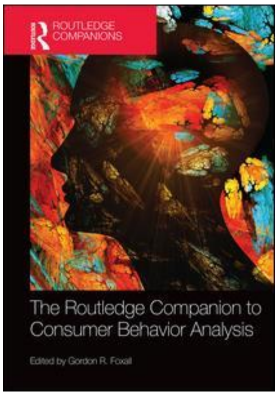

The Routledge Companion to Consumer Behavior Analysis

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Equivalence classes and preferences in consumer choice

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Equivalence classes and preferences in consumer choice

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Introduction

New product development

Consumers are faced with an increasing number of choices of ever-greater complexity, while, for companies, creating strong brands has become a management imperative. A recurring topic that links both of these considerations is the process by which new brands are introduced into existing product classes. Many of the generalizations about consumer brand choice were established by the work of Andrew Ehrenberg and his colleagues who point out that most consumers are not brand loyal, in the sense of purchasing a single brand 100% of the time; rather, the typical consumer of a product class buys a number of brands over time (sometimes even on the same shopping trip) (Ehrenberg, 1988). Products from this group of tried and tested brands, which is a subset of the brands that comprise the entire product class, are purchased apparently randomly (though in practice often in a structured manner) and are treated as though they were functionally equivalent. That is, the physical properties of each brand in the product class are sufficiently similar that they are closely substitutable. Each consumer's establishment of a particular consideration set of appropriate brands reflects this substitutability based on functional correspondence.

When a new brand is introduced, heavy users of the relevant product class tend to innovate by *trying* it, though whether they continue to purchase it depends on whether it measures up in practice to the demands the consumer makes of members of the product class in question. A brand that does not possess the functional characteristics of other members of the product class is likely to fail in the marketplace since the minimal expectation consumers have of a new brand is that it perform at least as well as existing members. One strength of Ehrenberg's framework of analysis is its reliance on observed patterns of consumer choice rather than speculation about the cognitive processes that might underlie preferences but which are essentially unobservable and untestable. Some of the generalizations on which such observations rest – for example, the idea that brands within the consumer's consideration set are functionally equivalent – have hitherto been untestable too. Moreover, the reasoning on which functional equivalence is attributed to brands comprising a consideration set is circular: we "know" that the brands are functionally equivalent because the consumer buys and uses them apparently interchangeably, while this pattern of behavior is sufficient to suggest that the brands must be functionally substitutable. Another question that arises is how consumers come to perceive the equivalence of existing brands in a product class and a newly introduced brand which a marketer simply claims to be a substitute for the product versions they are already using. In this chapter, we argue that consumer behavior analysis provides a way of thinking about brands that accounts for the inclusion of a new item into the consumer's consideration set.

Brand equity and brand preference

The relative importance of companies' brands has grown significantly in the past 20 years. According to a study by McDonald and Mouncey (2009), companies' brands account for over 80% of the value of organizations in the United Kingdom and United States, and 63% of the value of global organizations. Brands have, for that reason, turned out to be one of the most important assets that today's companies possess, and have become one of the top priorities for most managers. The ability to understand consumer brand choice is crucial to its legitimacy for academic marketing and equally important to marketing practice (Foxall et al., 2007). As a consequence, this has led to a large amount of brand research. According to a review paper (Keller & Lehmann, 2006), five streams of brand research have evolved in the past years: Brand positioning, corporate image and reputation, strategic brand management, brand growth, and brand performance. The focus of this study is the last of these, often referred to as brand equity.

Brand equity has been conceptualized and measured in different ways (Rego et al., 2009). One perspective is to understand and measure brand equity as the marketing effects that are attributable to a brand (Aaker, 1991). From this perspective, brand equity is measured by looking at the different outcomes from a branded product versus an unbranded one. The second perspective is to understand brand equity as the shareholders' value of the brand (Ailawadi et al., 2003). Brand equity is, from this perspective, measured by focusing on how business decisions and actions affect the company's economic value. The third, and most used, perspective is to understand and measure brand equity from a customer viewpoint. From this perspective, brand equity is understood as a result of the customers' perceptions of the marketing activity of the company and their experience over time – often referred to as customer-based brand equity (French & Smith, 2013). Brand equity is usually conceived as an aggregate measure of the strength of a brand for the consumers that make up an entire market. But we can also speak of the relationship between an individual consumer and a brand in terms of that individual's brand equity. This will be reflected in and reflect the pattern of utility maximization the consumer's behavior exhibits.

In customer-based brand equity research there is extensive use of associative model formulation, derived from cognitive psychology (Anderson & Bower, 1973; Wyer & Srull, 1989). There are a number of associative models with different underlying assumptions (e.g., Adaptive Control of Thought, Anderson, 1983; MINERVA 2, A Simulation Model of Human Memory, Hintzman, 1986; Theory of Distributed Associative Memory, Murdock, 1982; Search of Associative Memory, Raaijmakers & Shiffrin, 1981; Diffusion Model, Ratcliff, 1987), but generally they conceptualize associations as a set of nodes and links. In these models, which assume a cognitive perspective, nodes are stored information in the consumer's mind that are connected by links that vary in strength. For example, a node can be a brand (Apple™), a product (mobile phone), or an attribute (design). An association in a consumer's mind is, from this view, represented by links between two or more nodes as, for example, Apple™ – mobile phone – design.

Different research programs within consumer behavior have traditionally been labeled as (1) cognitive program, (2) behaviorist program, (3) economic program, and (4) structuralist program (Anderson, 1986). In the following we will focus on approaches within the behaviorist program. Learning psychologists have shown interest in consumer behavior (for a further discussion see DiClemente & Hantula, 2003). For example, one such program with a high impact is the program in which children and youngsters have been taught to choose healthy food (e.g., Hardman et al., 2011; Horne et al., 2011; Horne et al., 1998; Lowe & Horne, 2009; Pears et al., 2012). In general, one can divide the programs or the models that have used a behavior analytic framework to understand consumer choice into those based on classical conditioning (e.g., Bierley et al., 1985; Gorn, 1982; Janiszewski & Warlop, 1993; McSweeney & Bierley, 1984; Nord & Peter, 1980; Shimp et al., 1991; Zander, 2006) or on operant conditioning (Horne and Lowe and colleagues) or on a mix of techniques (Baker, 1999; Chen & Jiang, 2013). More recently, two different models have evolved within behavior analysis: the Behavioral Perspective Model (Foxall, 1998, 2010) and the Behavioral Ecology of Consumption (e.g., Rajala & Hantula, 2000; Smith & Hantula, 2003) have been put forward to interpret consumer choice.

The prevailing approach has been based on classical conditioning. Some researchers have argued for this in spite of the fact that there are few empirical papers showing that classical conditioning can in fact change or modify behavior within a consumer approach (Bierley et al., 1985). However, two examples of the classical conditioning program are worth mentioning. First, in a study by Shimp et al. (1991), the authors studied the effects of what they labeled as attitudes towards different kinds of brand familiarity (cola brands). They used a selection of unknown, moderately known, and well-known cola brands as conditional stimuli, while the unconditioned stimuli were four attractive water scenes. They found that conditioning of attitudes took place when the participants were aware of the contingency between the conditioned and unconditioned stimulus. Second, studies have shown that pairing a product with some preferred or disliked music can produce an association between the two (Gorn, 1982; Zander, 2006). Furthermore, Bierley et al. (1985) found that participants rated stimuli as preferable if they predicted pleasant music than if the stimuli predicted absence of music.

Another way to study variables influencing preferences in choice situations is through equivalence class formation and transfer of function, which is the approach taken in this chapter. Stimulus equivalence is defined as responding in accordance with the features of reflexivity, symmetry, and transitivity, and concepts are derived from mathematical set theory (e.g., Sidman & Tailby, 1982). Moreover, stimulus equivalence is concerned with stimulus substitutability, where different stimuli, which are not physically similar, may be members of the same class as a result of different types of conditional discrimination training (Green & Saunders, 1998). In contrast to stimulus generalization in which stimuli vary along one dimension, stimulus equivalence is a descriptive model for how arbitrarily related stimuli can become members of the same class and in many cases have the same function. Fields and colleagues used a transfer of function test to assess stimulus relatedness (Fields et al., 1993; Fields et al., 1995).

Research projects within stimulus equivalence research are studying topics such as (1) relations between stimuli that control behavior, (2) how stimuli change functions, and (3) how relations emerge without any programmed consequences. The last issue is related to the emergence of new relations and has been seen as a way behavior analysis can contribute to the study of cognition (e.g., Sidman, 1994). This means that if a certain number of relations are directly trained, a large number of relations will emerge without the arrangement of explicit reinforcement. The relation between the number of trained and emergent relations is illustrated in Figure 5.1. Furthermore, this can be expressed as trained relations = $c\ (m-1)$ and emergent relations = $c\ (m-1)^2$ in which c is the number of classes and m is the number of members (Arntzen, 1999). Therefore, to arrange training and testing in such a format as is argued in this chapter gives enormous potential for getting a number of new relations for free.

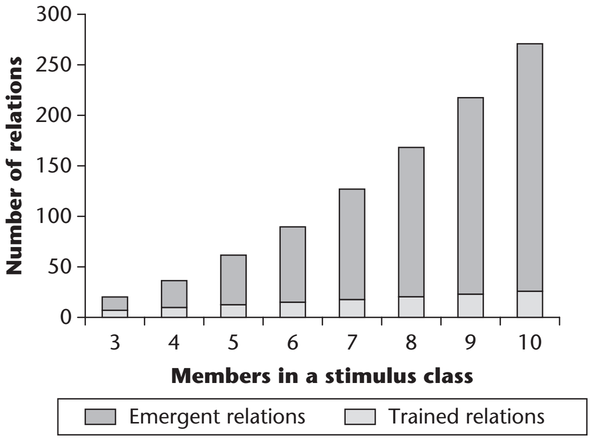

Figure 5.1 The number of trained and emergent relations

A hypothetical example of the relation between pictures of animals and corresponding names in different languages is shown in Table 5.1. The common nomenclature in this research area is that classes are labeled as numbers and members are labeled as letters. It is important to emphasize that in the example used they are already apportioning into different classes. A minimum requirement for training conditional discriminations for testing for stimulus equivalence is three members within two classes. However, it is most common to establish at least three classes as shown in Figure 5.2. In a potential three three-member class (A/B/C), in the presence of A1 (a picture of a cat) the participant is trained to pick B1 (the word cat) and not B2 (dog) or B3 (horse). In the presence of A2 (a picture of a dog), picking B2 (the word dog) is reinforced and not B1 (cat) or B3 (horse). In the presence of A3 (a picture of a horse), picking B3 (the word horse) is reinforced and not B1 (cat) or B2 (dog). Then, in the presence of B1 (the word cat), picking C1 (the word chat) is reinforced and not C2 (chien) or C3 (cheval). In the presence of B2, picking C2 is reinforced and not C1 or C3. In the presence of B3, picking C3 is reinforced and not C1 or C2. When baseline relations are established according to a mastery criterion of 90% or above (for further discussion see Arntzen, 2012), possible derived relations are tested in extinction conditions. Reflexivity is tested as A relations in the presence of A relations, and so forth. Symmetry relations are tested as BA and CB relations, while transitivity relations are tested as AC relations and global equivalence relations are tested as CA relations (e.g., Sidman & Tailby, 1982; Sidman et al., 1986).

The transfer of function can be characterized as a specific psychological function, which is explicitly established for one stimulus that participates in an equivalence relation. The same function may then transfer to the other stimuli participating in the relation without further training (e.g., Barnes-Holmes et al., 2000; Dougher et al., 1994; Roche & Barnes, 1997). Transfer of function refers to "the untrained acquisition or emergence of stimulus functions among members of stimulus classes" (Dougher & Markham, 1996, p. 139). In one study, Barnes-Holmes et al. (2000) trained potentially two three-member classes in a one-to-many (OTM) training structure (AB/AC). The A stimuli were nonsense syllables, VEK and ZID. The B stimuli were the words CANCER and HOLIDAY, and finally the A stimuli were trained to C stimuli, product labels BRAND X and BRAND Y. The participants were tested for equivalence formation following the training of conditional discriminations AB/BC. After finishing the test session, the participants were presented with two samples of cola-based soft drinks labeled BRAND X and

Table 5.1 A hypothetical example of different animal names in six different languages with pictures of the animals

Classes are indicated by numbers and members as letters. A = Pictures, B = English, C = French, D = German, E = Dutch, F = Norwegian, and G = Portuguese

Members	*No. of Classes*					
	1	*2*	*3*	*4*	*5*	*6*
A	Cat	Dog	Horse	Guinea pig	Rabbit	Hen
B	Cat	Dog	Horse	Guinea pig	Rabbit	Hen
C	Chat	Chien	Cheval	Guiné porc	Lapin	Poule
D	Katze	Hund	Pferd	Meerschweinchen	Kaninchen	Huhn
E	Kat	Hond	Hest	Cavia	Konijin	Kip
F	Katt	Hund	Hest	Marsvin	Kanin	Høne
G	Gato	Cão	Cavalo	Cobaia	Coelho	Galinha

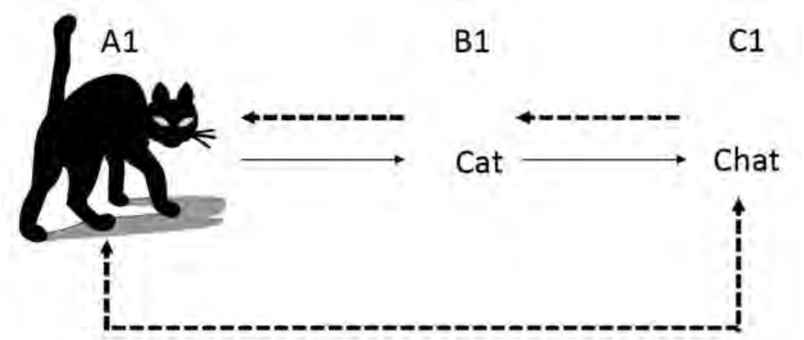

Figure 5.2 How the cat class is trained and tested

The other classes are not shown in the figure. The solid lines indicate the trained relations (AB and BC). The dashed lines indicates the tested relations. BA and CB relations indicate symmetry; AC and CA relations indicate transitivity and equivalence, respectively

BRAND Y. The results showed that when they were asked to rank the pleasantness of the colas there was a significant difference between the participants who passed the equivalence test and those who did not pass the test. They also showed in another experiment that it was possible to reverse participants' preference by reversing the conditional discrimination training.

In the current experiment, we present a stimulus equivalence approach including expansion of equivalence classes by including socially meaningful stimuli to understand consumers' brand choices. Hence, we asked if preference for specific but neutral stimuli is influenced by a test for transfer of function. First, we trained potentially three three-member classes with an OTM training structure (AB/AC). Second, we tested if the participants responded in accordance with stimulus equivalence. Third, social meaning stimuli (D) were trained to the nodal stimulus in the classes (A). Fourth, another test for responding accordance with stimulus equivalence was employed including all 12 stimuli. Finally, a preference test was arranged in which the participants were asked to pick one of three bottles of water labeled with printouts of the B1, B2, and B3 stimuli, respectively.

Method

Participants

Sixteen college students participated in the experiment: three females and 13 males. The average age of the participants was 27 years. They were recruited from the university college of the second author and they were not familiar with stimulus equivalence. The participants were informed that they could withdraw from the experimental session at any time. Each participant then read and signed an informed consent form. Finally, they were debriefed after the experimental session.

Apparatus and setting

The experimental sessions were conducted in a small, quiet room. The participants were seated in booths approximately 3.01 m^2 (215 × 140 cm), in front of a 45 × 90 cm table. The participants faced a wall or a window with drawn curtains. The booths were situated in two different housing locations affiliated with the laboratory, one approximately 25 m^2 in size and the other approximately 20 m^2. An HP computer, Compaq Nc 6320 PC with Windows 7 Professional 32-bit operating system, with custom-made matching-to-sample software, was used to present stimuli and record responses. The screen of the laptop was 15″, with a 16:9 aspect ratio and 1400 × 1050 resolution.

Stimuli

In Figure 5.3, the stimuli used to form potentially three three-member classes are shown, while in Figure 5.4 the stimuli used for expansion of the class size are shown. In Figure 5.3, the letters A, B, and C are the sets and the numbers are the different classes. This means that, for example, A1, B1, and C1 are within one experimenter-defined class.

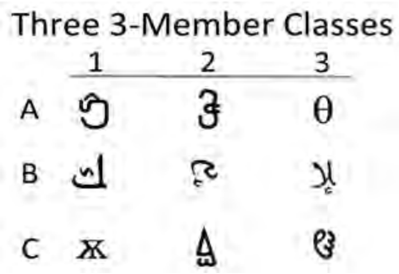

Figure 5.3 The abstract stimuli when forming three three-member classes

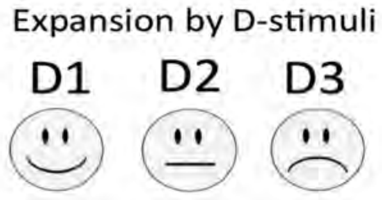

Figure 5.4 The stimuli used as D-stimuli

Procedure

The participants were told that they should not drink anything during the 90 minutes before the start of the experiment. All participants were reminded about this approximately 120 minutes before the experiment. All participants read an information sheet that explained the broad goals of the research conducted at the laboratory, although the purpose of the experiment was not mentioned and stimulus equivalence was neither defined nor explained. Each session lasted approximately 1–2 hours for the participants. The sessions started with instructions as described below.

When seated at the computer the participants were presented with the following instructions on the computer screen:

> In a moment a stimulus will appear in the middle of the screen. Click on this by using the computer mouse. Three stimuli will then appear in three corners of the screen. Choose one of them by clicking on it with the mouse. If you choose the stimulus we have defined as correct, words like "very good," "excellent," and so on will appear on the screen. If you press a wrong stimulus, the word "wrong" will appear on the screen. At the bottom of the screen, the number of correct responses you have made will be counted. During some stages of the experiment, the computer will NOT tell you whether your choices are right or wrong. Please do your best to get everything right. Thank you and good luck!

No further instructions were given before or after the experiment started.

When the participants finished reading the instructions, they pressed a square marked "Begin" on the bottom of the touch screen to start the experiment. A trial started with the presentation of a sample stimulus in the center of the screen. Touching the sample stimulus made it disappear, and three comparison stimuli then appeared simultaneously. The program determined the positioning of the comparison stimuli randomly from trial to trial. The comparison stimuli appeared in a circular layout, 160 mm from the sample stimulus. Choosing one of the comparison stimuli led to a 500-ms programmed consequence in which "good," "excellent," and so forth was displayed, following correct class-consistent responses. Choosing an incorrect comparison stimulus was followed by the display of "wrong." Reaction time was recorded based on the interval between touching the sample stimulus and selecting a comparison stimulus, which was transformed into the inverse reaction time. The intertrial interval (ITI) was set to 1,000 ms in all phases; at the end of the feedback interval, the screen remained black. No consequences resulted from touching the screen during the ITI or presentation of the feedback.

The participants were trained to form three three-member classes with arbitrarily related stimuli in an OTM training structure (AB/AC). An overview of the four steps of the procedure is shown in Figure 5.5. We employed a simultaneous protocol with a concurrent presentation of baseline relations. In the concurrent presentation, a mix of AB and CB trials were presented in a block with 18 trials, three of each trial type. The training trials were as follows: A1/B1B2B3, A2/B1B2B3, A3/B1B2B3, A1/C1C2C3, A2/C1C2C3, and A3/C1C2C3. In all strings, the first code is the sample stimulus and the underlined comparison is the correct stimulus choice. Trials were randomly presented. Following establishment of the conditional discriminations with 100% probability of programmed consequences, the programmed consequences were thinned from 75% to 50% until 0% probability of programmed consequences. The mastery criterion was an accuracy of 90% or more within a block for all phases. Then, a test including baseline trials (AB/AC), symmetry (BA/CA), and equivalence trials (BC/CB) was implemented (Step 1). The trials tested were: A1/B1B2B3, A2B1B2B3, A3B1B2B3, A1C1C2C3, A2C1C2C3,

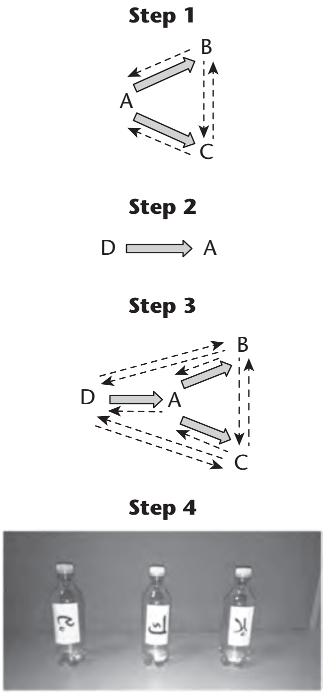

Figure 5.5 An overview of the different steps in the procedure

In Step 1, potentially three three-member classes are trained and tested. In Step 2, the D-stimuli are trained to the A-stimuli. In Step 3, all relations are tested. Finally, in Step 4, a preference for bottles of water with B-stimuli as labels is presented

A3C1C2C3 (i.e., directly trained trials), B1A1A2A3, B2A1A2A3, B3A1A2A3, C1A1A2A3, C2A1A2A3, C3A1A2A3 (i.e., symmetry trials), and B1C1C2C3, A2B1B2B3, A3B1B2B3, B1A1A2A3, B2A1A2A3, B3A1A2A3 (i.e., equivalence trials).

The test was done in extinction conditions. If the participants did not respond in accordance with the experimenter-defined classes, they were excluded from the session and thanked for their participation. If the participants responded in accordance with experimenter-defined classes, the test was followed by another training phase in which a picture of a face (smiling (D1), neutral (D2), or sour (D3)) was trained to the nodal stimulus (A1, A2, or A3) (Step 2). The training trials were as follows: D1/A1A2A3, D2/A1A2A3, D3/A1A2A3. Each trial was presented five times, which is a block of 15 trials with a criterion of 90% or above. Another test was implemented to see if the functions were transferred to all the stimuli within the class (Step 3). The trials tested were: A1/B1B2B3, A2/B1B2B3, A3/B1B2B3, A1/C1C2C3, A2/C1C2C3, A3/C1C2C3, D1/A1A2A3, D2/A1A2A3, D3/A1A2A3 (i.e., baseline trials), B1A1A2A3, B2A1A2A3, B3A1A2A3, C1A1A2A3, C2A1A2A3, C3A1A2A3, A1/D1D2D3, A2/D1D2D3, A3/D1D2D3 (i.e., symmetry trials), and B1/C1C2C3, B1/C1C2C3, B3/C1C2C3, C1/B1B2B3, C2/B1B2B3, C3/B1B2B3, D1/B1B2B3, D2/B1B2B3, D3/B1B2B3, B1/D1D2D3, B1/D1D2D3, B3/D1D2D3 (i.e., equivalence trials). The test was done in extinction conditions. After the participants had finished the test in Step 3, they were exposed to a preference test. On a table behind the computer, the experimenter placed three bottles of water, each of which had a different stimulus attached to it from the B set (B1, B2, and B3) (Step 4). The position of the bottles was randomly assigned. The participants were asked to pick a bottle and to give it to the experimenter. The participants were asked "Why did you pick that bottle?"

Results

The number of training trials when establishing the AB/BC relations varied from 150 to 600 trials with an average of 281 (see Table 5.2). The number of training trials for the extension of classes (DA training) varied between 15 and 45 trials. The lowest possible number of trials is 15. Three columns to the left of the "extension" column show the index of correct performance for baseline trials (DT), symmetry (Sym) and equivalence (EQ) in which correct performance is defined as 0.9 or higher. The three seminar columns to the right of the "extension" column show the index of baseline, symmetry, and equivalence trials after the extension training (D→A). The main findings are that the 16 participants formed equivalence classes following the OTM training of six conditional discriminations and, thus, formed three three-member classes. Furthermore, all participants formed three four-member classes following the DA training only. In the preference test after the final testing of equivalence class formation, 13 of the 16 participants picked the bottle of water labeled with the B1 stimulus. In other words, 81% of the participants showed preference for the stimulus in Class 1, the same class as the smiley face (D1).

Discussion

In summary, we used three identical bottles of water to show that it was possible to influence preference by forming equivalence classes followed by training a specific function (smiley,

Table 5.2 The number of training trials (No. of TT), trials during baseline (Bsl), indices of testing for symmetry (Sym) and equivalence (EQ) in Step 1, number of trials in extension with D-stimuli (Ext) in Step 2, indices of testing for symmetry (Sym) and equivalence (EQ), equivalence class formation (ECF) in Step 3, and whether the participants showed transfer of function (TOF) in Step 4

P#	*No. of TT*	*Bsl*	*Sym*	*EQ*	*Ext*	*Bsl*	*Sym*	*EQ*	*ECF*	*TOF*
13051	600	1.0	1.0	1.0	15	1.0	1.0	1.0	yes	yes
13052	270	1.0	1.0	1.0	30	1.0	1.0	1.0	yes	yes
13053	390	1.0	1.0	1.0	30	1.0	1.0	1.0	yes	yes
13054	330	1.0	1.0	1.0	30	1.0	1.0	1.0	yes	yes
13055	330	1.0	1.0	1.0	15	1.0	0.98	1.0	yes	yes
13056	210	1.0	1.0	0.97	30	1.0	1.0	1.0	yes	yes
13057	180	1.0	1.0	0.97	30	1.0	1.0	0.99	yes	yes
13059	240	1.0	1.0	1.0	30	0.98	0.98	0.99	yes	yes
13061	300	0.97	1.0	1.0	45	1.0	1.0	1.0	yes	yes
13062	210	1.0	1.0	1.0	15	1.0	1.0	1.0	yes	yes
13064	480	0.9	1.0	0.97	30	1.0	1.0	0.93	yes	yes
13067	180	0.9	1.0	0.97	30	1.0	1.0	0.93	yes	yes
13069	240	0.9	1.0	0.97	30	1.0	1.0	0.93	yes	yes
13058	150	1.0	0.93	0.93	15	1.0	1.0	1.0	yes	no
13060	180	1.0	1.0	1.0	30	1.0	1.0	1.0	yes	no
13068	210	0.9	1.0	0.97	30	1.0	1.0	0.93	yes	no

neutral, and sour face) to the nodal stimuli. The results showed that 13 of 16 participants (81%) picked the bottle with the B1-stimulus, indicating that the transfer of function test had influenced the preference. The present experiment replicated the previous findings on the effectiveness of using an OTM training structure in producing equivalence class formation (e.g., Arntzen et al., 2010; Arntzen & Hansen, 2011), the extension of equivalence classes (e.g., Sidman et al., 1985), and transfer of function (e.g., Barnes et al., 1995; Catania et al., 1989; Dougher & Markham, 1994; Ferro & Valero, 2007; Markham & Markham, 2002; Smyth et al., 2006). Furthermore, the results are in accordance with other studies showing that it is possible to influence preference in choice situations (Barnes-Holmes et al., 2000; Bierley et al., 1985; Gorn, 1982).

We know that consumers maximize specific combinations of utilitarian and informational reinforcement (Oliveira-Castro et al., 2015). We suggest that the unique combinations of these sources of reinforcement that consumers actually purchase form the basis of brand equity.

We have in particular established three stages in the process of symbolic learning by consumers which are most relevant to innovation in the sense of the introduction of new brands within established product classes. These three stages are: (1) the establishment of stimulus equivalences among stimuli (brands); (2) the transfer of function to an untrained stimulus (new brand); and (3) the establishment of consumer preference for the untrained stimulus. The first corresponds to consumers' perceptions of the brands that compose their consideration set, all of which exhibit stimulus equivalence. The second corresponds to the introduction of an initially neutral stimulus (untrained, the new brand) which emerges as equivalent to the established stimuli. The third is the extent to which consumers come to prefer the new brand to existing brands, at least to the extent of trying it. Whether they include the new brand in their choice sets will depend on the consequences of purchasing and consuming it. We therefore have (a) initially, a cognitive understanding of how the consumer learns the new stimulus and its equivalence to existing stimuli, and (b) the behavior analytic interpretation of how the new brand becomes accepted as part of the choice set.

We now have an explanation of how new brands come to exhibit functional equivalence to existing brands and can complete Ehrenberg's assertion of such equivalence by pointing to the processes by which functional equivalence is actually established in the marketplace.

Presumably the functional equivalence of the brands that compose a consumer's consideration set is based on the characteristics that define the product class in terms of utilitarian reinforcement while the motivating characteristics of brands reflect differences in informational reinforcement between brands. The establishment of stimulus relations between the utilitarian (functional) characteristic of the produce class and the informational reinforcement that comprises the identities of the brands that make it up is of particular interest.

Further research should include replication of the present experiment with different types of D-stimuli. We have done some pilot studies in the lab using different D-stimuli such as weather charts and monetary symbols. The results so far are quite promising but we need more participants. In addition, further experiments should include a group with neutral stimuli as D1, D2, and D3. The prediction is that the participants will pick B1, B2, and B3 with a probability of 33%. It also seems important to include a more extensive phase of training of D to A, which should be studied to see if this strengthens the relation to functional stimulus.

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