How brands twist heart and mind: Neural correlates of the affect heuristic during brand choice

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In this manuscript it is investigated how affect and cognition interact in consumer decision making. The research framework is multidisciplinary by applying a neuroscientific method to answer the question which information is processed during brand choice immediately when the decision is computed in the test person's brain. In a neuroscientific experiment test persons perform binary decision-making tasks between different brands of the same product class. The results suggest that the presence of the respondent's first choice brand leads to a specific modulation of the neural brain activity, which can be described as neural correlate of Slovic's affect heuristic concept.

For many years, the rationality assumption was regarded as an adequate approximation for modeling and predicting human behavior in social sciences (e. g. French 1988; Luce and Raiffa 1957; and for reviews Baron 1994; Shafir and LeBoeuf 2002). It was assumed that people assess the impact and likelihood of possible outcomes of alternatives as well as the utility value of each alternative. Through an expectation-based calculus, this information is then integrated in order to arrive at a decision (e. g. Neumann and Morgenstern 1953). Motivated by Simon's work on bounded rationality (Simon 1955) and later by Kahneman and Tversky's research on intuitive judgments and heuristics (for a review, see Kahneman 2002) it was shown that people use simple decision strategies, which do not follow basic principles of logic and reason. Thus, the inadequacy of the rationality assumption has been documented in the literature (Kahneman 1994). Although emotions were typically not considered in the rationality analysis, recent research was concerned particularly with investigating the role of affect in judgments and decision making (among many others, for a review, see Loewenstein and Lerner 2003). Previous research has shown that affect (related or unrelated to the decision) can have a significant influence on choice processes (Schwarz and Clore 1988; Pham 1998), affective deficits can decrease the quality of decision making (Bechara et al. 1997; Damasio, Tranel and Damasio 1990; Wilson, Hodges and LaFleur 1995), and the integration of affect in decision-making models can increase their explanatory power (Bernheim and Rangel 2004; Mellers, Schwartz and Ritov 1999). Furthermore, several empirical studies have proven that specific stimuli such as decision alternatives evoke an affective evaluation, which is not always conscious (for reviews see Bargh 2002; Kahneman, Ritov and Schkade 1999; Zajonc 1980). Against this background Finucane and Slovic et al. introduced the concept of the affect heuristic (Finucane et al. 2000; Slovic et al. 2002, 2004). This concept suggests that we often rely on automatically occurring affective responses to specific stimuli.

In conformity with the literature on brand and consumer relationship theory (Aaker, Fournier and Brasel 2004; Chaudhuri and Holbrook 2001; Fournier 1998; Thomson, MacInnis and Park 2005), we assume that strong brands can constitute just such an affect-laden stimulus and that brand choice processes can be based on the affect heuristic concept. Here, in contrast to previous studies, consumer evaluations of nearly similar brand products from the same product class are examined, which can only be distinguished from one another by implicit or explicit brand information. The influence of this brand information on decision making has been investigated by means of functional magnetic resonance imaging (fMRI) as proposed by consumer researchers (Percy, Hansen and Randrop 2004; Shiv and Fedorikhin 1999).

THE ROLE OF AFFECT IN BRAND EVALUATIONS

In the past three decades, the role of affect has been studied increasingly in consumer research (for reviews see Bagozzi, Gopinath and Nyer 1999; Erevelles 1998; Hirschman and Stern 1999). Researchers have investigated affective processes in advertising (e.g. Burke and Edell 1989; Edell and Burke 1987; Holbrook and Batra 1987; Petty, Cacioppo and Kasmer 1988; Vakratsas and Ambler 1999) during the consumption experience (e. g. Havlena and Holbrook 1986; Holbrook and Hirschman 1982; Holbrook et al. 1984), and during post-purchasing processes (Mano and Oliver 1993; Westbrook 1987; Westbrook and Oliver 1991). Additionally, research on the role of affect in consumer decision making has addressed a wide variety of issues such as the influence of mood on evaluative judgments (Cohen and Andrade 2004; Gorn, Goldberg and Basu 1993; Keller, Lipkus and Rimer 2003; Pham 1998; Schwarz 2000; Yeung and Wyer 2004), the impact of utilitarian versus hedonic product attributes (Babin, Darden and Griffin 1994; Batra and Ahtola 1991; Belk, Ger and Askegaard 2003; Dhar and Wertenbroch 2000), the impact of affect on memory (Kahn and Isen 1993; Lee and

Sternthal 1999; Stayman and Batra 1991), and the interplay between positive and negative affect in consumer judgments (Herr and Page 2004; Williams and Aaker 2002), as well as between affect and cognition (Garbarino and Edell 1997; Shiv and Fedorikhin 1999).

Neuropsychological Terminology and Consequences for Affect Measurement

The terms *emotion*, *affect* and *feeling* are currently used rather indiscriminately in consumer research. This lack of clear distinction is due to a general lack of consensus on an appropriate terminology (for reviews see Kleinginna and Kleinginna 1981; Plutchik 2003). This missing consensus is caused mainly by the complexity and subjectivity of affect which results in ambiguous descriptions of the phenomenon. In the following a terminology from neuropsychology is applied, which distinguishes between emotions and feelings (Damasio 2001). According to this terminology, emotions are specific and consistent somatic states. These states are specified as collections of physiological responses induced by specific brain systems when the organism represents certain objects or situations. Feelings in turn, are the private and mental experience of emotions (Damasio 2000). Affect is used here as generic term for both emotion and feeling.

The current work is grounded on this terminology because it operationalizes emotions more objective by separating individual and private perspectives of mental emotional experiences from the somatic state itself. The activity within specific brain systems related to the somatic state can be analyzed by means of modern brain imaging techniques. There is a substantial body of neuroscientific research, which has previously been done: Amongst others, the research has investigated the brain areas involved in analytic and emotional decision making (for reviews, see Bechara 2004; Gruber et al. 2001; Houde and Tzourio-Mazoyer 2003; Phan et al. 2002; Schwerdtner et al. 2004). In addition to more objective

measurement, the application of brain imaging techniques has at least two other relevant advantages in answering the underlying research question.

Firstly, recent studies on consumer decision making suggest that most information processing and, in particular, the processing of emotions is subconscious (see for reviews Bargh 2002; Fitzsimons et al. 2002; Woodside 2004). “Ninety-five percent of thinking takes place in our unconscious minds – that […] stew of memories, emotions, thoughts and other cognitive processes we are not aware of or what we can’t articulate” (Zaltman 2003, 9). However, the dominant prevailing studies in consumer research are based on interviews and questionnaires (Webb et al. 2002). Therefore, the application of functional brain imaging techniques promises complementary insights into existing findings in the field.

Secondly, there is evidence that it is important to examine emotion-based information processing *not after* the decision has already been taken, but *directly* during the evaluation process (Adaval 2001; Erevelles 1998; Pham et al. 2001). Functional brain imaging techniques allow an “observation the brain “ during these processes, and thus seem to provide relevant additional information (Shiv and Fedorikhin 1999).

Brands as Decision Objects

In the context of choice behavior, brands can be regarded as an “information chunk” (Jacoby 1977). Numerous studies in consumer research have shown that consumers use only a small number of product attributes to arrive at a purchase decision (e. g. Jacoby, Olson and Haddock 1971; Jacoby, Szybillo and Busato-Schach 1977). Brand name and price are the first and most frequently information being selected (e. g. Dodds, Monroe and Grewal 1991; van Osselaer and Alba 2000). Miller pointed out that “we are dealing here with a process of organizing or grouping input into familiar units or chunks and a great deal of learning has gone into the formation of these familiar units” (Miller 1956, p. 93). This “chunk” can be seen

as an amount of information that has psychological significance (Maheswaran, Mackie and Chaiken 1992; Simon 1974). That means the brand symbol activates a specific associative knowledge network. According to Keller, we assume that "ultimately the power of a brand lies in the mind of consumer" (Keller 2002, 157). Brands differ in these (mental) effects and individuals differ with respect to the evaluability of brand information. From the individual's perspective, a strong brand has the potential to bias a decision, resulting in a decision heuristic. Thus, we hypothesized the following:

H1: Brand choice tasks are accompanied by distinctive neural brain activity.

Following the logic of hypothesis 1, we assumed that the individual's brand preference ranking order would modulate the neural brain activity. Hence,

H2: the relationship between brand induced differences of cortical activity and the individual brand preference rating is linear.

The Affect Heuristic Concept

Traditional decision strategies for choosing from the total set of alternatives in consumer research focus predominantly on cognition and can be differentiated from another by the total amount of information processed in extensive evaluations (e. g. weighted adding strategy) or limited decision heuristics (e. g. lexicographic rule) (for a review, see Bettman and Luce 1998). Furthermore, recent work with prospect theory concepts has introduced relational decision heuristics (Simonson and Tversky 1992). Pham et al. integrated the perspective that feelings are a central factor influencing choice goals and introduced the "How-do-I-feel-about-it?"-heuristic (Pham 1998; Pham et al. 2001). Besides utilitarian aspects, the latter concept also considers the hedonic value of a decision outcome that might influence the decision strategy (see also Bagai 1999; Hsee and Rottenstreich 2004). What all

these decision strategies have in common is that they assume a conscious analytical weighing of attributes and/or alternatives as an underlying information processing rule.

However, studies by Loewenstein et al. and Slovic et al. suggest that affect plays a double role in information processing and decision making (Loewenstein and Lerner 2003; Loewenstein et al. 2001; Slovic et al. 2002). On the one hand, conscious feelings are integrated as rational information in analytical decision strategies as in the case of the "How-do-I-feel-about-it?"-heuristic (Schwarz 2000). According to this concept, positive (negative) feelings lead to a favorable (unfavorable) evaluation. On the other hand, mostly subconscious emotions can directly influence decision making by an affect heuristic that is not mediated by brain areas responsible for analytic information processing (Slovic et al. 2002). Using a readily available affective impression can be easier and more efficient than applying analytical decision-making strategies (Slovic et al. 2004). Thus, a *positive*, rather than a destructive influence of emotions on decision making is assumed. The affect heuristic seems to be an adequate explanation of Adaval and Jacoby's findings that the presence of a prominent brand during evaluation processes leads to a dominant overall effect (Adaval 2003; Jacoby et al. 1971). In accordance with Ambler et al., we assume that the brand-induced heuristic is characterized by a relatively rapid and intuitive decision-making process and low analytical information processing (Ambler et al. 2004). The heuristic is based on experience with the brand (Isen, Labroo and Durlach 2004), and thus a lifetime of learning, which leads to positive or negative associations, directly or indirectly linked to somatic states.

Supporting evidence for these assumptions can also be found in the neuroscientific literature. In his "Somatic Marker Hypothesis", Damasio (1996) proposed a system-level neuroanatomical framework for the influence of emotions on decision making (see also Bechara et al. 1997). The central idea behind this hypothesis is that decision making is a process influenced by "marker signals" that arise in (somatic) bioregulatory processes, especially those underlying emotions which can be triggered by internal or external stimuli

such as brand information. This influence can occur consciously and subconsciously. Damasio et al. concluded from lesion studies, that a specific brain region, the ventromedial prefrontal cortex (VMPFC), is part of a system that stores information about past positive and negative emotional experiences (Bechara et al. 1997; Bechara et al. 1999; Bechara, Damasio and Damasio 2000). Investigations of emotional participation in moral judgments have shown that brain areas associated with working memory (Brodmann Areas (BA) 7, 40, bilateral parietal lobe, and right BA 46) were less active during emotional as compared to analytic processing (Greene et al. 2001). This dual-process concept of *analytical* versus *emotional* information processing systems is not new, but is well supported in the decision-making literature (Epstein 1994; Shiv and Fedorikhin 1999; Sloman 1996; Zajonc 1980; also see figure 1).

Hence, we hypothesize that:

H3: Familiar brands are chosen intuitively, with dominant activity in brain regions being responsible for emotion processing (a) rather than analytical information processing (b).

Insert figure 1 about here

The analytical system performs logical connections and requires justification via logic and evidence (Epstein 1994). Behavior which is based on processing via the analytical system is mediated by a conscious appraisal of events. The processing of information in the analytic system is relatively slow compared to processing in the emotional system. The latter is based on past personal experiences and associative connections. Thus, the emotional system contains a high degree of self-engaged and self-referential information processing. We hypothesize that:

H4: The brain activity underlying brand choice tasks in the presence of a familiar brand involves areas which are responsible for self-engaging processes.

EMPIRICAL STUDY

The empirical study was designed to analyze whether brands possessing a personal significance modulate respondents' information processing according to the affect heuristic concept, whereas other brands lead to a more analytic information processing (*the neuroscientific aspects of this study have been published elsewhere and are not cited in this manuscript for reasons of anonymity*).

Participants and Study Design

Two separate samples (sample 1: twelve healthy males, median age 23, sample 2: ten healthy females, median age 22) of economic students were asked to perform binary decision-making task between different brands. The two gender specific groups were employed to keep the socio-economic characteristics of the participants as homogeneous as possible to avoid moderating effects. As product categories, coffee for the group of female respondents and beer for the male group were used to ensure brand expertise. These fast moving consumer goods are characterized by almost identical ingredients (i. e. German purity law for beer) as well as sensory qualities, respectively, causing that the brand itself functions as the major evaluation criterion. To avoid psychological biases and memory effects, the participants were not ask about the different brands prior to the study. Thus, the respective market leaders were selected as target brands T_{coffee} and T_{beer} to increase the probability to include individually familiar brands based on the concept of "double jeopardy" (Chaudhuri 1995), which suggests that brand strength is highly correlated with the brand's market share.

The binary decision-making task was simulated by a visual presentation of brand pairs during the respondents were lying in a magnetic resonance scanner. For each single decision trial, the respondents were instructed to decide which of the two displayed brand products they would buy. The experimental paradigm was designed to investigate systematic differences of cortical processing during purchase decisions in the presence or absence of the specific target brand, in contrast other brands ($N_{coffee} = 14$, $N_{beer} = 19$) which were classified as diverse (D_1, D_2, D_N). Thus, the respondents had to choose between either Target & Diverse (TD) or Diverse & Diverse (DD) brand pairs.

Insert figure 2 about here

A one factorial block design with altering blocks of TD and DD decisions was employed. For each choice task, the two different brands were combined in a pseudo-randomized manner from the pool of 19 beer or 14 coffee brands. The sequence within the 10 blocks of 10 decisions each was pseudo-randomized, so that these blocks consisted either of eight DD and two TD or two DD and eight TD decisions which is illustrated in figure 2.

No "resting" condition was implemented so as to avoid the problem of ambiguous baseline conditions (Stark and Squire 2001). In order to assess reproducibility and habituation effects, the run of 100 decision trials was presented twice for each participant (Lohmann et al. 2004). Further, the respondents were not asked for any feedback during the measurement process to avoid response-related brain activations and movement artifacts.

All data were acquired from a 3.0 Tesla whole body scanner (Intera T30, Philips, Best, NL; *technical details are published elsewhere and are not cited for reasons anonymity*). The total acquisition time was 5:00 min for each run. In combination with the fMRI measurement, the participants were asked to rank the relevant beer or coffee brands according to their preferences. The time stability of brand preferences was examined by a second interview 24

month later to analyze whether the brand preference order was due to situational effects. Furthermore, the questionnaire contained question referring to the past buying behavior.

Results

The fMRI data sets recorded during the simulated decision tasks were analyzed using different statistical approaches (*fMRI data analysis details are published elsewhere and are not cited for reasons of anonymity*).

Significant differences in cortical activations between TD decisions and DD decisions occurred in both product category groups (supporting H1). For the assessment of increased and reduced activations during TD decisions in relation to DD decisions, t-tests were calculated by contrasting TD decisions blocks minus DD decision blocks and DD decisions blocks minus DD decision blocks separately for each ranking group. It was found that only three male and five female participants were responsible for the main effects of the first analysis on the single subject level. The analysis of the survey data revealed that these test persons all had in common that they have ranked the target brand as first choice brand (FCB group). No significant effect could be found if the participant ranked the respective target brand as second choice brand or lower. Thus, we revealed an all-or-nothing effect during brand choice determined solely by the presence of the FCB, rather than a linearly graded response depending on the ranking order according to our initial hypothesis 2.

Figure 3A shows the results of the male FCB group of three participants, figure 3B those of the female FCB group of five participants. In these figures TD-DD contrasts are illustrated in red, whereas DD-TD contrasts are illustrated in green. Thus, red represents cortical areas with increased activity during non FCB-decisions. The numbered regions, corresponding to the identification numbers (IDs) in table 1, were found to be consistently and significantly modulated by the FCB in both gender and product category groups and in

reproducibility measurements. No gender differences were found. At the group level (FCB versus non-FCB groups) comparable activation patterns with those of figure 3 were found.

Insert figure 3 about here

Insert table 1 about here

Increased Activations in Absence of the Target Brand. The areas with increased activations in absence of the target brand, that means during DD in contrast to TD decisions, have been reported as involved in the neural network associated with working memory (WM), planning, and reasoning-based decision making (e. g. Kroger et al. 2002; Manes et al. 2002; Marshuetz et al. 2000). The finding that non-FCB decisions caused increased activations in these areas supports the hypothesis that the presence of a subjectively strong brand leads to a decision heuristic which is characterized by lower analytical information processing (H3b). The prefrontal cortex is a key region in many aspects of human decision making, however, it is not the only structure involved in the so called "FCB effect". Additionally, increased activations during non-FCB decisions in posterior regions were found, which has been described by Fuster as cortical dynamics between the posterior and frontal pathways of the perception-action cycle (Fuster 2001). Hence, the results also emphasize that frontal cortical regions do not work autonomously in carrying out decision processes, but rather interact with posterior areas.

Additionally, the increased activity during non-FCB decisions in the visual system (ID 2) can be interpreted as follows. In absence of the FCB, more visual comparisons between the brand pairs are required, as there is no stimulus that immediately draws the respondents' full attention.

Increased Activations in Presence of the Target Brand. In support of hypothesis 3a brain areas which are responsible for the integration of emotions into decision making (right and left ventromedial parts of the prefrontal cortex (VMPFC) , ID 11) were found to be involved in FCB decisions (Bechara et al. 2000). Damage to the VMPFC restricts social behavior, that means that the affected people become unable to observe social conventions and show abnormalities in their processing of affect (Damasio et al. 1990). Thus, in support of Slovic et al.'s concept of the affect heuristic, FCB decisions seem to be particularly influenced by emotions. Recent fMRI studies show that specific VMPFC regions are correlated with (monetary) rewards conditioned with abstract visual stimuli (e. g. O'Doherty et al. 2001; de Quervain et al. 2004). O'Doherty et al. found bilateral, but predominantly left-sided medial activations within the prefrontal cortex for rewarding decision outcomes. These findings are consistent with the results of this study. The activations were found at exactly the same positions (ID 11) with accordingly more activated volume pixel (voxels) in the left hemisphere. Thus, the presented FCBs seem to be associated with positive emotions.

Furthermore, additional areas with increased activations in presence of the target brand (the anterior medial prefrontal cortex (ID 11) , the inferior precuneus, and posterior cingulate cortex (ID 10)), have been found to be involved as multimodal association areas which are important for integrating current inputs with background knowledge (Krause et al. 1999; Maguire, Frith and Morris 1999), episodic memory retrieval (Zysset et al. 2002) and self-reference (Johnson et al. 2002). Therefore, in support of hypothesis 4 the activity increases during FCB-decisions within these areas can be it interpreted as particularly pronounced, self-referential process during FCB decisions.

Additionally, increased activity during FCB decisions in the right superior frontal gyrus (ID 7) were found. This area has been identified as specialized in maintaining working

memory representations that integrate verbal and geometrical information (Prabhakaran et al. 2000).

Another activation pattern was found in the right supramarginal gyrus (SMG) (ID 3). Specific activations in these areas have been described only in a small number of studies. Damasio et al. reported a significantly increased engagement of the right SMG during a comparison task between abstract shapes and concrete objects (Damasio et al. 2000). Additionally, Downar et al. revealed a specific role of the right SMG as part of a network in assessing behaviorally relevant events in the sensory environment (Downar et al. 2002). Thus, the right SMG can be interpreted as an important multimodal "node" of the network responsible for evaluating the relevance of the sensory characteristics of the FCB (e. g. its logo) and the immediate integration with self-referential and emotion-related information.

Time Stability of Brand Preference. Seven of the eight participants in the FCB group also reported the target brand as their brand of first choice brand 24 months after the fMRI experiment. Thus, we interpret the preference ranking as not situational, but stable over time. The participant who changed his first choice brand was a male from the beer sample. The preference shift in the beer sample as compared to the coffee sample could be evoked by the higher adverting intensity in the beer market than in the coffee market. Beer is consistently one of the ten most advertised products in Germany.

Relationship between First Choice Brand effect and reported buying behavior. Past buying behavior was measured by the *share of wallet* of the different brands (scale 1= 0-10%; 2=11-20%,…,10=91-100%). The results of an ANOVA analysis show that members of the FCB group spend most of their budget on products of the respective product group on the FCB: The share of wallet of the FCB in the FCB group (M_{FCB}=6.14) is significantly higher

than for the non-FCB group ($M_{\text{non-FCB}}$=2.13; $F(1,21)$=14,40; p=.001). Thus, we conclude that there is a positive relationship between the FCB effect and buying behavior.

DISCUSSION

The purpose of this study was to investigate the information processing modes underlying brand choice activities. Based on prior research, it was assumed that specific brands and the implicit knowledge associated with the brand act as marker signals and modulates the underlying information processing of brand-choice procedures.

The Interplay of Affect and Cognition during Brand Choice

The distinction of affect and cognition as two processes has been a topic of considerable interest in the last decades (see for reviews e. g. Epstein 1994; Smith and Neumann forthcoming; Zajonc 1980). According to the findings of Bechara et al. (Bechara et al. 1997) we could reveal one processing system involving emotional experience (the emotional system) and another based on traditional decision strategies if no sufficiently strong emotional information biases the decision (the analytic system) as separate neural networks interacting during brand evaluations. In contrast to recent studies on consumer decision making, we could observe the interplay of the two systems within information processing during the evaluation of nearly identical decision objects (homogenous brand products from the same product class). The only differences between these alternatives were the implicit knowledge networks associated with the different brands. In presence of the individual's first choice brand the test persons based their decision strategy on the affect heuristic whereas the

information was processed via the analytic system in presence of the second choice or lower ranked brands.

Thus, the FCB-specific increase in cortical activation within the VMPFC can be interpreted as the fMRI correlate of brain activations involved in this emotional system, i.e. the integration of previous emotional experience with a brand into the ongoing decision process. In combination with the increased activations in absence of the FCB in regions associated with analytical decision strategies ("analytic system"), this supports the hypothesis that in the competitive situation of buying decisions, only a FCB has the specific power to switch to the affect heuristic, whereas a lower rated brand clearly has not.

Favorite Brand distinctive Affect Heuristic

Keller assumes that brand names are stored in the memory as associative general knowledge structures (Keller 1993; Keller 2003). Based on this concept, previous research suggests that consumers may be not motivated to evaluate a brand's attributes extensively, but appear to use the brand name as a heuristic (Maheswaran et al. 1992), or as a retrieval cue for brand product performance (Van Osselaer et al. 2001; Warlop, Ratneshwar and van Osselaer 2005). Thus, when brand and attribute information are presented, the brand name is generally the main source of information (van Osselaer and Alba 2000). Adaval's findings demonstrate that the dominant brand name effect can be increased by the positive affect that people experience when receiving brand information (Adaval 2003).

This study is among the first to show that the respondents favorite brand has a dominant "winner-take-all" effect on the modulation of neural activity accompanying brand information processing. The implicit information relating to the favorite brand triggers an affective reaction and is based on self-referential experience with the brand. The affect-based information processing inhibits analytic weighing of brand product attributes.

Non-linearity and Dichotomy

Although the "winner-take-all" effect negates our initial hypothesis 2 of a cortical representation of a ranking list as the underlying decision criterion, this finding conforms to Kahneman and Tversky's concept of reference points (Kahneman and Tversky 1979). This concept suggests that the value of a decision alternative is not absolute, but depends on an individual reference point. Alternatives with an expected value higher than the reference point, such as the favorite brand, are perceived as positive outcomes, and alternatives with an expected value lower than the reference point are perceived as negative outcomes.

Ranking orders can only be established by multiple, time and resource-consuming brand-to-brand comparisons. Reasoning-based rating scales are seemingly ineffective from an evolutionary point of view, in the sense of *periculum in mora* (danger in delay). Thus, the findings support the view that emotions complement analytical decision making in positive and rational way (Loewenstein et al. 2001). This interpretation is also supported by findings of Carmon et al. that a close and detailed consideration of each decision alternative may induce discomfortable feelings like "choosing feels like loosing" (Carmon et al. 2003). Thus, they suggest that consumers are not necessarily better off by thinking carefully about each attribute of the alternatives via the analytic system.

Limitations and Future Research

Interpretations of the empirical findings are based on binary decision-making tasks conducted in a controlled laboratory environment and thus do not reflect the richness of brand choices in a real-world shopping situation. Hence, further refinement of the experimental design is necessary. For example, more flexible methods such as functional transcranial

Doppler sonography (fTCD; Deppe, Ringelstein and Knecht 2004) could be applied to observe choice behavior at the point of sale so as to avoid laboratory effects.

The underlying sample size was chosen in order to be very homogenous, thus avoiding socio-economic influences that could moderate the results. Future studies should analyze broader and larger samples.

Here, the "winner-take-all" effect was shown for (sensorily) very similar fast moving consumer goods, for which brand information was the prevailing, one-dimensional decision criterion. For other goods or in more complex decision situations, however, there will probably be competing explicit characteristics such as price, usefulness, availability, associated status, etc. Therefore, future research should analyze brands belonging to other product categories and other choice objects in a more general and social context. Additionally, the nature of the FCB effect as an "all-or-nothing" effect will be important issues for further research. Finally, the suggested model of affect in consumer decision making needs further empirical evidence, in particular with respect to the link between perceived risk, involvement and emotion.

References

Aaker, Jennifer L., Susan Fournier and S. Adam Brasel (2004), "When Good Brands Do Bad," *Journal of Consumer Research*, 31 (1), 1-16.

Adaval, Rashmi (2001), "Sometimes It Just Feels Right: The Differential Weighting of Affect-Consistent and Affect-Inconsistent Product Information," *Journal of Consumer Research*, 28 (1), 1-17.

--- (2003), "How Good Gets Better and Bad Gets Worse: Understanding the Impact of Affect on Evaluations of Known Brands," *Journal of Consumer Research*, 30 (3), 352-68.

Ambler, Tim, Sven Braeutigam, John F. Stins, Steven P. Rose and Stephen Swithenby (2004), "Salience and Choice: Neural Correlates of Shopping Decisions," *Psychology & Marketing*, 21 (4), 247-66.

Babin, Barry J., William R. Darden and Mitch Griffin (1994), "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value," *Journal of Consumer Research*, 20 (4), 644-57.

Bagozzi, Richard P., Mahesh Gopinath and Prashanth U. Nyer (1999), "The Role of Emotions in Marketing," *Journal of the Academy of Marketing Science*, 27 (2), 184-207.

Bargh, John A. (2002), "Losing Consciousness: Automatic Influences on Consumer Judgment, Behavior, and Motivation," *Journal of Consumer Research*, 29 (2), 280-85.

Baron, Jonathan (1994), *Thinking and Deciding*, New York: Cambridge University Press.

Batra, Rajeev and Olli T. Ahtola (1991), "Measuring the Hedonic and Utilitarian Sources of Consumer Attitudes," *Marketing Letters*, 2 (2), 159-79.

Bechara, A. (2004), "The Role of Emotion in Decision-Making: Evidence from Neurological Patients with Orbitofrontal Damage," *Brain and Cognition*, 55 (1), 30-40.

Bechara, Antoine, Hanna Damasio and Antonio R. Damasio (2000), "Emotion, Decision Making and the Orbitofrontal Cortex," *Cerebral Cortex*, 10 (3), 295-307.

Bechara, Antoine, Hanna Damasio, Daniel Tranel and Antonio R. Damasio (1997), "Deciding Advantageously before Knowing the Advantageous Strategy," *Science*, 275 (5304), 1293-95.

Bechara, Antoine, Hanna. Damasio, Antonio. R. Damasio and Gregory P. Lee (1999), "Different Contributions of the Human Amygdala and Ventromedial Prefrontal Cortex to Decision-Making," *Journal of Neuroscience*, 19 (13), 5473-81.

Belk, Russell W., Guliz Ger and Soren Askegaard (2003), "The Fire of Desire: A Multisited Inquiry into Consumer Passion," *Journal of Consumer Research*, 30 (3), 326-42.

Bernheim, B. Douglas and Antonio Rangel (2004), "Addiction and Cue-Triggered Decision Processes," *American Economic Review*, 94 (5), 1558-92.

Bettman, James R. and Mary Frances Luce (1998), "Constructive Consumer Choice Processes," *Journal of Consumer Research*, 25 (3), 187-218.

Burke, Marian Chapman and Julie A. Edell (1989), "The Impact of Feelings on Ad-Based Affect and Cognition," *Journal of Marketing Research*, 26 (1), 69-84.

Carmon, Ziv, Klaus Wertenbroch, Marcel Zeelenberg, David Glen Mick and Joel Huber (2003), "Option Attachment: When Deliberating Makes Choosing Feel like Losing," *Journal of Consumer Research*, 30 (1), 15-30.

Chaudhuri, Arjun (1995), "Brand Equity or Double Jeopardy?," *Journal of Product & Brand Management*, 4 (1/2), 26-33.

Chaudhuri, Arjun and Morris B. Holbrook (2001), "The Chain of Effects from Brand Trust and Brand Affect to Brand Performance: The Role of Brand Loyalty," *Journal of Marketing*, 65 (2), 81-93.

Cohen, Joel B. and Eduardo B. Andrade (2004), "Affective Intuition and Task-Contingent Affect Regulation," *Journal of Consumer Research*, 31 (2), 358-68.

Damasio, A. R., D. Tranel and H. Damasio (1990), "Individuals with Sociopathic Behavior Caused by Frontal Damage Fail to Respond Autonomically to Social Stimuli," *Behavioral Brain Research*, 41 (2), 81-94.

Damasio, Antonio R. (1996), "The Somatic Marker Hypothesis and the Possible Functions of the Prefrontal Cortex," *Philosophical Transactions of the Royal Society of London in Biological Sciences*, 351 (October), 1413-20.

--- (2000), "A Second Chance for Emotion," in *Cognitive Neuroscience of Emotion*, ed. Richard D. Lane and Lynn Nadel, New York: Oxford University Press, 12-23.

--- (2001), "Fundamental Feelings," *Nature*, 413 (6858), 781.

Damasio, Antonio R., Thomas J. Grabowski, Antoine Bechara, Hanna Damasio, Laura L. B. Ponto, Josef Parvizi and Richard D. Hichwa (2000), "Subcortical and cortical brain activity during the feeling of self-generated emotions," *Nature Neuroscience*, Vol. 3 (No. 10), S. 1049-56.

de Quervain, Dominique J.-F., Urs Fischbacher, Valerie Treyer, Melanie Schellhammer, Ulrich Schnyder, Alfred Buck and Ernst Fehr (2004), "The neural basis of altruistic punishment," *Science*, 305 (5688), 1254-68.

Deppe, Michael, Erich B. Ringelstein and Stefan Knecht (2004), "The Investigation of Functional Brain Lateralization by Transcranial Doppler Sonography," *Neuroimage*, 21 (3), 1124-46.

Dhar, Ravi and Klaus Wertenbroch (2000), "Consumer Choice between Hedonic and Utilitarian Goods," *Journal of Marketing Research*, 37 (1), 60-72.

Dodds, William B., Kent B. Monroe and Dhruv Grewal (1991), "Effects of Price, Brand, and Store Information on Buyers' Product Evaluations," *Journal of Marketing Research*, 28 (3), 307-20.

Downar, Jonathan, Adrian P. Crawley, David J. Mikulis and Karen D. Davis (2002), "A cortical network sensitive to stimulus salience in a neutral behavioral context across multiple sensory modalities," *Journal of Neurophysiology*, 87 (1), 615-20.

Edell, Julie A. and Marian Chapman Burke (1987), "The Power of Feelings in Understanding Advertising Effects," *Journal of Consumer Research*, 14 (3), 421-34.

Epstein, Seymour (1994), "Integration of the Cognitive and the Psychodynamic Unconscious," *American Psychologist*, 49 (8), 709-24.

Erevelles, Sunil (1998), "The Role of Affect in Marketing," *Journal of Business Research*, 42 (1), 199-215.

Finucane, Melissa L., Ali Alhakami, Paul Slovic and Stephen M. Johnson (2000), "The Affect Heuristic in Judgments of Risks and Benefits," *Journal of Behavioral Decision Making*, 13 (1), 1-17.

Fitzsimons, Gavan J., J. Wesley Hutchinson, Patti Williams, Joseph W. Alba, Tanya L. Chartrand, Joel Huber, Frank R. Kardes, Geeta Menon, Priya Raghubir, J. Edward Russo, Baba Shiv and Nader T. Tavassoli (2002), "Non-Conscious Influences on Consumer Choice," *Marketing Letters*, 13 (3), 269-80.

Fournier, Susan (1998), "Consumers and their Brands: Developing Relationship Theory in Consumer Research," *Journal of Consumer Research*, 24 (4), 343-74.

French, Simon (1988), *Decision Theory: An Introduction to the Mathematics of Rationality*, London:

Fuster, Joaquin M. (2001), "The Prefrontal Cortex - An Update: Time Is of the Essence," *Neuron*, 30 (2), 319-33.

Garbarino, Ellen C. and Julie A. Edell (1997), "Cognitive Effort, Affect, and Choice," *Journal of Consumer Research*, 24 (2), 147-59.

Gorn, Gerald, Marvin E. Goldberg and Kunal Basu (1993), "Mood, Awareness, and Product Evaluation," *Journal of Consumer Psychology*, 2 (3), 237-56.

Greene, Joshua D., R. Brian Sommerville, Leigh E. Nystrom, John M. Darley and Jonathan D. Cohen (2001), "An fMRI Investigation of Emotional Engagement in Moral Judgment," *Science*, 293 (5537), 2105-08.

Gruber, O., P. Indefrey, H. Steinmetz and A. Kleinschmidt (2001), "Dissociating Neural Correlates of Cognitive Components in Mental Calculation," *Cerebral Cortex*, 11 (4), 350-59.

Havlena, William J. and Morris B. Holbrook (1986), "The Varieties of Consumption Experience: Comparing Two Typologies of Emotion in Consumer Behavior," *Journal of Consumer Research*, 13 (3), 394-404.

Herr, Paul M. and Christine M. Page (2004), "Asymmetric Association of Liking and Disliking Judgments: So What's Not to Like?," *Journal of Consumer Research*, 30 (4), 588-602.

Hirschman, Elizabeth C. and Barbara B. Stern (1999), "The Roles of Emotion in Consumer Research," *Advances in Consumer Research*, 26 (1), 4-11.

Holbrook, Morris B. and Rajeev Batra (1987), "Assessing the Role of Emotions as Mediators of Consumer Responses to Advertising," *Journal of Consumer Research*, 14 (3), 404-21.

Holbrook, Morris B., Robert W. Chestnut, Terence A. Olivia and Eric A. Greenleaf (1984), "Play as a Consumption Experience: The Roles of Emotions, Performance and Personality in the Enjoyment of Games," *Journal of Consumer Research*, 11 (2), 728-39.

Holbrook, Morris B. and Elizabeth C. Hirschman (1982), "The Experiential Aspects of Consumption: Consumer Fantasies, Feelings, and Fun," *Journal of Consumer Research*, 9 (2), 132-40.

Houde, Oliver and N. Tzourio-Mazoyer (2003), "Neural Foundations of Logical and Mathematical Cognition," *Nature Reviews Neuroscience*, 4 (6), 507-14.

Hsee, Christopher K. and Yuval Rottenstreich (2004), "Music, Pandas, and Muggers: On Affective Psychology of Value," *Journal of Experimental Psychology: General*, 133 (1), 23-30.

Isen, Alice M., Aparna A. Labroo and Paula Durlach (2004), "An Influence of Product and Brand Name on Positive Affect: Implicit and Explicit Measures," *Motivation & Emotion*, 28 (1), 43-63.

Jacoby, Jacob, Jerry C. Olson and Rafael A. Haddock (1971), "Price, Brand Name, and Product Composition Characteristics as Determinants of Perceived Quality," *Journal of Applied Physiology*, 55 (1), 570-79.

Jacoby, Jacob, George J. Szybillo and Jacqueline Busato-Schach (1977), "Information Acquisition Behavior in Brand Choice Situations," *Journal of Consumer Research*, 3 (4), 209-17.

Johnson, Sterling C., Leslie C. Baxter, Lana S. Wilder, James G. Pipe, Joseph E. Heiserman and George P. Prigatano (2002), "Neural Correlates of Self-Reflection," *Brain*, 125 (8), 1808-14.

Kahn, Barbara E. and Alice M. Isen (1993), "The Influence of Positive Affect on Variety Seeking among Safe, Enjoyable Products," *Journal of Consumer Research*, 20 (2), 257-71.

Kahneman, Daniel (1994), "New Challenges to the Rationality Assumption," in *Choices, Values, and Frames*, ed. Daniel Kahneman and Amos Tversky, New York: Cambridge University Press, 758-74.

Kahneman, Daniel, I. Ritov and D. Schkade (1999), "Economic Preferences or Attitude Expressions? An Analysis of Dollar Responses to Public Issues," *Journal of Risk & Uncertainty*, (1-3), 203-35.

Kahneman, Daniel and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47 (2), 263-91.

Keller, Kevin L. (1993), "Conceptualizing, Measuring, and Managing Customer-Based Brand Equity," *Journal of Marketing*, 57 (1), 1-22.

--- (2002), *Strategic Brand Management: Building, Measuring, and Managing Brand Equity*, Upper Saddle River:

--- (2003), "Brand Synthesis: The Multidimensionality of Brand Knowledge," *Journal of Consumer Research*, 29 (4), 595-600.

Keller, Punam Anand, Isaac M. Lipkus and Barbara Rimer (2003), "Affect, Framing, and Persuasion," *Journal of Marketing Research*, 40 (1), 54-66.

Kleinginna, Paul R. and Anne M. Kleinginna (1981), "A Categorized List of Emotion Definitions, with Suggestions for a Consensual Definition," *Motivation & Emotion*, 5 (4), 345-79.

Krause, B. J., B. Horwitz, J. G. Taylor, D. Schmidt, F. M. Mottaghy, H. Herzog, U. Halsband and H. Muller-Gartner (1999), "Network Analysis in Episodic Encoding and Retrieval of Word-Pair Associates: a PET Study," *European Journal of Neuroscience*, 11 (9), 3293-301.

Kroger, James K., Fred W. Sabb, Christina L. Fales, Susan Y. Bookheimer, Mark S. Cohen and Keith J. Holyoak (2002), "Recruitment of Anterior Dorsolateral Prefrontal Cortex in Human Reasoning: A Parametric Study of Relational Complexity," *Cerebral Cortex*, 12 (5), 477-85.

Lee, Angela Y. and Brian Sternthal (1999), "The Effects of Positive Mood on Memory," *Journal of Consumer Research*, 26 (2), 115-28.

Loewenstein, George and Jennifer S. Lerner (2003), "The Role of Affect in Decision Making," in *Handbook of Affective Sciences*, ed. R. J. Davidson, K. R. Scherer and H. H. Goldsmith, Oxford: Oxford University Press, 619-42.

Loewenstein, George, Elke U. Weber, Christopher K. Hsee and Ned Welch (2001), "Risk as Feelings," *Psychological Bulletin*, 127 (2), 267-87.

Lohmann, H., M. Deppe, A. Jansen, W. Schwindt and S. Knecht (2004), "Task Repetition Can Affect Functional Magnetic Resonance Imaging-Based Measures of Language Lateralization and Lead to Pseudoincreases in Bilaterality," *Journal of Cerebral Blood Flow and Metabolism*, 24 (2), 179-87.

Luce, R. Duncan and Howard Raiffa (1957), *Games and Decisions*, New York: Wiley.

Maguire, Eleanor A., Christopher D. Frith and Richard G. Morris (1999), "The Functional Neuroanatomy of Comprehension and Memory: the Importance of Prior Knowledge," *Brain*, 122 (10), 1839-50.

Maheswaran, Durairaj, Diane M. Mackie and Shelly Chaiken (1992), "Brand Name as a Heuristic Cue: The Effects of Task Importance and Expectancy Confirmation on Consumer Judgments," *Journal of Consumer Psychology*, 1 (4), 317-36.

Manes, Facundo, Barbara Sahakian, Luke Clark, Robert Rogers, Nagui Antoun, Mike Aitken and Trevor Robbins (2002), "Decision-Making Processes Following Damage to the Prefrontal Cortex," *Brain*, 125 (3), 624-39.

Mano, Haim and Richard L. Oliver (1993), "Assessing the Dimensionality and Structure of the Consumption Experience: Evaluation, Feeling, and Satisfaction," *Journal of Consumer Research*, 20 (3), 451-67.

Marshuetz, Christy, Edward E. Smith, John Jonides, Joseph DeGutis and Thomas L. Chenevert (2000), "Order Information in Working Memory: fMRI Evidence for Parietal and Prefrontal Mechanisms," *Journal of Cognitive Neuroscience*, 12 (6), 130-44.

Mellers, Barbara, Alan Schwartz and Ilana Ritov (1999), "Emotion-Based Choice," *Journal of Experimental Psychology: General*, 128 (3), 332-45.

Miller, George A. (1956), "The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information," *Psychological Review*, 63 (1), 81-97.

Neumann, John von and Oskar Morgenstern (1953), *Theory of Games and Economic Behavior*, Princeton:

O'Doherty, John, Morten L. Kringelbach, Edmund T. Rolls, J. Hornak and C. Andrews (2001), "Abstract Reward and Punishment Representations in the Human Orbitofrontal Cortex," *Nature Neuroscience*, 4 (1), 95-102.

Percy, Larry, Flemming Hansen and Rolf Randrop (2004), "Emotional Responses to Brands and Product Categories," *Research Paper*,

Petty, Richard E., John T. Cacioppo and Jeff A. Kasmer (1988), "The Role of Affect in the Elaboration Likelihood Model of Persuasion," in *Communication, Social Cognition, and Affect*, ed. Lewis Donohew and Howard E. Sypher, Hillsdale: Lawrence Erlbaum Associates, 117-46.

Pham, Michel Tuan (1998), "Representatives, Relevance, and the Use of Feelings in Decision Making," *Journal of Consumer Research*, 25 (2), 144-58.

Pham, Michel Tuan, Joel B. Cohen, John W. Pracejus and G. David Hughes (2001), "Affect Monitoring and the Primacy of Feelings in Judgment," *Journal of Consumer Research*, 28 (2), 167-89.

Phan, K. Luan, Tor Wager, Stephan F. Taylor and Israel Liberzon (2002), "Functional Neuroanatomy of Emotion: A Meta-Analysis of Emotion Activation Studies in PET and fMRI," *Neuroimage*, 16 (2), 331-48.

Plutchik, Robert (2003), *Emotions and Life: Perspectives from Psychology, Biology and Evolution*, Washington: American Psychological Association.

Prabhakaran, Vivek, Shivakumar Narayanan, Xinhua Zhao and John D. Gabrieli (2000), "Integration of Diverse Information in Working Memory Within the Frontal Lobe," *Nature Neuroscience*, 3 (1), 85-90.

Schwarz, Norbert (2000), "Emotion, Cognition, and Decision Making," *Cognition & Emotion*, 14 (4), 433-41.

Schwarz, Norbert and Gerald L. Clore (1988), "How Do I Feel about It? The Informative Function of Affective States," in *Affect, Cognition, and Social Behavior*, ed. Klaus Fiedler and Joseph P. Forgas, Toronto: Hogrefe, 44-62.

Schwerdtner, Johannes, Monika Sommer, Tatjana Weber and Juergen Muller (2004), "Functional Neuroanatomy of Emotions," *Psychiatric Praxis*, 31 (1), 66-67.

Shafir, Eldar and Roby A. LeBoeuf (2002), "Rationality," *Annual Reviews in Psychology*, 53 (1), 491-517.

Shiv, Baba and Alexander Fedorikhin (1999), "Heart and Mind in Conflict: The Interplay of Affect and Cognition in Consumer Decision Making," *Journal of Consumer Research*, 26 (3), 278-93.

Simon, Herbert (1955), "A Behavioral Model of Rational Choice," *Quarterly Journal of Economics*, 69 (1), 99-118.

Simon, Herbert A. (1974), "How Big Is a Chunk?," *Science*, 183 482-88.

Simonson, Itamar and Amos Tversky (1992), "Choices in Context: Tradeoff Contrast and Extremeness aversion," *Journal of Marketing Research*, 27 (5), 281-95.

Sloman, Stephen A. (1996), "The Empirical Case for Two Systems of Reasoning," *Psychological Bulletin*, 119 (1), 3-22.

Slovic, Paul, Melissa L. Finucane, Ellen Peters and Donald G. MacGregor (2002), "The Affect Heuristic," in *Heuristics and Biases: The Psychology of Intuitive Judgments*, ed. T. Gilovich, D. Griffin and D. Kahneman, New York: 397-421.

Slovic, Paul, Melissa L. Finucane, Ellen Peters and Donald G. MacGregor (2004), "Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality," *Risk Analysis*, 24 (2), 311-22.

Smith, Eliot R. and Roland Neumann (2005), "Emotion Considered From the Perspective of Dual Process-Models," in *Emotion: Conscious and Unconscious*, ed. Lisa F. Barrett, Paula M. Niedenthal and Piotr Winkielman, New York: Guilford.

Stark, Craig E. L. and Larry R. Squire (2001), "When Zero is not Zero: The Problem of Ambiguous Baseline Conditions in fMRI," *Proceedings of the National Academy of Sciences of the United States of America*, 98 (22), 12760-66.

Stayman, Douglas M. and Rajeev Batra (1991), "Encoding and retrieval of ad affect in memory," *Journal of Marketing Research*, 28 (2), 232-40.

Thomson, Matthew, Deborah J. MacInnis and C. Whan Park (2005), "The Ties That Bind: Measuring the Strength of Consumers' Emotional Attachments to Brands," *Journal of Consumer Psychology*, 15 (1), 77-92.

Vakratsas, Demetrios and Tim Ambler (1999), "How Advertising Works: What Do We Really Know?" *Journal of Marketing*, 63 (1), 26-44.

Van Osselaer, Stijn M. J. and Joseph W. Alba (2000), "Consumer Learning and Brand Equity," *Journal of Consumer Research*, 27 (1), 1-16.

Van Osselaer, Stijn M. J., Chris Janiszewski, David Glen Mick and Frank R. Kardes (2001), "Two Ways of Learning Brand Associations," *Journal of Consumer Research*, 28 (2), 202-44.

Warlop, Luk, S. Ratneshwar and Stijn M. J. van Osselaer (2005), "Distinctive Brand Cues and Memory for Product Consumption Experiences," *International Journal of Research in Marketing*, 22 (1), 27-45.

Westbrook, Robert A. (1987), "Product / Consumption-Based Affective Responses and Postpurchase Processes," *Journal of Marketing Research*, 24 (3), 258-71.

Westbrook, Robert A. and Richard L. Oliver (1991), "The Dimensions of Consumption Emotion Patterns and Consumer Satisfaction," *Journal of Consumer Research*, 18 (1), 84-92.

Williams, Patti and Jennifer L. Aaker (2002), "Can Mixed Emotions Peacefully Coexist?" *Journal of Consumer Research*, 28 (4), 636-50.

Wilson, Timothy D., Sara D. Hodges and Suzanne J. LaFleur (1995), "Effects of Introspecting About Reasons: Inferring Attitudes From Accessible Thoughts," *Journal of Personality & Social Psychology*, 69 (1), 16-29.

Woodside, Arch G. (2004), "Advancing from Subjective to Confirmatory Personal Introspection in Consumer Research," *Psychology & Marketing*, 21 (12), 987-1010.

Yeung, Catherine W. M. and Robert S. Wyer (2004), "Affect, Appraisal, and Consumer Judgment," *Journal of Consumer Research*, 31 (2), 412-25.

Zajonc, Robert B. (1980), "Feeling and Thinking: Preferences Need No Inferences," *American Psychologist*, 35 (2), 155-75.

Zaltman, Gerald (2003), *How Customers Think*, Boston: Harvard Business School Press.

Zysset, Stefan, Oswald Huber, Evelyn C. Ferstl and Yves von Cramon (2002), "The Anterior Frontomedian Cortex and Evaluative Judgment: An fMRI Study," *Neuroimage*, 15 (4), 983-91.

Tables

Table 1: Summary of empirical results

ID	Cortical Region	Side	BA (Brodman Area)	Representative MNI coordinate (x,y,z) in mm
1	Occipital Lobe, Superior Occipital Gyrus / Cuneus	R	19	30,-86,25
	Parietal Lobe, Superior Parietal Lobule / Precuneus	R	7 / 31	33,-74,49
2	Occipital Lobe, Superior Occipital Gyrus / Cuneus	L	19	-24,-82,32
	Parietal Lobe, Superior Parietal Lobule / Precuneus	L	7	-24,-76,38
3	Temporal Lobe, Supramarginal Gyrus	R	40	59,-47,24
4	Frontal Lobe, Inferior Frontal Gyrus	L	6	-42,1,29
5	Frontal Lobe, Middle Frontal Gyrus	R	9	51,31,31
6	Frontal Lobe, Middle Frontal Gyrus	L	9	-49,28,34
7	Frontal Lobe, Superior Frontal Gyrus	R	10	27,49,30
8	Frontal Lobe, Inferior / Middle Frontal Gyrus	L	46	-48,36,13
9	Frontal Lobe, Inferior / Middle Frontal Gyrus	R	46	49,32,14
10	Parietal Lobe, Precuneus	L	7	-6,-54,43
		R	7	2,-58,34
11	Frontal Lobe, Medial Frontal Gyrus	L	10	-7,47,18
		R	10	6,53,5

Figures

Figure 1: The role of affect in consumer information processing

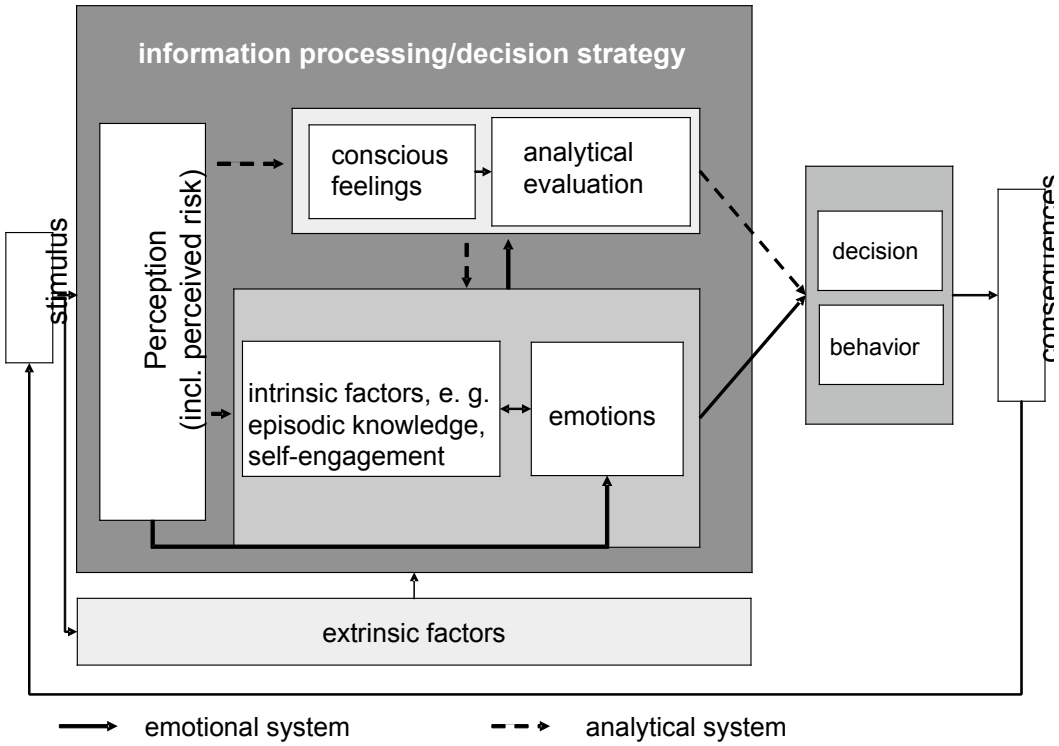

Figure 2: Experimental brand choice task

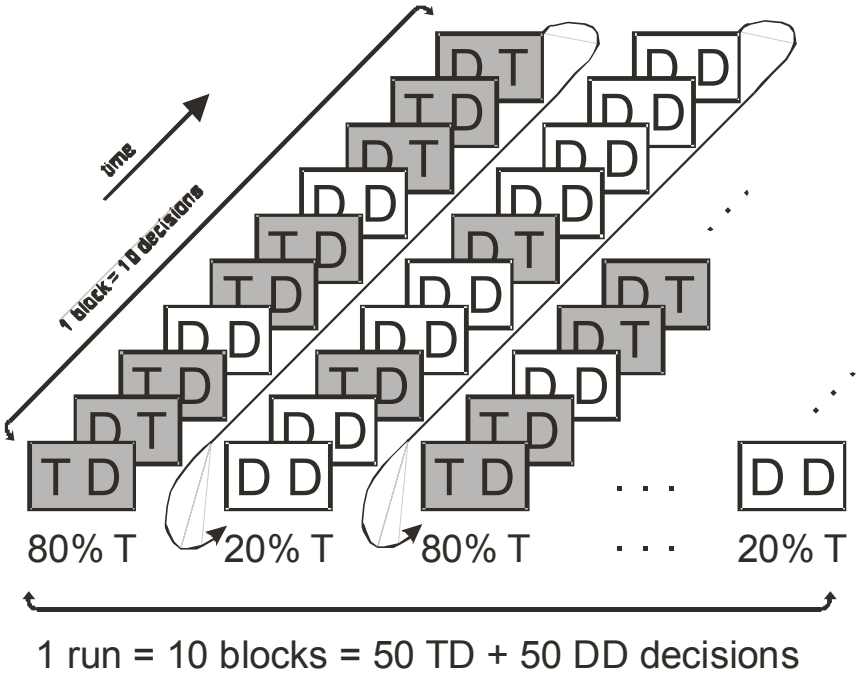

Figure 3: Regions (only) modulated by the first choice brand