

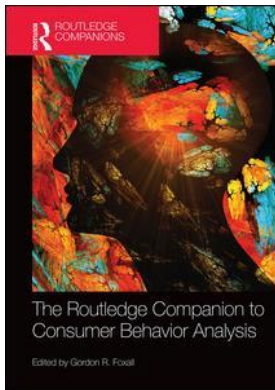
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Behavior analysis of online consumer behavior

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Behavior analysis of online consumer behavior

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Introduction

As online shopping becomes more and more omnipresent, both practitioners and consumer behavior scholars should gain more insight into online consumer behavior. A question of growing interest is how choices made online differ from those made in a traditional brick-and-mortar store (i.e., offline store). Despite in-store consumer behavior analysis in the offline world, researchers have done rather few studies on online consumer behavior from a behavioral perspective. This is unfortunate given the increasing emphasis on decision-making on the Internet and online stores, as well as amplified opportunities for experimentation and data gathering in this respect. There exist enormous opportunities in both lab and online field experimentation in consumer behavior analysis as the web may have the potential to enable behavior analysts and marketing scientists to research important behavioral contingencies related to online purchase behavior faster and with more detail compared with the traditional offline environment. Applied behavior analysis emphasizes behavior-environment relationships of social importance, mostly studied with within-subject experimental designs (Baer et al., 1987). What is most striking, though, is the lack of applied behavior analysis in digital consumer marketing.

Although experimental psychology research in dynamic computer-generated environments has been called for since the early 1990s (e.g., Brehmer and Dörner, 1993; DiFonzo et al., 1998), similar requests were added much later in proposed agendas for e-commerce research (e.g., Parasuraman & Zinkhan, 2002). Nevertheless, the use of experiments has been regarded as a promising approach for research on online consumer behavior and the effectiveness of online retail practices. As Parasuraman and Zinkhan (2002: 292) note, a field experiment “could be used to understand which promotional strategy is most effective on a company’s Web site”. They also recommend the use of laboratory experiments to “test theories and understand causal relationships” related to e-commerce issues. Due to the profound effect that the Internet has had in reducing the physical constraints on pricing, communication etc., combined with an increase in marketing noise and advertising clutter, firms have also been recommended to test various forms of their marketing or advertising stimuli using experimental design techniques. As Almquist and Wyner (2001) put it, an online retailer can change the prices and promotion of products it offers every minute of the day, as well as change the color of banner ads, the tone of promotional messages and the text in outbound e-mails with relative ease. Since scientific

experimentation will allow firms to better communicate with their customers, Almquist and Wyner (2001) are convinced that it is only a matter of time before experimental designs are widely adopted in most industries.

The importance of reinforcement in digital media

The advent of the Internet has resulted in an exponential rise of reinforcement rates. Operant conditioning and environmental control over behavior online is necessary to retain customers. This involves an increase or decrease of behavior, e.g., in terms of frequency or time, depending on the consequences that follow behavioral response. This is represented by the three-term contingency (Skinner, 1953):

$$S^D - > R - > S^{+/-}$$

where S^D represents the discriminative stimulus for consequences that are contingent on behavior that takes place in its presence, and R is a response that is either reinforced (S^+) or punished (S^-). All stimuli, or events, that follow a particular defined behavior and strengthen it (e.g., frequency or duration) are called reinforcers. All such stimuli that weaken the behavior are named aversive or punishing. Some consequences are classified as neutral, as they do not influence the magnitude of the behavior they follow (e.g., Skinner, 1976). Consumers today have more options to choose from than ever before. The technology today has produced products that can deliver reinforcement at high rates (Daniels, 2001). A positive reinforcement is pivotal in modifying behavior in an online environment. Today, consumers have so many opportunities to engage in activities that produce high rates of positive reinforcements that they move quickly from those that don't provide enough positive reinforcement to those that do. Surfing the Internet is one of the activities that provides high positive reinforcement at a rapid rate. Consumers spend long periods of time surfing the Internet, evaluating different products and eventually purchasing those which give high rates of positive reinforcement.

The most common method of changing the frequency or time of a particular behavior is to use reinforcement or punishment. When behavior is strengthened or weakened in this way, it is presumed that it affects neuronal relationships in the brain that make the activity possible (Carlson, 1998). In most circumstances there are changes in the environment or stimuli that increase the probability of a particular behavior that goes before the change (positive reinforcement). Likewise, avoidance or escape from some stimuli can increase behavior (negative reinforcement). When behavior has been increased with reinforcement (positive or negative) which is then taken away, the behavior should decrease in frequency. This decrease in behavior strength as a function of responses without reinforcement is called extinction. Just as there are stimuli which increase behavioral frequency when present after a particular behavior, there are also stimuli that lower behavior strength when present after the behavior has happened (positive punishment). Likewise, it is possible to lower behavior frequency by removing reinforcement after the target behavior is performed (negative punishment).

The three-term contingency entails molecular-discrete analysis suitable to describe simple environment-behavior relationships (e.g., effects of the price of brand A on it being bought) but does not handle competing environmental influences (the effects of the price of brand Y on the buying of brand X) very well (e.g., Herrnstein, 1997). This is an important limitation, as it is possible to have implicitly the same effect on behavior as direct reinforcement and punishment of the target behavior have by increasing the reinforcement or punishment for other (competing) behavior than the target behavior. This is hard to conceptualize from the standpoint of the

three-term contingency alone, but can easily be represented by the matching law (Herrnstein, 1961, 1970), which looks at all behavior as choice:

$$\frac{B_a}{B_a + B_b} = \frac{R_a}{R_a + R_b}, \quad (1)$$

The matching law states that relative behavior (e.g., response rate) matches its relative reinforcement in equilibrium. It is within the framework of relativity of response and matching that behavioral contrast (Reynolds, 1961) can be understood. It is called positive contrast when the frequency of the target behavior, that is not directly influenced, increases as other behavior decreases. A negative contrast is the opposite, when the frequency of the target behavior declines when another response increases. The rapidity of reinforcements is clearly advantageous and a threat to businesses that sell consumer products. Since the rate of changing behavior is associated with the rate of reinforcement, attracting consumers depends on how much reinforcement a product delivers. In the current digital environment where the levels of reinforcement are accelerating, if the purpose is to influence behavior, then it is mandatory to provide higher levels of reinforcement. To provide appropriate reinforcement, it is imperative that we understand the factors that drive consumer behavior. It is possible to use many independent variables for the generalized matching equation (Baum, 1974, 1979; Lander & Irwin, 1968). These can, for example, be variables that research has shown affect behavior such as rate, amount, immediacy and quality of the reinforcers or response effort (for a review see Fisher & Mazur, 1997). To account for this within the framework of the generalized matching equation, it is possible to use the concatenated generalized matching equation (Equation 2):

$$\log \frac{B_a}{B_b} = a_r \log \left(\frac{R_a}{R_b} \right) + a_m \log \left(\frac{M_a}{M_b} \right) + a_q \log \left(\frac{Q_a}{Q_b} \right) + a_d \log \left(\frac{D_b}{D_a} \right) + \log c \quad (2)$$

where R , M , Q and D represent reinforcer frequency, amount, quality and delay. If it is possible to assume that the effects of the independent variables do not interact, then the concatenated generalized matching law can be relevant and useful when researching the effects of two or more independent variables (Landson et al., 2003). Behavior analytical experimentation is the best way to research the effects of R , M , Q and D on consumer behavior online, in one way or another, as our survey of the literature reveals (see Table 4.1).

Online firms following a pragmatic empiricist tradition

Hantula (2005) argues that the Internet has been subject to a series of experimental efforts since retailers and consumers started to appear in this technology-mediated environment. One reason is that the Internet provides an unprecedented opportunity for measuring human online behavior. Online firms and practitioners were as such among the first to conduct experiments online, driven by their search for more effective websites. Following a *pragmatic empiricist tradition* (Hantula, 2005: 103) and using A/B testing, many firms online have adopted a *data-driven culture*. Such firms are running frequent experiments and are using the experimental results as a major input for making operative and/or strategic decisions (Kohavi et al., 2009). This approach gives hard figures behind the suggested changes or improvements. Hence, such firms have understood that a customer's response to different actions and initiatives can be tested rather quickly and at a very low cost online, giving them critical knowledge about the business value of the ideas that such actions are based upon. As Kohavi et al. (2009) note, the culture of experimentation at

Amazon, where data trumps intuition, has allowed Amazon to innovate quickly and effectively. A/B testing at Amazon ten years ago included experimenting with new home page design, moving features around the page, different algorithms for recommendations, changing search relevance rankings etc. (Kohavi & Round, 2004). Newly published research has revealed that firms emphasizing decision-making based on data and business analytics (“data-driven decision-making”) show higher performance (see Brynjolfsson et al., 2011).

Online marketing environment: a perfect arena for controlled field experiments

One of the main advantages of online retail field experiments is that it is much easier to assign consumers randomly to different treatment conditions. This is a precondition for an experiment to facilitate causal interpretation since it eliminates potential systematic differences across treatment conditions due to extraneous factors associated with the test subjects (Perdue & Summers, 1986). As long as a randomization algorithm and software using the output of this algorithm are in place (e.g., at the retailer’s website), test subjects will randomly be assigned to the different treatment conditions automatically (for more details, see Kohavi et al., 2009). However, it is not very easy to achieve this in physical field experiments in retailing. It is, for example, rather difficult to change the position of a target product on the shelves in a physical experimental retail store from one customer to the next, or to change store layout, in-store promotion or the layout or location of special displays containing the target product, from one customer to another – without having customers standing and queuing. For these reasons, sequential experiments, like those using an alternating-treatments design, are most applicable under such conditions (see, e.g., Sigurdsson et al., 2011, 2014). Instead of randomly assigning test subjects to different treatments, multiple interventions are here evaluated by rapidly interchanging interventions in a random sequence (the order of treatments can be randomized).

Since the online context represents a technology-mediated environment, consumers will be unaware of their participation in an experiment. This is a clear strength since human subjects tend to modify behavior when they are aware of their participation in an experiment (the Hawthorn effect). This is one of the hardest biases to eliminate in a research design involving human subjects, and could at worst lead to skewed results. It would require noticeably less resources (time and money) to acquire large enough sample sizes in an online field experiment compared to a laboratory study or a field experiment involving consumers in a physical retail environment. As Parasuraman and Zinkhan (2002: 292) state, “one advantage of the Internet is that . . . field experiments can be implemented quickly, with relatively little expense”. Large samples typically decrease the standard error and bring more representativeness into the sample and also offer greater test sensitivity than smaller samples, and as such improve the statistical power. Another advantage is that results of the experiment are obtained quickly (op. cit.) using clickstream data and transactional data. The online marketing environment is therefore a perfect arena for true controlled experiments.

Hantula (2005) argues that the gap between the laboratory and the field experimental work on e-commerce issues is further narrowed when real websites are used as stimuli and participants access these and complete measures in a laboratory. According to Hantula, this creates a blurring of boundaries between laboratory and real life, which he claims is among the most interesting aspect of experiments in e-commerce from a methodological standpoint. Since the experimental environment and real life “become indistinguishable when both occur on the same type of computer, running the same interfaces to perform the same tasks” (Hantula, 2005: 104), the general concern related to experimental situations might as such be muted. In the same vein, DiFonzo

et al. (1998) argue that dynamic computer-generated environments that subjects interact with in the laboratory provide higher experimental realism and thus increasing external validity. However, potential biases attributed to the fact that participants are aware of their participation in a laboratory are not necessarily neutralized. Nevertheless, the electronic environment challenges some of the common assumptions in experimental studies regarding rigor, relevance and artifact (Hantula, 2005).

Gregg and Walczak (2008) argue that online marketplaces, such as eBay, can be exploited as experimental laboratories for testing a variety of hypotheses about purchasing behavior online. They say:

As researchers attempt to make their research more relevant to practitioners . . . it may be necessary to measure actual purchase behavior. eBay and other online marketplaces provide researchers with platforms that can be used to demonstrate the real-world value in dollars of alternative e-image factors such as website designs, product attributes, and information content to practitioners. The ability to conduct controlled real-world experiments using the large pool of online consumers as subjects could potentially be a great asset to researchers wishing to avoid the potential biases of laboratory or survey research and the limitations of secondary data studies.

(Gregg and Walczak, 2008: 661–2)

See Kraut et al. (2004) and Reips (2000) for an in-depth discussion of the advantages and disadvantages of online behavioral research.

Frequently researched digital marketing issues

The literature consists of many experimental studies conducted online that provide relevant findings and implications for firms operating in a digital marketing environment. Although all of these studies use experimental techniques, there is a great diversity among them, and they are not all done in strict behavior analytical fashion, as we want to give a broader picture of possible experimental research.

The following paragraphs represent an attempt to illustrate this diversity, but also to show how the different experimental studies can be structured based on the development of the e-commerce field over the past 20 years or so. Even (if the number of studies referred to are many) with this high number of examples, the list is still not fully comprehensive. The studies are sorted under the following themes (Table 4.1).

Web design issues. Before consumers had access to high-speed broadband, speeding up delivery of online content, *download delays* (delay to reinforcement) was regarded as one of the most irritating aspects of using the Internet. The adoption and use of rich media (quality of reinforcement) technologies (animations, audio, video etc.) on websites created even more challenges, until a growing broadband penetration made download times no longer a critical issue in online retailing for most consumers, at least in the Western world. Research on the role of download time in various issues related to consumers' perceptions and opinions in digital environments appeared in scientific journals around 2000. Rajala and Hantula (2000) performed a laboratory experiment where they tested the effect of delay time related to the search feedback message (whether the store had a particular CD in stock) on the visiting and purchase behavior of participants shopping for CDs in a five-store simulated Internet mall. This study was replicated and extended by DiClemente and Hantula (2003). After the participants had performed their tasks in the simulated Internet mall, they were asked to complete a consumer-satisfaction survey so that

Table 4.1 Experimental studies on digital marketing, 1999–2013

<i>Themes</i>	<i>Author(s)/year(s)</i>
Web design issues	Rajala and Hantula (2000) DiClemente and Hantula (2003) Hong, Thong and Tam (2004) Martin, Sherrard and Wentzel (2005) Rose, Meuter and Curran (2005) Gregg and Walczak (2008) Wu, Cheng and Yen (2008)
Trust, risk and privacy issues	Pires, Stanton and Eckford (2004) Yousafzai, Pallister and Foxall (2005) Hui, Teo and Lee (2007) Tsay, Engelman, Cranor and Scquisti (2011) Beresford, Kübler and Preibusch (2012)
Clicking behavior	Murphy (1999) Hofacker and Murphy (2009)
Online retail practices	Teo, Oh, Liu and Wei (2003) Hantula and Bryant (2005) Yang and Lai (2006) Fagerstrøm (2010) Fagerstrøm and Ghinea (2011) Fagerstrøm, Arntzen and Foxall (2011) Sigurdsson, Menon, Sigurdarson, Kristjansson and Foxall (2013)
Online advertising issues	Sundar and Kim (2005) Moe (2006) Catterjee (2008) Rosenkrans (2009) Goldfarb and Tucker (2011) Jung, Min and Kellaris (2011)
Online community issues	Algesheimer, Dholakia and Herrman (2005) Algesheimer, Borle, Dholakia and Singh (2010)
Web 2.0 issues and social media marketing issues	Wang, Baker, Wagner and Wakefield (2007) Zhu and Tan (2007) Aral and Walker (2011) Chen, Wang and Xie (2011) Bakshy, Rosenn, Marlow and Adamic (2012) Bakshy, Eckles, Yan and Rosenn (2012)

the effect of delay times on store preferences could be analyzed. Rose et al. (2005) continued a stream of studies on download delay. Through a laboratory experiment, involving modified real-world retail Web pages, they explored how download times affect the overall evaluation of an e-retailer in terms of attitude towards the page, if the retailer could have designed the website to have it load faster, and how much of the delay was caused by the design of the page. They also measured attitudes towards the delay and perceived waiting time. Hong et al. (2004), on the other hand, performed a laboratory experiment to investigate the fit between informational format (different methods for organizing product information) and shopping task (searching tasks versus browsing tasks), to examine its influence on consumers' shopping performance and perceptions of shopping experience. Research on text versus images is also among the Web

design issues where researchers have used experimental methods. Martin et al. (2005) performed a laboratory experiment to explore what could be optimal website designs, in terms of the level of complexity in visual design and level of verbal complexity, for consumers seeking sensations. Wu et al. (2008) studied the effect of atmospheric factors such as music and color on participants' emotional responses and subsequent shopping behavior in an online store setting, using a laboratory experiment. Furthermore, Gregg and Walczak (2008) experimented with two real-world online auction businesses on eBay to examine the effect of creating a more professional online e-image on consumers' willingness to transact with the firm, and the prices they were willing to pay for the firm's goods and services.

Trust, risk and privacy issues. Although trust, risk and privacy issues are still important research themes in e-commerce, they were even more important in earlier phases of the Internet when consumers' transactional behaviors were hampered due to high perceived risk and a lack of privacy and trust. These issues have therefore attracted many researchers in the past, and continue to do so. Yousafzai et al. (2005), for example, examined the effectiveness of potential trust-building strategies for e-banking and their impact on online customers' perceptions of the trustworthiness of the bank. Pires et al. (2004), on the other hand, performed a laboratory experiment to examine whether the perceived risk of online purchasing varies with the participants' online purchasing experiences, level of purchase decision involvement, and the nature of the product to be purchased. Hui et al. (2007) performed a field experiment that assessed the value of privacy assurances on a website. The visitors' behavioral responses towards two types of privacy assurances were observed, and they tested whether the existence of a privacy statement could induce more subjects to disclose their personal information and the effect of a monetary incentive on disclosure. Hui et al. (2007) studied the relationship between the amount of information requested by a firm online and the rate of disclosure, as well as the influence of sensitivity on disclosure. Tsay et al. (2011) designed an experiment to determine whether a more prominent display of privacy information on a website will cause consumers to incorporate privacy considerations into their online purchasing decisions. (They assumed that consumers would tend to buy from online retailers who better protect their privacy.) Beresford et al. (2012) conducted an experiment giving participants the choice to buy a DVD from one of two online stores. By having one store consistently require more sensitive personal data than the other, but at the same time having lower prices, they were able to measure consumers' willingness to pay for privacy.

Clicking behavior. Consumers' clicking behavior has always interested practitioners and users because of the consumer insight that can be derived from clickstream analyses. Murphy (1999) examined website visitors' clicking behavior and ran experiments testing whether the specific location or size of graphics induces more or less clicking on the text links (clickthroughs). Researchers and practitioners were at this point concerned with how a website could be designed so that visitors would stay longer and click on several links. Hofacker and Murphy (2009) ran a field experiment on a live website to find out if visitors are more likely to click on the last link in the navigation menu than middle items. They randomly assigned site visitors, who arrived on the experimental page during the course of their normal web activity, to one of their five treatment conditions. Such knowledge allows firms to improve the efficiency of their website and thus their performance.

Online retail practices. Several experimental studies have explored online retail practices. Hantula and Bryant (2005), for instance, explored delivery issues using a simulated online store where participants ordered music CDs and bargained for delivery time and fees. Their study extends research on the behavioral economics of consumer choice to consider the issue of delivery in the online environment. Yang and Lai (2006), on the other hand, performed a field experiment to examine and compare the performance of three product bundling strategies. The

three product bundling strategies tested were based on different types of data collected on online shopping behaviors, which were a strategy based on order data only, a strategy based on browsing data only, and a strategy based on both browsing and shopping cart data. Teo et al. (2003) performed a controlled laboratory experiment to investigate the effects of interactivity level on Web users' attitudes towards commercial websites. The study by Fagerstrøm (2010) introduced the concept of motivating operations (MO) to the field of online consumer behavior and examined the motivating impact of antecedent stimuli on online purchasing. The results indicate that the concept of MO is applicable to the analysis of the motivating impact of antecedent stimuli on consumer purchase behavior. In another study, Fagerstrøm et al. (2011) performed a simulated online shopping experiment to study how environmental contingencies, such as free shipping, can be used in online stores to develop brand loyalty. Fagerstrøm and Ghinea (2011) studied approach/avoidance behavior by examining the motivating impact of price relative to online recommendation at the point of online purchase. Sigurdsson et al. (2013) conducted an e-mail marketing experiment to examine how consumer responses online can be shaped by incorporating informational (social) and utilitarian stimuli with a clear call for action into the firm's outbound e-mail newsletters.

Online advertising issues. Many researchers have investigated issues related to the effectiveness of online ads. Although this still seems to be a highly active research field, some of the research efforts the last few years have been directed towards ads on social networks. Sundar and Kim (2005) performed a laboratory experiment where they examined the effects of structural features of online ads, such as animation, ad shape and level of interactivity, on attitudes towards the ad and product, perceived product knowledge and perceived product involvement. Moe (2006) performed a field experiment to examine online consumers' reaction to pop-up promotions in terms of clickthroughs and website-exit behavior. In this study the experimental design involved manipulation of the timing of pop-up messages (delay time) and time of day. Chatterjee (2008) used a laboratory experiment to examine the enduring effects of banner and pop-up ad exposures on brand memory and attitudes towards the brand. In this study, the experimental design involved manipulation of advertisement size (large versus small) and ad exposure format (intrusive versus voluntary). The participant's unaided recall and recognition were measured after a seven-day delay. Rosenkrans (2009) performed a field experiment on a newspaper's website to determine whether online, interactive, rich media advertising results in more user interactivity (in terms of clickthroughs) than non-interactive, rich media ads. Goldfarb and Tucker (2011) conducted a field experiment to explore what influences the effectiveness of different ad campaigns. Online consumers were randomly exposed to ads on different websites and their preferences towards the advertiser's product and their purchase intent were measured through a survey. Issues that were explored were the link between contextually targeted advertising (product matching the website) and purchase intent, and the link between high-visibility (obtrusive) advertising (e.g., pop-up ads, floating ads) and purchase intent. Jung et al. (2011) used a laboratory experiment to examine how brand attitudes and purchase intentions are affected by online ads' level of entertainment value. The entertainment value of an ad was in this study manipulated using two different online ads that generated different levels of entertaining values (a game ad composed of interactive quizzes versus a banner ad).

Online community issues. Before social websites such as Facebook grew in popularity, many online firms built up customer community facilities on their own websites to achieve higher levels of engagement with the firm's products and brands. In many of these communities customers were motivated to help each other and to actively recruit others to the community (Algesheimer et al., 2005). In this period many firms therefore spent a large share of their online marketing budget on customer community marketing programs. Experimental studies are also

found among the research investigating online community issues. Algesheimer et al. (2010) employed data from a field experiment conducted by eBay Germany to investigate the link between customers' participation in a firm's online community and the firm's e-mail-based invitations (with incentives). As experimental manipulation, half of the selected customers were invited to participate in one or more of the communities on eBay through an e-mail message (with an incentive to those posting a message), and the behavior of all selected customers was then tracked for a period of one year after the e-mail invitations.

Web 2.0 issues and social media marketing issues. The phrase Web 2.0 is most often attributed to Tim O'Reilly, who described Web 2.0 as "developments in online technology that enable interactive capabilities in an environment characterized by user control, freedom, and dialogue" (Tuten and Solomon, 2013: 7). Web 2.0 technology allows for user-generated content and user participation on retailers' websites. These advances in technology have given firms an opportunity to facilitate and manage customer social interactions more effectively on their own websites (e.g. by allowing users to post their reviews on products and or experiences). Chen et al. (2011) used a unique natural experimental setting resulting from information policy shifts at Amazon.com to examine the differential impact of word-of-mouth (other consumers' opinions) and observational learning (other consumers' actions) on product sales, as well as to examine the lifetime effects and interaction effects of word-of-mouth and observational learning. Web 2.0 platforms (social media), such as Facebook (launched in 2004) and Twitter (2007), led to major changes in how consumers spent their time online and the amount of time spent on generating, sharing and consuming other users' content online. The potential of reaching thousands or millions of consumers through online word-of-mouth by creating a buzz encouraged many firms to experiment with viral marketing campaigns. In addition, firms gradually became involved in social media marketing (in terms of targeted promotional messages on social media platforms), which has the potential to increase awareness, influence desire, encourage trial, facilitate purchase and cement brand loyalty (Tuten & Solomon, 2013). Experiments have been used as a research method in studies on blog advertising. Zhu and Tan (2007), for instance, used fictitious blogs to investigate the impact of communicator expertise, advertising intent and product involvement on blog advertising effectiveness. Wang et al. (2007) investigated how social cues inherent in avatars influence customers' affect and shopping value. Through a laboratory experiment on a service organization's website they manipulated the sociability of the website by varying the number and type of human-like social cues incorporated into the website. Aral and Walker (2011) conducted a field experiment on Facebook to examine how firms can create word-of-mouth peer influence by incorporating viral features into their products and marketing campaigns. In this experiment experimental users were enabled to use passive broadcast and active-personalized viral message capabilities to exchange messages with their friends/network. The treatment groups used different versions of an application, enabling the user to automatically notify their network when a certain action was performed and to send personalized referrals or invitations to their peers to install the application. Bakshy et al. (2012) examined the role of social networks in online information diffusion with a field experiment. Their experiment evaluated the extent to which exposure to a URL on the news feed increases an individual's propensity to share that URL. Tucker (2012) explored the effectiveness of social advertising using data from field experiments of different ads on Facebook. This study estimates the combined effect of social targeting and social cues in ads, and involves ad campaigns targeted to three different groups and the use of various kinds of normative and informational social influence. The effectiveness is measured in terms of click-through rate per ad impression and connection rate (the number of likes). Bakshy et al. (2012) conducted two field experiments on Facebook to identify the effect of social cues on consumer responses to ads (in terms of clicks

on the linked content and liking the advertised page). In their first experiment they used sponsored story ad units where the main treatment was the number of peers shown. In their second experiment they examined the effect of having a social cue alongside an ad, and how the effect of social cues in advertising varies with the strength of the relationship between the consumer and affiliated peer.

A multi-method approach

Online behavioral data tell a story about what consumers *do* online, not what they *say*. However, for further insights and understanding of rule-following behavior regarding a particular behavior, both types of data might be needed. Building up knowledge of environmental contingencies attached to shopping cart abandonment (which reduces sales conversion rates) illustrates how behavioral data complement interview data. Consumers' verbal responses have for instance been collected by Forrester Research (see Hult et al., 2010) through interviews. Primary drivers were found to be frustration with the amount of shipping costs, unpreparedness to make a purchase and a desire to comparison-shop for a lower price. Faced with high abandonment rates, a natural step for a firm would traditionally be to improve the checkout process. However, as the Forrester consumer interview data suggest, this is only part of the answer. Another way of studying abandonment is to study the behavior of the visitors abandoning the shopping carts, and in particular the degree to which they are returning to the site to buy the items within a specific time. Such data have given a new perspective on shopping cart abandonment, namely that not all abandonments are bad and that 75 percent of these customers will come back multiple times as they consider the purchase or return to abandon again (Nicholls, 2011).

Measuring online shopping behavior of individual customers over a longer time span therefore allows for the collection of new types of information. As Nicholls (2011) reports, the data suggest that customers are using shopping carts to store items they might buy in the future and that shopping cart abandonment is an important part of the normal buying cycle for many customers. However, he also reports that the first 12 hours after abandonment are critical as the majority of customers that are going to buy do so within a 12-hour time span. By adding an element of experimentation, Nicholls (2011) demonstrates increases in the total return rate through remarketing, and that abandoners spend more on the site when remarketed. In attempts to broaden the literature in this area abandoners could, as experimental units, be subject to more controlled experiments. An example is to test the effect on total return rate, sales and plus sales using utilitarian (functional/economic) stimuli and informational stimuli.

Online behavioral analysis in future research

The current chapter has revealed that online behavioral experiments have a clear, definite advantage in understanding online consumers. As illustrated, these experiments can be enhanced further through a multi-method approach, using in-depth qualitative research, consumer observations and the latest technology. The current chapter has also pointed towards some of the many opportunities of online experimentation in relation to consumer behavior analysis. The Internet has the potential to assist behavior analysts as well as marketers to research important behavioral contingencies faster and possibly with more detail compared with what can be done in a traditional offline environment. Still, despite the advantages, the literature is somewhat scarce when it comes to efforts to study online consumer behavior through more rigorous behavioral experiments. More behavioral researchers are therefore encouraged to use the online arena as an experimental setting for their upcoming experiments. Such a move is crucial in

establishing further methodological ground for the application of operant psychology (behavior analysis) to consumer and social marketing.

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