

Constructing Stable Preferences: A Look Into Dimensions of Experience and Their Impact on Preference Stability

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There are 2 polar schools of thought regarding the existence of preferences. The *economics* tradition is based on the assumption of existing preferences. The emerging *constructive* processing approach assumes preferences are constructed based on the task and context factors present during choice or preference elicitation. Most researchers believe in a middle ground in which consumers construct their preferences when they are new to a category and eventually develop more stable preferences with experience in a domain. This research was designed to bridge the gap between these 2 schools of thought by understanding the process by which preferences are learned and developed over time. Specifically, we investigated the impact of several dimensions of experience (effort, choice, and experience) on preference stability. Results revealed that the type of experience and its corresponding effort had a large impact on the process of preference development. Study 1 demonstrated that by exposing participants to the trade-offs in their environment, their preferences developed and stabilized most rapidly. In addition, the act of making a choice (Study 2) and repeated choices (Study 3) both led to increased preference stability as indicated by measures of objective and subjective preference stability.

Consider the decision process of a soon-to-be parent who is in the market for a dazzling array of products that he has never considered before. He decides that

the first purchase is going to be a baby stroller. As he evaluates strollers, he notices that some of the strollers are quite heavy, whereas others are rather light. Thus, the soon-to-be parent learns that the weight of the stroller is one differentiating attribute. He could infer that a heavier stroller is more stable and thus favor the heavy strollers. Instead, he may infer that a lighter stroller will be more easily maneuvered and thus prefer the lighter stroller. Although he is not sure whether to get a light or heavy stroller, he decides to look at all of them and then decide based on weight and many other attributes (e.g., appearance, ease of folding, price). Our consumer, therefore, will have a large consideration set and will be fairly uncertain about how much importance to place on various attributes when making the purchase decision.

Now compare this decision process with the decision process of an experienced parent. She previously owned a heavy stroller and is certain that a lightweight stroller is the way to go. Not only is she certain that less weight is better than heavy, but she also feels that weight is the most important attribute. She evaluates only lightweight strollers and as a consequence has a much narrower consideration set. In addition, while making the purchase decision she consistently places a great deal of importance on the weight attribute.

There are two key points when contrasting the decision processes previously described. First, a consumer with less experience in a product category should consider a wider range of products than a more experienced consumer. Second, a consumer with more experience in a product category should understand the product domain better. This understanding should lead to better identification of the attributes that are important for the decision; a better identification of the direction of the correlation or relation between the attributes and overall satisfaction with the product; and finally, a better identification of the importance to place on the attribute when making the purchase decision (West, Brown, & Hoch, 1996).

In the baby stroller example, the new consumer identifies weight as an important attribute, tries to estimate the direction of the relation between weight and happiness with the stroller, and grapples with how important weight is in relation to the other attributes associated with the stroller. On the other hand, the experienced consumer has consolidated their preferences to the point where there is less variance around the range of acceptable alternatives. The goal of this research is to examine the consolidation process. It is clear that often preferences do consolidate over time; in fact, it is this process of preference consolidation over time that is the main focus of this article.

THE NATURE OF PREFERENCES

One of the key simplifying assumptions in economics is that preferences exist (but see Plott, 1996, for a view of "discovered" preferences). Specifically, eco-

nomic theory is built on the assumption that consumers' choices indicate their underlying needs and wants, because it is these underlying preferences that are tapped when consumers make choices. In addition, the trading off of one good versus another (e.g., guns and butter) until consumers are indifferent implies the existence of basic values for these products. Furthermore, in marketing one of the implied assumptions of conjoint analysis is that respondents know what they like and are able to make choices among options based on these underlying preferences. The emerging literature on constructive preferences calls many of these beliefs into question.

The notion that preferences are constructed by the decision maker within the task and the context of the decision task is an emerging generalization in the behavioral decision theory literature (Payne, Bettman, & Johnson, 1993; Slovic, Griffin, & Tversky, 1990). The constructive-preference perspective argues that often times people construct their preferences in a given situation based on information available at the time of preference elicitation. The groundwork for the acceptance of the constructed-preference perspective has been laid with a variety of demonstrations of the lability of preferences in the face of task and context changes. These demonstrations include preference reversals (Fischer & Hawkins, 1993; Lichtenstein & Slovic, 1971, 1973; Tversky, Sattath, & Slovic, 1988), contingent valuations (Kahneman, Ritov, Jacowitz, & Grant, 1993; Schkade & Payne, 1994), the endowment effect (Camerer, 1992; Loewenstein & Issacharoff, 1994; Medvec, Madey, & Gilovich, 1995), the winner's curse (Thaler, 1988), the asymmetric dominance effect (Ariely & Wallsten, 1995; Huber, Payne, & Puto, 1982; Simonson & Tversky, 1992), and many others. Such findings in the constructive processing literature raise serious concerns for measuring consumer preferences.

In our view, marketing is moving away from the economics perspective and toward the constructive approach. It is clear that consumer preferences often depend on the decision-making environment (i.e., that environments shape how preferences develop). Yet, even as the demonstrations of constructive processing accumulate, we do not completely believe that consumers construct their preferences for every decision. Consumers do not go into every situation with a *tabula rasa*, or blank slate. In fact, it would be maladaptive for consumers to ignore their previous experiences and go through the extensive effort of constructing their preferences for each and every decision they make.

Instead, consumers learn from past decisions and adapt their consumption behavior over time to reflect both their own learning and changes in the environment (see also West et al., 1996). Initially, when encountering a new domain, consumers are more likely to be constructing their preferences. Eventually, as consumers gain experience in a domain, stable preferences can develop (see Hammond, McClelland, & Mumpower, 1980; Hammond, Stewart, Brehmer, & Steinmann, 1975; West, 1996). Thus, the constructive approach provides a good approxima-

tion of what consumers are doing as they enter a new category and the economic perspective provides a good approximation of experienced consumers (see Fischhoff, 1991).

In our mind, it is clear that neither the economic perspective nor the constructive approach provides a complete account of the preference formation process. Consumers clearly have some form of preferences (a favored combination of attributes) and with increased experience these preferences can change and stabilize over time. Therefore, consumer experiences are the foundation of their preference structures, and the processes associated with such experiences lead to preferences that stabilize over time. In summary, the ideas we express suggest that both camps are right, some of the time. That is, when consumers first enter a category, they will probably need to construct their choices, due to lack of experience in the domain. However, as experience is gained in a domain, preferences will stabilize. It is this process of preference stabilization or consumer learning that is investigated in this article. We consider this preference stabilization process to have both objective and subjective aspects, and in the studies that we describe later, we use both objective measures (based on revealed preferences) and subjective measures (based on self-reports of attribute importance and strength of preference) to evaluate the preference development process.

The goal of this article is to explore the dimensions of experience and their differential impact on the structure of preference as experience is gained. In essence, we are trying to uncover what it is consumers take away from the processes associated with different types of common consumer experiences (*effort*, *choice*, and *experience*). We begin by identifying the important dimensions or components of experience. The primary focus of Study 1 is to examine how different dimensions of experience impact preference development and stability. Studies 2 and 3 focus more directly on the mechanisms and a specific type of preference stability over time.

STUDY 1: CHOICE AND EXPERIENCE

To represent a realistic picture of the preference stabilization process, the procedure used in Study 1 incorporated repeated choices, where after each choice participants experienced the outcome of their choice. In addition to investigating the impact of real choices and experiencing their outcome, this study attempted to examine different types (or dimensions) of experience. To provide an intuitive illustration of the different types of experiences we were investigating, consider the following examples.

Imagine three consumers who are in the process of making a decision to purchase a gas barbecue grill. The first consumer looks through a Sears catalog for information about gas grills (referred to as the *information condition*). This consumer does

not get to actually experience any of the gas grills and instead will infer benefit levels from the communicated description. Intuitively, we expect that even repeated encounters with listed information about the product category should have only a minor impact on the consumer's preference structure. In fact, this type of learning may be simple category metalearning about the relative price range of gas grills carried by Sears (see Hoch & Ha, 1986).

The second consumer, although not having purchased a grill in the past, has used them several times at neighborhood cookouts (referred to as the *trial condition*). Although not knowing a great deal about specific manufacturers or models, this consumer has a good feel for the attributes that are important to him in a gas grill. For instance, in all his experiences he has never used the side burner and questions what uses he may have for this feature. In addition, while using different grills he noticed that grills smaller than 30,000 BTUs had trouble cooking large quantities. This consumer has a general idea of what he or she wants in a grill (specific attribute values) but at the same time does not know the specific trade-offs he or she would like to make to best satisfy his needs.

The third consumer goes to a cookout demonstration at a store that specializes in outdoor grills and has a variety of brand names and models from which to choose. This consumer has the ability to examine many different grills and can learn about the trade-offs associated with the attributes of the gas grills (referred to as the *hard-choice condition*). For example, by examining one grill with a familiar brand name versus a similar grill without the brand name, the cost of the known brand can be estimated. Likewise, by examining a model with a side burner versus a similar model without a side burner, the cost of a side burner can be learned. In encountering all this information and comparing the different grills, he or she spends a fair amount of effort evaluating the gas grills before purchasing one. Therefore, in addition to a generic knowledge about the attribute importance, this consumer has a good idea of the costs associated with specific attributes, a more accurate view of the trade-offs in the environment, and a better idea about the trade-offs he or she prefers.

The key to understanding the impact of each type of experience may be in understanding the specific dimensions of experience. The three key dimensions we examine are effort, choice, and experience. The effort dimension is simply the amount of mental energy that consumers invest in making up their minds (Alba & Hutchinson, 1987). The choice dimension is conceptualized as a process by which preferences are consolidated to arrive at a resolution for a choice task (Beach, 1993; Montgomery, 1983). Finally, experience captures the idea that it is important to experience the outcome of the choice one makes (feedback). Indeed, marketers have believed for a long time in the power of getting the consumer to test or try their products (offering trial sizes, distributing free samples, and offering incentives to test drive cars). All three of the aforementioned dimensions (effort, choice, and experience) can potentially play a role in the development of stable

preferences. Expending more effort, making choices, and gaining actual experience should all help to stabilize preferences. In this work, we examine the relative role these three dimensions play in the process of stabilizing preferences during the initial encounters in a novel domain. We evaluate these general mechanisms by looking at both objective and subjective measures of preference stability, which are discussed in detail later.

In this study, we created conditions that map onto the different types of experiences mentioned in the gas grill example: information, trial, and hard choice. In addition, we added a condition that included the act of making a choice without its associated effort (easy choice). This was done to tease apart the impact of effort and making a choice as the underlying processes that drive preference consolidation over time (by comparing easy choice and hard choice). This design also allowed us to compare the trial condition versus the easy-choice condition to isolate the impact of choice. Finally, the trial condition can also be compared to the information condition to isolate the impact of the actual experience in the stabilization of preferences (see Table 1). Note that the subscripted comparisons in Table 1 attempt to hold all other dimensions constant and isolate the impact of effort, choice, and experience.

In terms of comparing the performance in each of these conditions, our goal was to capture both the objective and subjective aspects of the preference stability process. It is clear that objective measures are important because they capture consumers' actual preference stability. In addition, we also wanted to measure the subjective aspects of this process to capture the subjective feelings consumers have about their own knowledge (see Brucks, 1985; Hoch & Deighton, 1989). In this study, we used the actual choices and experiences participants had as representative of the objective aspects of the preference stabilization process. The subjective aspects of the process were represented by participants' strength of preference associated with their choices.

TABLE 1
Dimensions of Each Condition in Study 1 and Their Comparisons

| <i>Condition</i> | <i>Dimensions</i> | | |
|------------------|------------------------|-------------------|-------------------|
| | <i>Choice</i> | <i>Experience</i> | <i>Effort</i> |
| Information | No choice | No _a | Low |
| Trial | No choice _b | Yes _a | Low |
| Easy choice | Choice _b | Yes | Low _c |
| Hard choice | Choice | Yes | High _c |

Note. Items with the same subscript attempted to hold all other dimensions constant and isolate the impact of effort, choice, and experience.

Method

Participants. The participants were 84 undergraduate students at a large southeastern university who responded to an advertisement in the university newspaper. Each participant was paid \$10 for participating in the study.

Stimuli. The stimuli selected for Study 1 had to satisfy three key criteria to allow us to fully investigate the impact of the dimensions of experience on new preference formation. First, we hoped to eliminate any prior knowledge effects by selecting a domain in which participants had no prior experience. Second, to understand the processes associated with choice and experience, we selected a domain in which participants actually experienced their choices. Third, we selected an environment with the goal of minimizing potential satiation effects of repeated trials. The domain we selected to satisfy all these requirements was aversive noise. The aversive sounds we used were created by a white noise band with sawtooth pink noise added to it. This created a sound that somewhat resembled the emergency broadcast alert.

Each stimulus was composed of three attributes: intensity, duration, and points. Intensity indicated the loudness of the sound, duration was presented in seconds, and points represented the number of points gained for listening to the sound. The basic correlational structure among the three dimensions of the stimuli for all stimuli sets was $-.75$ for intensity and duration, $-.4$ for duration and points, and $.9$ for points and intensity. Participants were told that the larger part of their compensation would be based on the number of points accumulated during the study.

Procedure and design. At the start of the study, each participant listened to a sample of sounds that spanned the entire range used in the study. Participants were then asked if the sounds were too harsh and were given the opportunity to stop the study. All participants indicated that the sounds were annoying, yet within an acceptable range, and proceeded with the session. The study itself was composed of three stages: (a) initial exposure, (b) experience, and (c) preference measurement. Stage 1 was manipulated on four levels between participants and directly corresponded to the four types of experiences mentioned earlier (see Table 1). Stages 2 and 3 were the same for all participants, and the dependent measures were based on these two stages.

Stage 1 of the study was the only between-subjects factor (type of initial exposure), and it was manipulated on four levels. The first three levels of the exposure factor correspond to the three scenarios previously discussed (information, trial, and hard choice), and the fourth level was the control for choice (easy choice). For all conditions, 10 base sounds were presented 1 at a time in a ran-

dom order, and this was repeated twice for a total of 20 exposures to the stimuli (see Base Sounds in Table 2). The type of information that was provided during these 20 initial trials differed between the four conditions. Participants in the information condition were presented with a written description of the stimuli, presented one at a time. Similar to the information condition, participants in the trial condition read the description of the base sounds; in addition, these participants also experienced the corresponding sound for each of the 20 options. Participants in the other two conditions (hard choice and easy choice) were presented with 20 pairs of stimuli. Participants in the two choice conditions were presented with the same base sounds as participants in the information and trial condition. The base sounds were paired with an additional sound description (see Easy- and Hard-Choice Sounds in Table 2). After being presented with the description of the stimulus pair, these participants were asked to select one sound to be experienced; after doing so, they experienced the outcome of their selection. Participants in the hard-choice condition were presented with 20 pairs of the stimuli constructed so that for each choice they faced real trade-offs between the alternatives. Similar to the participants in the hard-choice condition, participants in the easy-choice condition also saw alternatives and made choices but without facing trade-offs or going through the same amount of effort as participants in the hard-choice condition. Elimination of trade-offs was achieved by adding a dominated alternative (see Table 2). The dominated alternative was created by presenting participants in the easy-choice condition with one of the 10 base stimuli and an additional stimulus that was equal to the base stimuli on two attributes (duration and intensity) and inferior on the third (points). This proce-

TABLE 2
Stimuli Used in Stage 1 of Study 1

| Sound Number | <i>Base Sounds: Information and Trial Conditions</i> | | | <i>Easy-Choice Sounds: Easy-Choice Condition</i> | | | <i>Hard-Choice Sounds: Hard-Choice Condition</i> | | |
|-----------------|--|----------------|-----------|--|----------------|-----------|--|----------------|-----------|
| | Points | Duration (sec) | Intensity | Points | Duration (sec) | Intensity | Points | Duration (sec) | Intensity |
| 1 | 0.15 | 6.0 | 6 | 0.13 | 6.0 | 6 | 0.40 | 6.0 | 7 |
| 2 | 0.25 | 7.5 | 6 | 0.22 | 7.5 | 6 | 0.55 | 4.5 | 8 |
| 3 | 0.20 | 3.0 | 7 | 0.17 | 3.0 | 7 | 0.60 | 1.5 | 9 |
| 4 | 0.30 | 4.5 | 7 | 0.26 | 4.5 | 7 | 0.15 | 6.0 | 6 |
| 5 | 0.40 | 6.0 | 7 | 0.34 | 6.0 | 7 | 0.25 | 7.5 | 6 |
| 6 | 0.45 | 3.0 | 8 | 0.39 | 3.0 | 8 | 0.70 | 3.0 | 9 |
| 7 | 0.55 | 4.5 | 8 | 0.47 | 4.5 | 8 | 0.20 | 3.0 | 7 |
| 8 | 0.65 | 6.0 | 8 | 0.56 | 6.0 | 8 | 0.70 | 3.0 | 9 |
| 9 | 0.60 | 1.5 | 9 | 0.52 | 1.5 | 9 | 0.30 | 4.5 | 7 |
| 10 | 0.70 | 3.0 | 9 | 0.60 | 3.0 | 9 | 0.40 | 6.0 | 7 |

TABLE 3
Stimuli Used in Stages 2 and 3 of Study 1

| <i>Trial</i> | <i>Points</i> | <i>Duration (sec)</i> | <i>Intensity</i> |
|--------------|---------------|-----------------------|------------------|
| 1 | 0.15 | 6.5 | 7 |
| 2 | 0.25 | 8.0 | 7 |
| 3 | 0.20 | 3.5 | 8 |
| 4 | 0.30 | 5.0 | 8 |
| 5 | 0.40 | 6.5 | 8 |
| 6 | 0.45 | 3.5 | 9 |
| 7 | 0.55 | 5.0 | 9 |
| 8 | 0.65 | 6.5 | 9 |
| 9 | 0.60 | 2.0 | 10 |
| 10 | 0.70 | 3.5 | 10 |

ture presented participants with stimuli pairs where a dominating option existed so that very little effort had to be given to the task itself. All other aspects of the easy-choice condition were identical to the hard-choice condition.

During Stage 2 of the study, all participants received all pair-wise comparisons (45) of 10 new base sounds in random order (see Table 3). These 10 new base stimuli were constructed such that they kept the same attribute correlation as the warm-up stimuli but with different combinations of levels on their three attributes (cf. Tables 2 and 3). Stage 2 of the study used a graded choice task to combine choice and strength of preference into one measure. This was done with a scale ranging from 1 (*100% sure I want Option A*) to 100 (*100% sure I want Option B*). Descriptions of the two items were shown with the preference scale, and the starting point of the probe was at the midpoint between the two options. Participants were then told to move the probe toward the preferred option to indicate the degree to which they were confident in their preference for the option. Because indifference between the two options was not allowed, participants were forced to move the probe toward one of the options to indicate their choice. Thus, the choice was made by moving the probe toward the preferred option. Strength of preference was measured by the distance the probe was moved toward an option. After indicating a preference, each participant experienced the option they had selected. This process was repeated for all pairs of stimuli (45 times). In Stage 3, all participants rated the 10 sounds used in the pair-wise selection task (Stage 2). This cardinal rating task was such that the participants were asked to allocate 100 points among all 10 of the options to indicate their relative preference.

To summarize, Stage 1 of the study contained four between-subjects conditions, and Stages 2 and 3 were the same for all participants. In Stage 2 (which was similar to the hard-choice condition), participants performed all 45 pair-wise comparisons among the new base stimuli (see Table 3) and experienced the sound chosen before finishing with the cardinal rating task in Stage 3.

Results

The four experimental conditions used in this study were aimed at isolating three different aspects of experience that may have a role in stabilizing preferences over time (effort, choice, and experience). The goal of this study was to test the stabilization process that occurs during the initial exposure (Stage 1) and to test how the three different components of experiences impact the stability of preferences. Next, we examined both the objective and subjective indicators of preference stability. For objective indicators of preference stability, we used the relation between the choices made in Stage 2 of the study and the ratings made in Stage 3 of the study (violations). Another measure we used as an objective indicator was the time needed to make choices in Stage 2 of the study (response time). For the subjective indicators of preference stability, we used participants' preference strength. For each of these indicators of preference stability (violations, response time, and preference strength), we first examined the main effects and then proceeded to examine how each condition impacted the way preference developed over time.

Violations. First, we created a measure we called *violations* to indicate the number of times participants violated their final preference order (Stage 3) during the 45 choice tasks (Stage 2). For this measure, we compared ratings participants gave to the 10 stimuli in Stage 3 with the actual choices they made during Stage 2. To compute this measure, all 45 choices made in Stage 2 were reevaluated based on the option that would have been chosen if participants were consistent with their final preference ordering (indicated by Stage 3). A violation occurred when an item chosen from a pair was later given a lower rating than the other option in the pair. Our expectation for this measure was that it would reflect the extent to which the initial experience (Stage 1) advanced participants along their preference stabilization process.

One issue with the violation measure is the fact that it compares two different elicitation modes (choice and ratings). Indeed, preference reversals are a common context effect that are manifested in different preference orderings for the same person based on the method used to elicit preferences. The fact that people's choices do not match their ratings in a similar task has been well established in the preference reversal literature (Lichtenstein & Slovic, 1971, 1973; Tversky, Sattath, & Slovic, 1988). The important notion in this study was not the discrepancy between choices and ratings but rather the size of the discrepancy as decision makers get experience in a domain. A smaller discrepancy between final ratings and choices over time indicates a more consistent and stable preference structure.

First, we examined the total number of violations participants made with regard to the three comparisons suggested in Table 1. The results indicated that none of the specific two-way comparisons suggested in Table 1 were significant.

Because Stage 2 consisted of 45 trials (which together were longer than the initial Stage 1 experience), the main effect of violations (average over 45 trials) may not have been very sensitive. Therefore, we also examined the violations created during the first 20% of Stage 2 (the first nine trials). For the first nine trials, the hard-choice condition had fewer violations than the easy-choice condition, $F(1, 80) = 2.37, p < .010$. In addition, the trial condition had fewer violations than the information condition, $F(1, 80) = 2.02, p < .024$. Finally, the difference between the easy-choice and trial conditions was not significant, $F(1, 80) = 0.639, p = .427$. These results indicate that choice had no stabilizing effect on preferences but that both effort and experience increased preference stability. The same analysis can also be performed on the violations created during the first 40% of Stage 2 (first 18 trials). For the first 18 trials, the only comparison from Table 1 that was significant was the difference between the hard-choice and easy-choice conditions. Participants in the hard-choice condition had fewer violations, $F(1, 80) = 2.17, p < .016$, indicating that effort may have had the most profound and long lasting impact on preference stabilization.

Aside from examining the total numbers of violations participants committed in Stage 2, it is also important to remember that Stage 2 itself provided participants with experience and feedback. Therefore, it may be important to examine changes in the tendency to commit violations within these 45 pair-wise comparisons. For this purpose, we grouped the 45 choices into five blocks of nine consecutive decisions to give a clearer representation of the changes in preference structures over time. As can be seen in Figure 1, the hard-choice condition, hypothesized to be the most stable, had a remarkably consistent level of violations ranging from .24 to .18 with no clear trend over time ($F < 1$). The trends for the other three conditions all showed a reduction in the proportion of violations over time. The information condition started with the highest level of violations (.49) and ended with .28. The easy-choice condition started with .41 violations and

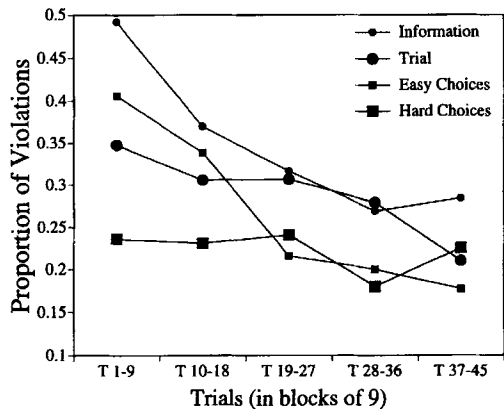


FIGURE 1 Violations of final ratings during Choice \times Condition and Choice \times Trial.

ended with .18. The trial condition started with .35 violations in the first block and had .21 in the last block, again a substantial reduction. When testing for linear trends, all (except for the hard-choice condition) were statistically significant at the .01 level.

Response time. We used the response time measures as a proxy for the amount of effort required to make a choice. An examination of the three pair-wise comparisons proposed in Table 1 showed that the only difference that was significant was the difference between the information and trial conditions, $F(1, 80) = 3.01, p = .0036$. This significant main effect supports the idea that experiencing the actual sounds during Stage 1 impacted the amount of effort participants invested in Stage 2 of the experience. It may not be surprising that participants in the information condition—who did not hear the sounds initially—took the longest time to make their choices. However, given the violation results, it is interesting to note that the level of effort invested in Stage 1 did not impact response time during Stage 2. In addition, it is also interesting to note that response time for all conditions decreased over time, although this reduction was obviously higher for the information condition (see Figure 2).

Preference strength. As indicated earlier, it was also important to capture some of the subjective aspects of preference development and stability. The idea was that such measures would not directly capture the level of preference stability but rather the level of beliefs participants have in their ability. The indicator used for subjective preference stability was the strength of preference participants displayed in their choices. A high level of preference strength indicates a subjective

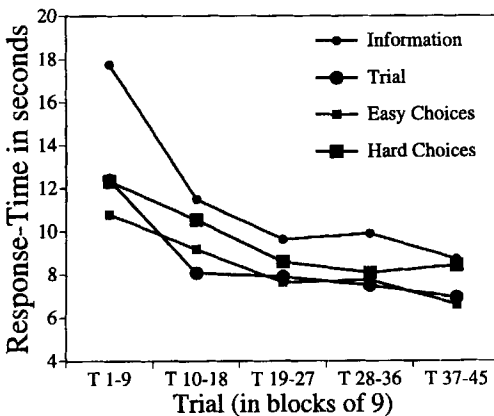


FIGURE 2 Decision-making time for the choice tasks across conditions and trials.

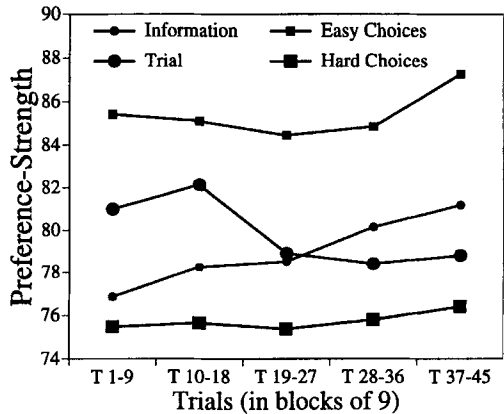


FIGURE 3 Preference strength across conditions and trials.

perception of stable or known preferences, at least in the specific choice situation in which preference strength is measured. Regarding the three pair-wise comparisons suggested in Table 1, the only significant difference was between the easy-choice and hard-choice conditions, $F(1, 80) = 3.79$, $p < .001$. However, the direction of this effect was in the opposite direction from what was expected: Participants in the easy-choice condition had greater preference strength than participants in the hard-choice condition (see Figure 3). We return to these results in the Discussion section.

A final point of interest was the interaction between the information and trial conditions. As can be seen in Figure 3, preference strength for the trial condition decreased over time, whereas the preference strength for the information condition increased over time, $F(1, 80) = 2.33$, $p = .032$. Note that this comparison isolated the impact of experiencing the stimuli on preference development (experience). The information condition started with a low level of preference strength because they had not even heard the sounds yet. Then as they obtained experience in the task, their preference strength slowly and steadily rose. The trial condition, on the other hand, started out with high preference strength, which decreased over the course of the study. Their initial high belief in their knowledge level decreased as they were forced to face the difficult trade-offs in the environment.

Discussion

The key component or dimension of experience implied by the results of Study 1 is effort. By comparing the easy-choice and hard-choice conditions, effort was shown to play a role in both the objective and subjective indicators of preference stability (violations and preference strength, respectively). Participants in the hard-choice

condition had fewer violations and less preference strength than participants in the easy-choice condition. Thus, the higher level of effort associated with the hard-choice condition led to more stable preferences and less preference strength (subjective perceptions) in those more stable preferences.

In addition to these two findings, the most fascinating results of Study 1 were the deleterious effects of preference strength in one's choices on the true stabilization of preferences. Why were participants in the easy-choice condition the most sure of their preferences, whereas participants in the hard-choice condition were the least sure of their preferences? Recall that this comparison isolated the impact of effort on preference structure development. One way to make sense of this discrepancy is to assess the differences between real or objective knowledge and subjective knowledge. Objective knowledge is obtained when we learn about our preferences for the underlying dimensions in an environment, thus furthering our ability to make consistent trade-offs. Although subjective knowledge and objective knowledge should be positively correlated (Brucks, 1985), some environments impact objective and subjective knowledge differently. We postulate that our task was one such environment. In the easy-choice condition, participants may have had a high level of preference strength (subjective knowledge) without the associated increase in objective knowledge, because they built up an unrealistic belief about the inherent simplicity of the trade-offs in the environment. In the hard-choice condition, while participants learned something about trade-offs in the environment (objective knowledge), they also learned something about the difficulty of those trade-offs, perhaps lowering their subjective knowledge. Specifically, one could characterize the participants in the easy-choice condition as feeling the most capable, whereas actually showing less consistency of preferences across the two methods of preference elicitation.

We speculate that participants in the easy-choice condition had such a high level of preference strength because of the large impact of the initial experience with a novel environment. After experiencing the ease of making choices during the initial stage of their preference development (Stage 1), these participants may have felt that they knew their environment and preferences. Conversely, participants in the hard-choice condition had their initial preference development in a difficult environment. Therefore, these participants knew that the environment was a difficult one and had a lower level of preference strength. These results indicate that the role of choice in preference stabilization is perhaps more complex than initially hypothesized. Choices that increase objective knowledge in an environment should lead to preference stabilization, whereas choices that increase subjective knowledge, without increasing objective knowledge at the same time, may lead to an unrealistic increase in preference strength but not in preference stabilization. For marketers, it is interesting to understand this disassociation and realize that certain types of experiences that consumers encounter may have a differential impact on objective and subjective knowledge. Which one of these aspects is more important may depend on the specific application.

STUDY 2: THE SINGLE-CHOICE STUDY

The main result of Study 1 was that encountering and making choices in environments characterized by difficult trade-offs stabilizes consumer preferences. Study 1 used different measures of preference stability to support this idea (violations, response time, and preference strength), but these measures were all outcome measures that do not bear directly on the mechanism for the preference stabilizing process. The goal of Study 2, therefore, was to explore a specific aspect of preference that stabilized when difficult trade-offs were encountered and made. Our main hypothesis in this study was that during the stabilizing process consumers learn to apply a more consistent weighting function to the domain. Specifically, by encountering trade-offs among attributes, consumers learn what importance (weight) to place on the different attributes. A similar type of weight shift has been used to explain preference reversals (Fischer & Hawkins, 1993; Hawkins, 1994; Tversky, Sattath, & Slovic, 1998). By learning the importance of these different attributes and using them consistently, consumers develop stable preferences. In the following two studies (Studies 2 and 3), we investigated this idea by examining the role of confidence in attribute-importance weights in the development of stable preferences.

One indicator of the stability with which preferences are held is the confidence consumers have in the importance of specific attributes in a given environment. Note that confidence in attribute-importance weights (preference stability) is independent of the importance of the specific attribute itself. For example, different consumers can have the same importance associated with a specific attribute (e.g., bitterness) of beer. A more experienced consumer (Steve) likes bitter beers and uses this attribute consistently over time in selecting beers. On the other hand, a less experienced consumer (Dan) will use the bitterness cue less consistently because of his limited knowledge structure. Therefore, we view confidence in attribute-importance weights (preference stability) as a "feeling of knowing" about the importance of an attribute. Such preference stability may be diagnostic in the same way that subjective knowledge (Brucks, 1985) may be more important than objective knowledge because of its influence on future behavior. Thus, the certainty with which consumers hold the importance of specific attributes should aid them in the selection process by consistently focusing their attention on certain attributes. Lastly, a more confident consumer may be more likely to perform a top-down or strategy-driven search, whereas a less confident consumer may be forced to be data driven and use a more constructive process (see Broniarczyk & Alba, 1994).

Method

Procedure. One hundred eighty-two participants from a large southeastern university were recruited for this study and received course credit for their participation. Participants were involved in a computer-simulated choice study (see Table 4).

TABLE 4
Description of the Procedure for Study 2

| <i>Condition</i> | <i>Stage 1 (Two Alternatives)</i> | | | <i>Stage 2 (Three Alternatives)</i> | |
|------------------|-----------------------------------|-----------------------------|----------------------|-------------------------------------|----------------------|
| | <i>Task 1</i> | <i>Task 2</i> | <i>Task 3</i> | <i>Task 4</i> | <i>Task 5</i> |
| Choice | Choice | Rating attribute importance | Confidence intervals | Rating attribute importance | Confidence intervals |
| No choice | No choice | Rating attribute importance | Confidence intervals | Rating attribute importance | Confidence intervals |

In Stage 1 of the study, all participants saw two products. During their initial encounter (Task 1), half of the participants made a choice between the two products (the choice condition), whereas the other half simply read the information about the two products without making a choice between them (the no-choice condition). Note that the choice condition in Study 2 is similar to the hard-choice condition in Study 1 because participants are forced to make trade-offs between attributes. The two products were then erased from the computer screen, and participants were asked to indicate how important each of the three attributes was in making a choice between the two displayed options (Task 2). After indicating the point estimate for the attributes' importance, participants were asked for a confidence interval around this estimate (Task 3). This estimate—preference stability—was explained to the participants as expressing the range of acceptable values around their attributes' importance point estimates. This measure was collected by having participants create an interval that was initially centered on their point estimate. We allowed the participants to increase the length of the interval both above and below their point estimate independently. In Stage 2 of the study, a third option was added to the choice set, and participants were again asked to indicate the importance of the three attributes (Task 4) and their confidence about this estimate (Task 5). The third alternative served to increase the difficulty of the trade-offs in the choice task. During these last two tasks, attributes' importance and preference stability were measured for the new choice set (including the third option).

Task. Five product categories familiar to the student population were used: microwaves, running shoes, computers, television, and bicycles (see Table 5). All five products were described by three relevant attributes, and each participant responded for all five product categories in either the choice or no-choice conditions (as described in Table 4).

For the attribute-importance ratings and the confidence intervals around the importance ratings (preference stability), participants were instructed to give their estimates based on the current set of options they were facing. In addition,

TABLE 5
Descriptions of Items Used in Study 2

| <i>Product and Attributes</i> | <i>Product A</i> | <i>Product B</i> | <i>Additional Product</i> |
|-------------------------------|------------------|------------------|---------------------------|
| Microwaves | | | |
| Price (\$) | 380 | 209 | 294 |
| Capacity (ft) | 1.8 | 1.2 | 1.5 |
| Power (W) | 1, 000 | 700 | 850 |
| Running shoes | | | |
| Comfort | 8.5 | 5.5 | 7 |
| Durability | 6.8 | 4.4 | 5.6 |
| Price (\$) | 90 | 58.5 | 74.3 |
| Computers | | | |
| Speed (Hz) | 33 | 21.5 | 27.2 |
| Memory (MB) | 8 | 4.4 | 6.2 |
| Price (\$) | 1, 900 | 1, 235 | 1, 567 |
| Televisions | | | |
| Screen size (in.) | 20 | 14 | 17 |
| Price (\$) | 650 | 357 | 504 |
| Power (W) | 25 | 15 | 20 |
| Bicycles | | | |
| Price (\$) | 400 | 180 | 290 |
| Weight (lbs) | 15 | 23 | 18.8 |
| Wheel base (in.) | 22 | 36 | 29 |

participants were asked to make these estimates in a way that reflected the importance weighting of the average student. This was done for two reasons. First, we hoped to diffuse any income effects and the resulting impact on true preference development. For instance, participants faced with a choice between a \$400 and a \$180 bicycle could make the decision trivial by simply stating that they do not have \$400 for a bike and selecting the cheaper alternative by default. Second, we did not want participants to simply dismiss an attribute as not being important to them and thus avoid the trade-off inherent in the choice task. For example, in the choice of a computer, one way of accomplishing the decision is to simply select the computer with the fastest speed. By forcing participants to weigh attribute importance with the entire student population in mind, we hoped to have them engage in more systematic processing of the alternatives (see Ariely & Wallsten, 1995).

Results

Preference stability. The confidence in the attribute-importance variable was transformed by subtracting 100 from each value, such that larger intervals reflected lower preference stability. An analysis of variance (ANOVA) was per-

formed on these measures using the confidence in attribute importance (preference stability) as the dependent variable; condition (choice or no choice) as a between-subjects factor; and product, attribute, and stage as within-subject factors. Because the study was not focused on differences between products or attributes and because there were no differences across the different products and attributes, we collapsed across both variables for the remainder of the analysis.

The results showed a significant interaction between the choice condition and the stage, $F(1, 180) = 2.78, p < .05$. When looking at this interaction further, preference stability seemed to increase from Stage 1 to Stage 2, $F(1, 180) = 8.28, p = .002$. In addition, the difference between the two choice conditions was marginally significant, $F(1, 180) = 2.54, p = .055$. As seen in Figure 4, the increase in preference stability from Stage 1 to Stage 2 was driven by the increase in the no-choice condition. There are two important aspects of these results. First, preference stability in the choice condition was higher than preference stability in the no-choice condition. Second, the difference between preference stability in Stages 1 and 2 was evident in the no-choice condition but not in the choice condition. These data suggest that by expanding effort to resolve trade-offs in the environment, participants' weighting function for the different attributes becomes more precise and stable.

Discussion

The measure of preference stability showed an increase in the stabilization of preference structures after participants made a choice. First, participants in the choice condition had greater preference stability compared with participants in the no-choice condition. This indicates the stabilizing impact of the initial choice on preferences. In addition, both conditions showed an increase in preference stability between Stages 1 and 2, suggesting the potential impact of simply acquiring more information about an environment. We speculate that the increase in preference sta-

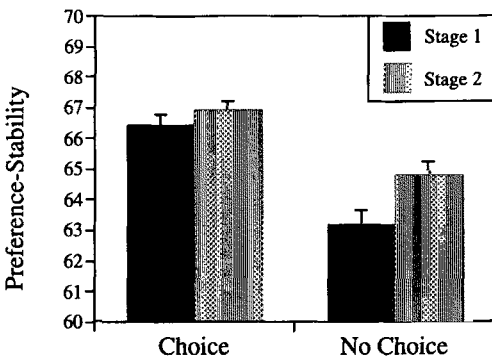


FIGURE 4 Average size of Preference Stability \times Condition and Preference Stability \times Stage. Error bars are based on standard errors.

bility was not statistically significant for the choice condition, because participants had consolidated their preferences when making their initial decisions. On the other hand, we conjecture that participants in the no-choice condition became more confident after the second exposure, because they had not consolidated their preferences with the first exposure to product information.

Because Study 2 involved only a single choice, it required a very limited amount of effort and entailed a very limited opportunity for learning. However, in most domains consumers make multiple purchases and have a variety of experiences with products. Therefore, in Study 3 we attempted to expand our understanding of preference stabilization by examining it in a scenario involving multiple choices.

STUDY 3: REPEATED CHOICE

Study 3 had two main goals. The first was to extend the findings of Study 2 to repeated decisions, and the second was to supplement the subjective measure of preference stability used in Study 2 (preference stability) with the same objective measure of preference stability (violations) used in Study 1. In addition, although the use of an agent task has its benefits, we also wanted to test our ideas with regard to one's own preferences. Therefore, in Study 3 we asked participants to provide us with their own attribute importance, confidence intervals (preference stability), and preferences. As in Study 2, Study 3 used confidence in attribute-importance weights as the subjective measure of preference stability. The additional objective measure of preference stability that was added in this study was based on the violation measure used in Study 1. Similar to Study 1, participants in this study made a series of repeated choices followed by a rating task of all the alternatives. The ratings given at the end of the study were used as a standard against which we measured the number of implied violations they made. The general hypothesis was that preference structures, both objective and subjective, become more stable over repeated choices.

Method

Participants. Participants were 39 undergraduate students at a large southeastern university who responded to an advertisement and received \$10 for participating in the study. During the study, all participants made a series of 12 choices (Stage 1) followed by a desirability rating for each of the options in the choice sets (Stage 2).

TABLE 6
Description of All Items Used in Study 3

| <i>Microwave Attribute</i> | <i>Item A</i> | <i>Item B</i> | <i>Item C</i> | <i>Item D</i> | <i>Item E</i> | <i>Item F</i> |
|-----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Price (\$) | 100 | 152 | 199 | 253 | 295 | 354 |
| Capacity (ft ³) | 0.6 | 0.84 | 1.06 | 1.3 | 1.58 | 1.84 |
| Power (W) | 590 | 680 | 760 | 850 | 930 | 1,010 |

Note. The structure of the stimuli was such that the higher letter (i.e., *F*) represented the highest price and quality, whereas the lower letter (i.e., *A*) represented the lowest price and quality.

Task. We created six sample microwave ovens with three attribute levels based on the *1996 Consumer Reports Buying Guide* (Consumer Reports, 1995). To create the stimuli, we selected the highest and lowest values for price, capacity, and power to create a high- and low-priced quality item. We then created four additional microwaves that were equally spaced between the highest priced microwave and the lowest priced microwave. Finally, we added 5% random noise to every value to mask the equal spacing. (Table 6 includes a complete list of the stimuli.)

Procedure. During Stage 1 of the study, participants were faced with 12 sets of three options randomly selected from the stimuli set (see Table 6). In each of the 12 trials, participants were first asked to select a microwave oven. After making their selection, participants were asked for attribute-importance weights and the preference stability for those weights (same measures as in Study 2). At the end of these 12 choices, participants were asked to individually rate each of the six microwaves that appeared in the study. By comparing the choices participants made in Stage 1 to the implied choices calculated from Stage 2, we created a measure of the number of times participants violated their final preference order during the 12 choice tasks (violations).

In addition, the amount of effort required in a decision task should be another indicator of the degree to which preferences are stable. When consumers have stable preferences, the amount of effort required in a decision task should be reduced because consumers will compare alternatives to previous choices, internal decision rules, or stored trade-off values. In other words, when consumers have less stable preferences, a hypothesized lengthy constructive process may be needed to solve the decision task (response time).

Results

Preference stability. As in the single-choice study (Study 2), the key indicator of the subjective preference structure was preference stability (with higher numbers reflecting smaller intervals and higher preference stability). When examining

this measure in a single factor repeated measure ANOVA design, all three attributes showed an increase in preference stability over the 12 trials when looked at for price, $F(11, 418) = 6.42, p < .0001$; capacity, $F(11, 418) = 4.97, p < .0001$; and power, $F(11, 418) = 5.30, p < .0001$. Figure 5 shows the dramatic increase in preference stability over the 12 trials, which indicates participants' increased feeling of knowing regarding their preferences as the experience unfolded. Again, as in the single-choice study, we saw a change in participants' subjective estimate of their own preference stability associated with choice. Note, however, that this stabilization appears much more dramatic in Study 3 than in Study 2, as participants made repeated decisions in the same domain.

Response time and preference consistency. As in Study 1, we used two objective measures of the preference stabilization process. The response time measure related to the time taken to make the choice in Stage 1 of the study, and the violations measure related to the consistency between Stages 1 and 2 of the study. As can be seen in Figure 6, the amount of time taken to make a choice decreased over the 12 trials when looked at in a single factor repeated measures ANOVA design, $F(11, 418) = 6.49, p < .0001$. Thus, we believe that in the first trials participants were learning the trade-offs for the attributes in the domain, and as they gained experience they were relying on their past choices to aid in the selection process. When examining violations, we were interested in the change in violations over time and not the total number of violations. A violation of preference structure consistency occurs when a participant selects an option that was later given a lower overall rating than another option in the specific choice set. Note that for some trials more than one option may have been given the same rating in the rating task. In such cases (41 of the 468), the selection of either option was not considered a violation. Comparing the proportion of violations over the first half of the study to the proportion of violations in the sec-

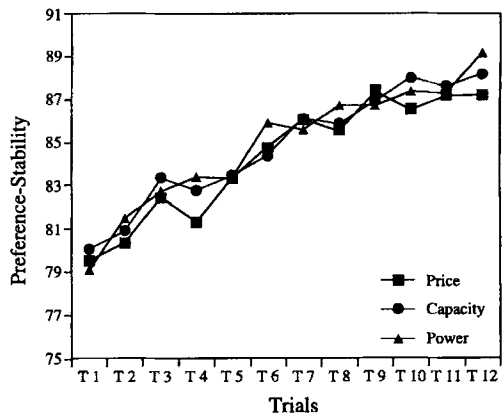


FIGURE 5 Average preference stability in Study 3 over 12 trials for all three dimensions.

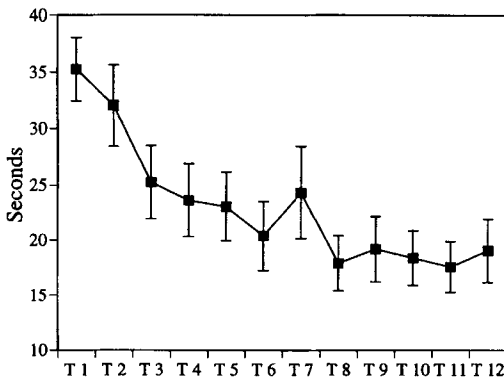


FIGURE 6 Average decision time in Study 3 for the 12 trials. Error bars are based on standard errors.

ond half of the study showed that violations decreased from the first half (.60) to the second (.49), a statistically significant difference, $t(196)=2.55, p<.01$. Thus, participants had fewer violations as they gained experience in the domain. Participants' increased consistency is even more compelling given the reduction in effort participants expended across the 12 trials. That is, participants became faster and more consistent over the course of the study (response time).

Discussion

The three key findings in Study 3 fully support the general hypothesis that choice in an environment when participants are forced to encounter trade-offs plays a key role in stabilizing preferences. The subjective measures of the stabilizing process are based on the confidence participants had in the attribute-importance weights. This measure showed that participants' preference stability increased as they gained experience in a domain. The objective measures of the stabilizing process were based on the violations of the preference ordering and the amount of effort invested in making the choices (response time). Both the violation measure and the response time measure indicated an increase in preference consistency over time. In summary, all three preference structure measures converged to indicate that choices increase the stability of preferences by either reducing the necessity to construct preferences or increasing the consistency with which preferences are constructed.

GENERAL DISCUSSION

Over the course of Studies 1 through 3, an intriguing picture of the preference stabilization process emerged. First, the type of environment in which the initial

experience took place was shown to impact the type of knowledge learned by consumers and the consistency with which this knowledge was applied (Study 1). By comparing the hard and easy environments, we conclude that objective and subjective knowledge can be disassociated. Subjective knowledge was gained after making choices in an easy environment, whereas objective knowledge was gained after making choices in a difficult environment. Studies 2 and 3 expanded on these findings by examining a possible mechanism for preference stabilization. The results showed that the consistency with which participants relied on the different attributes increased when making a single choice (Study 2) or repeated choices (Study 3). Across all three studies we employed different objective and subjective measures of preference stability. We used preference strength, confidence in attribute-importance weights (preference stability), time required to make a decision, and a new measure called *violations* (consistency over time). We do not believe that any one of our measures is the only "true" or "correct" measure of preference stability. Rather, we think that the set of measures provides insights into such stability.

The most complete picture of the preference development process is found in Study 1. In this study, participants made a series of choices and actually experienced the outcomes associated with their choices. The most important results of this study concern the differential impact of the initial experience on objective and subjective knowledge. Participants who were in the easiest choice environment had very unstable preferences, but these participants also believed that their knowledge level was high. Participants who were in the most difficult choice environment had very stable preferences, but these participants believed that their knowledge level was low. What were these participants learning during their initial experience? Perhaps environments that presented participants with easy choices lulled consumers into a false sense of security regarding the stability of their own preferences. Possibly these participants were misplacing the locus of the ease with which they made choices as a reflection of their own abilities and stable preferences and not as a factor characterizing the environment. Conversely, environments that forced participants to confront difficult trade-offs may have led participants to believe that the environment was indeed a difficult one, and therefore, they did not gain the same level of subjective knowledge.

In the domain of attitude judgments Tybout and Scott (1993) showed that weak evaluations can be influenced by subtle, constructive, self-perception processes, whereas strongly held evaluations that are based on immediate sensory data or experience are influenced by information aggregation. This is similar to the notion that consumers are more likely to construct a stable preference if the construction is based on rigorous experience in a domain. When the experience lacks rigor, consumers will be more susceptible to outside influences when constructing their preferences. The main difference between the Tybout and Scott studies and studies reported in this article is that Tybout and Scott focused on attitudinal judgments

(evaluations of a single alternative), whereas we focused on preference judgments (relative evaluation of multiple alternatives).

Another potential explanation for the differences between the hard-choice and easy-choice conditions is related to the difficulty of the choice task. Perhaps participants in the hard-choice condition faced such a difficult decision that instead of making a choice they would have preferred to delay the decision or not make the decision at all (Baron & Spranca, 1997). Of course, because we were dealing with aversive noise as the stimuli, we did not want to give participants this no-choice option. In the absence of the no-choice option, hard-choice participants may have formed weak, tentative preferences. Further research into the specific processes and types of preferences developed during initial expose to a novel domain is warranted.

In addition, it is very interesting to note the differential impact of the initial experience on objective and subjective preference stability. The objective measures of preference stability showed that regardless of the initial experience, all participants improved their objective knowledge when they made difficult trade-offs (during Stage 2). Remarkably, the subjective measures of preference stability were highly resistant to change after they were established during the initial experience. This resistance of subjective knowledge to updating is critical because in many consumer domains objective knowledge is hard to come by and consumers are forced to rely on their subjective knowledge.

The goal of Studies 2 and 3 was to examine the consistency with which participants used different attributes in their evaluations as a possible mechanism for preference stabilization. These studies replicated the results of Study 1 and provided insight into the stabilization process itself. The main measure used for this purpose was participants' preference stability (confidence in attribute-importance weights). The results indicated that participants used attributes more consistently after making a single choice (Study 2) and also after making repeated choices (Study 3). This validates the notion that consistency in usage of attribute importance is a component in the preference stabilization process.

To summarize, our goal was to understand the process by which preferences change from malleable to stable. The results show that making difficult trade-offs helps consumers stabilize or consolidate their preferences. The implied challenge to marketers, therefore, is to find ways to help consumers think deeply about the trade-offs in their product domain so that they understand better their own preferences and purchase products that better fit their needs. In addition, understanding consumers' experience level (and knowledge structure) can help marketers to create messages that are best suited for their consumers' needs. Consumers with little knowledge in the domain should get information that helps them understand the domain and the trade-offs within it, whereas consumers with higher knowledge need mostly product information. Finally, how a preference is constructed should have serious implications for those who are trying to measure preferences. One

would expect the accuracy of forecasts to vary greatly based on whether consumers were retrieving or constructing their preferences during the measurement exercise. Perhaps measurement analysts will want to estimate in some way the degree of preference construction in the measurement process. Currently, all preferences are evaluated equally in many popular preference measurement techniques (e.g., conjoint analysis, logit modeling). One would expect that preferences based on knowledge of trade-offs should be better predictors of sales than preferences that are more constructive.

Future Directions

Acquiring taste. The type of preference development we investigated in this research was preference consolidation. Essentially, preference structures stabilize due to improved powers of discrimination associated with the reduction of variance around attribute-importance estimates. There is another type of preference development that is different in nature. Think back to your first sip of beer. For most people, the first taste of beer is mystifying, because we wonder how anyone could drink such a foul concoction. Many people recall drinking sweeter and lighter beers initially and progressing to heavier and more bitter beers. Analogously, white zinfandel can be thought of as a training wine, as many newcomers to wine start with white zinfandel and then move into less sweet varieties. One expression used to describe this progression is that people “acquire a taste” over time.

One simple answer to the question of how preferences are developed is to say that consumers have inherent preferences and through trial and error learn what they like. Yet, in the beer example, most people claim to like the lighter and sweeter beers when they first start drinking beer, whereas people with more experience tend to prefer the heavier, more bitter beers. During the process of acquiring tastes, consumers are not simply homing in on the specific trade-off relation between attributes. Instead, they are changing the attributes trade-offs that they consider optimal (e.g., the importance of bitterness in beer).

Thus, we believe that there are two types of processes for learning preferences. In one, preferences converge over time toward ideal trade-offs among the attributes (as in our studies). In the second, preferences change over time as taste matures, such that the ideal trade-offs among the attributes change over time. Understanding these two processes and their implications for consumer learning seems to be a very promising next step.

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