

## **Who gains, who loses? Recall and Recognition of Brand Placements in 2D, 3D and 4D movies**

### **Abstract**

Brand placements in movies are common throughout the world. During the last 5 years, 3D movie technology has experienced a boost in cinemas and home entertainment. Furthermore advanced cinemas also offer “4”D experiences by adding scent, airflow or tactile stimuli to the 3D film. Based on the limited cognitive capacity model of information processing and the levels-of-processing effect theory, we investigate how the delivery modes of classic 2D compared to 3D or 4D (3D+scent) influence recall and recognition of brands placed in a prominent or in a subtle way. Results suggest that subtle brand placements are negatively affected by the enhancement of 3D or 4D as compared to 2D movies, whereas a prominent brand placement in the movie benefits from 3D technology. Some implications and directions for further research are addressed.

**Keywords:** *Product Placement, 3D, 4D, Recall, Recognition*

**Track:** *New Technologies and E-Marketing*

## **1. Introduction**

Brand placement in movies is a common method of promoting products or brands to a broad audience. During the last years, there have been changes in the distribution and consumption of movies which might interfere with product placement effectiveness: one of the most important changes concerns the increasing availability of 3D movies instead of classical 2D movies. Even more, some theaters and theme parks already offer 4D experiences to their audiences, enhancing 3D films with physical effects which are presented synchronized with the original films. Effects simulated in 4D films include scents, lights, rain, vibration or wind. It is expected that these new technologies create a richer and more vivid viewing experience (Higgins, 2012). Given that brand placements are prevalent in movies, the question arises of how 3D and 4D programming differ from traditional 2D formats with regard to the effectiveness of these brand placements. Thus this research poses the question: *Do brands placed in a movie gain from the additional technological features, or do they suffer?* This research analyses brand recall and brand name recognition of brand placements embedded in a movie, which is either shown with 2D, 3D or 4D technology, distinguishing between prominent and subtle placements of the brands.

## **2. Brand Placements in Movies**

Brand Placements are the "inclusion of branded products or brand identifiers, through audio and/or visual means, within mass media programming" (Karrh, 1998). Advertisers utilize this message form to promote products or services in a (less) obvious way, typically in a movie (Lehu & Bressoud, 2008). Since product placements are not clearly marked as promotional messages, they are met with less skepticism by audience members (McCarty, 2004). They may appear to be of non-commercial character while intending to create awareness for the (embedded) product, often leaving viewers clueless about advertisers' intent while indirectly influencing them (Balasubramanian, 1994). The most frequently featured product categories in movies are drinks, cars and cable companies (Galician & Bourdeau, 2004).

### *2.1. Recall and Recognition of Brand Placements*

The most prominent and frequent variables to determine product placement effectiveness are brand recall and brand recognition (Balasubramanian et al., 2006). According to interviews with film and television executives, product marketers, and advertising or public relations agencies, brand awareness is the primary objective for product placements (Karrh, 1998;). It was further revealed that other measures of effectiveness, such as purchase intention, sales and attitudes, are of lesser concern to practitioners (Karrh et al., 2003).

Recall refers to the subsequent re-accessing of events or information from the past, which have been previously encoded by and stored in the brain. Recognition, in contrast, alludes to the ability to recognize previously encountered things when showed or mentioned again (e.g., objects, events, or people; Du Plessis 1994). When the previously experienced event is re-experienced, this environmental content is matched to stored memory representations, eliciting matching signals in consumers.

Previous research has determined that brand recall and recognition depend on various factors, among others film genre (Park & Berger, 2010), product category, gender or movie viewing frequency (De Gregorio & Sung, 2010; Gupta & Gould, 1997). One factor that proved to be of high relevance is placement prominence (Cowley & Barron, 2008). Research found, that brands and products placed in the focal area of viewing (prominent placement) gain a higher memory effect than brands or products placed in a peripheral area (subtle placement) (d'Astous & Chartier, 2000; Gupta & Lord 1998; Cowley & Barron, 2008). This is the case as

prominent placements allow for an easy identification of the product or brand advertised, whereas subtle placements are typically shorter in terms of duration, for products are placed in the background at times (van der Waldt et al., 2007).

## 2.2. 2D, 3D and 4D movies

3D refers to a form of enriched broadcasting which conveys a perceived depth perception to audience members by employing particular techniques, e.g. multi-view or stereoscopic display, 2D-plus-depth, or some other form of 3D display, as compared against 2D that solely allows for broadcasting visual and auditory stimuli. Contemporary 3D sets apply either active 3D shutter or polarized 3D systems; more advanced devices are already auto-stereoscopic, meaning they do not require any form of glasses anymore. According to a sales statistics presented by DisplaySearch (2011), 3D penetration for all TVs shipped worldwide accounted for about 13%. In Western Europe and China, market share was about 18%, compared against the US, where market share was lower, accumulating to only 8%. More recently, DisplayResearch (2012) reported that 3DTV shipments were expected to increase by 90% in 2012. Shipment penetration is predicted to exceed 25% in both Western Europe and China as well as 20% in Eastern Europe. While North America is still lagging behind, with only a penetration of 19% in 2012, it is assumed to become the leading 3D shipment region by 2014, when most large sized screens will include 3D capability as a standard feature. 4D in movies refers to combining a 3D film with physical effects, which are presented in synchronization with the actual film. Effects simulated in 4D programs include scents, lights, rain, vibration or air flows. Currently, 4D films are usually presented only at special venues, such as selected and specifically equipped cinemas as well as theme or amusement parks (Verrier 2012).

## 2.3. Recall and Recognition in 2D, 3D and 4D movies

The assumption of humans possessing "limited capacity" has a long tradition in many cognitive theories (Craik, 2002), often referred to as the limited cognitive capacity model of information processing. If an individual pays attention to a specific stimulus, the brain's central mechanism is involved in the processing of information. The difficulty of paying attention to several things at once is then explained by the limited capacity of the fixed central mechanism. Many studies have demonstrated the limited capacity of human information processing and, the limited capacity model has also been applied to the area of communication. According to the Limited Capacity Model of Motivated Mediated Message Processing humans have limited resources available when cognitively processing information that they received via media, e.g. via watching TV (Lang 2000). Consumers of entertainment media allocate their cognitive resources especially to those parts that are central in the entertainment format, e.g., the stimuli that are related to a movie's main story line (Lang et al. 2012). As outlined above, the enhancement of a 2D film into a 3D or even 4D film adds additional stimuli to the film (depth perception, scent), which need to be processed and interpreted, even if not consciously, by the recipient. Hence, the amount of information presented in a 3D or 4D environment is clearly higher than in a 2D setting. This means that in 3D or 4D ambiances a larger portion of individuals' attention needs to be devoted to both, the film script and the experiential effects, leaving less capacity to process those stimuli that do not present the movie's central focus. Furthermore, a technical limitation of 3D adds to the likelihood that memory may be reduced for subtle brands. With 3D technology, the background typically loses contrast and appears as fogger and less clear (Sauer 2010). We therefore expect that those brand placements included in the movie in a subtle way only (in which brands do not play a central, but peripheral role) will be remembered to a lower extent in 3D and 4D movies as compared to 2D movies. Hence, we hypothesize:

**H1: Recall (a) and recognition (b) of the total number of brands included in the movie will be lower in the 4D-film than in the 3D-film than in the 2D-film.**

As mentioned before, recall or retrieval of memory refers to the subsequent re-accessing of events or information from the past, which have been previously encoded and stored in the brain. According to the levels-of-processing effect theory (Craik & Lockhart, 1972, Craik & Tulving, 1975) recall of stimuli is a function of the depth of mental processing, which is in turn determined by links to pre-existing memory, time spent processing the stimulus, cognitive effort as well as sensory input mode. This theory is based on the assumption that shallow processing leads to a relatively fragile memory trace and is susceptible to rapid decay, whereas deep processing results in a more durable memory trace. The theory thus suggests that brand placements put in the central role play (prominent placements) and that are more or less “staged” (e.g., the main actor in the movie uses the brand) might profit from the enhancement characteristic of 3D or 4D movies as compared to the 2D movie. If a movie includes 3D effects these are usually perceived as closer to the viewer (as they seem to be in the 3 dimensional space). Thus the focal attention is drawn to these 3D displayed effects (Hoffmann et al. 2008). If the product placement is enriched with 3D effects it should increase the likelihood that the viewer devotes attention to it. Adding an additional stimulus (4D) such as scent might also enhance memory for a stimulus (Morrin & Ratneshwar, 2000). Particularly, if the scent is congruent with the brand, brand memory increases (Morrin & Ratneshwar, 2003). Lwin et al. (2010) explain this by a dual coding of visual and olfactory stimuli which lead to additive coding. Thus we assume, that if a movie features a scent which is in line with the placement the brand is better memorized, and hypothesize:

**H2: Recall (a) and Recognition (b) of a prominent brand placement will be higher in 4D than in the 3D film than in the 2D film.**

In summary, we expect that memory for brands placed in a subtle way is negatively affected by the enhancement of 3D or 4D as compared to 2D movies, whereas a brand that is featured prominently will benefit from it.

### 3. Study

#### 3.1. Design

**Stimuli:** Three versions (2D, 3D and 4D) of a 15-minute-clip of the movie *Step Up 3D* were created. The clip was composed of sequences taken from the film. A consistent story was achieved by centering upon the art of film making combined with the meaning that individuals attribute to dancing. A set of pre-tests was carried out to ensure that the 2D and 3D versions do not differ in sound and picture quality as this might confound our results. Furthermore, we ran several tests to ensure the scent is strong enough, but not too intense. We used an automatic scent dispenser, which was remote controlled. Sound and picture quality of the three movie clips were tested in the main study again. Quality was perceived as high (the average quality of sound and picture quality: M=5.23 and 5.85 on a 7-point scale) and did not differ significantly between the three versions (sound: F=1.62, n.s.; picture: F=0.11, n.s.).

The movie clip contained a large number of brand placements. The brand ICEE (an iced drink), not available in Europe, was featured very prominently: The leading actors consume it in a playful way by making bubbles which are blown in the air. In the 3D version it appears that the red and green bubbles came out of the screen. In the 4D condition, a strawberry scent was diffused at the same time. The movie clip featured also 26 subtle placed brands of all kind of product categories (e.g. Adidas, HP, Hershey's, McDonalds, Samsung, Sony, Walgreens, Yahoo). None of the actors interacted with these brands nor were they part of any 3D effect. The movie clip was shown in a lab setting on a large 46" TV corresponding to the latest technology. In the 3D and 4D version participants received 3D-glasses. The room had

no windows and temperature was kept at a moderate level. To provide a theatre like feeling the room was dark.

**Sample:** In total 109 (47.7% female, average age=23.92) participants watched one of the three movie clips (2D=37; 3D=39; 4D=33) and then completed an electronic questionnaire. Subjects were recruited at a midsize university in Europe, as students are among the target groups of the movie Step Up 3D. Subjects were informed that the study deals with the relevance of dancing, no hint was given that the study analyzed brand placements.

**Measures:** Unaided recall was measured by asking subjects whether they remember any brands that appeared in the movie., Brand name recognition was measured by showing participants a list of 44 brand names, consisting of brands that appeared in the movie as well as filler products (existing brands that did not appear in the movie but within the same product categories). Subjects were asked to identify the brands they have encountered while watching the movie clip. The lists of brand names were rotated randomly. For the analyses of brand recall and brand name recognition of the subtle brands, the sums of the correctly recalled or recognized subtle brands were calculated per subject (i.e., filler brands that were named, but were not in the movie, were not included in the sums). To measure recall or recognition of the prominent brand ICEE, “1” was coded if a subject recalled or remembered ICEE, if not “0” was coded.

### 3.2. **Results**

Hypothesis 1a and 1b assume lower recall and recognition rates for subtle placements in more enhanced movies (4D and 3D) as compared to 2D movies. Results give large support for H1a and H1b. In the 4D movie, subjects recalled an average of 0.97 brands of subtle placements, in the 3D movie 1.33 and in the 2D movie 1.97 brands ( $F=4.43$ ,  $p<0.05$ ). Contrast analyses demonstrate that the differences between 2D and 3D are significant on a 10%-level ( $t=1.94$ ,  $p<0.10$ ).The differences between 2D and 4D ( $t=2.92$ ,  $p<0.01$ ) are significant, while the differences between 3D and 4D were found to be not significant ( $t=1.08$ , n.s.).

In the 4D movie, subjects recognized an average of 1.15 brand names of subtle placements, in the 3D movie 1.74 and in the 2D movie 2.41 brands ( $F=5.20$ ,  $p<0.01$ ) (contrast tests: 2D and 3D:  $t=1.77$ ,  $p<0.10$ ); 2D and 4D:  $t=3.22$ ,  $p<0.01$ ; 3D and 4D:  $t=1.54$ , n.s.). Though all mean values point in the expected direction, some of the mean differences are only significant on a 10%-level, and the two differences between 3D and 4D technology are not significant. Hence, our data lends partial support to our hypotheses H1a and H1b.

H2a and H2b postulate that recall and recognition of a prominent brand placement (a brand that is embedded in the movie's central role play) will be higher for 4D and 3D movies as compared to 2D movies.. Results of a Chi<sup>2</sup>-Test (three technologies x recall) indicate that technology and recall of the prominently placed brand ICEE are significantly related ( $\text{Chi}^2=8.38$ ,  $p<0.05$ ). Recall was highest in the 3D movie (18% of subjects recalled ICEE), followed by the 4D setting (6%); not a single subject recalled ICEE in the 2D movie (0%). A similar pattern was found for recognition of ICEE ( $\text{Chi}^2=8.97$ ,  $p<0.05$ ): Recognition was highest in the 3D movie (31% of subjects recognized ICEE), followed by the 4D (9%) and the 2D setting (8%), lending partial support to H2a and H2b.

## 4. **Discussion of Results and Future Research**

Our results suggest that subtle brand placements suffer from the enrichment of the movie technology from 2D to 3D or 4D delivery. Subjects who watched the 2D movie recalled and recognized a significantly larger number of brands that were subtly placed in the movie as compared to subjects who watched the 3D or 4D version. Based on the Limited Capacity Model of Motivated Mediated Message Processing (Lang 2000), the limitations of 3D

technology regarding a clear background (Sauer 2010) and the fact that the focal area of the viewer in a 3D setting is directed towards the 3D elements (Hoffmann et al. 2008) we demonstrated that the recall and recognition of subtle placements decrease with adding effects. Additional information, such as depth perception and scent in the 3D or 4D setting, needs information processing capacity that is then no longer available for the processing of other stimuli in the film such as the subtle brand placements. The fact that we did not find significant differences between the 3D and the 4D movie with regard to recall and recognition of subtle brand placements deserves further consideration. Given that the average number of brands recalled and recognized points in the expected direction, one reason for the non significant results might be the relatively small sample size. Yet, another reason might be that the additional stimulation through scent does not need a substantial amount of additional information processing capacity. It could well be that the enhancement from 2D to 3D seems to be a quite large step, whereas the additional provision of scent to the 3D movie seems to have a smaller impact.

With regard to prominent placements of brands, in line with our expectation, our study results suggest that a brand that is placed in the center of the movie gains from 3D as compared to 2D technology. However, by adding scent to the 3D movie, the prominent brand suffered again, meaning that the results of the 4D setting need further reflections. One explanation could be that by adding scent to the movie scene at the time when the prominent brand was shown in the movie, subjects were distracted from the movie play and from the brand placement, resulting in lower recall and recognition of the brand. According to the levels-of-processing effect theory (Craik & Lockhart, 1972; Craik & Tulving, 1975), distraction at the time of encoding can severely impair subsequent retrieval success.

Some managerial implications can be derived from our study. If companies seek subtle placements for their brand, it seems to be advantageous to stick to movies that are aired in 2D technology. Subtle placements in enhanced 3D or even 4D settings seem to be inferior with regard to recall and recognition of the brands. However, if companies want to place their brand in a prominent manner in a movie, it seems to be advantageous to try to do so in movies that are delivered in 3D. In line with our theoretical rationale and supported by our results, 2D movies proved to be inferior in terms of brand recall and recognition of prominent brand placements. With regard to the 4D setting, additional research is needed before profound conclusions can be drawn.

Despite the interesting and new findings the study has limitations and offers issues for further research. We only tested one movie and it would be interesting to extend the study to other genres such as action movies, sci-fi or fantasy. One advantage of the current study is that it we tested a real film with real brands in a setting that comes close to a movie theatre experience. Nevertheless, it was a lab setting and it would be interesting to test the effects in a real movie theatre. Future studies might also analyze fictitious brands in order to avoid any influences from familiarity with existing brands. Lastly, the analyses of additional or other 4D effects might prove interesting, too.

## References

- Balasubramanian, S.K. (1994). Beyond advertising and publicity: Hybrid messages and public policy issues. *Journal of Advertising*, 23, 29-46.
- Balasubramanian, S. K., Karrh, J. A. & Patwardhan, H. (2006). AUDIENCE RESPONSE TO PRODUCT PLACEMENTS: An Integrative Framework and Future Research Agenda. *Journal of Advertising*, 35 (3), 115-141.
- Cowley, E. and Barron, C. (2008). When product placement goes wrong: The effects of program liking and placement prominence. *Journal of Advertising*, 37 (1), 89-98.
- Craik, F. I. M., & Lockhart, R. S. (1972). Levels of processing: A framework for memory research. *Journal of Verbal Learning and Verbal behavior*, 11, 671-684.

- Craik, F.I.M. & Tulving, E. (1975). Depth of Processing in the Retention of Words in Episodic Memory. *Journal of Experimental Psychology: General*, 104 (3), 268-294.
- Craik, F.I.M. (2002). Levels of processing: Past, present... and future? *Memory*, 10 (5/6), 305-318.
- d'Astous, A. and Chartier, F. (2000). A study of factors affecting consumer evaluations and memory of product placements in movies. *Journal of Current Issues and Research in Advertising*, 22 (2), 31-40.
- De Gregorio, F., & Sung, Y. (2010). Understanding attitudes toward and behaviors: In response to product placement. *Journal of Advertising*, 39, 83-96.
- DisplaySearch. (2011). 2011 TV Shipments Fall After Six Consecutive Years of Growth. URL: [http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xsl/120314\\_2011\\_tv\\_shipments\\_fall\\_after\\_six\\_consecutive\\_years\\_of\\_growth.asp](http://www.displaysearch.com/cps/rde/xchg/displaysearch/hs.xsl/120314_2011_tv_shipments_fall_after_six_consecutive_years_of_growth.asp) (accessed 10.11.2012)
- Du Plessis, E. (1994). Recognition versus Recall. *Journal of Advertising Research*, 34(3), 75-91.
- Galician, M. & Bourdeau, P.G. (2004). The evolution of product placements in Hollywood cinema: embedding high-involvement 'heroic' brand images. *Journal of Promotion Management*, 10 (1/2), 15-36.
- Gupta, P. B., & Gould, S. J. (1997). Consumers' perceptions of the ethics and acceptability of product placements in movies: Product category and individual differences. *Journal of Current Issues and Research in Advertising*, 19, 37-51.
- Gupta, P.B. & Lord, K.R. (1998). Product placement in movies: the effect of prominence and mode of audience recall. *Journal of Current Issues and Research in Advertising*, 20 (1), 47-59.
- Higgins, S. (2012). 3D in Depth: Coraline, Hugo and a Sustainable Aesthetic. *Film History*, 24 (2), 196-209.
- Hoffman, D. M., Girshick, A. R., Akeley, K., & Banks, M. S. (2008). Vergence, accommodation conflicts hinder visual performance and cause visual fatigue. *Journal of vision*, 8 (3), 1-30.
- Karrh, J. A. (1998). Brand Placement: A Review. *Journal of Current Issues and Research in Advertising*, 20 (2), 31-48.
- Karrh, J.A., McKee, K.B. & Pardun, C.J. (2003). Practitioners' evolving views on product placement effectiveness. *Journal of Advertising Research*, 43 (2), 138-149.
- Lang, A. (2000). The limited capacity model of mediated message processing. *Journal of Communication*, 50, 46-70.
- Lang, A., Sanders-Jackson, A., Wang, Z., & Rubenking, B. (2012). Motivated message processing: How motivational activation influences resource allocation, encoding, and storage of TV messages. *Motivation and Emotion*, November 2012, 1-10.
- Lehu, J.M. & Bressoud, E. (2008). Effectiveness of brand placement: New insights about viewers. *Journal of Business Research*, 61, 1083– 1090.
- Lwin, M. O., Morrin, M., & Krishna, A. (2010). Exploring the superadditive effects of scent and pictures on verbal recall: An extension of dual coding theory. *Journal of Consumer Psychology*, 20 (3), 317-326.
- McCarty, J.A. (2004). Product placement: the nature of the practice and potential avenues of inquiry. In: L.J. Shrum (ed.) *The Psychology of Entertainment Media: Blurring the Lines between Entertainment and Persuasion*. Mahwah, NJ: Lawrence Erlbaum, 45–63.
- Morrin, M., & Ratneshwar, S. (2000). The impact of ambient scent on evaluation, attention, and memory for familiar and unfamiliar brands. *Journal of Business Research*, 49 (2), 157-165.
- Morrin, M., & Ratneshwar, S. (2003). Does it make sense to use scents to enhance brand memory? *Journal of Marketing Research*, 40 (1), 10-25.
- Park, D.-J. & Berger, B.K. (2010). Brand placement in movies: the effect of film genre on viewer recognition. *Journal of Promotion Management*, 16 (4), 428-444.
- Sauer, Abe (2010). 3D Technology: The End Of Product Placement As We Know It?, brandchannel Jan 14, 2010, <http://www.brandchannel.com/home/post/2010/01/14/3D-Technology-The-End-Of-Product-Placement-As-We-Know-It.aspx> (accessed 10.11.2012)
- van der Waldt, D.L.R., Du Toit L.S. & Redelinghuys, R. (2007). Does branded product placement in film enhance realism and product recognition by consumers? *African Journal of Business Management*. May 2007. 19-25.

Verrier, Richard (2012). 4-D movies: Next big thing for U.S. theaters? Los Angeles Times, July 7, 2012. <http://articles.latimes.com/print/2012/jul/07/entertainment/la-et-ct-4d-cinema-20120707> (accessed 10.11.2012)