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**Article**

## Uncovering the WHY of Consumer Behavior - From Neuroscience to Implementation

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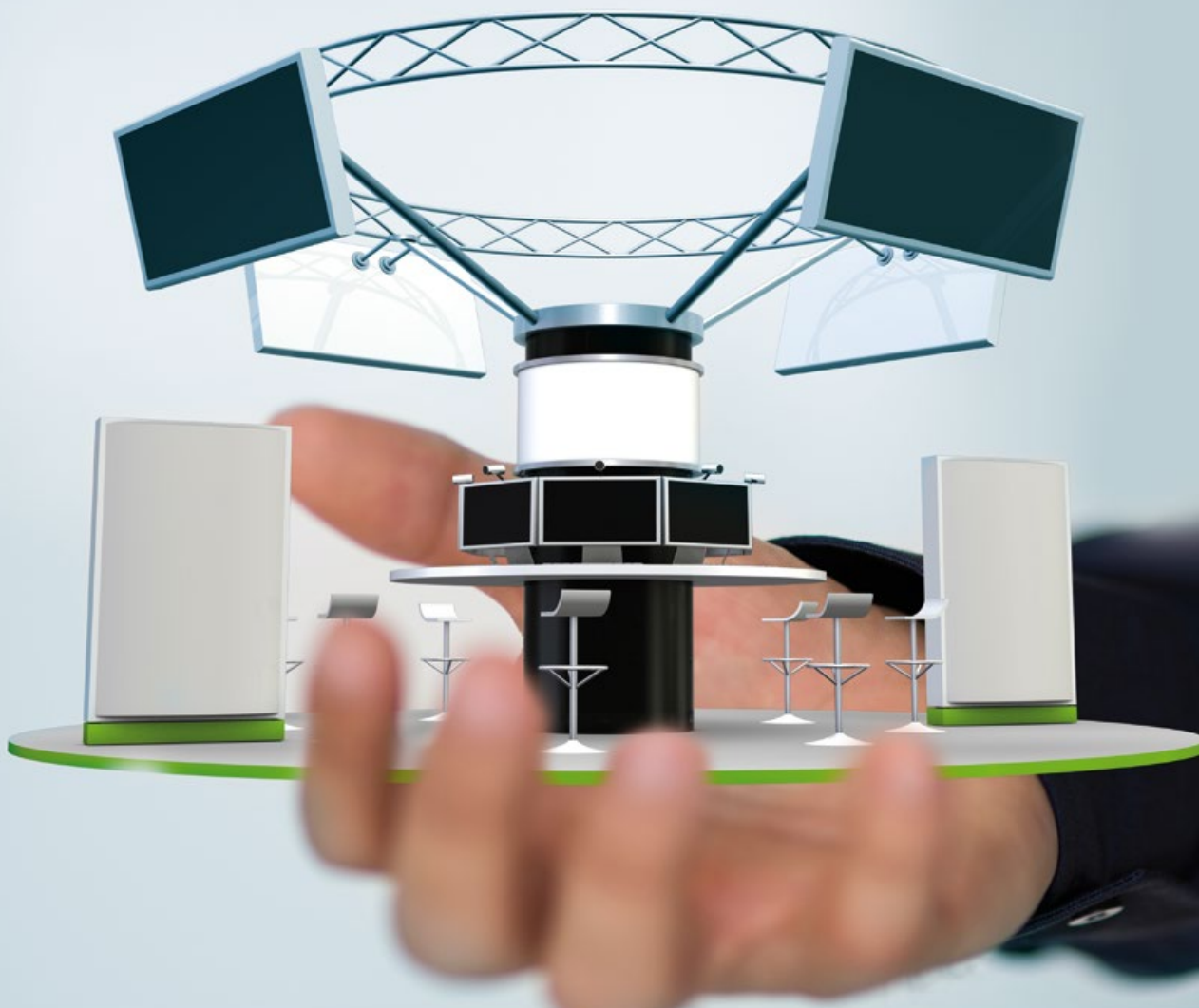
# Marketing Review St. Gallen



1 | 2018 **SCHWERPUNKT** Interview mit Dr. Jochen Köckler, Vorstandsvorsitzender der Deutschen Messe AG • Kommunikationsdramaturgie • Self-Service-Technologies • Erlebniseinheit Live Communication • B-to-B-Live-Erleben auf Messen • Live-Communication-Atmosphäre • Brick-and-Mortar-Retail • Sportbandenwerbung • Markenimage & Sport-Event-Marketing **SPEKTRUM** Interview mit Dr. Oliver Egger, Leiter Marketing des Bereichs PostMail der Post CH AG • Interview mit Ralph Winterhalter, CEO der Winterhalter Group • Neuroscience and Consumer Behavior • Video-Content **KOMMENTAR** Kaufprozesse im Marketing **INSIGHTS** Sprinklr Social Customer Care

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## Live Communication



# Uncovering the WHY of Consumer Behavior

## From Neuroscience to Implementation

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Neuroscience has identified the core drivers of consumer behavior. The challenge for marketing is to make these insights actionable in day to day marketing. Using a FMCG case study, this paper introduces a systematic approach that leverages neuroscience insights to uncover the why of brand choice, helps to evaluate communication at touchpoints and maximize marketing effectiveness in driving fit to brand and sales.

**Enrique Strelow, Christian Scheier**

Over the past fifteen years, neuroscience has uncovered the why of much of human behavior: the anticipation and the consumption of rewards. A reward is the attractive and motivational property of a stimulus (e.g. a brand) that induces approach and buying behavior. There is converging evidence the reward system in the human brain plays a key role in valuation, purchase decisions and ad effectiveness (see Glimcher et al, 2008; Plassmann et al., 2011, for review). The higher the expected reward of a brand or product, the stronger the perceived value and thus the motivation to act (e.g. buy).

In a seminal study, Knutson and colleagues asked participants to make purchase decisions while monitoring their brain activation with an MRI scanner (Knutson et al., 2007). The neural data indicated the decision whether to buy for the suggested price was accompanied by higher activity in two key reward structures (nucleus accumbens and medial orbitofrontal cortex). Prices, on the other hand, activated a structure known to be involved in processing pain. Thus, the consumer brain is sensitive to the net value between expected reward (brand, product) and pain (price). Also, it was recently demonstrated that activity in the reward system is observed when participants see their favorite brand label and when anticipating the receipt of a particular Coke drink (Kühn/Gallinat, 2013). In a series of Coke and Pepsi taste tests, it was shown that patients with damage specifically involving the reward system did not demonstrate the normal preference bias when exposed to brand information (Königs/Tranel, 2008). These results suggest the reward system is a critical neural substrate for the effect of commercial brand information on human decision-making. Brands increase expected rewards and thus willingness to pay a higher price (incur higher pain). Therefore, marketing is effective if it manages to maximize such reward- or value expectations across touchpoints.

Consistent with this perspective, willingness to pay has been shown to be associated with activity in the reward system (Plassmann et al., 2007; Plassmann et al., 2010). The more reward consumers expect from an offer (i.e., the higher the perceived value), the higher the resulting willingness to pay. Another study succeeded in forecasting aggregated market-level elasticities of television ads from activity in the reward system measured by means of a brain scanner (Venkatraman et al., 2015). Most recently, researchers were able to forecast changes of chocolate bar sales based on measured neural activation in the reward system during viewing of PoS communications that were later on placed in supermarkets (Kühn et al, 2016).

A brand with a long history has established well defined and distinctive reward associations in consumer memory (Franzen/Bouwman, 2001). These associations originate in the brand's communication history, the product experience, packaging and more. The total sum of rewards consumers associate with a brand defines the brand's perceived or expected value. These associations are stored in what is called associative memory, and are activated automatically – without thinking – when the brand is perceived (e.g. at the PoS). Thus, most of brand-related reward associations are implicit and cannot be measured with standard, explicit questionnaires. This implicit nature of brand associations also helps to explain why consumers rarely name brands as the core driving force for their FMCG purchase decisions.

Despite this progress, however, important questions remain to be answered, especially from a brand management perspective. While it is certainly useful and important to know that much if not all of consumer behavior is driven by the reward system, this does not inform marketers on the specific rewards linked with a brand or advertisement. Knowing that a given advertisement activates the reward system does not help to understand the reason for this activation, which naturally must be related to the content of the advertisement and how it is perceived by consumers. Not knowing the why moreover impedes the brand manager's understanding as to how an ad should be further optimized, or how successful content can be leveraged in future campaigns and executions, including agency briefings. Insights

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**Fig. 1: PoS Displays and Product Placement**

A) PoS Displays



Depiction of the six different communications used in the present study (top to bottom: woman, couple, hands without text, hands with text, group, toothbrush).

B) PoS Product Placement



Photograph of the quarter palette placement at point-of-sale in the supermarket.

Source: Strelow/Scheier, 2017.

into the why of PoS communication effectiveness can help both brand manager and ad agency to develop effective in-store advertisements and displays in a systematic manner, without resorting to subjective evaluations.

Thus, while neuroscience has uncovered the processes underlying valuation and motivated behavior, it does not inform about the specific content that consumers find rewarding (Chen et al, 2015). Only when this rewarding content is uncovered marketers can optimize a brand's positioning, brief agencies or develop motivating innovations.

The objectives of this paper are to 1) replicate the neural findings between reward and sales and 2) develop and empirically test a complementary, implementation-oriented approach to measure reward that provides more brand management direction.

### Empirical findings from the FMCG industry

The chocolate bar brand Duplo by Ferrero was introduced in the German market in 1964. A core pillar of the brand's sales strategy are instore PoS displays. Here we report on a study investigating effectiveness of six PoS displays to drive sales for the Duplo brand (Figure 1A). In a separate study, reported in detail elsewhere (Kühn et al., 2016), each of the six displays was analysed with functional MRI

("brain scanning") with the goal to forecast changes of chocolate bar sales in supermarket based on neural activation data.

Specifically, after the neural data were acquired and the data analysis and therewith the forecast of sales was finished, the pretested communications were tested at a point-of-sale of the product in a German supermarket (Figure 1B). The communications were placed behind a quarter palette of the product in the direct neighbourhood and in addition to the regular product placement in the shelf. Six weeks were selected during the year that were not influenced by festive periods, holiday seasons or the fact that the product was on special offer and assessed sales of the product from the quarter palette on each day allowing a direct comparison of the sales between the different communications tested. The best selling communication was display group, followed by woman (rank 2) and couple (rank 3). After the sales data were acquired, post-hoc Spearman rho correlation coefficients were computed to explore the predictive validity of the activation of neural structures with respect to the sales data. Correlations and regression analyses showed that activation in one key reward structure (medial orbitofrontal cortex) alone was highly predictive of the observed sales rank ( $r_s = 0.94$ ,  $p = 0.005$ ). Thus, the PoS display with the strongest reward activation generated the most sales, and the display with the weakest reward activation resulted in the weakest sales result. This is consistent with a large body of research showing that the reward system drives purchase decisions.

However, from a marketing practitioner point of view, it would be even more helpful to understand which specific rewards were responsible for the elevated sales. To this end, the goal of the empirical work presented here was to quantify: 1) with which specific rewards the Duplo brand is associated in consumer's minds, 2) the specific rewards communicated by each of the six PoS displays and 3) the overlap or fit of the brand's reward profile with the profile of each of the six displays ("brand fit") to replicate the neural findings between reward and sales.

### Effectively, the following two hypotheses were evaluated:

**Hypothesis 1:** the PoS display that best matches the brand's rewards will be most effective in driving brand sales.

**Hypothesis 2:** there is a systematic relationship between brand fit of PoS displays and resulting sales. Displays with

higher brand fit will be more, and those with lower brand fit will be less effective in driving sales for the brand.

## Rewards associated with Duplo

The first task was to define the specific reward associations to be evaluated. To this end, three sources were leveraged. First, the brand's communication history was reviewed since past communication likely is a key driver in establishing brand-level associations. Communication of competitors was also reviewed. Second, in-depth interviews with industry experts were conducted, to include reward associations for chocolate (bars) more generally. Third, neuroscience findings on reward systems and insights from the psychology of motivation were screened (e.g. Panksepp, 1998; Higgins, 2011). For example, it is known that humans find it rewarding to care for others, to feel safe and cared for, to get recognition, to be in control, to play, to find new ideas (novelty) and so on. Overall, a total of sixty specific rewards were derived. Each of these rewards was captured in a short expression that could be used in an implicit association test (see below). Examples include "relaxation", "energy", "caring for others", "enjoyment", "indulge myself" or "curiosity". Note that most of these rewards are on a psychological level, rather than a more functional level (e.g. "tasty"). This is not surprising in the chocolate category where there are relatively few functional benefits (beyond taste). In other FMCG categories (e.g. detergents, skin care), there typically are more functional benefits that consumer seek. Indeed, consumer psychology has established that consumers look for both functional and psychological benefits, sometimes referred to as "lower-level" and "higher-level" goals (Ratneshwar et al., 2000).

The next task was to identify a measurement procedure that is consistent with the known fact that the human reward systems mostly operates on an implicit level. When consumers perceive an established brand such as Duplo, or when they encounter a piece of branded communication, associated rewards are automatically activated through a process called spreading activation (Collins & Loftus, 1975; Anderson, 1983). Therefore, an implicit association test procedure was used to quantify, in a first step, association strengths between the Duplo brand and each of the sixty rewards. The Duplo brand is sold in a shelf setup in which it shares shelf space with two other Ferrero brands (Hanuta, Kinder Bueno). To establish the distinctive reward profile of Duplo, we thus presented it as part of the bigger portfolio of three brands. Before entering the main test, subjects went through a short training session in which they learned the task and, most importantly, to answer automatically, without thinking.

In the main task, brand logos of the three brands were presented in a 1x3 matrix, together with one of the 60 reward values. The task of respondents was to choose, using the mouse pointer, the brand or brands they spontaneously associate with a given reward value, by clicking on the respective brand or brands. They were instructed to choose as quickly as possible. Ordering of brands and sequencing of reward values was randomized across respondents. Only the first brand choice per reward value was used for analysis. For this first choice, reaction time was measured as the time from the onset of the stimulus (three brands and one reward item) until the mouse click occurred. The main outcome is quantification (0–100%) of how strongly a reward value is associated with any of the three brands, in percent. Reaction time was used as a weighing factor whereby faster responses were weighed more, and slower responses were weighed less strongly. The idea here is that implicit associations manifest themselves by automatic (vs. deliberate) and fast (vs. slow) responses (Ranganath et al., 2008).

Three hundred twenty healthy female subjects with a mean age of 42.5 years (SD = 13.71, range: 18–59 years) participated. We recruited women exclusively since they are known to be the typical buyers of chocolate in supermarkets (Ferrero, inhouse research/data). All women did indicate that they regularly buy the product we intended to investigate as well as awareness of the brands in question. Respondents were recruited and tested using a computer-aided web interview (CAWI). Average duration of each test session was 14.2 minutes (SD = 3.8). Mean response time of the first choice per reward value was 1.2 sec (SD: 780 msec), indicating that respondents were not thinking about

## Management Summary

1. An approach to leverage neuroscience insights in day to day marketing is introduced.
2. A FMCG case study illustrates how this approach can inform marketers on the why of brand choice, and how to decide and optimize PoS displays.
3. A key result is that sales results of PoS displays can be predicted and explained by the fit of implicit brand associations with communication content of PoS displays.




**Table 1: Distinctive rewards per brand**

| Duplo                           | Hanuta              | Kinder Bueno |
|---------------------------------|---------------------|--------------|
| Sensuality                      | Tradition           | Surprise     |
| Friendship                      | Healthy ingredients | Curiosity    |
| Community                       | Reason              | Phantasy     |
| Harmony                         | Discipline          | Fun          |
| Sharing with others             | Control             | Enjoyment    |
| Doing something good for others | Provides strength   | Discovery    |

Source: Strelow/Scheier, 2017.

**Table 2: Distinctive rewards per PoS display**

| Woman           | Couple           | Group                           |
|-----------------|------------------|---------------------------------|
| Spoiling myself | Security         | Sharing with others             |
| Feel at home    | Friendship       | Doing something good for others |
| Enjoyment       | Seduction        | Community                       |
| Feel balanced   | Care             | Pampering others                |
| Optimism        | Warm-heartedness | Recognition                     |

Source: Strelow/Scheier, 2017.

their choices but rather their choice of brands, given a reward value, was overall automatic.

Distinctive associative reward profiles emerged for each of the three brands. The main distinctive rewards associated with the focus brand Duplo were (see Table 1): “sensuality”, “friendship”, “community”, “harmony”, “sharing with others”, “doing something good for others”.

Thus, the notion of buying the brand not for owns one hedonic pleasure but rather for someone else’s pleasure, is the core distinctive equity of the Duplo brand. This is based on the fact that the brand communicated this core message for two decades. It may at first seem surprising that a chocolate

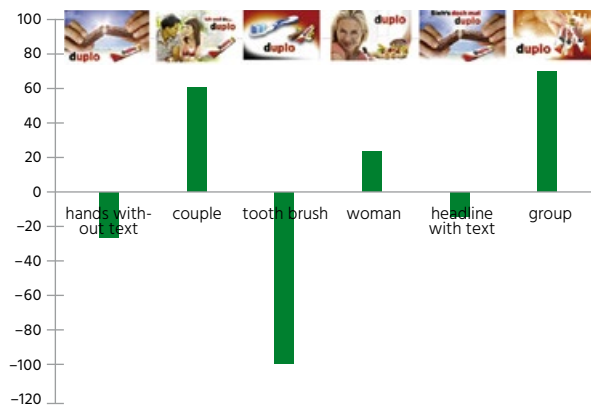
bar is bought for social rewards, rather than indulging oneself. However, engaging in (or contemplating engaging in) hedonic consumption (e.g. purchasing and eating a chocolate bar) is known to induce guilt and consumers seek justification for such consumption (Ramanathan & Williams, 2007). One such justification is that the purchase is intended to be enjoyed by someone else (Lee-Wingate & Corfman, 2010). A consumer reluctant to indulge in the purchase of a chocolate bar for herself might be more inclined if she is primed, through the brand or a PoS display, that the main reward is in fact one of doing something good for others.

### Rewards associated with PoS displays

Having established the reward profile of the brand, the next step was to quantify the respective reward profile of each of the six PoS displays. Hundred fifty healthy female subjects with a mean age of 41.3 years (SD = 11.43, range: 18–59 years) participated. The same test procedure as in the brand-level study was used, except that instead of a 1x3 matrix with three brands, respondents were presented with a 2x3 matrix containing the PoS displays, and the displays were presented in full screen before the main task. Each participant thus was presented with 60 screens, one for each of the 60 reward values. The task of respondents was to choose, using the mouse pointer, the displays they spontaneously associate with a given reward value, by clicking on the respective display or displays. The main outcome of this test is a measure, for each reward value, of how strongly a reward value is associated with any of the six displays, in percent. Reaction time was used as a weighing factor whereby faster responses were weighed more, and slower responses were weighed less strongly.

Mean average association strength of each of the displays with the 60 reward values showed strong differences across the six displays, with couple (mean association strength: 25%), woman (24%) and group (18%) emerging as the displays with the strongest, and hands without text (12%), hands with text (11%) and toothbrush (11%) with the weakest overall association strength, respectively (see Figure 1A for an overview on the displays). Based on these aggregate metrics, a brand manager can already discard three of the six displays as they draw significantly fewer rewards and will thus likely not be successful in driving attention or persuasion and thus sales. This is indeed confirmed by the sales results, discussed in more detail below, showing that displays hands (with and without text) and toothbrush (which was used as a control display) generated the weakest sales, while woman,

**Fig. 2: Brand-Fit score of PoS Displays**



For each PoS display, the fit to the brand's reward associations are shown.

Source: Strelow / Scheier, 2017.

couple and group were the most successful displays in converting consumers to buy the brand.

These more successful displays (woman, couple and group) are associated with distinctive rewards (Table 2). Display woman is about spoiling oneself, feeling at home and balanced as well as optimistic. Couple is about friendship, warm-heartedness and seduction, while the core of group is about sharing with others and pampering others.

A significant advantage of the approach presented here is that the same set of implicit reward associations can be quantified on a brand and on a touchpoint-level. This effectively allows brand managers to quantify the fit of a given touchpoint (e.g. PoS display) with the brand's equity, thus ensuring that a touchpoint communicates the brand's core values. The resulting brand-fit of each PoS display was calculated by multiplying, for each reward, the relative brand-level with the display-level reward associations, and summing across all sixty reward values. This "brand-fit" score (see Fig. 2) was highest for group (70%), followed by couple (61%), woman (23%), hands with text (-16%), hands without text (-27%) and toothbrush (-107%).

The three displays that result in a positive brand-fit score (couple, woman and group) were also the most successful in terms resulting sales, with group emerging as the most effective PoS display in driving sales. Thus, hypothesis 1 is confirmed. PoS display group resulted in the highest

sales because it best fits with the "social" core of the Duplo brand, with the display showing the social gesture of offering the product, together with a group of people. With this insight, brand management can optimize future briefings and brand communication. In order to test the second hypothesis of a systematic relationship between brand fit and sales, the correlation between the brand-fit rankings of the six PoS displays and the respective sales ranks was calculated. This correlation is significant ( $r_s = .77$ ;  $p < 0.05$ ), thus supporting the hypothesis of a systematic relationship between reward-based brand fit of PoS displays and resulting sales.

Given the insights on the neuroscience of expected rewards driving willingness to pay and purchase decisions, an effective communication strategy for Duplo is to leverage already existing reward associations that fit with the brand's associated and thus expected rewards. Seen this way, the objective of a PoS communication is to prime (i.e. activate) existing brand associations, rather than to establish new associations, which is much harder to achieve, particularly in the case of a hedonic impulse product such as chocolate bars where involvement is low.

In order to compare these reward-based analyses with standard (explicit) metrics, we assessed likeability and purchase intention for each of the six displays with an independent sample of 150 female category buyers, recruited with the same screening criteria as the two studies reported

## Main Propositions

1. Neuroscience has revealed that much of human behavior in general, and purchase behavior in particular, is based on the anticipation and consumption of rewards.
2. While neuroscience has uncovered the processes underlying valuation and motivated behavior, it does not inform about the specific content that consumers find rewarding.
3. Brand- and communication-related rewards can be quantified through implicit association testing.
4. Marketing communication (e.g. PoS displays) that best matches the brand's rewards will be most effective in driving brand sales.
5. There is a systematic relationship between brand fit of PoS displays and resulting sales. Displays with higher brand fit are more, and those with lower brand fit are less effective in driving sales for the brand.



so far. Inspection of correlation coefficients of the respective ranks with the sales ranks shows that neither likeability nor purchase intention are significantly related to the sales ranks (likeability:  $r_s = -0.05$ ;  $p = 0.92$ ; purchase intention:  $r_s = 0.06$ ;  $p = 0.91$ ).

## Conclusion

Neuroscience helps to understand the basic processes of consumer choice, in particular highlighting the role of the

reward system in driving purchase decisions, loyalty and willingness to pay a premium. The role of brands, in this perspective, is instrumental in the sense that consumers buy brands to obtain rewards on a functional and psychological level. The challenge for marketers is to turn these insights into action. This paper illustrates a conceptual and empirical framework to this end, based on implicit reward associations that are measured on both a brand and a touchpoint level. The empirical study on the Ferrero Duplo brand illustrates the benefits of this approach.

First, the fit between empirically measured reward associations on brand and touchpoint-level is systematically related to resulting effectiveness (sales in this case study). Second, the specific associations linked with a brand help to understand the why of consumer brand choice, i.e. the motivational properties that make the brand motivationally relevant for consumers. Third, the brand-specific reward associations enable brand managers to brief and to screen different pieces of communication to maximize brand fit and thus effectiveness. This then helps to close the gap that often exists between a brand's strategy and implementation of this strategy across touchpoints. These benefits resulted in Ferrero adopting the approach described here for its other brands as well. Future research may focus on the question whether and when a fit of TV ads and communication at the PoS is beneficial for the marketer.



## Lessons Learned

1. Marketers should measure and understand the rewards associated with their brands, as these rewards are the why underlying brand choice.
2. This measurement should be based on implicit measurement techniques, as many brand-related associations are not accessible to consciousness (i.e. remain implicit).
3. Brand-related rewards can be used to brief agencies and evaluate resulting communication routes, with the goal to maximize the fit between the brand-related rewards and the brand's communication.

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