

The Role of Context Intensity and Working Memory Capacity in the Consumer's Processing of Brand Information in Entertainment Media

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ABSTRACT

Despite the increasing use of entertainment media such as movies, sport telecasts, or video games as a way to get in touch with consumers, the understanding of the cognitive processing of brand information in these environments is still limited. This current research investigates the role of two moderating factors on brand information processing in entertainment media: Context intensity and working memory capacity. Context intensity relates to the perceived level of excitement in a communication environment, while working memory capacity indicates a consumer's ability to control his or her cognitive resources. The results of an experimental laboratory study reveal that context intensity negatively affects visual attention for brand information (i.e., intensity attention assumption), while working memory capacity has a positive influence on memory for brands (i.e., capacity memory assumption). These findings hold important implications for marketing management: First, managers should place brand information in situations where context intensity is rather low in order to facilitate the target group's visual attention. Second, the frequency and duration of brand information should be adjusted to the target group's ability to cognitively process such information. © 2015 Wiley Periodicals, Inc.

Numerous companies are engaging in entertainment media by embedding their brands within media content in order to reach certain marketing outcomes, for example, increasing brand awareness, brand liking, or brand desire (Chang, Newell, & Salmon, 2009). Entertainment media, such as sport broadcasts, movies, or video games provide the context for so-called indirect marketing communications, for example, sponsorship, product placement, or in-game advertising. All of these contexts are characterized by their dynamic content: that is, intense sequences alternate with less intense sequences. Thus, it would be interesting to understand if context intensity facilitates or blocks the processing of brand information as this knowledge could lead to an optimized timing with regard to brand placements.

Cornwell (2008) argues that encoding and receiving brand information “depends not only on the nature of the exposure, but also on the nature of the receiver” (p. 47). However, what happens inside the consumer's mind in response to indirect marketing communications must still be considered a “black box”: that is, little is known about the receiver's brand information processing (Cornwell, Weeks, & Roy, 2005). This lack of knowledge is related to the fact that most research in the field simply ignores the complexity of information processing and rather employs simple

input–output models (Cornwell, 2008). Consequently and for the first time, the roles of two moderating factors on brand information processing in entertainment media are investigated: context intensity and working memory capacity.

Even though there is consensus that only a small share of brand information is received and processed by a consumer (e.g., Breuer & Rumpf, 2012; d'Ydewalle & Tasmin, 1993), the concept of working memory capacity has not yet been investigated in the realm of marketing research. Against this background, the paper aims to fill this gap by investigating, on the one hand, the moderating effect of context intensity on the consumer's visual attention and memory in entertainment media. On the other hand, the moderating effect of the consumer's working memory capacity on visual attention and memory in entertainment media will be analyzed.

COGNITIVE PROCESSING OF BRAND INFORMATION

Past research has revealed that brand information processing in entertainment media is influenced by

personal variables (e.g., Gwinner, Larson, & Swanson, 2009; Lardinoit & Derbaix, 2001; Wakefield, Becker-Olsen, & Cornwell, 2007), by brand-related variables (e.g., Pham & Johar, 2001), as well as by brand appearance characteristics (e.g., Bressoud, Lehu, & Russell, 2010; Breuer & Rumpf, 2012).

However, most empirical studies to date have ignored the importance of psychological variables with regards to the processing of brand information (Cornwell, 2008). One relevant exception is the experimental work by Pham (1992) who investigated the effect of sport viewer's involvement, pleasure, and arousal on brand recognition in a sport sponsorship context. Based on a quasi-experiment, heightened arousal was found to yield a negative effect on recognition, which can be explained in terms of focused attention toward the arousing stimulus, in this case the sporting actions, and thus, drawing attention away from the surrounding brand information (Pham, 1992). In recent times, Pham's (1992) framework inspired numerous empirical investigations.

Lee and Faber (2007) analyzed the conditions under which brand information become processed in a video game setting. Based on the limited-capacity model of attention, the authors found the location of the brand message, prior game experience, and game involvement to have a positive effect on brand memory. In their experimental study, the variable game involvement was manipulated using the given instructions: While the participants with high involvement were told that those with a high score may receive a reward, this incentive was not offered to participants with moderate involvement. The study results revealed a significant difference between the high and moderate game involvement group in terms of brand recall and recognition. These findings are of interest because higher involvement in an event might lead to a higher perception of context intensity.

Scotta and Craig-Lees (2010) examined factors related to the processing of brand information within movies. In their quasi-experimental study, different brands were embedded within a movie and exposed to participants to test for audience engagement effects (i.e., pleasure, arousal, dominance) and liking of the actors on brand recognition. In contrast to Pham (1992), the authors did not find statistical evidence for a relationship between arousal and brand recognition (Scotta & Craig-Lees, 2010). In a sponsorship context, Breuer and Rumpf (2012) investigated the processing of brand information in sport telecasts. They used a mixed-methodology design to obtain multilevel data related to the exposure, attention, and memory of brand information. Based on their results, the authors conclude that only brand information that reaches the consumer's visual attention will be cognitively processed.

Beyond the investigation of involvement, arousal, and attention, an academic void is identified in research on brand communication within entertainment media: to date, there is no research published on the role of context intensity and working memory capacity in brand

information processing. Considering that both the communication environment and the receptiveness of the consumer are critical for successful information transfer, the research at hand provides a significant contribution to the body of knowledge.

THEORETICAL FRAMEWORK

Entertainment media provides a large amount of information acting upon the consumer, while only a limited amount of information can be visually perceived and cognitively processed within a given time frame. Against this backdrop, it is to be analyzed if the perception and processing of brand information by the consumer is influenced both by the excitement or intensity of the media content as well as by the receiver's capability to process more or less information.

A factor that was previously shown to affect the processing of brand information is the consumer's felt arousal (Pham, 1992). It was reasoned that arousal narrows the consumer's visual attention toward the arousing stimuli and away from other objects, such as brand information. Additionally, more intense scenes feature more aspects that might be of relevance to a consumer (Pham, 1992). Thus, it is reasonable to assume that the perceptual load in more arousing scenes is relatively high, whereas perceptual load in less arousing scenes is rather low. As a result, the chance of brand information to be picked up further decreases if the context intensity is high. On the basis of this reasoning, it is assumed that more intense media content increases the chance that brand information is not attended to by the consumer (intensity attention assumption), and therefore not remembered (intensity memory assumption).

Furthermore, the theoretical model is based on the assumption that there is no cognitive processing of any kind if the information is unattended (Lachter, Forster, & Ruthruff, 2004). Though this notion is not undisputed (e.g., Dehaene, Changeaux, Naccache, Sackur, & Sergent, 2006), it is commonly accepted that conscious processing depends on attention and stimulus strength. Considering that visual perception of a certain stimulus is a prerequisite for long-time effects on memory—in which marketing managers are naturally interested—it seems obvious that in research on brand information processing the difference between both views is of somewhat lesser importance. The more important point is that unattended information will not get access to declarative memory (Dehaene et al., 2006). This implies that brand information will not be recognized if it has not raised attention before.

However, the amount of information that an individual is able to process and the ability to attend to relevant information in the presence of distracting information varies from person to person (e.g., Broadway & Engle, 2011). In this regard, working memory capacity is an all-embracing measure that indicates an individual's ability to control someone's attention effectively (Conway et al., 2005). An important difference

between individuals with high or low working memory capacity is that the former is able to handle more information within a given time frame (Unsworth, 2007).

In entertainment media there is usually a high number of relevant (i.e., content-related) and irrelevant (i.e., brand-related) stimuli that are thought to compete for limited processing resources. Though controlled attention theory (Kane, Bleckley, Conway, & Engle, 2001) describes working memory to function as focusing on relevant information and neglecting distracting information so that individuals with a high working memory capacity perform better in controlling their attentional resources compared to people with a lower working memory capacity (i.e., they are better in attending relevant and ignoring irrelevant information), it seems questionable whether this distinction can really be made in the context of entertainment media. Though it seems possible and from an advertiser's perspective appropriate to distinguish between relevant (i.e., content-related) and irrelevant (i.e., brand-related) information, consumers are probably not actively ignoring brand-related stimuli while solely focusing on content-related aspects as in laboratory research on detection probabilities of ignored stimuli (cf. Engle, 2002).

Therefore, it seems reasonable to imply that people with a high working memory capacity could well be able to attend to more brand information because their working memory capacities are not as easily exhausted as processing resources of individuals with low working memory capacity (capacity attention assumption). As a consequence these individuals are also thought to remember more of the brand-related stimuli (capacity memory assumption) because only stimuli that could have been processed (i.e., were already attended, Lachter, Forster, & Ruthruff, 2004) are thought to have a chance to get access to memory. Others are limited to short-term priming effects or are not able to influence behavior at all (Dehaene et al., 2006).

METHODS

Research Design

An experimental approach was used to test the assumptions on the role of context intensity and working memory capacity. In a 2×2 between-subject design, the level of context intensity was systematically manipulated by preparing a high-intensity stimulus video and a low-intensity stimulus video. Half of the participants ($n = 32$) were randomly assigned to the high-intensity video, whereas the other half ($n = 36$) was exposed to the low-intensity video. Since some cases were subsequently dropped from the sample due to inaccurate measurement of the dependent variables there was a slight imbalance between the group sizes. The second between-subject factor—working memory capacity—was derived from a median split of the full

sample based on the participants' operation span score. Thus, a group of 34 participants rather high in working memory capacity and another group ($n = 34$) rather low in working memory capacity was obtained.

Stimulus Material

Sport events provide a typical platform for brand communication purposes. Thus, a sport telecast was chosen as a medium to present brand information. The video material contained footage regarding a match in the *Second Football Bundesliga* (Germany), which provided fairly good brand visibility (14 different brands were clearly visible). This video material was used to create two match summaries with the help of video editing software: One summary was high in intensity and featured goals, fouls, disputed referee decisions, and missed goal opportunities, whereas the other summary was not subject to any of these scenes and therefore considered low in intensity. To ensure that the match summaries did not differ on aspects other than intensity, they had to meet further criteria: Each summary was three minutes in length of which the left, right, and middle third of the pitch had to be visible for one minute each. Furthermore, the match summaries neither included slow motions, closeups nor sound. It was also ensured that the visibility of sponsor signage did not differ between the two match summaries.

A 9-point pictorial arousal scale adapted from the self-assessment manikin test (Bradley & Lang, 1994) was employed to validate the produced stimuli. The manipulation check confirmed that the perceived intensity of the highly arousing match summary ($M = 7.5$, $SE = 0.4$) differed significantly from the less arousing match summary ($M = 1.6$, $SE = 0.2$) as indicated by the results of an independent t -test, $t(12) = 12.875$, $p < 0.001$.

Participants

Students ($n = 68$, $M_{\text{age}} = 24.4$ years, $SD_{\text{age}} = 4.8$ years) that were either enrolled in physical education or sport science were recruited for this experiment. As a requirement, the participants needed to indicate at least a minimum involvement with the given sport event. Based on Zaichkowsky's (1994) personal involvement inventory, the participants had a moderate involvement with the German *Second Football Bundesliga* on a 0–100 scale ($M = 36.1$, $SD = 21.4$) with considerable variation in the data. All participants (24 females, 44 males) provided written consent prior to the experiment, were treated in accordance with the local institution's ethical guidelines, and reported normal or corrected-to-normal vision.

Measurements

To measure the participants' working memory capacity, a standard operation span test (Engle, Cantor, &

Carullo, 1992; Turner & Engle, 1989) was employed. It requires participants to verify brief mathematical equations such as $(5 \times 4) - 2 = 17$ by pressing a corresponding button for either right (“r”) or wrong (“w”) on the keyboard while remembering letters that are presented immediately after each equation. Stated solutions were correct in 50% of the trials. After varying numbers of equations, participants were asked to replicate all the letters in the right order. The final score was a function of the maximum number of letters a participant was able to replicate without a drop in performance of verifying equations.

The allocation of the participants’ attention was assessed by eye-tracking methodology. Given that the direction of the gaze is highly correlated to visual attention (Henderson & Hollingworth, 1999), eye-tracking measures function typically to assess visual attention to brand information (Duchowski, 2007). In preparation for the data analysis, AOI (areas of interest) for each visible brand information on screen had been marked throughout the stimulus videos. By matching the participant’s gaze coordinates with the AOI coordinates in each time frame the computer software (SMI BeGaze) was able to determine the individual glance duration on brand information. A glance was defined as a stable gaze remaining directed toward one AOI for at least 100 milliseconds.

Finally, memory for brand information was measured by means of a double-stage recognition test (Sherman & Moran, 2011) that was provided on a tablet computer. The test presented 20 brand logos one after another, including 14 target brands (i.e., those brands that have been visible in the stimulus video) and six foils. In the first stage, the participants had to indicate whether they had perceived the brand. In the second stage, they were asked if they simply made a guess, knew about the brand’s engagement in sports prior to the experiment, or noticed it within the match summary. In preparation for the data analysis, only those brands which had been correctly noticed within the match summary were coded as “1” in the final database.

Procedure

After providing informed consent, participants’ working memory was assessed by means of the operation span test. To prevent any distractions the test took place in a quiet room and participants could opt to wear headphones. It lasted for about 25 minutes after which a short break followed before participants were guided into a second room that was equipped with a comfortable armchair in front of a TV screen.

Participants were then randomly assigned to either the high-context intensity or to the low-context intensity group. The test persons were not informed that the study’s interest was related to brand information, but asked to focus on the sport media content.

Before the participants were exposed to the stimulus material, a calibration of the eye-tracking

Table 1. Descriptive Statistics.

Variable	<i>N</i>	Mean	SD	Min	Max
Brand glance duration (seconds)	68	12.96	9.44	1.42	55.90
Brand identification accuracy	68	3.90	2.23	0.00	11.00
Working memory capacity (WMC)	68	73.31	18.25	14.86	100.00
WMC—high group	34	87.00	6.95	75.68	100.00
WMC—low group	34	59.62	15.55	14.86	75.68

system for each participant (with nine different calibration points and four validation points on the screen) was performed to ensure good data quality. The stimulus videos were presented on a 42” TV screen with a resolution of 1920 × 1080 pixel. The distance between the participant and the screen was 200 cm. While watching the video, a table-mounted eye-tracking device measured the participants’ eye scan path with a frequency of 60 Hz. At the end of the experiment, participants were asked to do the double-stage recognition test after which they were informed about the aims of the research.

Data Analysis

Intraindividual sums of the dependent measures (i.e., “brand glance duration” reflecting participants’ visual attention for all brand-related information, “brand identification accuracy” reflecting memory for all visible brands) were submitted to analyses of variance with “context intensity” and “working memory capacity” as between-subject factors. To take into account the possible confounding effect of participants’ gender (e.g., Cahill, Uncapher, Kilpatrick, Alkire, & Turner, 2004; Canli, Desmond, Zhao, & Gabrieli, 2002), this variable was also entered into the ANOVAs on (1) “brand glance duration” (2) and “brand identification accuracy.”

RESULTS

The study’s results will be presented in three steps: First, the descriptive statistics of the collected data will be introduced. Second, the effect of “working memory capacity” and “context intensity” on “brand glance duration” will be assessed by means of ANOVA. Third, the effect of “working memory capacity” and “context intensity” on the “brand identification accuracy” will be investigated.

A summary of descriptive statistics is provided in Table 1. The variable “brand glance duration” that indicates the total time a participant’s gaze was devoted to visible brands on screen had a mean of 12.96 seconds (SD = 9.44) and ranged from 1.42 to 55.90 seconds. The variable “brand identification accuracy”—the sum

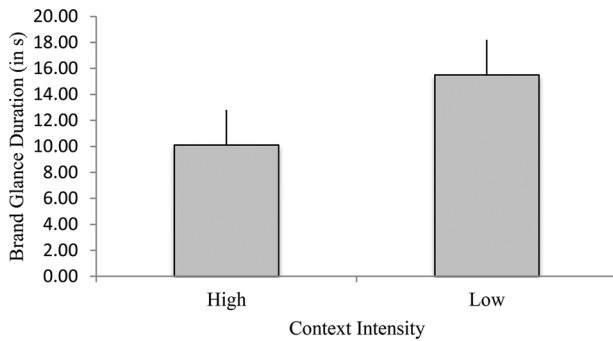


Figure 1. Brand glance duration and context intensity.

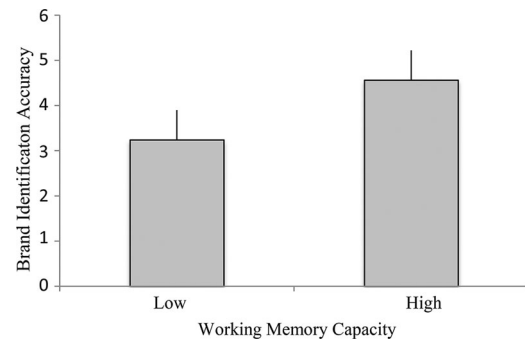


Figure 2. Brand identification accuracy and working memory capacity.

of correctly identified brands per participant—reached a mean of 3.90 brands ($SD = 2.23$) and varied from 0 to 11 brands. Finally, the variable “working memory capacity” that had been normalized to achieve a maximum of 100 showed a mean of 73.31 ($SD = 18.25$) points throughout the sample. The mean of the group high in working memory capacity was 87.00 ($SD = 6.95$) points, whereas the mean of the group low in working memory capacity was 59.62 ($SD = 15.55$) points.

A 2 (context intensity: high, low) \times 2 (working memory capacity: high, low) \times 2 (gender: male, female) ANOVA with “brand glance duration” as dependent variable revealed that only “context intensity” had an effect on the time that the participants attended to brand-related information, $F(1, 58) = 6.5, p < 0.02, \eta_p^2 = 0.101$. As shown in Figure 1, participants who watched a match summary high in intensity attended less to brand-related information (10.11 s) than participants watching a match summary low in intensity (15.50 seconds). On the contrary, “working memory capacity,” $F(1, 58) = 1.41, p > 0.2$, as well as “gender,” $F(1, 58) = 2.03, p > 0.05$, had no influence on “brand glance duration” and there were no correlation between factors included in the analysis (all p -levels > 0.1). Thus, statistical evidence was found for the intensity attention assumption, but not for the capacity attention assumption.

A similar ANOVA for “brand identification accuracy” showed that only the participant’s “working memory capacity” influenced how accurate brand information was recognized, $F(1, 58) = 4.9, p < 0.04, \eta_p^2 = 0.078$. On average, participants high in “working memory capacity” were able to identify more brands correctly (4.56) than consumer with a lower “working memory capacity” (3.24, see Figure 2). Furthermore, “context intensity,” $F(1, 58) = 0.997, p < 0.3$, and “gender,” $F(1, 58) = 0.01, p < 0.9$, had no influence on the number of brands participants could correctly identify and there were again no correlations between factors included in the analysis (all p -levels > 0.1). Thus, statistical evidence was found in favor of the capacity memory assumption, but in contradiction to the intensity memory assumption.

DISCUSSION

This research delivers more clarity to the moderating role of context intensity and working memory capacity in branded entertainment media. The empirical findings reveal that both the condition of the communication environment and the consumer’s ability to control his or her cognitive resources moderate brand information processing. In the remainder of this paper the major contributions of this research will be highlighted.

From an intuitive standpoint, the excitement of entertainment media seems to be beneficial for brands because excitement and emotionality attract consumers to watch a certain program in which brand information is embedded. Thus, brands obtain the opportunity to be attended by a huge audience. However, the results support the intensity attention assumption, that is, if context intensity is high the consumer’s attention for brand information becomes less likely and therefore branding objectives might be missed. This is most probably caused by the fact that brand information in more exciting environments has to compete with a higher number of more intense stimuli to be perceived. Therefore, it is argued that a lower level of surrounding intensity facilitates the visual attention for brand information. The maximization of attention should therefore be regarded as an important challenge in marketing communication, since any downstream processes, such as building brand awareness and enhancing brand image, are dependent on the consumer’s visual attention.

Therefore, it is suggested that brand information should be placed in situations where the excitement of the story or sporting action is on a moderate to low level. In a soccer sponsorship context, for example, billboards that are placed close to the halfway line can be of high value to sponsors because the dynamics of goal-mouth scenes are avoided. Brand information that is placed next to the goals might be overrated by marketing managers because attention for brand information must be expected to be rather low due to more arousing sport scenes that take place in this area.

Moreover, the consumer’s working memory capacity was found to influence brand recognition (i.e., capacity memory assumption) because participants high in

working memory capacity were able to identify more brands correctly. That is, the consumer's ability to process as much information as possible is of higher importance than his or her ability to focus on content-related stimuli while ignoring other (brand-related) stimuli.

This finding raises the question of whether it is really appropriate to distinguish between relevant (i.e., content-related) and irrelevant (i.e., brand-related) information in more applied research fields. The ability to ignore irrelevant stimuli is considered a major difference between people high and low in working memory in laboratory-controlled experimental research where relevant and irrelevant stimuli are clearly distinguishable. Without an explicit instruction to ignore a certain kind of stimuli, this distinction is rather less absolute. That is, though a consumer is surely more interested in stimuli related to the match, movie, or video game, she or he might also be interested in other environmental factors such as brand information from time to time.

From a management perspective, it seems to be advisable to design brand information adequately so that consumers need to spend a minimum of working memory capacity for processing. Marketing communication within entertainment media should therefore take into account the cognitive capability of specific target groups. Since it is known from basic psychology that working memory capacity declines with age (e.g., Bopp & Verhaeghen, 2009; Elliott et al., 2011), it is advisable to adjust the frequency and duration of brand information exposure. For example, a brand targeting the age group 14–25 years could benefit from a diversified communication strategy with limited exposure in various entertainment media, whereas a brand with an older target group (e.g., 40–65 years) should focus on a single media engagement which provides highly repeated exposure within the same program.

LIMITATIONS

The choice of *Second Bundesliga* footage in order to limit prior knowledge of brand event associations has led to a relatively low involvement in the stimulus material at hand. As a consequence the external validity of the current study may be lower than desirable. That is, involvement scores probably differ significantly from the consumers' involvement in entertainment media, considering that consumers normally choose among entertainment media on their own free will. This could have biased the identified effects of working memory capacity and context intensity.

Furthermore, the findings are based on data from a laboratory experiment in which TV match summaries without up-to-date relevance were presented. It is assumed that the participants' involvement was lower compared to watching live sport telecasts. To enhance the external validity, future research could replicate the trials in a real time envi-

ronment by using mobile eye tracking. Moreover, the reliability could be enhanced by a larger sample size.

Considering that the difference in interest for content- and brand-related information probably increases with involvement, the distinction of irrelevant and relevant information may possibly be more appropriate for consumers with a higher involvement compared to consumers with a somewhat lower involvement (as in the current study). However, it is expected that the effects regarding context intensity would be even larger if consumers are more involved in the entertainment media, because the higher the involvement, the higher is probably also the subjective intensity of stimuli that compete for processing at higher cognitive stages.

CONCLUSION

The confirmation of the intensity attention assumption and the capacity memory assumption is of interest for both researchers and managers as it provides a new approach to explain brand information processing within entertainment media. Considering that sponsorship, product placement, or in-game advertisement represent indirect ways of communicating with the consumer, the receiver's ability to process visible brand information should not be neglected. By definition, it is the fundamental idea of indirect marketing communications to expose a brand concurrently to another stimulus in order to transfer favorable meanings to the brand (Cornwell, 2008). Therefore, it is mandatory to understand which personal and situational factors play a role and in how far consumers are capable of perceiving brand information in the presence of possibly more interesting entertainment stimuli.

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