Do Retail Brands Bias Consumer Decision Making? - an Fmri-Study on Retail Brand Frames and the Evaluation of Product Packaging

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In economic and psychological theory there is evidence that the manner ("framing") in which a choice-problem is presented, can affect people’s preferences. To add a new theoretical perspective to this research stream, we investigated the neural correlates of retail-brand-frames and analysed how participants’ product evaluation is biased by the framing-information.

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http://www.creditreform.de/Deutsch/Creditreform/Aktuelles/Creditreform_Analysen/SchuldnerAtlas/7_Geschlecht.jsp (27.11.09).

### Do Retail Brands Bias Consumer Decision-Making?

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**An fMRI Study on Retail Brand Frames and the Evaluation of Product Packaging**

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**Extended Abstract**

Research in the field of retail marketing is important for manufacturers, in order to select the best marketing strategy, the most appropriate distribution channels, the optimal price policy, and the best retailers (Choi 1991; Lee and Staelin 1997; Pasternack 1985). However, very little is known about optimal strategies of product positioning, or about how different retail brands influence (“frame”) customers’ product perception and evaluation (Martenson 2007).

In contrast, in economic and psychological theory the “framing effect” is a very well-known and important concept for the identification of judgment biases within subjects’ choices (Gonzalez et al. 2005; Tversky and Kahneman 1981). Recent studies provide evidence that the “framing effect” occurs due to the integration of conscious and unconscious implicit and explicit background knowledge in the decision-making process. In addition, recent evidence indicates that specific neural processes play a central role for susceptibility to the manner in which a choice-problem is presented (Deppe et al. 2005a, Deppe et al. 2007).

Against this background, we applied fMRI in order to understand how the product evaluation of consumers is influenced by retail-brand-frames. In this regard, the application of fMRI could offer a new theoretical perspective and may help to reach a higher level of explained variance regarding the susceptibility of consumers to retail brands.

In our study, we investigated the behavioral decision-making and the correlating neural activity pattern of 21 subjects (11 female, $M_{age}$ =25.91, SD= 4.4; 10 male, $M_{age}$ =28.6, SD=5.502), by comparing individual attractiveness evaluations of 30 packages within an unframed task and a framed task. The unframed task consisted of the attractiveness evaluation of product packages alone, whereas in the
framed task we presented product packages together with selected retail brands. Both tasks were pseudo-randomized, and repeated four times. Because of this structure, the 30 product package images had to be evaluated four times in the unframed task and, respectively, four times—in combination with the retail brand—in the framed task.

The stimulus material for the fMRI-experiment was selected in a pretest. In this pilot study, 51 randomly selected subjects (23 female, 28 male) evaluated, according to their attractiveness, 130 original paper-based packages of current supermarket products. The packages had to be rated on a score ranging from 1="very unattractive" to 10="very attractive". We then selected only the 10 most attractive packages ("P+"), the 10 least attractive packages ("P-"), and 10 neutral packages ("P0") for the neuroimaging experiment (Deppe et al. 2005a; 2007; Stoll, Baecke and Kenning 2008).

The study was executed on a 3T scanner (Magnetom Trio, SIEMENS, Erlangen, Germany). The protocol included a 3D isotropic T1-weighted data set of the entire head, with a measured voxel size of 1.0 mm edge length for anatomical identification and coregistration into the Talairachspace. The data set consisted of 36 transversal slices of 3.6 mm thickness without a gap, FOV 230 mm x 230 mm, acquired matrix 64 x 64, that is, isotropic voxels with 3.6 mm edge length. Contrast parameters were TR=3000 ms, TE=50 ms, flip angle=90°. The stimuli were projected onto a transparent screen with an LCD beamer, and viewed from the other side via a 45° mirror mounted on an element phase array coil.

First, we compared the behavioral data (the attractiveness rating) of the framed task with the behavioral data of the unframed task. For this we used the evaluations of each participant within the scanner. We calculated an individual attractiveness ratio (AR) for the framed (AR [framing]) and the unframed task (AR [packaging]), by subtracting the number of negative evaluations (not attractive) from the number of positive evaluations (attractive) in the scanner, divided by the total number of all evaluations for each participant (Deppe et al. 2007). The Response Bias (RB), a measure of susceptibility toward framing information, was assessed by subtracting the absolute values of the AR (packaging) from the absolute value of the AR (framing). The expected value of the RB for an individual participant should be zero if the framing information has no influence on the participant’s decision-making. We identified 15 of 21 participants who were influenced by the framing information with an RB unequal 0 on a range from RB=0.03 to RB=0.45. A paired t-test for AR (packaging) and AR (framing) confirmed these differences to be significant (t=2.155, p<0.05).

Second, results from the fMRI data analysis indicated that people who are susceptible to framing information (RB unequal 0) also show different neural activity changes compared to people who show an RB=0. We found activity changes in the dorsolateral prefrontal cortex (DLPFC) and the ventral anterior cingulate cortex (vACC). The DLPFC is suggested to play a prominent role for cognitive control, working memory, and decision-making (McClure et al. 2004a; Sanfey et al. 2003). The vACC is linked to emotions and to reward-based learning, and seems to play an important role in visual attention, the integration of incoming information with background knowledge, the retrieval of episodic memory, and self-reflection (Bush et al. 2002; Deppe et al. 2005a, 2005b, 2007; Devinsky, Morrell and Vogt 1995; Lammt et al. 2007). Moreover, activity changes in the vACC are also associated with the general susceptibility of a person (Deppe et al. 2007). Our results are in accordance with the study conducted by Deppe et al. (2007) and their findings that the anterior cingulate cortex is associated with the general susceptibility of a person and plays a decisive role in behavioral adjustments and the integration of framing information in the decision-making process.

Our findings suggest that the application of fMRI can offer a new perspective in order to better understand unconscious processes that influence consumer decision-making. We found neural correlates of judgment biases within the DLPFC and the vACC. This confirmed recent findings in other studies regarding the influence of the “framing effect” on marketing-relevant decisions (e.g., Deppe et al. 2007). Because of the strong influence of the psychological “framing-effect,” it should be important for manufacturers to implement consumer susceptibility, product positioning, and the biasing effects of retail brands in their product and price strategy portfolios.

References