fitzsimons (2008). For example, in one study, exposure to orange-colored stimuli (e.g., pumpkins) around Halloween increased the accessibility of orange-colored candy. In another study, consumers learned an association between dining hall trays (i.e., situational cue) and eating fruits/vegetables (i.e., means) through multiple exposures to the slogan “Each and every dining hall tray needs five fruits and veggies a day.” Exposure to dining hall trays led to a 25% increase in fruits and vegetable consumption. In still another study, consumers learned to associate dining hall trays (i.e., situational cue) with a digital music player through frequent exposure to the slogan “Dinner is carried by a tray, music is carried by ePlay.” Later exposure to dining hall trays resulted in an increased evaluation of the music player. The authors attributed these effects to a fluency process. The goal-based choice model predicts that the same effect could result from the situational cue activating the means and the means activating goals that are served by the means. The goal-based explanation and fluency explanations could be disentangled by looking at the evaluations of unrelated means. Due to the relative nature of goal activation (Shah et al. 2002), the goal-based process predicts that exposure to the situational cue (e.g., dining hall tray) should lead to a devaluation of means (e.g., a stapler) that serve unrelated goals.

In conclusion, the goal-based choice model holds that some of the instability in a consumer’s choices is caused by cues in the consumer’s environment that activate related means. Different environments trigger the consideration of different means, and the activation of those different means activates associated goals. This process indirectly affects product evaluations and choices due to the highlighted goals’ higher importance in product evaluation and choice.

Incoming Activation from Goals

Incoming activation from goals to means (Σgi × gm) reflects the influence of goal activation on associated means. This influence depends on the level of activation of the goal (gi) and the strength of the activation association from the goal to the means (gm). The summation sign (Σ) reflects the fact that a means may be activated by multiple goals. Incoming activation from goals to means encodes an essential and quite obvious phenomenon in memory-based
decisions: the means that are retrieved from memory and evaluated tend to be means that are positively associated with highly activated, hence important, goals. For example, a consumer with a highly activated goal to quench his thirst is more likely to retrieve water from memory than to retrieve dry crackers. Thus, activation of a goal will increase the chance that a means that satisfies that goal will enter the evaluation set.

Ample evidence exists that activating goals increases the accessibility of means that satisfy those goals (Aarts and Dijksterhuis 2000, 2003; Aarts, Dijksterhuis, and Custers 2003; Aarts, Dijksterhuis, and de Vries 2001; Belk 1975; Ratneshwar et al. 1996; Ratneshwar and Shocker 1991). For example, Aarts and Dijksterhuis (2000, experiment 1) found that priming a travel goal (e.g., to attend lectures at the university) reduced response latencies to a means (the word bicycle) for participants who frequently satisfied the goal by choosing that means. In a more consumer-related experiment, Aarts et al. (2001), found that thirst-related words representing means (e.g., water, juice, soda, glass, bottle, cup) are more accessible for people who are thirsty (i.e., have a highly active goal to quench thirst). Ratneshwar et al. (1996) show that activating a cool down goal increases the likelihood that goal-consistent means will enter the evaluation set.

Despite the uncontroversial nature of the idea that goals activate means, this process may have important implications for self-control. Whereas self-control has usually been thought of as a choice problem between the vice and virtue products in an evaluation set, the goal-based choice model suggests that consumption of vice and virtue products may also depend on evaluation set formation. If activated goals have strong associations only to vice means or if the vice means have high base-level activation, consumers may not even consider a virtue product. For example, consumers might not even think of healthy alternatives when they are hungry. If so, self-control may benefit from encouraging associations between neutral goals (e.g., goal to eat) and virtuous means. Associations between goals and means are built through advertising, as exemplified by a number of campaigns linking hunger/snack goals to healthy alternatives (e.g., “I think I’ll have a V8,” California almonds, Chiquita Fruit Bites, and a successful Dutch campaign exhorting consumers to consider eating a sweet apple when craving sweetness), shelf placement, point-of-purchase displays, and observation of consumption.

In addition to the evaluation set effect, incoming activation from goals has an indirect effect on goal activation. Some of the incoming activation from goals to means is fed through again to goals via the means-to-goals activation associations \((m_{gj})\), increasing activation of goals associated with the means. If the activated means has a strong means-to-goal activation association with the goal that activated the means in the first place, this process will only further strengthen the decision importance of the triggering goal. However, if the means also has strong means-to-goal activation associations to other goals, this process will bring other goals into the decision process and reduce the importance of the triggering goal. For example, if a thirst-quenching goal activates the means water and water only has a strong means-to-goal activation association to the thirst-quenching goal, the indirect activation process (from thirst quenching to water and back to thirst quenching) should lead to an increased importance of products’ capacity to quench thirst. However, if a thirst-quenching goal activates the means cola, the activation of cola might lead consumers to also consider secondary goals associated with cola, such as the goal to be alert. This would decrease the relative importance of thirst quenching in the choice of a beverage. We are not aware of empirical evidence for the indirect goal-activation process (from goals to means and then from means to goals).

Unlike means to goal activation associations \((m_{gj})\), goal to means activation associations \((g_{mj})\) can be negative. Fishbach et al. (2003) found that priming a goal (e.g., a health goal) led to a decrease in the accessibility of a temptation means (e.g., a fattening food) in memory. This finding suggests that within the same means-goal pair, the activation association from the means (e.g., a Twix bar) to the goal (e.g., health) can be excitatory (i.e., positive) whereas the activation association from the goal (e.g., health) to the means (e.g., a Twix bar) is inhibitory (i.e., negative). Thus, separate activation associations need to be assumed from means to goals versus from goals to means. The existence of negative goal to means activation associations implies that activation associations can also discourage healthy behaviors. For example, a highly active indulgence goal (e.g., eat for pleasure) can not only increase the activation of vice products (e.g., fatty snacks) but also decrease the activation of virtuous products (e.g., vegetables), making it even less likely that these virtues enter the evaluation set. A summary of hypotheses concerning the influence of means activation on behavior is provided in table 5.

**EVALUATION SET FORMATION**

Most general models of consumer product evaluation and choice do not explicitly account for evaluation set formation (but see Kardes et al. 1993; Kardes et al. 2002; Roberts and Lattin 1991). However, many real-world consumer choices are memory based or mixed (Alba, Hutchinson, and Lynch 1991). Therefore, we felt that adding a means-selection-from-memory process adds value to the goal-based choice model. In addition, the selection of means from memory integrates quite naturally into the goal-based choice model. That said, evaluation set formation is only a small and relatively nonfocal module of the model. Needless to say, the model cannot come close to accounting for all the phenomena documented in the memory literature.

**Stimulus-Based Choice**

In stimulus-based choice situations, the goal-based choice model makes the simple assumption that all available choice options are perceived simultaneously and evaluated con-
Currently, thus, all presented means are in the evaluation set. This is not a critical assumption, but it is in line with findings showing that evaluative appraisals can occur immediately and automatically (Bargh 1997; Fazio et al. 1986; Zajonc 1980). We also assume that perceiving a means increases its temporary base-level activation \((tm_i)\). The extent of this increase may depend on the perceptual salience of the means. For example, perceiving means that are farther away, more ambiguous or vague, or otherwise less fluent should yield lower increases in the means’ activations.

**Memory-Based Choice**

In memory-based decisions, an evaluation set is formed by retrieving means from memory. We make several assumptions about this retrieval process. First, during each decision episode, people conduct a limited number of discrete searches or draws from memory. The number of draws is a function of process goals such as maximizing accuracy, minimizing time and effort, or avoiding conflict (Bettman et al. 1998, 2008; Sanbonmatsu et al. 1998; Svenson and Maule 1993). Second, each draw yields a retrieved means. Which means is retrieved depends on a means’s activation in memory relative to the activation of other means. A higher relative activation increases the chance that a means is retrieved. Third, there is also a random component in means retrieval. Finally, all means that are retrieved are evaluated.

More formally, the probability that means \(i\) is retrieved for evaluation on a memory draw is given by

\[
P(\text{evaluate means } i) = \frac{\exp(\xi \times m_i)}{\sum_i \exp(\xi \times m_i)},
\]

where \(\xi\) is a nonnegative scaling constant and \(m_i\) is the activation of means \(i\). The scaling constant reflects the extent to which the most highly activated means is likely to be retrieved relative to less highly activated means. As \(\xi\) increases, the probability that the means with the highest activation level will be retrieved goes to one. As \(\xi\) approaches zero, all means are equally likely to be retrieved regardless of their activation.

It is also important to note that draws from memory are with replacement. That is, a means may be retrieved multiple times during the same decision episode, although each means is only evaluated the first time it is retrieved during a decision episode. The chance that a means is retrieved multiple times is further increased by another assumption: each time a means enters working memory within a decision episode, its temporary base-level activation \((tm_i)\) is increased by a constant amount. This increases the means’ activation \((m_i)\), making it more highly activated relative to the other means and increasing the chance that it will be retrieved again in the next draw. Whether the same means is retrieved multiple times also depends on the scaling constant \(\xi\). If \(\xi\) is high, it is likely that the same means (the one with the highest level of means activation) is retrieved over and over again. If \(\xi\) is low, a broader and more varied set of means will be sampled (Hutchinson, Raman, and Mantrala 1994). We expect that several conditions-at-retrieval and individ-
GOAL-BASED EVALUATION AND CHOICE

Although greatly simplified relative to more specialized memory models, our simple assumptions about the retrieval of means are broadly consistent with current models of cued recall, in which memory traces are sampled in proportion to the ratios between their activation levels and the activation levels of other traces (Shiffrin 2003, 350). In addition, the goal-based choice model can account for findings in the literature showing small consideration sets and output interference in retrieval. For example, consumers often consider fewer options (i.e., means) in memory-based choice (Mitra and Lynch 1995). In the goal-based choice model, evaluation set sizes are limited because consumers only conduct a limited number of searches in memory, draw with replacement, and retrieve the most highly activated means multiple times. In addition, each retrieval episode boosts the activation level of the retrieved means, further increasing the likelihood that it will be retrieved again on the next draw.

Mixed (Stimulus- and Memory-Based) Choice

When consumers consider both means present in their perceptual field and means stored in memory (i.e., mixed choice), we assume that each evaluation of a stimulus-based means reduces the number of memory draws by one. Thus, search for means from memory only occurs when the total number of draws exceeds the number of means present in the perceptual field. In addition, the remaining draws from memory can retrieve the representations of stimulus-based means, further limiting the number of memory-based means considered by the consumer. The chance that stimulus-based options are retrieved and, hence, interfere, with the retrieval of memory-based options in mixed choice situations is further increased by the fact that the presence of an option in the perceptual field itself increases its means activation.

These assumptions are consistent with the part-list cuing phenomenon, in which presenting choice options inhibits the retrieval of other options from memory (Alba and Chattopadhyay 1985, 1986; Rundus 1973; Slamecka 1968). In the goal-based choice model, part-list cuing increases the temporary activation of the cued products, making it more likely that these cued products are repeatedly retrieved at the expense of other, memory-based options.

LOOKING ACROSS CHOICE EPISODES

Whereas most models of consumers’ product evaluation and choice take a static perspective, looking only at a single choice episode, the goal-based choice model seeks to describe the evolution of product evaluations and choices across more than one choice episode. The model explicitly accounts for changes in goal activations, means activations, and association strengths over time.

Temporary Base-Level Activation of Goals

We have already discussed the temporary base-level activation of goals ($tg_g$ or temporary goal activation for short) as one of the elements that goes into overall goal activation ($g_g$) and, hence, goal importance. As its name already indicates, this element varies considerably over time and explains much of the instability of consumers’ product evaluations and choices. Temporary goal activation itself has several components or constituent processes. Thus far, we have concentrated on one of these processes, direct activation of the goal, for example, through goal priming. That is, goals can be directly activated by highlighting the goal, for example, by mentioning the goal in an advertisement. Thus, consumption benefits (i.e., goals) can become more important in consumers’ product evaluations and choices because they are highlighted directly in their perceptual fields. We refer to this source of temporary goal activation as direct temporary goal activation or $dtg_g$ (from here onward, we add a $t$ subscript to indicate time, which is necessary when we start looking across choice episodes). Direct temporary goal activation, however, is not the only source of temporary goal activation. Temporary goal activation also depends on goal (non)achievement, goal activation during the previous decision episode, and the time between decision episodes. These sources are reflected in the following equation. Temporary goal activation in a decision episode at time $t$ is equal to

$$tg_g = [g_{g,ITI} + (\gamma \times g_{g,ITI} \times -fb_{j,t-ITI})] \times (1 + \phi)^{ITI} + dtg_g$$

In the following paragraphs, we will discuss the properties of equation 5 (with the exception of $dtg_g$, which we have already discussed at length). We will explain how the elements contribute to temporary goal activation and how, via relative or overall goal activation ($g_g$), they affect a goal’s decision weight. We will also touch upon empirical evidence consistent with each element of the model and explore some important insights generated by the model.

Goal Satisfaction and Goal Frustration. One of the defining characteristics that distinguish goals from other concepts represented in memory is the fact that the activation of unattained goals may increase over time and that goal attainment often leads to a decrease in goal activation (Bargh and Barndollar 1996; Bargh et al. 2001; Dewitte, Bruyneel, and Geyskens 2009; Förster, Liberman, and Friedman 2007; Kivetz, Urmins, and Zheng 2006; Lattin and McAlister 1985; McAlister 1982). In the goal-based choice model, satisfaction of a goal by a chosen means reduces the goal’s temporary activation relative to a goal-neutral situation,
whereas frustration of a goal by a chosen means increases the goal’s temporary activation. For example, choosing Perrier as a first drink at an exclusive restaurant will satisfy a status goal and will decrease that goal’s temporary base level activation in memory. Because temporary base-level activation is an input to overall goal activation (g), this often decreases goal activation and, hence, the goal’s importance in subsequent decisions about food and drinks. Choosing tap water, on the other hand, will frustrate (i.e., counteract) the status goal and increase its importance in subsequent decisions.

The goal satisfaction/frustration process is incorporated into the first element of our temporary goal activation equation, \[g_{t-ITI} = \left[ g_{t-ITI} + (\gamma \times g_{t-ITI} \times -fb_{t-ITI}) \right].\] Starting from the last term, we see that temporary goal activation at time \(t\) \((tg)\) depends on goal feedback \((fb)\), that is, the perceived level of goal satisfaction or goal frustration as a result of the previous choice episode (i.e., at time \(t-ITI\), where \(ITI\) or intertrial interval is the number of time steps between the current and previous decision episodes; the default \(ITI\) is set to 1). In the goal-based choice model, goal feedback \((fb)\) takes a value between 1 and \(-1\). Positive values indicate that directly after choosing and consuming a means (in the previous episode), the perceived level of goal achievement has increased. Positive goal feedback values lead to an immediate decrease in temporary goal activation \((tg)\). This is consistent with Atkinson and Birch’s (1970) assertion that a goal reaches its lowest level of activation immediately subsequent to goal attainment and McAlister’s (1982) observation that the desire for a benefit is lowest immediately after consuming a product delivering this benefit. Negative goal feedback values indicate that the perceived level of goal achievement decreased due to the choice of the means. This leads to an increase in the frustrated goal’s temporary activation \((tg)\). Thus, the change in temporary goal activation is always in the opposite direction of the level of goal feedback, as indicated by the negative sign for goal feedback in the equation.

We assume that the extent to which a goal’s temporary activation decreases or increases as a result of goal satisfaction or frustration depends on the importance of the goal in the previous choice episode (i.e., \(-fb_{t-ITI}\) is multiplied by \(g_{t-ITI}\)). That is, the activation of more highly activated (hence, more important) goals is more strongly influenced by the degree of goal satisfaction or goal frustration than the activation of less highly activated goals. This implies, for example, that failing to achieve important, as opposed to unimportant, goals will result in a greater increase in temporary goal activation. The extent to which a goal’s temporary activation decreases or increases as a result of goal satisfaction or frustration also depends on a parameter \(\gamma\) \((0 \leq \gamma \leq 1)\), which indicates how sensitive temporary goal activation is to goal satisfaction and frustration. Finally, the first element of our temporary goal activation equation, \[g_{t-ITI} = \left[ g_{t-ITI} + (\gamma \times g_{t-ITI} \times -fb_{t-ITI}) \right],\] starts with goal activation in the previous choice episode \((g_{t-ITI})\), indicating that if absolutely nothing happens (i.e., no satisfaction or frustration, no passage of time, etc.), goal activation will transfer to the next choice episode.

Empirical evidence that goal satisfaction leads to a decrease in goal activation abounds (Kahn and Dhar 2006; Laran and Janiszewski 2009; Liberman, Förster, and Higgins 2007; Marsh, Hicks, and Bink 1998). For example, Förster, Liberman, and Higgins (2005) showed that, for people who had the goal of finding a picture of eyeglasses on a visual display, fulfilling the goal of finding the glasses led to a strong decrease in the accessibility of words related to glasses in memory. The same authors also showed results suggesting that the negative effect of goal satisfaction on goal activation was stronger for initially more highly activated, and more important, goals. Evidence also exists for the effects of goal satisfaction in the consumer realm. Several of the goal-based choice model’s assumptions were tested by Laran and Janiszewski (2009), who found, for example, that satisfying a pleasure goal by eating a large quantity of chocolate (means) leads to a decrease in the activation of the pleasure goal, resulting in decreased attractiveness of chocolate and other products that satisfy a pleasure goal. In addition, these authors found support for the goal-based choice model’s assumption of the relative nature of goal activation. Decreased activation of a pleasure goal due to its satisfaction by eating large quantities of chocolate was accompanied by increased activation of a competing health goal and increasing attractiveness of products (means) positively associated with the health goal.

The implications of the goal satisfaction process for our understanding of (the instability) of consumers’ preferences and choices are quite clear. The goal-based choice model quite naturally incorporates processes of satiation and the very basic concept of diminishing marginal utility of consuming additional units of a good. As consumers consume more of the same good, the goals afforded by that good are satisfied, making these goals less important. This decreases the attractiveness of additional units of that good. Interestingly, however, the goal-based choice model also incorporates the ideas that (1) diminishing marginal utility is not limited to additional units of the same good but generalizes to different goods that happen to satisfy the same goals, and (2) diminishing marginal utility of additional units of one good is accompanied by increasing utility of units of different goods that satisfy other highly activated goals. This may explain why consumers vary their purchases among a dominant brand, substitutes, and complements (Lattin and McAlister 1985; McAlister 1982). Each purchase and consumption alters the relative importance of the benefits/goals sought by the consumer, both within and across product categories (Novemsky and Dhar 2005).

A final implication of the goal satisfaction may seem a bit counterintuitive. One would expect that demand for a more efficacious good should be higher than for a less efficacious good. The goal-based model predicts that this may not always be the case. Suppose a consumer has access to one type of chocolate of which a single portion completely satisfies the active goal (e.g., a taste goal). This complete
satisfaction should quickly reduce the activation of the taste goal, steering behavior away from eating more chocolate. Now consider that the consumer only has access to lower-quality chocolates (with the same price and similar on all other dimensions). This chocolate may only partially satisfy the taste goal, leading to the consumption of additional chocolates. Thus, in some situations (e.g., low marginal cost of additional units of a good, absence of better means to satisfy the taste goal), demand for lower-quality (i.e., less efficacious) products may be higher than for higher-quality (more efficacious) products. Perhaps one way to limit our intake of chocolates, cigars, and cognac is to make sure only the very best get into our house.

**Time.** In the previous subsection we mostly discussed the effects of goal satisfaction, paying scant attention to goal frustration. The reason is that few papers in the literature discuss goal frustration per se, which we define as the consumption of means that actively decrease the level of a goal’s achievement. For example, depriving a thirsty person of water should not, at the exact moment, decrease the level of achievement of a hydration goal, whereas making a thirsty person eat salt should result in goal frustration. We consider only the latter a case of goal frustration, and we do not know of any examples of this form of goal frustration in the literature. However, there are many examples in the literature of the former case, in which no efficacious means is consumed or in which a goal-neutral means is consumed (e.g., the thirsty person watches TV). We will term this a case of goal deprivation, as opposed to active goal frustration.

In the goal-based choice model, the effects of goal deprivation are modeled by a separate process from the goal satisfaction/frustration process. Separate modeling is necessary because the satisfaction/frustration process, \[ \gamma \times g_{s,t} \times -f_{b_{s,t}} \] equals zero when there is deprivation (\[ f_{b_{s,t}} = 0 \]). In addition, the goal satisfaction/frustration process is an immediate influence upon choice, not a time-based updating of goal activation owing to deprivation. The goal-based choice model incorporates time-related deprivation effects by multiplying the outcome of the goal satisfaction/frustration process with an exponential growth component (\[ 1 + \phi^t \]). That is, temporary goal activation grows exponentially by a percentage \( \phi \) in every time step between consuming a means and the next choice episode (\( ITI \) encodes the total number of time steps in this time interval). Because this is a multiplicative function, the influence of this process is strongest on goals (1) that had the highest goal activation during the previous decision episode (i.e., higher \( g_{s,t} \)) and (2) whose activation was less diminished by goal satisfaction or more enhanced by goal frustration (i.e., more positive \( \gamma \times g_{s,t}\times -f_{b_{s,t}} \)). It should also be noted that due to the relative nature of overall goal activation (\( g \)), increasing temporary goal activation as a function of time does not necessarily lead to increased goal activation. If other goals are more highly activated, their temporary goal activations will grow faster and there will be a decrease in the overall, relative goal activation of the initially less-activated goal.

The time-based process accounts for what is often considered a core characteristic of goals as opposed to other concepts stored in memory, namely, that goal activation can increase autonomously over time instead of decaying ( Bargh et al. 2001). More interestingly, this process accounts for some very intriguing findings (Bargh et al. 2001, experiment 3). Bargh and his colleagues primed a goal and then asked participants to perform a goal-related task either directly or after a delay of 5 minutes. Goal-deprived participants primed with goal-related words showed stronger goal-relevant task pursuit after the 5-minute delay than when asked to engage in the task immediately. Interestingly however, participants primed with neutral words did not show such an increase. The goal-based model suggests that the strong increase in goal activation occurred because goal priming allowed the exponential growth process to start from (i.e., is multiplied with) a higher level of goal activation at time \( t\cdot ITI \). There was no time effect in the neutral words condition because the goal likely had an initial activation similar to other goals. If the temporary activations of all goals increased over time, then there should be no change in relative goal activation.

The time-based escalation of goal activation implies that the influence of a dominant benefit will increase with delay. That is, delay will often increase the extremity of the decision weights, provided that the process does not begin with similar levels of goal activation. It is as if time allows people to figure out which benefits are more versus less important to them. However, if all benefits are equally important to start with, allowing more time will not clear up the confusion. Another implication of the goal-based choice model is that goal deprivation does not always lead to increased overall goal activation. Deprivation only increases the relative activation of the most important goals. Thus, the goal-based choice model suggests that whereas autonomously increasing activation over time may be sufficient to identify a concept in memory as a goal, it is by no means a necessary condition. That is, decreasing activation over time is no proof that a memory concept is not a goal. If other goals were more important right after the decision episode, a deprived goal’s (relative) activation \( g \) may decrease with time.

**Temporary Base-Level Activation of Means**

As discussed previously, the temporary base-level activation of means (\( m_{s,t} \)) affects consumers’ choices in two ways. First, it affects the probability, in memory-based or mixed stimulus-and-memory-based choice situations, that a means will be retrieved from memory and enter the evaluation set. Second, higher temporary means activation (\( m_{s,t} \)) affects the activation and, hence, importance of goals through means-to-goal activation associations (\( mg_{s,t} \)). In addition to direct means activation (e.g., through priming of means, direct presence in the perceptual field, or retrieval from memory itself; \( dmt_{s} \)), temporary means activation depends on means activation during the previous decision episode and on the time between decision episodes. Temporary means activation in a decision episode at time \( t \) is equal to
\[ tm_i = [m_{0i,ITI} \times (1 - \gamma)^{ITI}] + dtm_i, \] (6)

That is, temporary activation of means \( i \) in episode \( t \) depends on (1) means activation in the previous choice episode \( (m_{0i,ITI}) \), (2) a simple exponential decay process \( [(1 - \gamma)^{ITI}] \) which decreases means activation by \( \gamma \) percent in each time step, and (3) direct activation of the means \( (dtm_i) \).

As mentioned in the section on memory-based choice, the goal-based choice model accounts for some standard findings in the evoked/consideration set formation literatures (part-list cuing, interference leading to small evoked sets, etc.). An additional desirable property is that the model is consistent with the power law of forgetting, which posits that memory decays at a decreasing proportional rate over time (Anderson and Schooler 1991; Wickelgren 1974; Wixted 2004). Because base-level means activation is made up of both temporary and chronic activation components, whereby chronic activations remain stable across episodes and temporary activation decays exponentially, total means activation decays at a decreasing proportional rate.

Associations between Means and Goals

Situational changes and changes in base-level activation of goals and means are not the only sources of the variability in consumers’ product evaluations and choices over time. Consumers’ preferences also change because they learn and forget the relationships between means and goals. Although an important facet of our model, the learning and decay processes per se are not the main focus of the goal-based choice model. Therefore, we have kept the learning and decay processes in the model as simple as possible. Although still quite powerful, these simple updating algorithms cannot account for each and every finding in the associative learning and forgetting literatures.

Activation Associations from Means to Goals. Activation associations from means to goals \( (mg_{ij}) \) allow means to activate goals, as described in the section on incoming activation to goals from means. We assume that the updating of activation associations from means to goals consists of two processes, a learning process and a decay process. We assume, for now, that learning only takes place when a product is chosen (and consumed; see the “Final Observations” section for a discussion of how the model could account for learning by observation). When a means is not chosen, there is no learning of the activation association from that means to goals because there is no goal feedback from that means to goals prior to updating in the previous choice episode. In this process, the activation association from the means to a goal is strengthened to the extent that the choice of the means leads to more extreme goal satisfaction or frustration (i.e., higher \( |fb_{ij,i,ITI}| \)). This makes being alert more important and, therefore, coffee consumption increases (and caffeine consumption decreases) due to (partial) goal achievement, making being alert less attractive, (partially) offsetting the reduction in temporary base level activation of the goal. This learning is stronger when more important goals are involved. For example, a person who is not concerned with his health will not develop a strong association from a fatty food means to the health goal, so that seeing the fatty food will not make this person think (consciously or nonconsciously) about health. Finally, there is not much extra learning if a person has already learned what she needs to learn.

After learning owing to feedback in the learning process, activation associations from all means to all goals slowly decay over time (for chosen and nonchosen means, in the latter case \( c_{0i,ITI} = 0 \)). After each time step, the (updated) association strength is multiplied by \( (1 - \delta) \), where \( \delta \) is the rate of decay (between 0 and 1) and \( ITI \) is the time (i.e., the number of time steps) between two choice episodes.

Most of the implications of this learning-and-decay process were discussed in the section on incoming activation to goals from means. However, one additional implication is that goal satisfaction does not necessarily lead to much lower goal activation. Whereas choosing a means whose consumption helps to satisfy a goal leads to lower temporary base level activation of the goal (eq. 5), the consumer also learns that the goal was more highly activated during the choice (i.e., higher \( g_{0i,ITI} \)), and to the extent that the association was not already strong (i.e., lower \( mg_{0i,ITI} \)). Thus, if choosing a means leads to more extreme changes in the level of goal achievement, positive or negative, the positive association from the means to the goal is strengthened. This learning is stronger when more important goals are involved. For example, a person who is not concerned with his health will not develop a strong association from a fatty food means to the health goal, so that seeing the fatty food will not make this person think (consciously or nonconsciously) about health. Finally, there is not much extra learning if a person has already learned what she needs to learn.

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assumed in the literature on goals as knowledge structures (Förster et al. 2007), postattainment decrements in motivation are not a necessary condition for a concept in memory to be considered a goal.

**Activation Associations from Goals to Means.** Activation associations from goals to means \((g_{j\rightarrow i})\) help consumers bring to mind products that satisfy their most active needs (i.e., benefits they crave, activated goals) and prevent products that do not satisfy those needs from doing the same. For example, these associations help a thirsty consumer think of water instead of salty crackers as activation of the hydration goal excites the water means and inhibits the salty crackers means. These excitatory and inhibitory associations are learned and decay through two processes similar to those for activation associations from means to goals, a learning process and a decay process. We again assume that learning per se only takes place when a product is chosen (and consumed; i.e., if \(c_{i,t-1} = 1\)). Formally, the activation association strength from goal \(j\) to means \(i\) at time \(t\) is computed as

\[
g_{j,i,t} = g_{j,i,t-1} + \left( c_{i,t-1} \times \alpha \times g_{j,i,t-1} \right) \times \left( f_{j,i,t-1} - g_{j,i,t-1} \right) \times \left( 1 - \delta \right)_{t-1}.
\]

If means \(i\) was chosen in choice episode \(t-1\), the learning process updates the association strength by \(\alpha \times g_{j,i,t} \times (f_{j,i,t-1} - g_{j,i,t-1})\), where \(\alpha\) is a strictly positive learning rate parameter that reflects the speed of learning, and \(g_{j,i,t}\) is the memory activation of goal \(j\) at the end of the previous choice episode but before the updating process of goal activations described in equation 5. \(f_{j,i,t-1}\) is the goal feedback or extent to which the chosen means \(i\) is perceived to have satisfied or frustrated goal \(j\), and \(g_{j,i,t}\) is the activation association from a goal \(j\) to a chosen means \(i\) during the previous choice episode. For activation associations from goals to means (as opposed to from means to goals), we do not take the absolute of the goal feedback, so that negative levels of \(f_{j,i,t-1}\) can occur and can lead to negative associations that prevent means that frustrate an activated goal from entering the evaluation set. The decay process is analogous to that for the activation associations from means to goals. It operates on the association strengths after any learning or updating due to feedback and multiplies the (updated) association strength by one minus the rate of decay, \(\delta\), in each time step. Decay takes place regardless of whether the means was chosen (i.e., \(c_{i,t} = 1\)) or not chosen (i.e., \(c_{i,t} = 0\)) in the previous choice episode. Thus, the failure to choose and consume specific means allows the natural decay in goal-to-means association strengths to reduce the likelihood that the means will be considered in the future.

The goals-to-means association updating process can be illustrated with an example. Consider a consumer who has a goal to have fun on a Friday night. The consumer uses goal activation to retrieve six means: go out to eat, attend a movie, go dancing, consume alcohol, attend a cultural event, and attend a sporting event. The consumer elects to go to the movie. If the movie is fun (not fun), the association strength between the have fun goal and the movie means is strengthened (weakened), increasing (decreasing) the likelihood that a movie will be considered and chosen on the next choice occasion (e.g., Saturday night). The activation associations from the goal to the means that were considered and not chosen decay, which decreases the likelihood that these means will be considered the next time the fun goal is activated. Appropriate (e.g., playing video games) and inappropriate (e.g., clean house) means that were not considered also experience decay in goal-to-mean association strength. They are less likely to be considered in future attempts to have fun.

In sum, our specification of changes in activation association strengths from goals to means has the same desirable properties as that of changes in activation association strengths from means to goals with one exception. Whereas means develop positive associations with important goals that they satisfy or frustrate, active goals develop positive associations only with means that satisfy those goals. Active goals become negatively associated with means that frustrate those goals. This is consistent with findings by Fishbach et al. (2003), who found that priming of a goal (e.g., a weight-watching goal) decreased accessibility of a means that frustrates the goal (e.g., cake).

Shah and Kruglanski (Shah and Kruglanski 2000; Shah, Kruglanski, and Friedman 2003) hypothesized that when a goal can be satisfied by more than one means, that is, when there is equifinality, accessibility of each of the means given the activation of the goal is lower than when the goal is satisfied by only one means. The goal-based model accounts for this effect in a very simple manner. If a goal can be satisfied by only one means, means will almost always be retrieved, chosen, and consumed when the goal is activated. If a goal can be satisfied by two means, activation of the goal will lead to some instances in which one means is chosen and some instances in which the other means is chosen. In learning from experience, feedback is only received when a means is chosen and consumed, and learning requires feedback. Thus, the number of occasions on which a goal-to-means activation association is strengthened is decreased in the equifinality situation. This leads to weaker goal-to-means activation associations, which in turn lead to weaker activation of each of the means upon activation of the goal. This may account for “there is nothing to do” perceptions when a have fun or be entertained goal is active.

Interestingly, the model predicts that the equifinality effect should be smaller as the learning rate (\(\alpha\)) is higher and the rate of forgetting (\(\delta\)) is lower. In fact, because the model holds that (assuming a low rate of forgetting) equifinality primarily slows down learning instead of limiting the maximum association strengths, the equifinality effect should become smaller and smaller as consumers become more experienced with a goal and the means that satisfy it. In addition, the model predicts the existence of a negative equifinality effect. If a goal is frustrated by more than one means, consumers should also learn to suppress these means more slowly upon activation of the goal.
Predictive Associations from Means to Goals. Predictive associations from means to goals ($p_{ij}$) encode the perceived instrumentality of consuming means for satisfying, or preventing the satisfaction of, goals. We assume that changes in predictive associations from means to goals are again subject to two processes, a learning process and an autonomous decay process. Predictive associations ($p_{ij}$) are learned through goal-specific feedback and are updated according to the difference between the anticipated and experienced level of goal achievement given the choice of means $i$. This adaptive learning process is guided by an error-reducing learning rule that minimizes this difference (Bush and Mosteller 1955). The updating rule is a version of the delta learning rule (Grossberg 1976; Rumelhart, Hinton, and McClelland 1986) with stronger updating for more highly activated goals. After updating due to goal feedback, predictive associations from all means to all goals slowly decay over time. Formally, the predictive association from means $i$ to goal $j$ at time $t$ is given by

$$p_{ij} = p_{ij,t-1} + [c_{ij,t} \times \beta \times g_{ij,t} \times (fb_{j,i,t-1} - p_{ij,t-1})] \times (1 - \epsilon)^{t-1}. \quad (9)$$

For means that were chosen during the previous choice episode (i.e., $c_{ij,t} = 1$), the learning process changes the predictive association by $\beta \times g_{ij,t} \times (fb_{j,i,t-1} - p_{ij,t-1})$, where $\beta$ is a strictly positive learning rate parameter that reflects the speed of learning, $g_{ij,t}$ is the activation of goal $j$ at the end of the previous choice episode but before the updating process of goal activations described in equation 5, and $fb_{j,i,t-1}$ is the goal feedback or extent to which the chosen means $i$ is perceived to have satisfied or frustrated goal $j$. After learning, if applicable, predictive association strengths decay at a rate $\kappa$ for each time step between choice episodes.

The processes in equation 9 have desirable properties. The processes allow for means that are expected to satisfy (frustrate) important goals to be more (less) likely to be chosen, without interfering with the finding that means can activate goals that are frustrated by those means. In addition, strong predictive associations are formed only with important, highly activated goals, preventing a means from being associated indiscriminately with hundreds of goals.

The learning process in equation 9 has several implications. One implication of the predictive learning process is a further qualification of the idea that if a product satisfies a goal, the product should become less attractive on the next choice occasion. The reduction of temporary goal activation due to goal satisfaction (eq. 5) can be compensated by positive updating of the means-to-goal predictive association, especially if the consumer is not very familiar with the product. Thus, even if the goal becomes less important, the product may be seen as a better way to satisfy the goal in the next decision episode.

The goal-based choice model can account for the multifinality effect owing to assumptions about (1) the learning of predictive and activation associations from means to goals and (2) the competitive nature of goal activation (Shah and Kruglanski 2000; Shah et al. 2002; Zhang, Fishbach, and Kruglanski 2007). In a multifinal situation, a single means satisfies multiple goals. According to Shah and Kruglanski, this should lead to lower perceived instrumentality (i.e., weaker predictive associations) and lower accessibility of each goal upon presentation of the means (i.e., weaker activation associations from the means to the goals) than if the same means satisfies only a single goal. Our model accounts for this goal dissociation phenomenon because when multiple goals are at play, each goal is less important and less highly activated due to the relative nature of goal activation (eq. 2). Because updating of means-to-goal associations depends on goal activation (eqq. 7 and 9) the association with each goal will be updated more slowly when the activation is divided among multiple goals than when all activation is concentrated in a single goal. Again, this effect should become smaller as consumers have more learning experiences with the means and goals (especially when memory decay is low). In addition, the model predicts that the multifinality effect is not limited to means that satisfy multiple goals. The same slowdown of learning should be found when a means frustrates multiple goals or satisfies some and frustrates others. A summary of hypotheses concerning dynamic goal-based choice is provided in table 6.

**FINAL OBSERVATIONS**

Our aim has been to introduce a goal-based model of product evaluation and choice. We demonstrated that a small number of mechanisms could explain changes in consumers’ product evaluations and choices over time and across situations. Perhaps more importantly, we wanted the goal-based choice model to encourage a different way of thinking about product evaluation and choice. We contend that choice is driven by goals, not attributes. Choice is explicitly based on expectations and is subject to learning, forgetting, satisfaction, deprivation, and the momentary but nonrandom highlighting of means and goals. In the final section, we compare the goal-based choice model to other models, discuss the model’s limitations, and suggest potential extensions of the model.

Relations to Other Models and Theories

To assess the contribution of this work, it is important to situate it among existing theories of decision making, attitudes, and choice. The goal-based choice model is most closely related to the theory of goals as knowledge structures (Kruglanski 1996). According to this theory, goals have associations with means and other concepts, goals differ in activation, and more highly activated goals have a stronger impact on behavior. The goal-based choice model, however, adds substantially to the theory of goals as knowledge structures. First, the model introduces the notion of separate activation and predictive associations. Second, the model addresses the whole goal system, as opposed to looking at one element at a time (e.g., one type of association or one type of phenomenon). Third, the model formalizes a theory, making it easier to generate and test new predictions. Finally,
GOAL-BASED EVALUATION AND CHOICE

TABLE 6
PROPOSITIONS AND HYPOTHESES ABOUT DYNAMIC GOAL-BASED CHOICE

P11: Goal satisfaction will reduce temporary goal activation ( Förster et al. 2005; Laran and Janiszewski 2009; Liberman et al. 2007).
H11.1: Reductions in temporary goal activation owing to goal satisfaction will
   a. reduce the appeal of all means that are instrumental to the goal (i.e., satiation is not means specific),
   b. increase the appeal of all means that frustrate the goal,
   c. increase the appeal of all means that are instrumental to other goals, and
   d. decrease the appeal of all means that frustrate other goals.
H11.2: Consumption of less efficacious products can be higher than consumption of more efficacious products, especially when no other means are available that serve the same goal(s) more effectively.
H11.3: Goal-satisfying means can increase overall goal activation owing to activation associations between means and goal.
   a. Means consumption can lead to increased goal activation.
   b. Means consumption can lead to increased desire for the means.
   c. Means consumption can lead to increased desire for other means that satisfy the goal and reduced desire for other means that frustrate the goal.
H11.4: A goal-satisfying experience affects the strength of activation associations, predictive associations, and the level of satisfaction of other goals. These other effects may neutralize or reverse the effect of temporary goal activation on evaluation of the satisfied means.
P12: Goal frustration (i.e., consuming means that decrease goal achievement) will increase temporary goal activation.
H12.1: Increases in temporary goal activation, owing to goal deprivation, will
   a. increase the appeal of all means that are instrumental to the goal (i.e., desire is not means specific),
   b. decrease the appeal of all means that frustrate the goal,
   c. decrease the appeal of all means that are instrumental to other goals, and
   d. increase the appeal of all means that frustrate other goals.
P13: Goal deprivation (i.e., delaying consumption or consuming means that have no influence on goal achievement) will increase temporary goal activation ( Bargh et al. 2001; Fitzsimons et al. 2008; Laran and Janiszewski 2009).
H13.1: Increases in temporary goal activation owing to goal deprivation will
   a. increase the appeal of all means that are instrumental to the most active goal(s) (i.e., desire is not means specific),
   b. decrease the appeal of all means that frustrate the most active goal(s),
   c. decrease the appeal of all means that are instrumental to other goals, and
   d. increase the appeal of all means that frustrate other goals.
H13.2: Due to the relative nature of goal activation, the effect of goal deprivation on overall goal activation and on the appeal of means depends on the activations of other goals.
P14: Changes in goal activation over time depend on the relative level of goal activation, goal satisfaction, and goal frustration.
H14.1: Goals with higher (lower) levels of relative goal activation will be more (less) sensitive to goal satisfaction or frustration, as reflected in period-to-period changes in goal activation.
H14.2: Goals with higher (lower) levels of relative goal activation will become relatively more (less) active with the passage of time.

NOTE.—Hypotheses that have been empirically tested are noted by a citation.

whereas most research in the goals as knowledge structures tradition has looked at one episode, the goal-based choice model is a dynamic model that explicitly models changes in goal activation and means evaluation over time.

In a more general sense, the goal-based choice model can be seen to incorporate and extend on a general multi-attribute attitude model in the tradition of Rosenberg (1956) or Sheth and Talarzyk (1972). According to Rosenberg’s model, the attitude toward an object is a “function of the algebraic sum of the products obtained by multiplying” the importance of valued states by the perceived instrumentality or potency of the object for achieving or blocking the achievement of those valued states (Rosenberg 1956, 367). The goal-based choice model has a similar structure. Predictive association strengths are perceived instrumentalities of consuming a means for reaching valued states, or goals. In addition, these goals differ in importance as given by their relative goal activations. Finally, evaluation of a means is an additive, linear combination of predictive association strengths and relative goal activations. In fact, Rosenberg’s model is a special, static case of the goal-based choice model in which goal activation is purely chronic and no learning or forgetting of predictive associations takes place. Findings in support of many of the assumptions underlying Rosenberg’s model (e.g., restraining total importance at 1, assuming a city-block distance metric, summation) may, therefore, be seen as supportive of the goal-based choice model as well (Wilkie and Pessemier 1973). In addition, the goal-based choice model explains many other phenomena that the original multi-attribute attitude models could not account for,
such as consideration set issues (e.g., part-list cuing), context effects, or the priming phenomena documented in the literature on goals as knowledge structures. The goal-based model also incorporates learning processes. In general, the goal-based choice model is much better suited to deal with instability in evaluations than Rosenberg’s model.

From a motivation theory perspective, the Rosenberg model (1956) and related theories such as the theory of reasoned action (Fishbein and Ajzen 1975) are essentially expectancy-value theories (Lewin et al. 1944; Tolman 1932). Thus, the goal-based choice model can also be considered an extended expectancy-value theory with added dynamics, unstable values, and explicit treatment of the learning of expectancies.

Focusing specifically on product evaluation and choice, the goal-based choice model can be seen as a somewhat drastic elaboration of the standard multi-attribute utility model that models choice as a linear-additive function of attribute values and attribute weights. The goal-based choice model can be likened to a multiattribute utility model in which a customer’s utility for a choice option (means) is a sum across attributes (goals) of the level of the attribute provided by the choice option (predictive association predicting the level of goal satisfaction) multiplied by the utility weight (importance, relative goal activation) of the attribute (goal; Guadagni and Little 1983; Keeney and Raiffa 1976; Lancaster 1966). While adhering to the additive, linear structure, the goal-based choice model explicitly places values in goals (i.e., benefits) and not in attributes (the latter being characteristics of the product whereas the former are tied more directly to consumers’ experiences). In addition, the goal-based choice model, unlike the standard multi-attribute utility model, explains how preferences are formed through learning, accounts for the apparent lability in consumer preferences and choices observed in the real world (e.g., as a result of temporary influences on goal activations or learning and decay of predictive associations), and predicts several context effects and changes in preferences over time.

Relatively, the goal-based choice model may shed some light on conjoint analysis. It suggests that part-worth utilities as measured in conjoint experiments do not merely reflect chronic goal activations and stable instrumentality, but also many more dynamic components such as incoming situational activation, temporary base-level activation of goals, and association strengths that change over time. To the extent that any of these factors differ between measurement and actual choice, the conjoint results should be less predictive of real choice. Thus, thinking about conjoint measurement in terms of the goal-based choice model should give us a greater handle on when the part-worth utilities from conjoint analyses are most predictive of actual consumer behavior.

A highly relevant comparison for the goal-based choice model is to other models that have sought to incorporate results that deviated from the standard multi-attribute utility formulation. For example, Tversky and Simonson (1993), created the componential context model, which accommodates effects of the presence of alternative choice options on product evaluation and choice (i.e., context effects) in a multi-attribute utility framework. It does so by adding a relative advantage term to each choice option’s multi-attribute utility. In our view, the componential context model represents a large enhancement relative to the standard model. Comparing the componential context model to the model presented here, however, reveals that the goal-based choice model is far from dominated by the componential context model. The present model provides a useful addition because it (a) can account for effects that are not due to changes in the presence of alternative choice options (e.g., consequences of direct goal priming, goal [dis]satisfaction, associative learning), (b) provides a more detailed psychological explanation for empirical phenomena, while (c) also accounting for several context effects. Importantly, whereas many deviations from the standard multi-attribute utility model can be fitted post hoc by the componential context model, the goal-based model predicts the deviations (i.e., they are endogenous to the model).

The additive, linear formulation of the goal-based choice model is, further, consistent with a constructive consumer choice process characterized by a weighted adding-based, compensatory decision rule (Bettman et al. 1998). The goal-based choice model contributes by considering how and why decision weights may change over time and across situations and by explicitly modeling the predictive learning process that allows people to determine the subjective values of attributes.

Furthermore, our model incorporates several characteristics of the seminal work by McAllister (1982; Lattin and McAllister 1985) that pioneered research on the instability of consumer choices due to satiation (i.e., goal satisfaction). In McAllister’s model, consumers’ choices change over time because consuming a product accumulates inventories of that product’s attributes. This leads to shifts in consumer preferences to products that are rich in attributes whose inventories have been depleted. The attributes in McAllister’s model (e.g., thirst quenching) are very similar to the benefit goals (e.g., hydration) in our model, and attribute satiation is similar to our goal satisfaction process. Of course, the goal-based model contributes by looking at sources of goal activation (cf. preference for an attribute) beyond satiation and by incorporating learning and memory processes.

Finally, the goal-based choice model can be situated in the literature on formal models of memory and learning by marrying associative memory (e.g., the declarative storage module in Anderson et al. 2004) with associative learning involving multiple outcome dimensions (Cunha and Laran 2009) and by incorporating the motivational influence of goals that have mostly been studied outside the cognitive psychology literature.

Level of Analysis, Process, and Domain

When presenting a model like this one, we are frequently asked about claims we do or do not make. We would like to be as humble as possible in this area. The goal-based
choice model is a computational model in the sense of Marr’s (1982) three levels. The model merely describes what the system does at a relatively general level and makes predictions about process outcomes such as consumers’ evaluations, choices, and measures of activation and association strength (e.g., recall, response time measures). It does not describe exactly how the system does what it does or make claims about how the system is implemented in terms of neural structures and neuronal activities. Thus, we are reluctant to make claims about the processes per se. For example, it is unclear to what extent each of the elements in the goal-based choice model reflect conscious or unconscious processing (see Markman and Brendl [2005] for a discussion of this issue). Clearly, the goal-priming literature provides ample evidence that the processes that govern activation of goals can take place at a subconscious level (Bargh 2006; Bargh and Barndollar 1996; Bargh and Chartrand 1999; Chartrand et al. 2008). However, debates are still raging about (the benefits of engaging in) conscious versus unconscious processing to combine and weigh information about multiple benefits yielding evaluations and choices (Dijksterhuis 2004; Dijksterhuis and Nordgren 2006; Payne et al. 2008) and about the conscious versus unconscious nature of associative learning (Schultz and Helmstetter 2010).

Whether conscious or unconscious, it is clear that the goal-based choice model will be a better fit for some decision processes than others. For example, it should be better able to describe the results of weighted adding (WADD) or its subconscious counterpart than decision strategies that do not rely on weighting multiple attributes or benefits, such as elimination by aspects (EBA), lexicographic decision making, or the fast and frugal strategies described by Gigerenzer and others (Dougherty, Franco-Watkins, and Thomas 2008; Gigerenzer 2004), although results similar to, for example, a lexicographic strategy are predicted by the model at high levels of goal focus. It is also difficult to see how a simple model like ours can account for many higher-order inference and (causal) reasoning processes. Finally, as a relatively simple model of product evaluation and choice, the goal-based choice model does not naturally account for elaborate goal-setting processes that involve planning a series of steps and continuous monitoring of progress toward a specific level on an outcome dimension (Baumgartner and Pieters 2008; Locke and Latham 1990; Louro, Pieters, and Zeelenberg 2007; Wang and Mukhopadhyay 2012; Zhang and Huang 2010).

Further Limitations and Extensions

In addition to the limitations outlined in the previous paragraphs, we have further limited the scope of the model in a number of ways. For example, in the current article, we focus on learning from experience. However, a few simple additional assumptions could allow the model to account for learning by instruction or observation (e.g., advertising, word of mouth). In this case, the observation or mention of a means replaces the choice of that means and being told that the means satisfies or frustrates a goal replaces the goal feedback term. A similar analogy can be made for activation associations from goals to means and predictive associations from means to goals. Of course, observing or being instructed that a means satisfies a goal does not satisfy a goal (e.g., seeing somebody drink water does not satisfy a goal to quench one’s thirst). Thus, there is no updating of temporary goal activation due to goal satisfaction or frustration in learning by instruction or observation. This implies that $\gamma = 0$.

Furthermore, the current model assumes only a single layer of means and a single layer of competing goals. In our model, we have assumed competition between goals that are not in a means-goal relationship with each other. The current model has no problem with correlated goals in the sense that when one goal is satisfied or frustrated, another goal is also satisfied or frustrated. However, direct facilitative activation relationships between goals, in which activation of one goal leads to increased activation of another goal, are outside the scope of the current model. We believe that such facilitative goal relationships often occur when a goal is itself a means to the achievement of another goal (Pieters, Baumgartner, and Allen 1995). Our model can be extended to situations with multiple levels of goals in which goals at one level function as means to goals at a higher level, as we would find in means-end chains. Such a hierarchical goal structure extension of our model would allow it to explain facilitative goal effects found by Shah and Kruglanski (2002) and Shah et al. (2002). Conceptually, this extension seems quite doable, but at the expense of a dramatic increase in the complexity of the model. Another extension, that would have an equally dramatic effect on complexity, would allow explicit associations between goals at the same level in a goal hierarchy similar to the associations between different stimulus attributes documented by, for example, Anderson and Fincham (1996).

We have also limited the scope of the goal-based choice model by using a localist representation of the means (Smith 1996). That is, a means is represented as one element instead of as an array of brand names, features, or ingredients. As a consequence, the model cannot address phenomena that require a distributed representation of means, such as cue interaction phenomena (van Osselaer 2008) and effects depending on similarity between means elements. The model does account for similarity effects due to the representation of multiple goals. For example, we discussed how the model predicts different effects of a means’s presence on evaluations of means that serve similar or different goals. It would be useful to extend the current model to incorporate a distributed representation of means. We envision that such a model would have a competitive, delta learning rule for predictive associations but would retain a Hebbian formulation for the activation associations (van Osselaer and Janiszewski 2001; van Osselaer, Janiszewski, and Cunha 2004).

In its current version, the model we propose does not explicitly incorporate emotional processes. There are several ways in which the model could be extended to incorporate
emotions, such as mood or more specific emotions, instead of treating them as completely exogenous. For example, emotions may be represented as knowledge structures much like goals and means. Emotions could also be linked to the extent of goal satisfaction/frustration or to the difference between the predicted level of goal satisfaction and the actual level of goal satisfaction afforded by the consumption of a means.

Other possible extensions may be to loosen the assumptions the model shares with simple linear, additive attitude and utility models. Although many of the assumptions we used have the advantage of simplicity and have received considerable empirical support (Wilkie and Pessemier 1973), it is possible to relax many of them. For example, the current model has a strong restriction on total goal activation (to 1). This implies that the total importance of the goals active in a decision is always the same. We believe this assumption is warranted because the total activation of the goals that are satisfied or frustrated by the evaluated means is not fixed. For example, if a decision is not important to a person, it is likely that the most highly activated goals are not the ones linked to the benefits afforded by the evaluated means, but goals that have nothing to do with the current decision. Nevertheless, it would be possible to abolish the restriction of total goal activation, for example, using the formulation introduced by Kruschke (1996) to regulate attention strength normalization in categorization tasks. Another possible extension may be to abandon the linear, additive formulation and allow configurational representation of goal constellations.

Another issue not included in the current model concerns longer-term changes in goal activation and importance currently represented as chronic goal activation. Instead of presenting chronic goal activations as a given and completely stable, the model could be extended to incorporate the evaluative conditioning processes that should lead to long-term changes in the activation, hence importance or desirability, of goals (Aarts, Custers, and Holland 2007; Custers and Aarts 2005). For example, through evaluative conditioning, it is conceivable that repeated failures to achieve a goal might decrease the chronic activation, hence desirability, of a goal.

Moreover, the goal-based choice model was designed for so-called consumption goals, or the benefits afforded by the consumption of a means (van Osselaer et al. 2005). Although not designed with these goals in mind, the model could account for differences between means in the extent to which they satisfy or frustrate other criterion goals (van Osselaer et al. 2005), such as justification of the choice of a means (Simonson 1989), expressing uniqueness through the choice of a means (Puntoni and Tavassoli 2007), or gathering information (Ariely and Levav 2000). The effects of process goals linked to the decision process instead of to any of the means per se (e.g., minimizing effort or avoiding painful trade-offs; Bettman et al. 1998, 2008) would be much less straightforward to incorporate in the current model.

In addition, the model does not explicitly incorporate probabilities (see Krantz and Kunreuther [2007] for a model that does). In the goal-based choice model, probabilities of satisfying or frustrating goals are captured by the predictive association strengths, which simultaneously encode the extremeness of goal satisfaction or frustration.

The limitations of scope and possible extensions mentioned above all come down to the idea that the goal-based choice model is too restrictive in scope and, hence, too simple. However, one could also criticize the goal-based choice model for being too complex. There are many parameters and many possible starting values (especially compared to the other, more basic, models we discussed in these final observations). Thus, one might argue that the model can explain too much (Roberts and Pashler 2000). This is always a concern in complex connectionist models. However, we feel that our approach has largely mitigated this problem for four reasons. First, the number of free parameters in single-episode situations is extremely limited. Thus, we can simulate most of the phenomena in the goal-priming literature without the use of many free parameters. Second, we ran computer simulations of the phenomena described in this article and recovered these phenomena using a single set of parameter and starting values throughout all our simulations (adjusting one or two at a time to implement manipulations but always reverting to the same basic settings; a document describing a large number of simulations is available from the first author). Thus, we do not need dramatically different parameter settings to explain different empirical results in the literature. Third, unlike black box neural network models, all parameters and nodes in our network have a psychological meaning and many of these can be measured directly. For example, if an empirical result can only be explained by the model if it assumes very high goal activation for a particular goal, it is possible to measure and verify that goal activation using, for instance, a lexical decision task. Thus, whereas the model can explain quite a wide range of effects, it can only do so assuming specific activations, activation strengths, or parameter values that can often be verified empirically. In addition, because the psychological mechanisms in the model are made explicit, the model makes very specific and verifiable predictions about what should happen empirically when one of the inputs is changed. Fourth, although the model could accommodate a substantial set of potential outcome patterns by adjusting its free parameters, one can easily think of a number of phenomena that would challenge the core assumptions of the theory. For example, finding that goals selectively activate means that frustrate those goals or that means selectively inhibit the activation of goals (i.e., not through the relative nature of goals) cannot be explained by the model in its current form.

In sum, the goal-based choice model remains limited in scope. It was not designed to explain everything. Given the enormous complexity of consumer behavior (and sometimes even the difficulty of empirically replicating some published findings), our simple model can also not pretend to account for all published findings even within its intended domain. Thus, unlike an empirical article, in which a small amount
of data is explained perfectly, a broad, conceptual article like ours tries to cover a wider range of phenomena. We feel it is necessarily imperfect and more of a start than a definitive conclusion.

Summary

In this article, we have introduced a goal-based model of product evaluation and choice. Our main aim was to provide a model that accounts for the roles of goal activation and learning in consumers’ product evaluations and choices. Over the years, more and more findings, several of which form the literature on goals as knowledge systems, have accumulated that cannot easily be accounted for by traditional models of consumer evaluation and choice. Together, these findings portray a picture of consumer product evaluation and choice as being less stable across time and context than traditional models would assume. Instead of regarding this variation as error, we assume that much of it is systematic variation caused by the fact that consumers learn and forget, that consumers evaluate and choose based on the benefits or goals they expect, and that the importance of these goals depends on their momentary activation in memory. The goal-based choice model explicitly incorporates these assumptions in terms of a coherent set of computational processes. Although we duly note the limitations and imperfections of the goal-based choice model, we do hope that the model provides more than a set of equations, perhaps even a different view of the way consumers evaluate and choose. In addition, we have tried to show that the goal-based choice model provides insight by explaining a broad variety of phenomena, tying together seemingly disparate phenomena into a relatively coherent framework. Finally, we hope that the goal-based choice model will contribute by inspiring new testable predictions about product evaluation and choice.

REFERENCES


Baumgartner, Hans, and Rik Pieters (2008), “Goal-Directed Con-


Fishein, Martin, and Ick Ajzen (1975), Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research, Reading, MA: Addison-Wesley.

Fitzsimons, Grairne, and John A. Bargh (2003), “Thinking of You: Nonconscious Pursuit of Interpersonal Goals Associated with...
GOAL-BASED EVALUATION AND CHOICE


Keeney, Ralph L., and Howard Raiffa (1976), Decisions with Multiple Objectives: Preferences and Value Tradeoffs, New York: Wiley.


Koriat, Asher, Morris Goldsmith, and Ainat Pansky (2000), “To-
ward a Psychology of Memory Accuracy,” *Annual Review of Psychology*, 51, 481–537.


