Behavioural psychology, marketing and consumer behaviour: A literature review and future research agenda

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Biography: Victoria Wells is Senior Lecturer in Marketing at Durham University Business School and Mid-Career Fellow at the Durham Energy Institute (DEI). Her research interests lie in the application of behavioural psychology to consumer choice, foraging ecology models of consumer behaviour, and environmental behaviour, psychology and social marketing. She joined Durham University Business School in 2011 after holding the post of Research Associate and Lecturer in Marketing and Strategy at Cardiff Business School. Before joining Cardiff Business School, she worked in Marketing Communications as an Account Executive. She has published in a wide range of journals, including *Journal of Business Research, Journal of Marketing Management, Marketing Theory, Service Industries Journal* and *Psychology & Marketing*, amongst others, and is editor of the *Handbook of Developments in Consumer Behaviour* published in 2012.

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Abstract Psychology, along with a wide range of other academic disciplines, has influenced research in both consumer behaviour and marketing. However, the influence of one area of psychology—namely, behaviourism—on research on consumers and marketing has been less prominent. Behaviourism has influenced consumer and marketing research through the application of classical and operant conditioning, matching, and foraging theories, amongst other frameworks, during the past 50 years. This article provides a review of research and applications of behavioural psychology in the area, as well as a brief introduction of behavioural psychology for scholars unfamiliar with the area. The article also suggests avenues for further research examining the potential development of behavioural psychology approaches for both consumer and marketing researchers.

Summary statement of contribution Although prior research has reviewed specific areas of behavioural psychology influences on consumer behaviour and marketing research (Pornpitakpan, 2012) and others have provided an overview of all areas (classical and operant conditioning, foraging, consumer behaviour analysis etc) (DiClemente & Hantula, 2003a), the current research is the most detailed, up-to-date review of the area that both combines a review of operant and classical conditioning, matching, and foraging theories and provides a comprehensive future research agenda.

Keywords behaviourism; behavioural psychology; operant conditioning; classical conditioning; consumer behaviour analysis; foraging

Introduction

The aims of this article are threefold. First, it strives to provide an overview of the state of behavioural psychology approaches and their applications to marketing and consumer behaviour research. Although prior work has reviewed some aspects of behavioural psychology research and introduced or discussed behaviourism in the area of marketing and consumer behaviour (e.g. DiClemente & Hantula, 2003a; Pornpitakpan, 2012), little, if any, research has combined these in an overall review in marketing management literature. Second, this article aims to provide an introduction to behaviourist thought for scholars unfamiliar with behaviourism, including an understanding of how it developed as an independent field and how its influence in marketing and consumer psychology began and has continued to the present day. Third, the article suggests several avenues for further research examining the potential development of behavioural psychology approaches for both consumer and marketing researchers.

Behaviourism developed in the early 20th century as an approach to psychology that argued that the only appropriate subject matter for scientific psychological investigation was observable, measureable behaviour (Foxall, 1987) and that behaviour was a function of its consequences and environment (Rothschild & Gaidis, 1981). Significant avenues of behaviourist thought have developed throughout history, though such thought is generally attributed to the American psychologist John B. Watson, who is credited with fathering the discipline (Bales, 2009). Watson's approach was 'antimentalist to the extreme', 'embodied a strict environmentalism', and relied on 'only that which is publicly verifiable in attempts to theorise about, explain and predict behaviour' (Reber, Allen, & Reber, 2009). Watson made great strides in academia and had a renowned national reputation (Kreshel, 1990), but it is perhaps his approach to advertising that is most widely remembered. Watson's advertising career began in 1920, when he joined the J. Walter Thompson Company, after being

dismissed from academia, and was able to apply his work in behaviourist theory in an entirely new way, though it is widely debated how much he applied his theories beyond his role as 'ambassador-at-large' for the company (Bales, 2009; Buckley, 1982; Kreshel, 1990).

Along with Watson, other notable behavioural academics include Ivan Pavlov, who studied conditioned responses through experimentation and is best known for his studies on a particular form of behaviourism called 'classical conditioning', and B. F. Skinner, who denied the usefulness of hypothesising about unobservable acts, such as the concepts of freedom, will, and dignity, and is most famous for his exploration of operant conditioning. Considerable debate and discussion surrounds the classification of differing types of behaviourism and the relevant similarities and differences between them. Skinner (1974) distinguished two types of behaviourism: methodological (based on the development of Watson's work) and radical (which attempts to understand and analyse behaviour in relation to its environmental context) (Blackman, 1985). O'Donohue and Kitchener (1999) note that there are at least 15 different behaviourisms based on both influential behaviourists (e.g. Watsonian behaviourism, Tolman's purposive behaviourism) and broader categorisations (e.g. radical behaviourism, theoretical behaviourism). Few of these approaches have been employed in marketing and consumer behaviour, and thus the reminder of this article focuses only on the specific areas that have been transferred and applied in marketing and consumer behaviour.

One of the most well-known and frequently used behaviourist approaches, and one that has been applied systematically to marketing and consumer behaviour studies, is classical conditioning, which 'occurs when a stimulus that elicits a response is paired with another stimulus that initially does not elicit a response on its own. Over time, this second stimulus causes a similar response because it is associated with the first stimulus' (Pachauri, 2002, p. 324). A second well-known approach, also applied to marketing and consumer

behaviour studies, is operant (sometimes called instrumental) conditioning, which 'occurs as [an] individual learns to perform behaviours that produce positive outcomes and to avoid those that yield negative outcomes' and puts emphases on reinforcement associated with a response (see Pachauri, 2002, p. 324).

Early attempts to apply behavioural psychology to marketing and consumer behaviour appeared in the 1950s and 1960s. Goldsmith (2004, p. 13) notes the key reason behaviourist approaches are relevant to consumer behaviour and stimulated this early interest as follows:

> [H]humans are animals that have evolved over long periods of time. As such, humans behave much like other animals because they learn and adapt due to their interactions with the environment, and their learned behaviour is analogous to animal behaviour so that it can be modelled (described) mathematically as patterns of responses to environmental stimuli.

Critiques of cognitive and social psychological models of consumer behaviour suggest that they have often failed to explain observed variations in behaviour and have led some researchers to explore alternative explanations, one of which is behaviourism (Foxall, 2002; Wright, 1998). Rothschild and Gaidis's (1981) early application of operant principles was also motivated by Kassarjian's (1978) presidential address to the Association for Consumer Research, during which he suggested that behaviourism could be useful in analysing consumer decisions that are 'unimportant, uninvolved, insignificant and minor' and 'do not need a grand theory of behaviour' (see Rothschild & Gaidis, 1981, p. 70).

Rothchild and Gaidis's (1981) work also laid the foundation for much of the behavioural psychology applications to the area that followed. Their work covered a range of core principles, including shaping procedures, a process to derive new desired behaviours, which are learned over time, as intermediate actions are rewarded (Pachauri, 2002). The

procedure involves arranging conditions, for example, by positively reinforcing successive approximations of the desired behaviour (Nord & Peter, 1980). In addition, they note that reinforcement can be arranged on schedules, which can, in their simplest form, be continuous (reinforcing the behaviour every time) or intermittent (not reinforcing the behaviour every time). They also note that both primary reinforcers (e.g. food, water) and secondary reinforcers (e.g. those that are learned or conditioned and can include money or tokens; Foxall, 1990) can be used in marketing, though as Peter and Nord (1982) note, in most circumstances money can be easily exchanged for food and other primary reinforcers and may be more flexible and useful for marketing strategies. Rothschild and Gaidis (1981) also presented the core principle of extinction, describing it as the removal of a correlation between a response and a reward, resulting in the extinction of the behaviour in focus. In marketing, they give the lack of reinforcement as a reason for poor product performance, which leads to extinction of the behaviour (the purchase of the product).

The exploration of less well-known behavioural psychological approaches and their application to marketing and consumer behaviour respond well to calls both for a more pluralistic and interdisciplinary culture in consumer research (Marsden & Littler, 1998) and for multi-paradigm research (Tadajewski, 2004). Furthermore, O'Shaughnessy (1997, p. 682) highlights the 'silliness of assuming there is just one overall explanation of buying behaviour', and Foxall (2001) states that the behavioural aspects of his work have never been 'an attempt to reassert the importance of behavioural psychology to the exclusion of cognitive or other perspectives on consumer choice' (p. 166) and it has 'never sought to pursue a behaviourist approach to the exclusion of other perspectives; indeed the coexistence and interaction of multiple theoretical viewpoints is central to its conception of intellectual development' (p. 183). Thus, the current article supports the notion that it is crucial to understand approaches based on behaviourism, as any other approach or paradigm, to ensure

that the production of theory does not result in 'intellectual provincialism' (Tadajewski, 2004, p. 322). Indeed, many of the current approaches employ a blended approach, mixing both cognitive (e.g. attitudes) and behavioural (e.g. classical conditioning) standpoints.

The remainder of this article reviews the main areas previously discussed, starting with a review of classical conditioning approaches to marketing and consumer behaviour, followed by operant/instrumental approaches—in particular, consumer behaviour analysis (CBA) and applied behaviour analysis—and ending with the behavioural ecology of consumption (BEC). Space restrictions preclude addressing all areas of behaviourism in consumer behaviour and marketing, such as preference analysis (see Wright, 1998) or vicarious learning (Nord & Peter, 1980); however, one area briefly noted is the study of aggregate behaviourism, the foundation on which some of the matching and CBA work is based and integrated. As with all behaviourists, aggregate behaviourists reject the study of beliefs and desires in favour of observable behaviours but also examine behaviour not at the individual level but at the aggregate level (Wright, 1998). Ehrenberg (1988) has been successful in his studies of aggregate behaviour, mathematically modelling the regularities between market penetration and average purchase frequency and, in turn, developing the Dirichlet model. Therefore, the current article also briefly touches on the methods employed by behavioural psychologists and how these have been applied to consumer and marketing research. The article concludes with an overview of the state of behavioural psychology approaches to consumer and marketing research and suggests avenues for further research.

Classical conditioning in marketing and consumer behaviour research

> [Classical conditioning is] an experimental procedure in which a conditioned stimulus (CS) that is, at the outset, neutral with respect to the unconditioned response (UR) is paired with an unconditioned stimulus (US) that reliably

elicits the unconditioned response. After a number of such pairings the CS will elicit, by itself, a conditioned response (CR) very much like the UR (Reber et al., 2009).

The best-known example of classical condition is Pavlov's work, in which the sound of a metronome acted as the conditioned stimulus (CS), food as the unconditioned stimulus (US), and salivation as the unconditioned and conditioned responses (UR/CR) (Macklin, 1986). The food (US) automatically caused the dogs to salivate (UR), and when the sound of the metronome (CS) was paired (followed by) with the food, the dog responded to the sound of the metronome by salivating (CR) (see Figure 1).

Figure 1 Pavlovian conditioning

US (food) ----------→ UR (salivation)

CS(sound of the metronome)/US (food)(pairing of CS and US) ----------→ UR (salivation)

CS(sound of the metronome) ----------→ CR (salivation)

Source: Adapted from Macklin 1986.

Allen and Janiszewski (1989), based on their work on contingency awareness, provide an anecdotal illustrative example of how classical conditioning could work successfully and be correctly used in advertising (a television commercial for Diet Pepsi), in which most of the work on classical conditioning in consumption and marketing has taken place. They suggest that:

This commercial features a repetitive musical jingle with a series of brief visual clips. The jingle lyrics-"Now you see it, now you don't, here you have it, here you won't"-are precisely coordinated with the image presentation … the

> CS (the brand) predicts the US (a slim female torso). In each instance "Now you see it, now you don't" is sung as first the brand (CS) and then a trim-figured woman (US) is shown (pp. 39–40).

Overall, there has been mixed support for classical conditioning effects in advertising, but the general suggestion is that positive attitudes towards an advertised product (CS) might develop through their association in a commercial with other stimuli that are reacted to positively (US), such as pleasant colours, music, and humour (Gorn, 1982).

Early work applying classical conditioning to advertising appears to have been based on and inspired by the work of Razran (1938), who paired a free meal (US) with various political statements (CS). He found that agreement with the slogans was greater when people received a free meal than when they did not. The work of Staats and Staats (1958), who successfully associated visually presented nonsense symbols (CS) with several spoken words (US) such as beauty, healthy, smart, and success, opened the door further for a classical conditioning approach to advertising. After the associative pairings, the participants' ratings of the CS indicated that the core meaning in the US (i.e. either positive or negative evaluation) had transferred to the nonsense syllables (Allen & Janiszewski, 1989). In a second experiment, Allen and Janiszewski associated each of two national names ('Swedish' and 'Dutch') with either 18 positive or 18 negative words. The national name paired with positive words was later evaluated more favourably than the one paired with negative words.

Gorn (1982) was the first marketing academic to attempt empirical work in the area of classical conditioning. His study, which used liked and disliked music to condition attitudes towards a pen, is one on which the majority of studies in the area are based. For example, Allen and Madden (1985, p. 301) stated that 'communication researchers' interest in the classical conditioning framework has intensified recently; it is now common to find

conditioning offered as one possible explanatory mechanism in the "peripheral route" to persuasion'. They also argued that behavioural psychology was fitting well into the area of uninvolved choices. Although this view has continued, the awareness debate is thought to have broadened the potential involvement level that can be targeted through classical conditioning.

Throughout the 1980s, 1990s, and beyond, a range of experiments have built on the work of Gorn (1982) by adding and testing concepts and characteristics of classical conditioning discovered through animal experimentation. Table 1 summarises key features of classical conditioning empirical work from 1982 to 2008. The table organises the studies by the specific characteristics of classical conditioning examined (see the characteristics of classical conditioning outlined by McSweeney and Bierley (1984)). Many of the experimental studies included in the table (e.g. Allen & Janiszewski, 1989; McSweeney & Bierley, 1984; Till & Priluck, 2000; Till, Stanley, & Priluck, 2008) employ the procedure set out by Rescorla (1967) to demonstrate true classical conditioning from other pseudo-conditioned responses (Bierley, McSweeney, & Vannieuwkerk, 1985). The procedure uses both a group subjected to the experimental procedure (pairing of CS and US) and a second random-control group, for which the pairings are presented randomly. Classical conditioning is said to occur only if preferences increase for the experimental group and do not increase for the random-control group (Bierley et al., 1985).

[insert Table 1 here]

In experimental work on classical conditioning, research has attempted to test and explore similarities and deviations from classical conditioning, many of which are outlined and highlighted by McSweeney and Bierley (1984). They provide a comprehensive overview of five situations in which classical conditioning may not occur, as well as six characteristics

of classical conditioning observed in advertising and consumer behaviour, which are discussed next (see also Table 1).

Acquisition and extinction

The first characteristic, acquisition, indicates that classically conditioned responses do not fully appear after only one pairing/trial, and the strength of the response increases with the number of pairings (McSweeney & Bierley, 1984). Whereas early studies (see the first part of Table 1) used only one or an arbitrary number of pairings, experimenters quickly began testing the optimum level of pairings/trails, often experimenting with different numbers of pairings in different experimental groups. The focus of the first of the four experiments by Stuart, Shimp, and Engle (1987) was on testing the amount of conditioning with different numbers of pairings (1, 3, 10, and 20). They found that the groups subjected to higher levels of pairings/trials (10 and 20) demonstrated significantly higher levels of conditioning. They also attempted to test the optimum number of trails to ensure effective conditioning and used 1, 3, 10, and 20 pairings of the CS and US; they found that conditioning was greater as the number of trials increased. Although other studies have used different trial numbers, there remains no agreement on an optimum number of trails for conditioning to occur.

Extinction is the prediction that the conditioned behaviour will disappear if the predictive relationship between the CS and the US is broken by either omitting the US entirely or by presenting the CS and US randomly (McSweeney& Bierley, 1984). Till et al. (2008) explored the characteristic of extinction empirically. Their study paired brands with celebrities and measured attitudes towards the brands after conditioning. Attitudes increased with the use of well-liked and relevant celebrities. They then attempted to extinguish these effects but found that, once paired, the pairings were difficult to eliminate, with brand

attitudes still affected two weeks after the procedure. Till and Priluck (2000) studied the characteristic of generalisation, or the extent to which a response conditioned to one stimulus transfers to similar stimuli. Through two experimental procedures, they found that attitudes conditioned to a particular brand (Garra mouthwash) could be transferred (generalised) to a product with a similar name (Gurra, Gurri, and Dutti) in the same category, as well as a product with the same name in a different category (soap). As Table 1 shows, more marketing/consumer behaviour classical conditioning studies have taken place in the area of acquisition and extinction than any of the other areas discussed.

Latent inhibition, pre-exposure, and familiarity

Research has also examined the characteristics of latent inhibition, pre-exposure, and familiarity of the CS and US. Latent inhibition occurs where the CS is presented several times without the US, and when the CS is later paired with the US, little conditioning occurs (McSweeney & Bierley, 1984). Stuart et al. (1987) found latent inhibition effects due to participant pre-exposure to the CS and noted that such pre-exposure considerably hindered later conditioning. Both Stuart et al. (1987) and McSweeney and Bierley (1984) suggest that it would be easier and more successful to classically condition behaviours to new products/brands (CS) than to familiar or mature products/brands, which have already been exposed to the public. This pre-exposure to the brand may have caused consumers to have opinions towards the brand, which hindered the attempt to classically condition a response. McSweeney and Bierley (1984) also suggest that classical conditioning will not occur if participants are previously exposed to the US alone. Several studies have used familiar USs and highlighted their use as a limitation. For example Bierley et al. (1985) used the *Star Wars* music and Macklin (1986) used Smurfs, both of which were well known by the participants involved.

Novelty and salience

Research has also explored the novelty and salience of CSs, based on the idea that more novel and more salient CSs promote a greater amount of or faster conditioning effects. In their study, Shimp, Stuart, and Engle (1991) expected that greater conditioning would result when novel, unknown brands were used as CSs than when moderately known and well-known brands were used. They reflected that the mix of known and well-known brands was relevant to the real-world situation in which consumers choose between brands and that the association with and comparison of the brands were important constructs. The study used four unknown colas (Cragmont, Elf, My-te-Fine, and Target), which were real but not available where the experiment took place, two moderately known colas (Royal Crown [RC] and Shasta), and two well-known colas (Coca-Cola and Pepsi). They anticipated that because consumers already had highly positive attitudes towards the familiar brands Coke and Pepsi, the conditioning effects would be weaker for them than for the moderately known or unknown brands. They confirmed this result in their experimental conditions, finding stronger attitudinal classical conditioning effects for RC and Shasta (the moderately known colas) than for Coke or Pepsi (the well-known colas).

Temporal priority

Research has also examined temporal priority (a CS must temporally precede a US for classical conditioning to occur) and simultaneous/backward/forward conditioning (CS and US presented simultaneously/CS precedes the US/US precedes the CS). Macklin (1986) tested both forward and simultaneous conditioning and found that simultaneous conditioning was more successful. Stuart et al. (1987) tested both forward and backward conditioning and found stronger effects of forward conditioning but also noted that some conditioning does occur even with backward conditioning.

Different USs

As Table 1 shows, studies have also explored a range of US, such as music, pictures of characters (e.g. Smurfs), words, comedy/humour, and celebrities. Regarding the use of celebrities, classical conditioning provides the underlying explanation for 'meaning-transfer' models in advertising, which have been used to explain the effects of celebrity endorsement (McCracken, 1989; Till et al., 2008). Research has also used a range of CSs, from pens to fictitious and actual brands. In general, realism and relevance have increased as experimental procedures have developed, moving to the use of real brands and actual adverts in conditioning procedures (Janiszewski & Warlop, 1993).

Awareness

In addition to the examination of the characteristics of classical conditioning, throughout the development of classical conditioning procedures in advertising, significant debate has surged regarding participant awareness of the CS–US contingency in experiments (see the last section of Table 1). Shimp et al. (1991, pp. 7-8) note that 'a particularly provocative and troubling issue throughout the history of conditioning experiments with human subjects has been the matter of subject awareness of the CS-US contingency'. The awareness debate highlights the multi-paradigm element of classical conditioning research. Classical conditioning has most often been used to condition attitudes towards the brand in advertising experiments (Janiszewski & Warlop, 1993) and attention to attended and unattended CSs (Tom, 1995). Allen and Janiszewski (1989) argue that the debate between pure behaviourists and cognitivists reflects an instance of partial incommensurability because it is grounded in fundamental metaphysical differences. In behaviourism, mental events are considered non-scientific and are not the focal point of research; thus, for behaviourists, the awareness issue is simply not of interest. In contrast, the steadfast cognitivist perceives the

awareness issues as pivotal. Several studies have explored whether participants are aware of stimuli pairings in experimental procedures and have found that contingency-aware participants have significantly more positive attitudes than unaware participants (Shimp et al., 1991). Furthermore, when researchers monitor learning on a trial-by-trial basis, conditioning does not occur until the participant becomes aware, inviting 'a view of classical conditioning as a cognitively mediated process' (Allen & Janiszewski, 1989, p. 38). While this view has generally been accepted, research has continued to question the issue. For example, Olson and Fazio (2001) suggest that attitudes can be conditioned without contingency awareness and test this using supraliminal conditioning procedures. The reasoning they provide for this is based on implicit learning theory where individuals sometimes show evidence of having learned a rule or association implicitly, even though they are unable to articulate any explicit, conscious knowledge of the relevant information.

Classical conditioning research in advertising has moved slowly away from its pure behaviourist form and has largely taken on the role of attitudinal conditioning, somewhere in the 'seam' between cognitivism and behaviourism (Anderson, 1986, p. 165), and has been conceived as a basic mechanism of attitude formation (Allen & Janiszewski, 1989). Although this may cause pure behaviourists to feel uncomfortable, Peter and Olson (1987, p. 306) suggest that 'cognitive approaches that attempt to describe the internal mechanisms involved in conditioning processes not only add insight but also help to develop more effective conditioning strategies'. Thus, this seam is a unique opportunity for knowledge development (Allen & Janiszewski, 1989).

This section has reviewed the influence of classical conditioning on the study of consumer behaviour and marketing research. The next section reviews the influence of an alternative behavioural psychology approach, operant conditioning, which has arguably been developed more fully in the realm of consumer and marketing research.

Operant/instrumental conditioning in marketing and consumer behaviour research

In operant conditioning, behaviour is shaped and maintained by its consequences (Foxall, 1986), meaning that the rate at which a behaviour will be performed is directly related to the consequences of that behaviour performed previously. Foxall (2002, pp. 27–28) notes the following:

> [B]ecause behaviour is conceptualised as operating upon the environment to produce consequences it is known as operant behaviour, the process in which the consequences come to influence the behaviour as operant conditioning, and the behavioural psychology which studies the process as operant psychology.

According to Skinner, each behavioural act can be broken down into three key parts: (1) the response/behaviour (R); (2) the reinforcement/punishment ($S^{+/-}$), which is a consequence of the behaviour; and (3) a discriminative stimulus (S^{d}), which is a cue that signals the likelihood of positive or negative consequences arising from performing the behaviour (Foxall 1986, 2002). The three parts together, labelled the three-term contingency, highlight that the determinants of the behaviour must occur in the environment (Foxall, 1986, 1993):

$$S^{d} \text{ -> } R \text{ -> } S^{+/-}$$

In general, reinforcement is segmented into three forms: positive, negative, and punishment. Positive reinforcement is generally a reward or something that strengthens the behaviour (e.g. a pleasant experience or satisfaction with a product, a positive response to a behaviour), which likely leads the person to buy the product again in future. With negative reinforcement, the behaviour is generally performed to avoid unpleasantness (e.g. buying a

product to avoid an aggressive salesperson, purchase and consumption of painkillers to relieve a headache; Cadogan & Simintiras, 1996). Punishment is an aversive consequence after a behavioural response and may lead to the extinction of a behaviour (Nord & Peter, 1980). An example of punishment is a product that does not do the job it was designed to do or is of poor quality, and thus the buyer no longer buys it.

Reinforcement, in both experimental procedures and real-life situations, is provided on a schedule. That is, reinforcers can be administered after every second emission of a desired behaviour, and so forth. A behaviour reinforced every time is called a 'continuous schedule of reinforcement', while a behaviour not reinforced after every emission is termed an 'intermittent schedule of reinforcement'. As Nord and Peter (1980, p. 39) note:

> Where every second, third, tenth, etc. response is reinforced, a fixed ratio schedule is being used. Similarly, it is possible to have a reinforcer follow a desired consequence on average one-half, one-third, one-fourth, etc. of the time, but not every second time or third time, etc. Such a schedule is called a variable ratio schedule (behaviours are reinforced half the time, one-third of the time etc).

Research has shown that intermittent schedules of reinforcement develop high rates of behaviour resistant to extinction, and they are also more economical because they use fewer reinforcers, which can reduce the cost (Peter & Nord, 1982). Peter and Nord (1982) suggest that most marketing activity in the real world (differentiating brands and manipulating marketing variables such as price and promotions) often occurs on an intermittent schedule.

In terms of marketing and consumer behaviour, a full range of behaviours, such as actual purchasing, visiting and browsing in a store, and searching for information online, can be examined under the three-term contingency. Foxall (1986, p. 404) also documents that

verbal behaviour, for example, sharing positive or negative word of mouth about a product, can also be examined but notes that 'behaviours which belong to different classes (e.g. talking about how one will vote and actually voting) will be consistent only when the contingency of reinforcement applicable to both are functionally equivalent'.

Discriminative stimuli serve to signal the probability of behaviour being reinforced and can change the probability of a behaviour being emitted. Nord and Peter (1980) provide examples of discriminative stimuli such as store signs (e.g. 50% off, buy one get one free), store logos (e.g., Kmart's big red 'K,' MacDonald's golden arches), or distinctive brand marks (e.g. Levis, Coca-Cola). Past learning history and experiences will have taught customers that responding to cues such as these in the past rewards them with satisfactory value purchases. They may also have learned that they are not rewarded when the symbols or cues are absent.

Studies on consumer behaviour and marketing have used operant conditioning in different ways. The next section explores the early applications of operant conditioning to advertising before discussing the three main areas of operant application: applied behaviour analysis, CBA, and the BEC. These are not the only areas in which an operant approach has been used. Other studies exist—for example, those exploring the behaviours of salespeople (Cadogan & Simintiras, 1996) and online product selection (Perotti, Source, & Widrick, 2003)—but they are often less thorough in analysis or are not integrated into broader or detailed behavioural approaches.

Early approaches to operant conditioning in marketing and consumer behaviour

The earliest approaches to marketing and consumer behaviour from an operant perspective, similar to classical conditioning, concentrated on advertising. DiClemente and Hantula (2003a) highlight studies that employed an approach called the 'conjugately

programmed analysis of advertising' to measure advertising effectiveness. These studies placed participants in a room with a television and had them hold a small switch that would increase the brightness of the television picture when pressed, according to a conjugate schedule of reinforcement in which the participant directly and immediately controlled the intensity of a continuously available reinforcing stimulus, such as a television show. A range of studies using this technique investigated television commercial effectiveness (Lindsley, 1962; Nathan & Wallace, 1971), as well as magazine readership (Wolf, Newman, & Winters, 1969). Winters and Wallace (1970) provide a literature review and commentary of this technique.

In the 1980s, Nord and Peter (1980) encouraged marketing scholars to give further consideration to the wider potential of operant approaches and, in particular, highlighted the work of Skinner and the behaviour modification approach. Work was simultaneously taking place in applied behaviour analysis, but it would be several years before an operant approach was developed into a full marketing and consumer behaviour approach. This approach, CBA, is outlined next.

Applied behaviour analysis

Applied behaviour analysis has a long tradition of applying behavioural principles to a range of problems, and the behaviour analyses movement bought operant conditioning applications into the consumer field (DiClemente & Hantula, 2003a). Foxall (1993) notes the focus of applied behaviour analysis on the effectiveness of prompts (which he states act as antecedent verbal stimuli) and highlights feedback and incentives as two types of reinforcement. These two types have largely centred on issues of social importance, such as domestic energy use (Kohlenberg, Phillips, & Proctor, 1976; Winett, Leckliter, Chinn, Stahl, & Love, 1985; Winett, Neale, & Grier, 1979), waste disposal and recycling (Brothers, Krantz,

& McClannahan, 1994; Craig & Leland, 1983; Ludwig, Gray & Rowell, 1998), and disease prevention (Winett, Moore, & Anderson, 1991). Because of this, interest in applied behaviour analysis from the social marketing perspective has increased (Donovan, 2011), as reflected in relevant developments in the area, such as choice architecture (Thaler & Sunstein, 2009). Applied behaviour analysis, though largely focused on issues of social importance, has also centred on marketing-related behaviour, such as shopping and consumption behaviour (Barnard, Christophersen, &Wolf, 1977; Greene, Rouse, Green, & Clay, 1984; Sigurdsson, Saevarsson, & Foxall, 2009; Valdimarsdóttir, Halldórsdóttir, & Sigurðardóttir, 2010; Winett, Kramer, Walker, Malone, & Lane, 1988), alcohol consumption (Caudill & Lipscomb, 1980), and financial behaviour (Hantula & Crowell, 1994).

CBA

Perhaps the most developed research programme applying operant perspectives and radical behaviourism to marketing and consumer behaviour is the consumer behaviour analysis research programme. Goldsmith (2004) and Foxall (2001) describe the initial emergence of CBA and define it as the use of behaviour principles to interpret human economic behaviour at the intersection of behavioural economics/economic psychology and marketing science (Foxall, 2001). Several distinct streams of research have developed on the basis of the differing aspects of behavioural psychology, as well as applications to differing marketing and consumer behaviour contexts.

The first stream was the development of a model of consumer behaviour, termed the behavioural perspective model (BPM). Foxall (1990) provides extensive detail on the development of the model, but in basic terms, the model states that the rate of behaviour emission/responding is explained by both discriminative stimuli in the behaviour setting and levels of informational (termed ‘hedonic’ in previous accounts) and utilitarian reinforcement.

The behaviour setting runs on a continuum from open to closed, with the understanding that the majority of consumption situations will be relatively open. In relatively open settings, physical, social, and verbal pressures are largely absent; thus, the consumer is able to choose between a range of products and has discretion over which stores to visit and whether to purchase at all (Foxall, 1992). Utilitarian reinforcement captures the technical and operational qualities of the products themselves, while information reinforcement refers to performance feedback on the behaviour in question. So, while the utilitarian benefits of having a car include the ability to go from A to B, some prestigious cars also provide informational reinforcement through social status and the prestige of owing and consuming such a brand.

Taking into account the levels of reinforcement and the openness of the behaviour setting, the model presents four operant classes of consumer behaviour (based on low/high utilitarian and low/high information reinforcement: maintenance, hedonism, accumulation, and accomplishment) and eight contingency classes (e.g. in the fulfilment contingency category, the situation is relatively closed, and both high levels of informational and utilitarian reinforcement occur, while the routine purchasing contingency category is a relatively open behaviour setting in which both relatively low informational and low utilitarian reinforcement occur). Research has tested the BPM in many ways, situations, and international contexts (Foxall & Greenley 1998, 1999, 2000; Foxall & Yani-de-Soriano 2005; Soriano, Foxall, & Pearson, 2002), most recently in neurophysiology (Foxall, Yani-de-Soriano, Yousafzai, & Javed, 2012).

A second approach in the CBA field, matching (or the matching law), was first noted by Herrnstein (1961, 1970), who observed that during experiments with concurrent schedules, organisms distributed their behaviour between the two options, according to the rate of reinforcement received from responding to each option, respectively. If animals such as pigeons and rats have the opportunity to peck either key A or key B, each of which delivers

food pellets (reinforcers) on its own schedule, they allocate their responses to A and B in proportion to the relative rate of reinforcement. That is, organisms 'match' their behaviour to the relative returns from the environment. Research has explored this relationship both theoretically and empirically (see Table 2), showing strong support for a matching-based view of consumers' multi-brand purchasing and providing some explanation for complementarity and independence of competing brands and market structures. Table 2 contains a representative selection of empirical work within the CBA research programme reflecting work on the BPM and matching. This table is not exhaustive, but rather designed to provide a glance of the main studies in the area. It is organised around the 4Ps of product (including branding and brand characteristics), price, place, and promotion, as well as strategic approaches, to highlight the relevance of different areas of marketing. In addition, extensive theoretical discussion within CBA exploring, for example, the relevance of CBA for social marketing (Foxall, Oliveira-Castro, James, Yani-de-Soriano, & Sigurdsson, 2006), motivating operations (Fagerstrøm et al 2010), and the marketing firm (Vella & Foxall, 2013) has taken place. The development of CBA has also been widely addressed in a series of special issues in *Psychology & Marketing* (2003), *Journal of Economic Psychology* (2003), *Service Industries Journal* (2011), *Journal of Organisational Behaviour Management* (2010), and *Psychological Record* (2013).

[insert Table 2 here]

The BEC and foraging

Two other areas that have received attention in consumer behaviour and marketing literature is the BEC, and foraging theory, largely in terms of the study of behavioural ecology, which is a blend of operant psychology and foraging theory (Foxall, 2001). Behavioural ecology provides a framework for answering questions about strategic and

consumption behaviour of animals (Stephens & Krebs, 1986), including search, identification, procurement, handling, utilisation, and digestion (Mellgren & Brown, 1987). Foraging theory has traditionally been used to study the behaviour of animals in naturalistic settings, through both quantitative and qualitative methodologies, and has been expanded to the operant experimental laboratory through behavioural psychology (termed 'behavioural ecology') (Williams & Fantino, 1994).

Rajala and Hantula (2000) first introduced the idea of foraging as a possible model of consumer behaviour, as well as a specific model—the BEC (see also DiClemente & Hantula, 2003a, 2003b; Hantula, DiClemente, & Rajala, 2001). Building on the synergistic coupling between behaviour analysis and behavioural ecology (Fantino, 1985), the BEC applies mathematical models of optimal foraging theory (Stephens & Krebs, 1986) to human consumption through operant experimentation and is described as a synthesis of Darwinian theory, foraging theory, and the effects of delay on decision making (Hantula, DiClemente, Brockman, & Smith, 2008). Table 3 contains a summary of the main empirical research that applies both the BEC and foraging theories to consumers and marketers behaviour.

[insert Table 3 here]

The BEC highlights the potential of foraging in marketing, which has applied several foraging theories, including the delay reduction hypotheses (DRH) and changeover delay (COD), to consumer online purchasing of CDs. Hantula and colleagues manipulated delays in store, temporal issues, and in-stock probability to assess consumers' time allocation and switching behaviour in a simulated Internet mall (Rajala & Hantula 2000; DiClemente & Hantula 2003; Smith & Hantula 2003; Hantula et al 2008). They found that consumers were sensitive to programmed delays and that hyperbolic discount functions provided the best fit to

the data, in support of the matching law. These quantitative conclusions are similar to the work of researchers exploring animal foraging.

Both Wells (2012) and Flavián, Gurrea, and Orús (2012) build on the works of Hantula and colleagues and Pirolli and colleagues (Pirolli, 2003, 2005; Pirolli & Card, 1999), providing further theoretical and empirical development and application of foraging theories in consumer behaviour and marketing. In particular, Flavián et al. (2012) explore the applicability of the BEC to online consumer environments in realistic, rather than experimental, settings and also examine the emotional responses of consumers during online search. Wells (2012) notes a range of areas in which the BEC and foraging ecology could be further employed, including brand choice, social issues (through social foraging theory; see Giraldeau, &Caraco,), and post-purchase behaviour (e.g. handling, storage).

Behavioural psychology methods

In light of the overview of behavioural psychology applications, it also seems appropriate to discuss the methodologies employed in these types of research programmes. According to Foxall (2003), the methodologies employed are worlds apart from the type of research generally undertaken by marketing scientists, though more recent interest has emerged in experimentation, the key methodology of behavioural psychologists. Key features of a behavioural psychology methodology include rigorously controlled experiments, with direct measurement of consumer behaviour; longitudinal studies often, in the case of operant experimentation, requiring weeks or months of data collection (DiClemente & Hantula, 2003a); within-subject designs (where the same group of subjects serves or is exposed to more than one treatment or experimental condition, also called a repeated measure design; Greenwald, 1976); a small number of participants or including some studies with a single-

subject research design; and multiple baseline procedures (a procedure whereby responses are identified and measured over time to provide baselines against which changes in behaviour can be measured). Once established, the experimenter will apply one or a few experimental variables and measure any changes. The experimenter will then remove and apply experimental variables, measure baselines between the experimental variables (Baer, Wolf, & Risley, 1968), use comparison groups, and, in the case of applied behaviour analysis, employ field experimentation (DiClemente & Hantula, 2003a; Foxall, 1986; Winett et al., 1979). Foxall (2001) and Wells and Foxall (2013) note the danger of assuming something discovered through these types of rigorously controlled experiments. However, Foxall (2001, p. 188) notes that though there are limitations in this type of experimental design,

> [I]t is only through experiment that previously unknown behavioural phenomena can be definitively identified and systematically monitored. A specific purpose of experimental research can be to show that a previously uninvestigated behavioural phenomenon is functionally similar to other, better known, consumer activities.

Wells and Foxall (2013) also note that the transference of methodologies used in animal experiments to humans (especially in real-life situations) is difficult, without careful thought and planning.

These experimental procedures have received strong support in the classical conditioning approaches to marketing and consumer behaviour. In contrast, the approaches taken within an operant perspective have not been as restrictive, with a wider range of methodologies used, including greater use of field experiments and panel data.

Discussion and future research directions

The goal of this research was to outline the current state of behaviourist approaches to consumer behaviour and marketing. This final section considers the future and what

researchers can do to move the discipline forward. This article proposes that two key aspects of classical conditioning can lay the path for further research: *replication* and *realism*.

Further detailed and strategic replication is required to provide a stronger evidence base to the area. McSweeney and Bierley (1984) call for the role of classical conditioning to be established through careful experiments, and though some work has been done, much remains to be explored and replicated to ensure continuing theoretical development. Specifically, this work needs to explore all the characteristics fully and to test their application to advertising and marketing. Several characteristics remain under-explored, including overshadowing (when two CSs that differ in salience are presented at the same time; McSweeney & Bierley, 1984), the Garcia effect (improper choice of a CS paired with a US; McSweeney & Bierley, 1984), the most effective US for any given CS (Olson & Fazio, 2001), and the boundary and cross-cultural elements of a classical conditioning approach (Pornpitakpan, 2012). Pornpitakpan (2012) also highlights the range of experimental procedures needed to ensure success in experimentation, including pre-testing to ensure that the CS and US match each other logically and perceptually and using both negative and positive USs to determine whether classical conditioning effects are present in both.

Future work on classical conditioning should concentrate on understanding where the principles of classical conditioning hold in real-world situations and improving its external validity. Although studies have slowly moved forward in some aspects of realism, concern remains about whether classical conditioning works under natural advertising and marketing conditions, and the use of familiar brands as CSs would improve this ecological validity (Till & Priluck, 2000). Extant research has focused on print and television advertising, but recent developments in online and e-mail marketing, as well as social media, provide a ripe testing ground for real-world experiments and use of new media (see Sigurdsson, Menon, Sigurdarson, Kristjansson, & Foxall 2013). Tension also exists on the realism (Hantula &

Bryant, 2005) and relevance (Fantino & Preston, 1988; Rajala & Hantula, 2000) of laboratory experimental work, and the use of student samples is an area in which this is evident. Moving the work beyond students and simplified experiments will also improve the external validity of the findings (Fantino, 1985; Fantino & Preston, 1988). As with all research focusing on attitudes, there is also a need to move beyond attitudes to explore the effects on actual purchase and repeat purchasing behaviour.

With regards to operant conditioning approaches to marketing and consumer behaviour, several avenues for further research exist. Work in CBA continues in a wide range of areas, and further research could determine the boundary conditions of a CBA application to marketing and consumer behaviour issues. One issue noted by several CBA studies that requires further thought is that of closed experimental conditions and their application to the more open conditions of consumer and marketing situations. The theories of matching and a range of other operant techniques were initially developed through closed experimental conditions (Foxall, 2003). More open settings will always make it more difficult to specify the elements of the three-term contingency with the precision available to laboratory scientists (Foxall, 2003). The BPM proposes a continuum of closed and open behaviour settings, but this issue has not yet been researched fully. As the area grows, it will be important to compare and contrast the studies completed in laboratory settings (e.g. Hantula et al., 2008), field experiments (e.g. Sigurdsson et al., 2009), and panel data (Wells & Foxall, 2013) and develop further qualitative and more open approaches.

Further research should also aim to build on some of the most recent developments in the field of behavioural psychology itself. Foxall (2003) highlights relevant developments, including approaches to decision making and language and the further distinction between contingency shaped behaviour (behaviour due to direct contact with the environment) and rule-governed behaviour (behaviour due to verbal interventions from others or from the

individual him-/herself). The BPM recognises the importance of both rule-governed and contingency-based behaviour, but further research is necessary to explore the interactions of both rule-based and contingency-shaped behaviour and the individual influences of each. Two streams of potential research, and more recent developments in behaviour analysis, open up this area for further exploration. These are the study of stimulus equivalence (Barnes & Holmes, 1991; Barnes-Holmes, Keane, Barnes-Holmes, & Smeets, 2000) and relational frame theory (RFT) (Hayes, 1996; Hayes & Gifford, 1997; Hayes & Wilson, 1996). Stimulus equivalence is based on the principle that a person who is trained (through a process or reinforcement) to respond first to 'B' and then to 'C' when presented with stimulus A will respond with 'C' when presented with B, even though this relationship had not been reinforced (Foxall, 2001, 2003). Although some work has begun exploring this relationship in consumer areas (e.g. Barnes-Holmes et al., 2000), a full application has not yet been developed. RFT considers stimulus equivalence as one of the derived stimulus relationships and suggests that relationships such as 'same as', 'opposite', and 'more and less than' can also be explored in behavioural accounts and further within the CBA framework itself. DiClemente and Hantula (2003a) also note that RFT's treatment of transferring emotion may be of particular importance.

Finally, Hantula (2013) notes that combining work on organisational behaviour management (OBM) and the CBA research programmes could lead to a range of exciting developments and research opportunities, building on the idea that bringing the two streams together will build a more comprehensive analysis. For example, he suggests that employees who receive incentives are consumes of those incentives and, therefore, that behavioural economic or preference analyses may help fine-tune reward systems. He also notes that research at the CBA–OBM interface could explore sustainability and pro-social consumption. He suggests that informational (rather than utilitarian) reinforcement is more successful in

increasing consumption of green goods and that CBA approaches could increase environmental disposal of goods by consumers and employees alike. Finally, he proposes that work on substance use/misuse (through substitutes for drug use, demand curves, and indices of individual drug treatment progress) and obesity (through shelf-placement and the increase of healthy eating amongst employees) may benefit from work at the CBA–OBM intersection.

In terms of development of the behavioural ecology of foraging, DiClemente and Hantula (2003a) highlight the place of CBA within a larger framework of evolutionary theory (as reflected in the work on foraging theory), which provides several potential avenues for research. Wells (2012) highlights the importance of determining a currency for foraging—that is, potential applications of foraging for human consumption in which resources are scare or consumers have low incomes (Ekström & Hjort, 2009); utilisation of the theory of complex and affluent foragers (Koyama & Uchiyama, 2002), and the need for work beyond the experimental chamber to gain external validity. A range of methodologies are potentially available, including opportunities to investigate mall habitats using qualitative or phenomenological approaches, such as observation, videography, and in-depth interviewing (Bloch, Ridgeway, & Dawson, 1994). Hui, Bradlow, and Fader (2009) also suggest combining shopping path data with surveys collected before or after the shopping trip and asking consumers to state their goals. All of these factors could assist in the development of a foraging model of consumption.

In conclusion, this article presents a wide-ranging review of behaviourist approaches in marketing and consumer behaviour research and provides an introduction to behaviourist thought for those unfamiliar with the discipline. This review ranged from early classical and operant conditioning studies focused on advertising to more recent approaches, such as the BPM, foraging, and matching, to explain the behaviour of both consumers and marketers. The article also took a step forward for these behavioural-based approaches, highlighting a

future research agenda and the importance of external validity, replication, and incorporation of the most up-to-date approaches in the field of behavioural psychology.

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Table 1 Empirical studies on classical conditioning in marketing and advertising, 1982–2008.

Author(s)/Year	*CS*	*CR*	*US*	*Characteristics of Classical Conditioning Examined/Experimental Information*	*Number of Pairings/Trials/Exposures*	*Sample*	*Conclusions*
Acquisition & Generalisation, Extinction							
Gorn 1982 (2 experiments)	Neutral product: Two colours of pens	Preference for one of the coloured pens	Music (positive US = music from *Grease*, negative US = while classical Indian music)		1	244 undergraduate first-year management students	Conditioning evidenced: The majority of the sample picked the colour of pen (79%) that was associated with the liked music.
	Neutral product: Two colours of pens	Preference for one of the coloured pens	Music for one decision-making condition and information for the other	Compared information provision with music in decision-making versus non-decision-making situations.	1	122 undergraduate management students.	Gorn (1982.p. 99): "an individual in a decision making mode when exposed to a commercial is affected by the information it contains."
Allen & Madden 1985	Two colours of pens	Preference for one of the coloured pens	Humour (positive US = Bill Crosby extract, negative US = Red Foxx extract)	Subjects were processed individually rather than as a group; a 'buy-back' procedure introduced.	1	60 female students	Conditioning not evidenced overall; conditioning occurred in the pleasant humour group but not the unpleasant humour group.
Bierley et al. 1985	Coloured geometric figures	Preference for one of the coloured geometric figures	Theme music from *Star Wars*	Influence of number of trials. Awareness of the purpose of the experiment. Test of generalisation	84 (with a 45-second inter trial interval)	100 students	Conditioning evidenced, but the effect was small and required many pairings of the CS and US.
Stuart, Shimp & Engle 1987 (1	Fictitious brand-"brand L	Attitude towards	Pleasant and emotionally pleasing	Influence of number of	1, 3, 10 and 20	202 undergraduate	Conditioning occurred at all four trial levels with

of 4 experiments)	toothpaste"	the brand	pictures	trials.		business and psychology students	more positive attitudes towards the brand in the 20 trial and 10 trail conditions.
Tom 1996	Two colours of pens/Chinese ideograms	Preference for one of the coloured pens/Chinese ideograms	Background feature: Music (Positive= Kenny G's 'Song Bird' Negative = John Lennon's 'Number 9 Dream')	Unattended versus attended stimuli	12 presentations	227 students	Positive USs created affect that successfully transferred to both the conditioned attended stimuli and the conditioned unattended stimuli.
Till & Priluck 2000 (2 experiments)	Garra Mouthwash	Favourable attitude towards the brand	Three pleasant (well-liked) visual scenes	Stimulus generalisation	15	60 undergraduate students	Conditioned evaluative responses to a brand can transfer via stimulus generalisation.
	Garra Mouthwash	Favourable attitude towards the brand at 1 and 3 weeks after the experiment	Three pleasant (well-liked) visual scenes	Stimulus generalisation/ Extinction	6	54 undergraduate students	Effects may be relatively transitory.
Till, Stanley, & Priluck 2008 (3 experiments)	Garra Styling Gel	Attitude towards the target brand	Celebrity (Jennifer Aniston)	Extinction. Use of Celebrity Endorsers	5	78 students	More positive attitudes towards the brand were found in the treatment group.
	Laparo Sports Drink	Attitude towards the target brand	Celebrity (Michael Jordan for the high-fit treatment and Pierce Brosnan for the low-fit treatment)	Use of Celebrity Endorsers/ perceived fit	5	157 students	Conditioning is more effective when celebrity and product fit is higher.
	Garra Styling Gel	Attitude towards the target brand	Celebrity (Jennifer Aniston)	Extinction	5	150 students	Positive conditioned attitudes remained even after extinction trials.
Latent Inhibition, Pre-exposure, and Familiarity							

Stuart et al. 1987 (2 of 4 experiments)	Fictitious brand- "brand L toothpaste"	Attitude towards the brand	Pleasant and emotionally pleasing pictures	Latent inhibition	1 and 10	260 undergraduate business and psychology students	Conditioning was weaker when there was latent inhibition on both the 1 and 10 trial groups.
Novelty and Salience							
Shimp, Stuart, & Engle 1991 (21 experiments)	Cola Brands of various familiarity	Positive evaluation of the brands	Four pleasant and emotionally pleasing pictures	Novelty and salience	20 conditioning trials (60 non-conditioning trials)	21 experimental sessions had two to 10 subjects. Student sample: psychology and business students	Conditioning was strongest for unknown and moderately known brands for colas conditioned in a context of known versus unknown brands.
Temporal Priority							
Macklin 1986	Brightly coloured pencils	Preference for one of the coloured pens	Picture of a smurf	Simultaneous and forward conditioning. Buy-back procedure used.	3	84 young children (4 and 5 year olds)	Conditioning not evidenced.
Stuart et al. 1987 (3 of 4 experiments)	Fictitious brand- "brand L toothpaste"	Attitude towards the brand	Pleasant and emotionally pleasing pictures	Temporal priority: Forward versus backward conditioning.	10	40 undergraduate business and psychology students	Conditioning was stronger in the forward conditioning group.
Stuart et al. 1987 (4 of 4 experiments)	Fictitious brand- "brand L toothpaste"	Attitude towards the brand	Pleasant and emotionally pleasing pictures	Temporal priority: Forward versus backward conditioning.	10	133 undergraduate business students.	Upholds the results of experiment. Conditioning was stronger in the forward conditioning group.
Janiszewski & Warlop 1993 (3 experiments)	Mountain Dew and Canada Dry (using TV commercials)	Subsequent attention to the brand	Interesting or fun segments of a television commercial.	Forward conditioning/Influence of classical conditioning on attention to advertised brands	18 forward conditioning trials, 18 random conditioning trials	54 undergraduate students	Those for which the brand was presented with the forward conditioning procedure looked at the conditioned brand sooner.

	Mountain Dew and Canada Dry	Subsequent attention to the brand	Interesting or fun segments of a television commercial.	Forward conditioning/Influence of classical conditioning on attention to advertised brands	18 forward conditioning trials, 18 random conditioning trials	178 undergraduate students	The associative learning hypothesis may provide a better explanation of the influence of the conditioning procedure on subsequent attention to the brand.
	Mountain Dew and Canada Dry	Subsequent attention to the brand	Interesting or fun segments of a television commercial.	Forward conditioning/Influence of classical conditioning on attention to advertised brands	18 forward conditioning trials, 18 random conditioning trials	52 students	The conditioning procedure influenced subjects' perceptions of the target consumers of the soft drinks.
Awareness & Attitude Formation							
Allen & Janiszewski 1989 (2 experiments)	Five Norwegian words used as brand names	Attitudinal evaluation of each word/rating of each word for a new men's cologne	Positive phrase highlighting a successful outcome	Contingency learning/ Awareness.	50 'plays', 10 for each word	61 MBA students	Both experiments provide no evidence for the conditioning without awareness position. Attitudinal conditioning only takes place when subjects are aware of the contingencies.
	Five Norwegian words as brand names	Attitudinal evaluation of each word/rating of each word for a new men's cologne	Positive phrase highlighting a successful outcome	Contingency learning/ Awareness.	10 but with longer inter-trial intervals	78 second year MBA students	
Shimp et al. 1991 (21 experiments)	Cola Brands of various familiarity	Positive evaluation of the brands	Four pleasant and emotionally pleasing pictures	Contingency learning/ Awareness- via known and unknown brands.	20 conditioning trials (60 non-conditioning trials).	21 experimental sessions had two to 10 subjects. Student sample: psychology and	Conditioning was strongest for unknown and moderately known brands for colas conditioned in a context of known versus

						business students	unknown brands.
Kim, Lim, & Bhargava 1998 (2 experiments)	Brand L Pizza House	Attitude towards & product beliefs of Brand L.	Picture of a kitten	Assessment of the impact of affect on attitude formation	10	36 undergraduate students	Affect can influence attitudes even in the absence of product beliefs.
	Brand L Pizza House	Attitude towards & product beliefs of Brand L.	Picture of a race car	Whether attitude or beliefs play the most important role in attitude formation/Number of trials	1, 10	84 undergraduate students	Depending on the number of repetitions, affects plays as important /more important a role than beliefs in attitude formation.
Olson & Fazio 2001 (two experiments)	Pokemon	Evaluation of Pokemon	Positively valenced words and images and negatively valenced words and images	Explicit/Implicit attitude formation.	9	45 undergraduate female students	An attitudinal conditioning effect was found using an explicit measure.
	Pokemon	Evaluation of Pokemon	Positively valenced words and images and negatively valenced words and images	Explicit/Implicit attitude formation	9	56 undergraduate female students	An attitudinal conditioning effect was found using an explicit and implicit measure.

Table 2 Main empirical studies in CBA, 2001–2013.

Author(s)/ Year	*Focus*	*Sample/Methodology*	*Conclusions/Notes*
		Product/Branding	
Foxall & James 2001	Matching/Brand Choice	Quantitative: FMCGS 3 participants, 17-40 weeks	Matching applies to consumer choices at brand/product levels. Different patterns are observed for substitutes, non-substitutes. and complements.
Foxall & James 2003	Matching/Brand Choice	Quantitative: FMCGS, 9 participants, 17-40 weeks, 17 products Qualitative interview data	Matching is exhibited by consumers' behaviour but in the form of multi-brand purchasing rather than exclusive choice.
Foxall & Schrezenmaier 2003	Matching/Brand Choice	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories	Matching analysis suggested that the brands purchased were close substitutes and the majority of consumers were multi-brand purchases, with a small number sole purchasers of each brand. Consumers selected the cheapest brand within their consideration set, which in many cases includes only premium brands.
Foxall, Oliveira-Castro, & Schrezenmaier 2004	Matching/Brand Choice, Utilitarian and informational reinforcement (BPM), Brand Choice/Price Responsiveness	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories	Consumers choose their consideration set based on the informational and utilitarian levels of the brands, and consumers classified by the informational/utilitarian level they buy show different responsiveness to prices.
Oliveira-Castro, Ferreira, Foxall, & Schrezenmaier 2005	Repeat purchasing, Brand choice, Brand differentiation by informational benefits (BPM)	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories	As the number of shopping occasions increases, the probability of sequential repeat buying decreases. Purchasers of brand groups (by level of informational reinforcement) behave similarly to purchasers of specific brands with respect to repeat purchasing.
Oliveira-Castro, Foxall, & Schrezenmaier, 2006	Elasticity of demand, Brand Choice	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories	Demand elasticity (based on several purchases of many consumers) includes the effects of inter-consumer and intra-consumer elasticities. Demand elasticities of different product categories, groups, and individuals are similar, and individual differences are relatively consistent across time but not across products.
Romero, Foxall, Schrezenmaier, Oliveira-Castro, & James 2006	Matching, (and deviations from matching), Product-level analysis	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories	At the individual consumer level, substitutable products did not show matching, independent and complementary products did not show under-matching or anti-matching. At the aggregated level (across all purchases/individuals), the expected patterns were approached when the data were integrated on a weekly basis.
Oliveira-Castro, Foxall, James, Roberta, Pohl, Dias, & Chang, 2008	Brand equity, behavioural perspective model (BPM), Consumer loyalty	Quantitative: 2 sets of Brazilian data, product categories. 2 sets of UK data, between 832 and 1594 consumers depending on product category, 4 product categories.	The relationship between consumer-based brand equity (which varied considerably across brands) and brand performance varied across product categories. For 11 of the products, total brand revenue was positively related to increases in consumer-based brand equity.
Foxall, Wells,	Matching, Substitutability of brands	Quantitative: 1847 consumers, 2209 brands	Brands performed as perfect substitutes with one another. Five

Chang, & Oliveira-Castro 2010	and products	of biscuits, 52 weeks	subcategories of biscuits generally performed as separate products. The matching analysis provided a graded measure of substitutability.
Oliveira-Castro, Foxall, Yan, & Wells 2011	CBA, Reinforcer quality, Demand elasticity, Essential value of brands	Quantitative: 1639 consumers of baked beans, 1874 consumers of cookies, both 52 weeks.	The paper examined the Hursh–Silberberg model in the context of human consumer choice. The model can be used to measure the essential value of brands, and this value varied systematically with changes in utilitarian and informational brand attributes.
Cavalcanti, Oliveira-Castro, & Foxall 2013	Individual differences in consumer purchase behaviour, BPM, Informational and Utilitarian reinforcement	Quantitative: FMCGS, 52 weeks, 4 product categories, between 832-1594 households (depending on the product category).	Purchase data were divided into three consecutive buying periods. Individual differences in buying behaviour are stable across time periods. Some patterns of behaviour were specific to certain product categories. Consumers who paid lower prices tended to buy larger amounts.
Porto & Oliveira-Castro 2013	Brand Choice, Say-do correspondence, Learning history, Informational/Utilitarian reinforcement	Quantitative and Qualitative: Brazilian retail store data (366 consumers), 9 weeks.	Relationships between what consumers say about the brands they last bought and what they intend to buy were examined. Marketing strategies at the point of sale, the intention to buy a given brand, and the last purchase brand predicted the level of say-do correspondence.
Sigurdsson, Kahamseh, Gunnarsson, Larsen, & Foxall 2013	BPM, relative demand analysis, informational/utilitarian benefits.	Quantitative: Norwegian sales data, 10 product categories, 12 week period (March 2011-May 2011).	Informational benefits are the best individual predictor of consumer buying behaviour, but all three predictors together (utilitarian, informational and pricing) give the best predictor of consumer behaviour overall.
Wells & Foxall 2013	CBA, Matching, maximisation and demand analyses	Quantitative: 1639 consumers of baked beans, 1542 purchasers of fruit juice and 1817 consumers of yellow fats, 52 weeks.	Strong support is shown for matching as well as maximisation and multi-brand purchasing patterns observed in earlier research. Demand patterns are generally downward sloping.
Price (including the effect of product attributes on price promotions)			
Oliveira-Castro, Foxall, & Schrezenmaier 2005	Elasticity of demand, Utilitarian and informational reinforcement (BPM), Price Promotion	Quantitative: FMCGS, 80 consumers, 16 weeks, 9 product categories.	Brands were ranked according to utilitarian and information benefits. Inter-brand elasticities (consumers buying smaller quantities of more expensive brands when compared to cheaper ones) occur. Intra-brand elasticity (consumers' propensity to purchase a brand when its price differs from its average over time) was higher than utilitarian inter-brand elasticity (consumers sensitivity to brands that offer higher utilitarian benefits), which was higher than informational inter-brand elasticity (consumers sensitivity to brands that offer higher informational benefits).
Oliveira-Castro, Foxall, & James, 2008	Demand elasticity, Intra-Consumer, Inter-Consumer, Intra-Brand, Inter-brand elasticities	Quantitative: FMCGS, 52 weeks, 4 product categories, 832-1594 households (depending on the product category).	Consumers buy larger quantities when paying lower prices, and consumers who buy larger quantities tend to pay lower prices, both within and across brands.
Oliveira-Castro, Foxall, & Wells 2010	Brand Choice, Matching, Informational and Utilitarian Reinforcement, Price Promotion	Quantitative: 52 weeks 4 product categories, between 832-1594 households (depending on the product category).	Consumers spending changed based on changes in price promotion, quality bought, utilitarian reinforcement, and informational reinforcement in decreasing level of importance. Increases in price

			promotions were associated with decreases in spending, whereas increases in the other variables were associated with increases in spending.
Sigurdsson, Foxall, & Saevarsson 2010	The effect of price on brand choice	Quantitative: In-store experimentation. Shampoo sales, February to April 2006, two convenience stores, two supermarkets.	The intervention periodically reduced the target brands price by 17–26% but this had none or only minor effects on relative buying behaviour.
Foxall, Yan, Wells, & Oliveira-Castro 2013	Price/Demand Elasticity, Product and Brand Choice, Utilitarian and Informational reinforcement	Quantitative: FMCGS, 52 weeks of data, 4 product categories, between 832-1594 households (depending on the product category).	Price elasticity differs across products and brands. Quantity purchased is affected by changes in price and benefits (informational and utilitarian) that occur across products and within and across brands.
Place & Promotion			
Sigurdsson, Saevarsson, & Foxall 2009	In-store experimentation, shelf placement	Quantitative: Sales volume data for 24 brands of potato chips in two budget stores in Iceland, February to May 2006.	Placement of potato chips on the middle shelf was associated with the highest percentage of purchases.
Fagerstrøm 2010	Motivating Operation, Online consumer behaviour, Online point of purchase	Quantitative: 90 undergraduate students, experimental procedure. Qualitative: Unstructured interviews with online shoppers.	The concept of motivating operation is applicable when analysing online point of purchase influences (in stock status, price, customer reviews, order confirmation procedures and charity donation). Customer reviews had the greatest overall impact on likelihood to purchase.
James 2010	Retail Choice, Matching, Maximisation	Quantitative: 1500 consumers over a 52 week period.	Matching and maximisation is possible and appropriate at the retail level with analysis at the retail type–level completed.
James & Foxall 2010	Retail Choice, Matching, Maximisation	Quantitative: 1500 consumers over a 52 week period.	Matching and maximisation is possible and appropriate at the retail level with analysis at the retail brand–level completed.
Sigurdsson, Engilbertsson, & Foxall 2010	Point of Purchase Displays, Brand Choice	Quantitative: In-store experimentation. Dishwashing liquid sales, February to May 2006, convenience stores and supermarkets.	Point-of-purchases displays did not change relative (as a percentage of the category) sales of the focus brand.
Sigurdsson, Menon, Sigurdarson, Kristjansson, & Foxall 2013	Online/e-mail marketing, BPM, Utilitarian and informational advertising stimuli	Quantitative: 2 groups of consumers for 2 different e-mails. Groups consisted of 7265, 7227, 6533 ad 6508 prospective consumers.	Informational stimuli increased the likelihood of the e-mail being opened, while utilitarian stimuli increase the buying behaviour of consumers.
Stratton & Werner 2013	CBA, Fair-trade coffee, point of purchase marketing	Quantitative: Experimental conditions (low- and high- information point of purchase displays and service time)	Point-of-purchase materials (whether low or high information) highlighting the availability of Fair-trade coffee positively influenced sales.
Marketing Strategy			
Wells, Chang, Oliveira-Castro, & Pallister 2010	Marketing Strategy-Segmentation by benefits sought, utilitarian and informational reinforcement, price sensitivity	Quantitative: 1847 consumers, 2209 brands of biscuits, 52 weeks	Consumers who purchased at lower utilitarian levels were the least sensitive to changes in these benefits. Consumers (segmented by the brand benefits they purchased) showed different sensitivities to price. Consumers were more responsive to utilitarian benefits than to

			informational benefits.
Other			
Xiao & Nicholson 2010	Consumer misbehaviour, the purchase of counterfeit goods	Qualitative: Interviews, counterfeit retailers & buyers, authorised retailers/ manufacturers, law enforcers, anti-counterfeiting agencies. Secondary data: Corporate reports, materials published by anti-counterfeiting agencies.	Four actors and four types of exchange network of bilateral relationships were identified based on the analysis of complex reinforcing relationships. Counterfeit firms manage the reinforcement and scope of the behaviour settings of the other parties and in particular consumers.
Lyons 2013	Gambling, BPM, Matching	Quantitative: Sales and prize data from gaming products in Oregon between 1986 and 2010. Lottery jackpot and sales per capita data for 21 states.	Gambling products are purchased/consumed within setting conditions that include game frequency, odds of winning, jackpot size, and state of the economy. Different gambling options provide different reinforcement. Game choice reflected a matching pattern based on the relative probabilities of winning.

NB: FMCGs are fast moving consumer goods.

Table 3 Empirical consumption and marketing studies on the BEC and foraging

Study author(s) and year	*Foraging area*	*Consumption area*	*Main Methodology*	*Conclusions*
Pirolli & Card (1999) (see also Pirolli 2005)	Patch selection and use, Identification of useful prey/patches	Human information technology usage Information collection within an office environment Online information collection by MBA students.	Qualitative: interviews, observation Quantitative: mathematical analysis of use of a commercial online bibliographic system.	Evidence is shown for the application of food foraging models to information search and selection behaviour.
Rajala & Hantula (2000)	Delay reduction hypothesis (DRH), Changeover delay (COD)	Online purchasing of CDs- delay in store and in-stock probability.	Quantitative: Experimental analysis in a simulated internet mall.	Some consumer behaviour is sensitive to the programmed delays. Hyperbolic discount functions provided the best fit to the data.
DiClemente & Hantula (2003b) (replication and extension of Rajala & Hantula 2000)	DRH, COD.	Online purchasing of CDs- delay in store and in-stock probability. Temporal Issues- the influence of a visible clock.	Quantitative: Experimental analysis in a simulated internet mall.	Participants were more sensitive to the delays in the various stores in the cybermall when an ascending clock was present on the screen. This affected their entries into the store, purchases, and time spent in the store. Hyperbolic discount functions provided the best fit to the data for purchases in store.
Smith & Hantula (2003)	DRH, COD.	Online purchasing of CDs- delay in store and in-stock probability. Price. Store preference.	Quantitative: Experimental analysis in a simulated internet mall.	Participants established relatively consistent shopping preferences between stores. Price increases affect consumer preferences analogously to increases in delay to conditioned reinforcement, as predicted by the DRH. Hyperbolic discount functions provided the best fit to the data.
Foxall & James (2003)	Patch choice, assessment and usage, travel time	Brand choice. Impact of price and travel time	Quantitative: via matching analyses of consumer choice Qualitative: Interviews	Consumer behaviour for fast-moving consumer goods (FMCGS) exhibits matching, but in the form of multi-brand purchasing rather than exclusive choice. Foraging is a useful explanatory devise for the differences in purchases of substitutes and non-substitutes.
Hantula, DiClemente, & Smith (2008)	Delay and handling time, Time discounting,	Online purchasing of CDs- delay to in-stock information. Store preference. Time allocation.	Quantitative: Experimental analysis in a simulated internet mall.	Hyperbolic discount functions provided the best fit to the data for both purchase and time allocation (patch residence).

	Patch Residence.			
Flavián, Gurrea, & Orús (2012)	Situational factors and foraging, emotional responses	Online search engine behaviour. Online information search.	Quantitative: Experimental analysis using eye-tracking methodology	Authors show evidence for the application of foraging models to information search behaviour online. They found that the type of search task had no impact on the search process, participants' initial emotional state significantly influenced their online search behaviour, and time pressure strongly affected online foraging with the search engine.