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CONSUMER BEHAVIOUR ANALYSIS:

II. CONSUMER BRAND CHOICE

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In the last decades, several regularities have been discovered concerning consumer brand choice and the behaviour of brands in the market (e.g., Ehrenberg, 1988), which should be considered by any researcher interested in the topic. Using consumer panel data of mainly, but not only, frequently bought branded consumer products bought on a regular basis (generally fast moving consumer goods, i.e., fmcg), Ehrenberg and colleagues have analysed enormous amounts of data and reported interesting and systematic results (for examples of and detail about the research programme see Ehrenberg, 1988; Ehrenberg, Goodhardt & Barwise 1990; Ehrenberg & Scriven 1999; Ehrenberg, Uncles & Goodhardt, 2004; Goodhardt, Ehrenberg & Chatfield 1984; Uncles, Ehrenberg & Hammond 1995). Among such results, Ehrenberg's (1972/1988) showed that most consumers practice multi-brand purchasing, choosing apparently randomly from a small "repertoire" of often three or four brands in a particular product category. Most of the brands are perceived to perform in a functionally similar way and are therefore assumed to be substitutable. Furthermore,

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consumers of a given brand tend to buy in total more items of the other brands of their subset in order to meet their requirements in that product category. For example, in the US breakfast cereal market consumers make on average about four purchases of the brand Shredded Wheat in one year, but buy other brands about 37 times in the same period (Ehrenberg & Goodhardt, 1977). By contrast, only a small proportion of consumers (approximately 10%) are exclusive buyers of or 100% loyal to any particular brand during, for example, one year. Sole buyers are described as relatively light users of their favourite brand, disconfirming traditional marketing research which claims that showing exclusive loyalty to one particular brand is to be set equal with being a heavy user and therefore a disproportionately valuable to the company. This also contrasts with the wide-spread belief that higher loyalty rates lead to improved profitability (Reichheld and Sasser, 1990). When comparing across brands, results show that competitive brands differ mainly in the number of buyers they have and not so much in how loyal those buyers are, although there is a 'double-jeopardy' (DJ) tendency, that is, brands with smaller market shares do not only attract fewer buyers of the product category but those buyers buy the brand less frequently than buyers of larger brands. All these results have been replicated across more than 50 product categories (for example, grocery products, aviation fuel, store choice, newspapers) and few exceptions have been found in the fmcg market, such as the observed deviations discovered in some US Spanish-language and religious TV stations, which attract heavy viewing from their relatively few viewers (Ehrenberg et al., 1990).

This line of research has enabled the development of a mathematical model to describe the regularities found, the Dirichlet Model (Ehrenberg et al., 2004; Goodhardt et al., 1984), which comprises two main areas: repeat-buying patterns of whole product categories and brand-purchasing patterns. Thus, by making some basic assumptions, the model can specify probabilistically how many purchases in one product category each consumer makes in a time-period and which brand he or she buys on each occasion. Moreover, the performance of single brands can be predicted in different situations such as market introduction or during and after sales promotions (Ehrenberg, 1991; Ehrenberg, Hammond & Goodhardt, 1994). The model has been criticized mainly for the reason that it does not give attention to the underlying patterns and motivations of consumers and their purchases (Bartholomew 1984; Jeuland 1984) or the underlying variables (Popkowski-Leszczyc, Sintra and Timmermans 2000). It is certainly true that Ehrenberg's work has remained largely descriptive and has not questioned why consumers behave in the way that has been repeatedly observed. Goodhardt et al. (1984, p. 638) have also supported this: "why one person (or household) generally consumes more toothpaste or soup than others, or somewhat prefers brand j to k or vice versa, is not accounted for by the model and is in fact at this stage still largely unknown".

The following are some of the questions left unanswered by this line of research: 1) It has been assumed that brands within an individual's repertoires are functionally substitutes, but can this be empirically demonstrated or tested? 2) Is the quantity consumers buy on each shopping occasion relatively constant, as assumed by the model? 3) Although it has been assumed that any consumer can have any brand repertoire, how are brand repertoires formed? In what follows, lines of research that have investigated these questions are described.

Substitutability of brands and the Matching Law

Choice, according to behavioural interpretations, is usually treated as the rate at which a particular behaviour is performed, usually in the context of other competing behaviours (Herrnstein, 1997). This view suggests that choice is not a single event but the distribution of behaviour over time, for example, the proportion of times that A is chosen over B or B over C. The behavioural explanation for choice is sought not in mental deliberations, as cognitive psychology would suggest, but in the environmental events that accompany the behaviours in question, the pattern of reinforcement and punishment that increases or decreases the

probability of those behaviours being repeated and the contingencies encountered. The analysis of any one choice (i.e., any one sequence of behaviour) requires the analysis of other behavioural choices that might have been enacted instead and the configurations of reinforcement and punishment that maintain or inhibit them. In the context of the study of choice in behavioural psychology, the matching law is a quantitative formulation describing a proportional relationship between the allocation of an organism's behaviour to two concurrently available response options on the one hand and the distribution of reinforcement between the two concurrent behaviours on the other hand (Herrnstein, 1961). The matching law states that animals or human beings match their behaviour in proportion to the reinforcement the behaviour produces. In experiments using pigeons as subjects, Herrnstein (1961, 1970) found that organisms distribute their behaviour between the two options according to the rate of reinforcement the behaviour receives from responding to each option respectively. If animals such as pigeons and rats have the opportunity to choose between pecking key X or key Y, each of which delivers food pellets (reinforcers) on its own concurrent variable-interval schedule ², they allocate their responses on X and Y in proportion to the relative rate of reinforcement R. Hence, individuals are said to "match" their behaviour in proportion to the reward or punishment this behaviour obtains. In its general formulation, the matching law can be described by the following equation (Baum, 1974):

$$\frac{B_x}{B_y} = s \left(\frac{R_x}{R_y} \right) \quad \text{Equation 1}$$

where B is the behaviour the individual allocates to options x and y and R is the reinforcement contingent upon that behaviour. The parameters b and s are empirically obtained, and can be interpreted as measures of bias towards one of the alternatives and of sensitivity to changes in reinforcement ratio, respectively.

Rachlin, Kagel and Battalio (1980) propose that the exponent s in Equation 1 represents substitutability between reinforcement sources, that is, when the exponent s is equal to 1.0 there is perfect substitutability between reinforcers. According to this interpretation, after some necessary adaptations related to characteristics of consumer brand choice, the generalized matching law can be used to measure the level of substitutability between different brands. In the case of brand choice, the equation is calculated based upon the ratio of the amount paid (responding) for the preferred brand divided by the amount paid for the other brands as a function of the ratio of the amount bought (reinforcement) of the preferred brand divided by the amount bought of the other brands (cf. Foxall, 1999). The data in this case can be obtained from consumer panels, formed by volunteers who record all their purchases within certain product categories during several weeks and passes the information on to commercial firms or researchers.

Recent investigations using a small sample of consumers (Foxall & James, 2001, 2003) recording purchases of three products and an 80-consumer panel including data for nine different product categories, obtained from a commercial firm (Foxall et al., 2004; Foxall & Schrezenmaier, 2003), indicated that exponents of Equation 1 were very close to unity, showing matching. These results demonstrate that brands within consumers' repertoires function as substitutes, corroborating the assumption put forward by Ehrenberg and colleagues.

Constant quantity: Inter-and intra-consumer demand elasticity

² An interval schedule maintains a constant minimum time interval between rewards (reinforcements). Fixed interval schedules maintain a constant period of time between intervals, while on a variable interval schedule the time varies between one reinforcer and the next. Concurrent schedules permit simultaneous choice procedures.

One way of examining whether the quantity consumers buy on each shopping occasion is relatively constant, as assumed by the Dirichlet Model, would be to calculate the elasticity of demand for different product categories. An analysis of demand elasticity relates the amount consumed or purchased as a function of changes in price. In its simplest quantitative form:

$$\text{Log Quantity} = a - b (\text{Log Price}) \quad \text{Equation 2}$$

Where a and b are empirically obtained parameters interpreted as intensity and elasticity of demand, respectively (cf. Hursh, 1984). Values of b significantly different than zero would indicate that the quantity consumers purchase on each shopping trip changes significantly as prices change, suggesting that the quantity individuals buy does change systematically across shopping occasions.

Based on data from a panel of 80 consumers, Oliveira-Castro et al. (2005) calculated overall demand elasticity for each of nine product categories (baked beans, biscuits, breakfast cereals, butter, cheese, fruit juice, instant coffee, margarine and tea). For each product, Equation 2 was calculated using all data points obtained from all consumers. Results showed that overall elasticity coefficients were significant ($p \leq .01$) for all nine product categories and ranged from -.23 to -1.01, indicating that quantity bought was not constant and decreased significantly with increases in price.

Although these results refute the constant quantity assumption, they do not clarify the buying patterns associated to changes in quantity. As overall demand elasticity coefficients were calculated by including all data points from all consumers, the observed decreases in quantity bought could be due to different consumers buying different quantities, the same consumers buying different quantities on different occasions, or any combinations of these two patterns. With the purpose of answering this question, Oliveira-Castro et al. (2006) calculated inter- and intra-consumer elasticities using the same data set. Inter-consumer elasticity would occur if consumers that buy in average larger quantities pay in average lower prices than consumers that buy in average smaller quantities. Intra-consumer elasticity would occur if consumers were to buy larger quantities when paying lower prices than when paying higher prices, across shopping occasions. Oliveira-Castro et al. (2006) calculated inter-consumer elasticity based on the average quantity and price for each consumer for each product category. Inter-consumer elasticity coefficients were negative for all nine product categories and significant ($p \leq .05$) for seven of them, indicating that consumers that buy in average larger quantities tend to pay lower prices. Intra-consumer elasticity coefficients were calculated for each consumer using all data points from all product categories, normalized according to each consumer's mean quantity and price in each category. Intra-consumer elasticity coefficients were negative for 93.4% of consumers and significant for 75% of them. These results indicate that consumers tend to buy larger quantities when paying lower prices. Taken together, these findings refute the constant quantity assumption and suggest that consumers' choices within their brand repertoires are price sensitive (rather than random).

Brand repertoires: The role of utilitarian and informational benefits

With the purpose of testing if brand repertoires are related somehow to the level of utilitarian and informational reinforcement of the brands, as suggested by the BPM, Foxall et al. (2004) developed a classification of brands according to their benefit levels. Based on the already-mentioned 80-consumer panel data set, the authors ranked each brand according to two levels of utilitarian benefit and three levels of informational benefit. Benefit levels were ranked based on the interpretation that brands represent programmed reinforcement contingencies arranged by managers and producers. The choice of two utilitarian and three informational levels was based on the size of the sample (not all brands and brand types were

purchased by members of the sample during the period) and on the purpose of making comparisons across product categories. Thus, the different levels of utilitarian and informational benefit cannot be defined absolutely: they ultimately are a result of each researcher's focus and interest. For example, as Foxall et al. (2004) pointed out, more levels of utilitarian reinforcement could have been identified for some product categories (e.g., cookies and cheese) in the sample they used, but an equal number of levels across products was considered beneficial for their analysis.

In the marketing context of routinely-bought supermarket food products, higher levels of utilitarian benefit can be identified by the addition of (supposedly) desirable attributes. These attributes are considered to have value-adding qualities for the product or its consumption, they are visibly declared on the package or are part of the product name, and ultimately justify higher prices. Moreover, in most cases, several general brands offer product varieties with and without these attributes. In Foxall et al.'s (2004), utilitarian levels were assigned based on additional attributes (e.g., plain baked beans vs. baked beans with sausage) and/or differentiated types of products (e.g., plain cookies vs. chocolate chip cookies). In the case of differentiated product types, several manufacturers tend to offer the different product types at differentiated prices (e.g., plain cookies were cheaper than more elaborate cookies for all brands examined).

By contrast, informational reinforcement can be linked to brand differentiation, which in turn is usually also related to price differentiation, because the most promoted and best known brands tend to be related to higher levels of prestige, social status, and trustworthiness. In fact, there is a particularly close association between informational reinforcement and brand differentiation in the fmCG context. As an example, when comparing the levels of brand differentiation of Tesco Value and Kellogg's Cornflakes, Kellogg's is clearly the better known, more differentiated and also more expensive brand, with a higher programmed level of informational reinforcement. This type of variation among brands has been translated into different levels of informational reinforcement. It should be noted that the classification of informational reinforcement levels does not rule out the possibility of there also being different degrees of utilitarian reinforcement between two informational levels. Naturally, a company spokesperson of Kellogg's, or for that purpose any other differentiated brand such as Heinz or DelMonte, would claim that their products are distinct from those of other companies in terms of their "utilitarian" attributes, for instance the quality of raw materials and ingredients, production procedures or health aspects. Equally, buyers and users of differentiated brands are likely to confirm such brands' superiority, e.g., the much better taste in comparison the other, cheaper brands.

In this first attempt of categorizing different levels of reinforcement Foxall et al. (2004) took such possibilities into consideration, since most consumer behaviour generates both types of consequences. Nevertheless, because brands usually have almost identical formulations (cf. Ehrenberg, 1972/1988; Foxall, 1999), the ranking of informational reinforcement was based on the predominant, more obvious differences between brands. In fact, there is evidence that consumers may not even be able to distinguish between brands of one product category on the basis of their physical characteristics (e.g., in blind tests).

In Foxall et al.'s (2004) study, the following criteria were the basis for determining the different levels of informational reinforcement: 1) increases in prices across brands for the same product type (e.g., plain baked beans, plain cookies or plain cornflakes) were considered to be indicative of differences in informational levels; 2) the cheapest store brands (e.g., Asda Smart Price, Tesco Value, Sainsbury Economy) were considered to represent the lowest informational level (Level 1); 3) store brands without the add-on good value for money or economy (e.g., Asda, Tesco, Sainsbury) and cheapest specialized brands were thought to embody the medium informational level (Level 2); and 4) higher-priced, specialized brands

(e.g., Heinz, McVities, Kelloggs, Lurpak), were assigned to Level 3, the highest informational level.

After classifying all brands of all nine product categories, Foxall et al. (2004) examined consumers' brand choices within and across informational levels. This analysis made clear that most consumers bought mostly brands at one particular informational level, rather than across all levels. The percentage of consumers that bought 70% or more of goods at one particular informational level was: for baked beans 92%, tea 91%, coffee 84%, margarine 84%, butter 81%, cereals 68%, fruit juice 68%, cheese 64%, and biscuits 58%. This showed that the majority of consumers made 70% or more of their purchases within brands at the same informational level. Similar analyses also showed that, for 8 of 9 product categories, most consumers also made the large majority of their purchases within the same utilitarian level. The percentage of consumers who made 70% or more of their purchases within the same utilitarian level was: for butter 91%, for baked beans 85%, coffee 84%, tea 84%, cheese 82%, fruit juice 77%, margarine 74%, cereals 66%, and biscuits, 42%. Taken together, these findings clearly indicate that consumers' repertoires of brands are related to the level of informational and utilitarian benefits offered by the brands. This is a clear step in the direction of understanding the formation of brand repertoires, which can be very useful to marketing segmentation strategies.

Intra- and inter-brand elasticities

The previously described tendency of buying larger quantities when paying lower prices still raises questions about the underlying choice patterns. Do consumers buy larger quantities of a given Brand A when Brand A's price is lower or do they buy larger quantities when buying a cheaper Brand B or some combination of both? One of the ways of answering this question would be to analyse intra- and inter-brand elasticities. Intra-brand elasticities would occur if consumers were to buy larger quantities of Brand A when Brand A is cheaper (due to price promotion or regular package size discount). Inter-brand elasticity would occur if consumers were to buy larger quantities when buying a cheaper Brand A than when buying a more expensive Brand B. A theoretically interesting way of looking at inter-brand elasticity would be to consider that inter-brand switching may occur across utilitarian levels, across informational level, or both. This would not only provide information about inter-brand elasticity in general, but would also suggest the type of benefits that may be influencing consumers' choices.

Oliveira-Castro, Foxall et al. (2005) conducted these analyses using data from the 80-consumer panel described previously. Intra-brand elasticity was calculated considering changes in quantity and price relative to the average quantity and price for each brand. So, intra-brand elasticity measured changes in quantity above and below the average quantity bought for the brand when its price changed above and below the brand average. Two types of inter-brand elasticities were calculated. Informational inter-brand elasticity, measuring changes in quantity bought as a function of changes in the informational level of the brands, and utilitarian inter-brand elasticity, measuring changes in quantity bought as a function of changes in the utilitarian level of the brands.

Multiple regression analyses, with quantity bought as a function of intra-brand price, inter-brand utilitarian level, and inter-brand informational level (all in log scales), revealed that all elasticity coefficients were significant ($p \leq .05$) for at least eight of the nine product categories (cf. Oliveira-Castro, Foxall et al., 2005). These results suggest that the observed overall demand elasticity can be decomposed into these three choice patterns. Moreover, when the types of coefficients were compared, results showed that intra-brand elasticity coefficients were larger than inter-brand utilitarian elasticity coefficients, which, in turn, were larger than inter-brand informational coefficients.

Some conclusions concerning brand choice

The results presented here answered, at least partially, some of the open questions concerning consumers' patterns of brand choice. One can conclude from this line of research on brand choice that: 1) The vast majority of consumers practice a multi-brand repertoire when purchasing fmcg; 2) Brands within the repertoire are functionally substitutable; 3) Brand repertoires are mostly formed by brands belonging to the same level of utilitarian and informational levels; 4) Consumers that buy larger quantities in average tend to pay lower prices in average; 5) Consumers tend buy larger quantities when paying lower prices; 6) This tendency of buying larger quantities with lower prices is related to three different patterns: buying larger quantities of a given brand when its price is lower (intra-brand elasticity), buying larger quantities when buying a brand with lower utilitarian level (utilitarian elasticity), and buying larger quantities when buying a brand with lower informational level (informational elasticity); 7) Intra-brand elasticity is higher than utilitarian elasticity, which is higher than informational elasticity.

Conclusion

Consumer behaviour analysis is a new and fast growing field of research (cf. Foxall, 2002; Oliveira-Castro & Foxall, 2005). The investigation of brand choice was presented here as an example of how the field uses behaviour principles, usually gained experimentally, to interpret human economic consumption. In addition, laboratory experiments with human subjects have enabled propositions about matching to be examined empirically in a simulated shopping mall context (Hantula, DiClemente, & Rajala, 2001; Rajala & Hantula, 2000), and other experiments have allowed propositions with regard for instance to unit pricing to be examined with human consumers (e.g., Madden, Bickel & Jacobs, 2000).

The area stands academically at the intersection of behavioural economics on one hand, and marketing science – the study of the behaviour of consumers and marketers, especially as they interact – on the other. Whilst behaviour principles are central to its theoretical and empirical research program, its quest to interpret naturally occurring consumer behaviour such as purchasing, saving, gambling, brand choice, the adoption of innovations, and the consumption of services raises philosophical and methodological issues that go beyond the academic discipline known as the 'experimental analysis of behaviour', 'analysis' or 'behavioural economics'.

However, there remain problems of interpreting the behaviour of consumers acting *in situ* and subject to the multiple influences of modern marketing management and the societal influences that shape consumption. Psychology has long attempted to formulate *rules of correspondence* by which the theoretical constructs it employs to denote unobservable operations can be related to observed behaviour. The aim of radical behaviourists has generally been to avoid theoretical terms of this kind but different sorts of rules of correspondence are needed: rules that relate the findings of laboratory research to the interpretation of everyday life to which we address ourselves. The full scope of consumer behaviour analysis is not yet fixed: diversity of materials and viewpoints is an essential element in the intellectual adventure and what will prove central and what merely useful has yet to be established.

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