Game portal banner ads: is anybody watching them?

Examining the effectiveness of banner ads at game portals and exploring the role of attention on the memory of these banner ads.

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Abstract

This study examined the effectiveness of banner ads at game portals. It was predicted that the recall and recognition of banner ads would be low, due to the amount of attention needed to play the game. As predicted, recall and recognition of banner ads were very low. Participants could hardly remember one banner ad in the free and cued recall tasks. Recognition of banner ads turned out to be very poor as well, participants could only recognize one third of the banner ads being showed.

Besides examining the effectiveness of banner ads, this research also explores the role of attention in recall of banner ads. By manipulating gaming experience and type of game, an attempt was made to find out differences in attention. It was predicted that in a skill game experienced players would score higher on recall and recognition tasks than novice players, due to the levels of attention in both conditions. It was also predicted that there would be no differences in recall and recognition between the experienced and novice players in the brain game condition. Results indicate that experienced participants in the skill game condition indeed recognized more banner ads than participants in the novice condition. These differences could not be found in scores of the recall tasks. As predicted, in the brain game condition, no differences in gaming experience were found. Results showed that attention plays an important role in memorizing banner ads on game portals.

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Have you ever played a game on a game portal? Let me ask you a question, did you see advertisements around the game? And if you did, do you remember the brands being displayed? No? Well, you are not the only one. This research examines the recall and recognition of banner ads placed next to games on game portals and aims to find out the reason for forgetting these advertisements.

Banner ads

There are many types of advertising on the web, for example banners, buttons, text links, sponsorships and target sites. From all of these forms of advertising, banner advertisements (banner ads) are the most prevalent and popular ones and they became the standard web advertising format (Cho, 2003; Li & Leckenby, 2004). With banner advertising, advertisers pay an internet company for displaying static or hyper-linked banners or logos on one or more of the company's web pages (Internet Advertising Bureau, IAB, 2009). According to IAB, banner ads deliver an important contribution to the total revenue of internet advertising. From all display-related advertising revenues in 2008, banner ads are the greatest contributors with 21 percent ($ 4.9 billion), followed by rich media (7 percent), digital video (3 percent) and sponsorship (2 percent).

Because of this popularity, much research on the effectiveness of banner ads was done. Most of this research is focused on click-through rates: the ratio of clicks on the banner ads over the total exposure to visitors (Cho, 2003; Lohtia, Donthu, & Hershberger, 2003; Dahlén, Rasch, & Rosengren, 2003). Cho (2003) and Drèze and Hussherr (1999) indicate that click-

through rates show very disappointing results. Fortunately, click-through rates are not the only indication of banner effectiveness. Bayles (2000) for example argued that simply looking at click-through rates does not consider key concerns like brand awareness, recognition and recall of the products being advertised. Research shows that even without click-through, banner ads can result in increased ad awareness and brand perceptions and shifts in attitudes (Briggs & Hollis, 1997).

The effectiveness of banner ads depends on several factors. Cho (2003) made a distinction between *consumer-related factors*, for example need for cognition and involvement, and *contextual factors* like type of media and environment in which the banner ads are placed. This research is mainly focused on the influences of the contextual factors on the recall of banner ads.

Banner ads on game portals

A specific environment in which banner ads are displayed, are game portals. These are online websites where people can play games. Because the games are often surrounded by banner ads, they can be played for free. Different types of advertising are possible on game portals, for example *display ads*, which are simple banner ads, and *pre- and postgame ads* which are shown before and after playing the game (Newzoo, 2009).

In the Netherlands, online games are very popular. Dutch people above eight years spend an average of four hours a week playing games. 48 percent of these four hours is played on game portals (TNS NIPO, 2008). Because of this fact, it is not a surprise that game portals are very popular among advertisers. Although there has been much research on effectiveness of banner advertising in general, little research was done on the effectiveness of banner ads in the context of game portals. It is possible that there are differences in banner recall within different contexts, for example different websites.

In the next paragraph the relation between context influences and information processing of banner ads will be discussed.

Brand information processing

Brand information processing is defined as the extent to which consumers allocate attention and processing resources to comprehend and elaborate brand information in an ad (MacInnis, Moorman, & Jaworski, 1991). The level of processing of the ads influences the encoding, storage and retrieval of the message (Lang, 2000). This process is influenced by several factors, for example *motivation,* the desire or readiness to process brand information in an ad, *ability*, consumers' skills to interpret brand information in an ad, and *opportunity*, the extent to which distractions or limited exposure time affect the attention of the consumers to the brand information in the ad (MacInnis, Moorman, & Jaworski, 1991).

When consumers are performing tasks on websites, they are often so involved in the tasks that all attention is occupied by these tasks, which results in limited ad processing. Therefore attention seems to be an important factor in information processing. This influence is already visible at perception: the human eye registers a large part of the visual field but the fovea registers only a small fraction of that field. To see a particular part of the field, we have to devote our attention to that part (Anderson, 2005, p 79-82). An important theory in the process of visual attention is the *Spotlight Metaphor* (Posner, 1980). In this theory, visual attention is seen as a spotlight that we can move around to focus on various parts of the visual field. To process a complex visual field we have to pay attention to different parts of the field to uncover the information. An important phenomenon that demonstrates the importance of attention is *change blindness* (Simons & Levin, 1998). Simons and Levin (1998) show in their experiment an experimenter that initiated a conversation with a pedestrian. During the interaction, the experimenter was replaced by a different experimenter. Only half of the

participants detected the change. Research of Simons and Chabri (1999) also shows the importance of attention in their experiment on *inattentional blindness.* They suppose that without attention visual features of our environment will not be perceived. They demonstrated this in the following experiment: participants had to watch a video in which two teams dressed in black and white played basketball. Participants had to pay attention to either the team in white or the team in black depending on the condition they were assigned to. Because the players were intermixed, the task was difficult and required sustained attention. In the middle of the game a person in a gorilla suit entered the room and walked through the game. Results showed that 54 percent of the participants noticed the unexpected event and 45 percent failed to notice the unexpected event. This reveals a substantial level of sustained inattentional blindness for a dynamic event.

The results of the experiments mentioned before show the importance of attention in information processing and therefore in examining the effectiveness of banner ads at game portals.

The effects of attention on memory of banner ads

The limited-capacity model of mediated message processing (Lang, 2000) can be used as a theoretical framework for explaining the effects of attention on memory of banner ads (Diao & Sundar, 2004). The model assumes that people have a limited amount of cognitive resources. In the processing of messages three sub processes are involved: encoding, storage and retrieval. The process of *encoding* determines which elements of the stimulus, in this case the banner ads, will be transformed into mental representations. The *storage* process refers to relating the newly encoded information to previous memories stored in the brain. The last process, *retrieval,* is reactivating a stored mental representation of the message, in this case the banner ad. The limited-capacity model is based on the assumption that memory is an

associative network. The more links established between new and old information, the better the message is stored. Another assumption is that cognitive resources are independently allocated to the three processes of information processing. In the light of this assumption an increase in resource allocation to one process will result in a decrease of available resources for other processes. Therefore, the identification of factors that affect the allocation of resources to the different processes is an important issue in the processing of banner ads on game portals.

Applying the theory of limited-capacity model on the case of banner ads on game portals it is assumed that the more attention is needed to play a game, the less attention will be available for simultaneous sub processes like elaborating the advertisement banners. Therefore it is expected that memory of banner ads on game portals will be low. The first hypothesis is:

H1: Participants will have a low performance score on memory tasks for banner ads surrounding the game they are playing.

According to Diao and Sundar (2004) measurements of memory of banner ads can be divided into two categories: recall (free and cued) and recognition. Measures of *free recall* index retrieval, measures of *cued recall* the thoroughness of storage and measures of *recognition* index whether information is encoded. If this assumption is true, the game will distract the attention so much that the encoding, storage and retrieval of the banner ads will take place to a small extent. Since game playing consumes a great deal of cognitive capacity, it is hypothesized that both scores of recall and recognition tasks will be low, and that recall of banner ads will be lower than the recognition measures:

H1a: Participants will show better performance on the cued recall tasks than on free recall tasks.

H1b: Participants will show better performance on recognition tasks compared to performance on recall tasks.

Gaming experience

Gaming experience is expected to affect memory for banner ads. Theories about *automaticity* assume that when a person performs a task for a few times, the task is executed so automatically that it will require few attention resources (Anderson, 2005, p 282). In case of a person who is playing a game and is simultaneously exposed to banner ads, it is supposed that the game will absorb so much attention, that less cognitive resources are left for processing the banner ads. But when the game becomes more automatic, more attention will be available for processing the banner ads. Therefore, it is hypothesized that there will be a difference between experienced gamers and novice gamers in recall and recognition of banner ads, due to the attention addressed to the game and banner ads:

H2. Experienced game players will have a higher score on recall and recognition tasks of banner ads than novice game players.

Type of game

Another variable that is expected to affect memory of banner ads is type of game. When we look at theories of automaticity it is clear that this cannot be applied to all kind of tasks (Samuels & Flor, 1997; Anderson, 2005). According to Kraiger, Ford and Salas (1993) there are three kinds of learning outcomes in tasks: *cognitive outcomes*, like verbal knowledge, knowledge organization and cognitive strategies, *affective outcomes*, like attitudes, motivational disposition, self-efficacy and goal setting and *skill-based outcomes*, like proceduralization, composition and automaticity. Only in the skill-based condition, tasks will become automatic. Because of this, it is expected that in a skill game some degree of

automaticity will occur. This will not be the case in a brain game, in which cognitive outcomes are expected. It is assumed that abilities in a skill game will improve, so that after a period of practice the game will demand less attentional resources. The other attentional resources can then be used to process other tasks, like remembering the banner ads. It is therefore expected that there will be differences in scores on recall and recognition tasks for novice and experienced players in a skill game. This cannot be applied to the case of a brain game because the skills cannot become automatic. So it is hypothesized that there will be no significant differences between novice and experienced players in a brain game.

H3. In a skill game participants in the experienced condition will have higher scores on recall and recognition tasks of banner ads than participants in the novice condition.

H4. In a brain game there will be no differences between novices and experienced gamers in scores on recall and recognition tasks of banner ads.

Other variables that will affect recall

Research on recall and recognition of banner ads assumes that there are other variables that are likely to affect memory for banner ads, for example involvement (Lee & Faber, 2007), arousal (Diao & Sundar, 2004) and attitude (Cho, 2003; Henthorne, LaTour, & Nataraanjan, 1993). This research also examines the relative influence of these variables. The research question is therefore:

RQ: What other variables are likely to affect the recall and recognition of banner ads on game portals?

Method

Design

The design of this study was a 2 (game experience: novice player versus expert player) X 2 (type of game: skill game versus brain game) between-subjects factorial design. Participants were randomly assigned to one of the four conditions.

Participants

102 participants (44 boys and 58 girls) from secondary school Ulenhof College in Doetinchem with an average age of 13.6 (*SD* = 1.24) participated in the study. The reason that secondary school pupils were chosen is because of the fact that research of TNS NIPO (2008) showed that secondary school pupils spend many hours of the week playing games: 4.6 hours a week for girls and 7.7 hours for boys. Another reason to choose secondary school pupils is because they do not know much about scientific research so that the chance of hypothesis guessing was minimized.

Materials

A special website was build to gather information from the participants. This website consisted of an experimental page with the game and the banner ads and pages with questionnaires.

Games

For the condition of the skill game a racing game called Ferrari was used (see for an example of the game: http://www.game1games.com/playgames/1225/ferrari-xv.html). This game was chosen because the game was easy to learn and the fact that it was not possible to crash in the game or to get ‘game over’. That the game was easy to learn was verified in a

pretest in which 19 participants had to play the game two times and significantly improved the mean round times, from 3.06 minutes in the first round to 2.85 in the second round, t (18) = 2.24, p = .019. The participants also declared in a self administered questionnaire that their skills improved from the first to the last round of the game, t (18) = -5.09, p = .000. For the condition of the brain game Mahjong was chosen (click on the following link for an example: http://www.mahjongspelen.nl/mahjong.php?mahjong=Getallen+Mahjong&game=11). To diminish the chance that participants are familiar with this game, a special version with numbers was selected. Also for this game a pretest was conducted. Although the results of the comparison between high scores of the participants (n = 16) of the first and second time they played the game did not reveal a significant difference, t (15) = 1.56, p = .067, the scores on the self administered questionnaire showed that their skills during the game improved t (15) = - 4.79, p = .000.

Ads

The game was surrounded by 12 animated banner ads for different product categories, see figure 1a and 1b for an example of the webpage. Animated banner ads were used, because these are the most common forms of banner ads on game portals. Besides, research has confirmed that there are no differences in recall between static and animated banner ads (Rae & Brennan, 1998; Diao & Sundar, 2004). To choose product categories of the banner ads, the content of banner ads on game portals was observed. It was concluded that most game portals show animated banners of different product categories that are not congruent to the content of the site. Furthermore, research has confirmed that congruency between the product category of the website and the banner ad is not necessary for memory of ads (Moore, Stammerjohan, & Coulter, 2004; Mccoy, Everard, Polak, & Galetta, 2007). Because of this, animated banner ads that were frequently used on game portals and that are incongruent with the game content

were used. The sizes of ads were standardized (234 x 60 pixels) consistent with the size guidelines for ads on the web of the Internet Advertising Bureau (IAB). The location of the ads was randomized to prevent order effects.

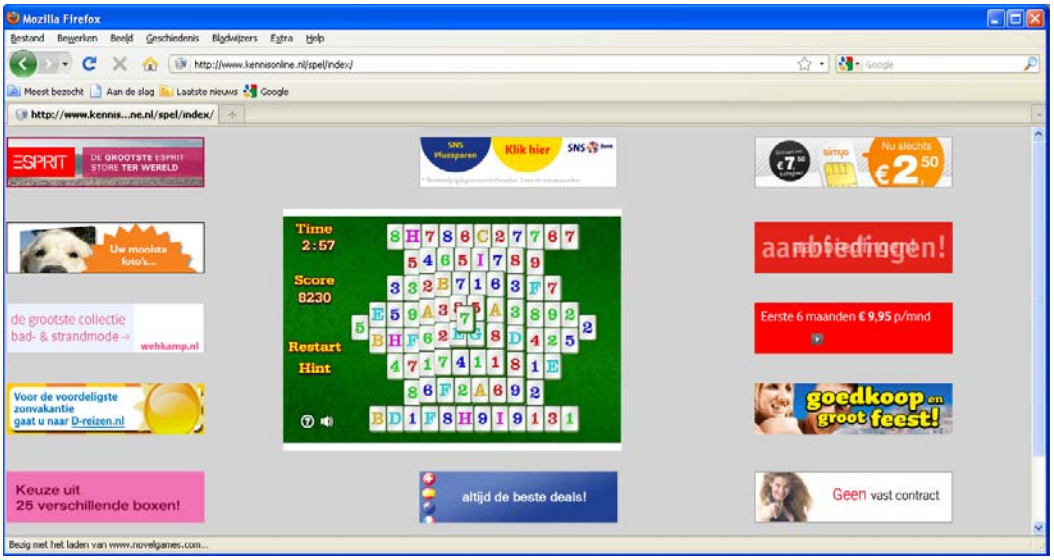

Figure 1a. Example of the experimental webpage, condition brain game.

Figure 1b. Example of the experimental webpage, condition skill game.

Questionnaires

Dependent measures

Three questionnaires were used to evaluate the participant's memory for the products advertised. The first questionnaire asked participants to freely recall and write down everything they could remember about the ads that were shown around the game they played. Participants could receive a score of 12 points if they gave a totally correct answer to all the 12 ads. When participants gave a partially correct answer to an ad, they were given a partial mark of 0.5 points. In the second questionnaire the participants were given cues about the products advertised to assist the recall of the ads. They were asked to mention the ads they could remember on the basis of cues. Also in this part, the participants could score a maximum of 12 points (1 point for correct answers, 0.5 points for partially correct answers). The last questionnaire to evaluate the participants' memory for the products advertised was a recognition task. Brand recognition was assessed by presenting participants with 15 banner ads. Participants indicated whether each of the brand names had appeared by mentioning "yes" or "no". Of the 15 banner ads presented to the participants, only 12 actually appeared in the experiment, the other banner ads acted as distracters. Participants were informed that not all of the banner ads appeared in the experiment.

Simply counting the scores of correctly indicated banner ads would be incorrect, because there is a chance that participants were guessing. The best way to treat the problem of guessing is using confidence rates (Tulving & Craik, 2005, p48). Participants rated their confidence level on a scale ranging from a *low score* of 1, what indicates guessing, to a *high score* of 7 what indicated that the person remembered seeing the ad in the experiment (Palacio & Santana 1998; Pagendarm & Schamburg 2001; Krishnan & Smith, 1998). For every participant, the cumulative scores of free and cued banner ad recall and banner ad recognition were used to measure dependent variables in the analyses.

Control Variables

Besides the recall and recognition questionnaires, subjects completed a questionnaire with demographics, emotional response, experiences with the game, online gaming experience and attitudes toward the game and banner ads. The demographic section of the questionnaire included questions about participants' gender, age, education level and grade in secondary school. To measure the emotional response, the Self-Assessment Manikin (SAM) (Bradley & Lang, 1994; Schneider, Lang, Shin, & Bradley, 2004) was used, in which valence (negative - positive), activation (calm - excited) and presence (there - not there) were assessed. To determine the experiences with playing the game, 14 questions were formulated inspired by Witmer and Singer (1998). Six of these questions assessed control factors (α = .71), four questions awareness (α = .79) and four questions assessed distraction factors (α = .82). The participants gave their answers on a seven-point Likert scale varying from totally disagree (1) to totally agree (7).

Subsequently, information on previous online gaming experience of the participants was obtained by four questions in which participants reported if they play online games on game portals, what kind of games they play online, how many days and hours in the week they play and for how many years they play online games. Finally, the attitudes of the participants were assessed. Attitude toward the game was assessed using a six-item, seven point Likert scale (Cho, 2003). The subscale of attitude toward the game appeared to have a good internal consistency, α = .70. The attitude toward the banner ads was measured using a six-item, seven point Likert scale (Henthorne, Latour, & Nataraanjan, 1993); α = .77.

Procedure

On arrival at the computer lab, participants were seated in front of computers. They were told they would be participating in an evaluation of online games. After being thanked

for their participation, the participants were told to go to a website developed specifically for this study. After filling out an informed consent form, the participants started to play the game they were randomly assigned to. The participants in the skill game condition played the car racing game, while participants in the brain game condition played Mahjong.

The novice players in the skill game condition played the racing game for five rounds and novice players in the brain game condition played the game for three minutes (based on the average time participants in the pretest needed to finish the five rounds in the racing game). The experienced players played the same game as the novices, but had to practice the game for five rounds or three minutes extra. Five rounds and three minutes were selected because the pretest revealed that this was sufficient in increasing participants' skills, and short enough to allow participants to play the games in one session. To prevent the chance that the participants in the experienced condition would be longer exposed to the banner ads than the novice players, other banners were shown in the exercise game.

After playing the game, the participants had to fill in the questionnaires. When the participants ended the questions, the experiment was finished. Until everybody was finished, the participants were allowed to do something on their own, like browsing the internet or playing a game.

Results

Manipulation Check

To test the accuracy of the novice versus experienced player manipulation, the performance scores on round times in the racing game and high scores of players in the brain game were compared. As expected, the time experienced players needed to finish the first round of the racing game appeared to be significantly higher (M = 3.47) than the round time of the second round (M = 3.02), t (22) = 3.91, p = .001. Moreover, scores of experts in the

brain game increased from a high score of 6517 in the first game to 6934 in the second one. Although this improvement did not turn out to be significant, scores on skill questionnaires show that participants improved their skills. Scores on the questionnaire in which participants administered their skill improvements revealed that both experts in the skill game, t (22) = -4.60, p = .000 and experts in the brain game, t (24) = -3.74, p = .001 significantly improved their skills.

Hypotheses testing

Performance on memory tasks

Hypothesis one predicts that when people are playing a game, they do not have attention for surroundings such as banner ads. It was hypothesized that the greater part of the banner ads would not be memorized. It was also stated that measures of free recall would be lower than measures of cued recall and recognition, and that measures of cued recall would be lower than measures of recognition. As shown in table 1, participants indeed had a poor memory for banner ads.

Table 1

Mean performance scores on recall and recognition tasks of banner ads

Tasks	*M*	*SD*
Free recall	0.83	1.37
Cued recall	1.61	2.05
Recognition	4.39	3.26

Note. Maximum score = 12.

Results indicate that from the 12 banner ads showed in the experiment, participants could only recall 0.83 banner ads freely. Although the mean scores of cued recall (1.61) were higher than the scores on free recall, the results were also very low. The same is true for the recognition rates. Only one third of the banner ads were recognized by the participants, which indicates that the greatest part of the banner ads was not recognized. This level of recognition is low given the fact that participants had been given the choice between two options (either yes or no). Participants may have been conservative in indicating brands they have seen, or maybe they were guessing. To examine if participants may have been guessing, not only scores of correct answers (hit responses) on the recognition test were calculated, but also wrong answers. Hit responses were calculated by the part of participants who correctly recognized the banner ads. Miss responses were calculated by the proportion of participants who indicated that they have not seen the target banner ads. Results are shown in table 2.

Table 2

Mean performance scores on responses of the recognition task of banner ads

Responses	*M*	*SD*
Hitrate	4.39	3.26
Missrate	7	3.26
Confidence level[a]	4.66	1.70

Note. Maximum score = 12.

[a] Confidence level ranging from 1 (not confident) to 7 (fairly confident).

These results show that the greatest part of the banner ads was not correctly recognized, with a hit rate of only one third of the banners. The scores of miss rates indicate that participants did not recognize seven banner ads that were shown in the experiment. Interestingly, the

confidence level of 4.66 (on a scale of 1 to 7) indicates that participants were fairly sure about their (false) choices. This assumes that participants did not fully process the banner ads although some participants thought they did.

Gaming experience and performance on memory tasks

Hypothesis two predicted that participants in the experienced condition would score higher on recall and recognition tasks than participants in the novice condition. To examine the performance of participants in the two conditions on the memory tasks, the proportion of the 12 target brand names correctly mentioned or recognized by each participant was analyzed using a one-way ANOVA (analysis of variance) with the two conditions (novice and experienced) as independent variables and recall and recognition as dependent variables. See table 3 for an overview of the results.

Table 3

Mean performance scores on recall and recognition tasks of banner ads for novice and experienced players

	Free recall		Cued recall		Recognition	
Condition	*M*	*SD*	*M*	*SD*	*M*	*SD*
Novice (*n* = 48)	0.96	1.21	1.78	1.67	3.89	3.14
Experienced (*n* = 54)	1.17	1.72	2.35	2.50	4.96	3.31

Note. Maximum score = 12.

The comparison of mean scores on recall and recognition indicate that experienced players scored higher than novice players. However, these differences did not appear to be significant, F (1,100) = .487, p = .487. Differences in scores on cued recall and recognition of participants in the novice and experienced condition also did not turn out to be significant F (1,100) = 1.917, p = .169; F (1,100) = 2.79, p = .098. Hypothesis two was therefore not supported: both conditions scored just as bad on memory tasks and there were no significant differences between groups.

Type of game and performance on memory tasks

Skill game

Hypothesis three predicted that in a skill game, participants in the experienced condition would score higher on recall and recognition than participants in the novice condition. Results of the one-way analysis of variance (ANOVA) indeed indicate that experienced players score higher on free and cued recall than participants in the novice condition. However, these differences were not significant. On the other hand, the mean scores of recognition revealed a significant difference between the scores of novice and experienced players, F (1, 45) = 5.69, p = .021. The mean scores of participants in the novice condition (M = 3.17, SD = 2.84) were significantly lower than mean scores of experienced players (M = 5.13, SD = 2.80), see table 4 for an overview of the results. Because these differences only count for the recognition measures, hypothesis three was partly supported.

Table 4

Mean performance scores on recall and recognition tasks of banner ads for novice and experienced players in the skill game and brain game condition.

	Free recall			Cued recall			Recognition		
Condition	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*
Skill game									
Novice (*n* = 48)	24	0.83	1.05	24	1.71	1.73	24	3.17	2.84
Experienced (*n* = 54)	23	1.17	1.92	23	1.83	2.64	23	5.13*	2.80
Brain game									
Novice (*n* = 48)	30	1.07	1.34	30	1.83	1.64	30	4.47	3.32
Experienced (*n* = 54)	25	1.16	1.55	25	2.84	2.30	25	4.80	3.76

Note. Maximum score = 12, * p <.05

Brain game

The fourth hypothesis predicted that there would be no differences between novice players and experienced players in a brain game in scores on free recall, cued recall and recognition tasks. The results of the one-way analysis of variance (ANOVA) indeed indicate that the mean scores of free recall of players in the novice condition did not differ significantly from the scores of experienced players, see table 4. Also the scores between novices and experienced players on the other memory tasks did not significantly differ from each other, hence hypothesis four was supported.

Influence of other variables on performance on memory tasks

To look at the impact of other variables on performance on memory tasks a regression analysis was done. In the stepwise multiple regression, *control of the game* was entered first and explained 15 percent of the free recall of banner ads, F (1, 99) = 18.06, p = 0.000, other factors did not account for any variance in free recall of banner ads. For cued recall it turned out that *control of the game* was a significant predictor, F (1, 99) = 7.38, p = 0.008, and explained 7 percent of the cued recall of the banner ads. To examine the differences between groups in the factor 'control of the game' an ANOVA was executed. Results show that for both free recall and cued recall, participants who indicated to have a great amount of control, performed significantly better on memory tasks. The mean scores on free recall of participants who had a great amount of control (M = 1.57) were significantly higher than the mean scores of participants who were not in control of the game (M = 0.54), F (1, 65) = 10.36, p = .002. This difference was also found on performance on the cued recall tasks, in which participants with a high amount of control (M = 2.60), scored significantly higher than participants with a low amount of control (M = 1.46), F (1, 65) = 5.42, p = .023. In both free and cued recall the amount of control was an important variable. The more control participants had over the game, the better they scored on the recall tasks.

The influence of control factors on recognition was examined by performing a stepwise multiple regression analysis. *Control of the game* was entered first and explained 9 percent of the variance in recognition of banner ads, F (1, 99) = 9.91, p = 0.002. *Awareness for environment factors* was entered second and explained a further 4 percent, F (1, 99) = 4.73, p = 0.032. The last factor entered was *valence*, which explained 4 percent, (F (1, 99) = 4.22, p = 0.043) of the variance in recognition of banner ads. Results indicate that the higher the amount of control of the game a participant had, the higher the probability for recognition of the banner ads. Furthermore the higher the awareness of the participants,

the more banner ads the participant could recognize. For valence applies that the less happy a person feels, the more the more banner ads he could recognize.

Additional analysis

Previous described results indicate that memory for banner ads on game portals is very low. The aim of this study was to examine the effects of attention on memory of banner ads. For both recall and recognition no significant differences were found between novice and experienced players. The only significant difference between novice and experience players was found in the recognition task in the skill game condition. It is possible that participants in the free and cued recall tasks were conservative in giving their answers because they were afraid to give false answers. In the recognition task they were forced to give an answer, while in the recall tasks the participants were free to answer. Therefore, it may be interesting to look at differences between participants who did mention at least one banner ad in the free and cued recall tasks.

Differences between experienced and novice players on free and cued recall

Additional analysis for participants who recalled at least one banner ad show that there are significant differences between performance on both free and cued recall tasks. For free recall the mean scores of participants in the experienced condition (M = 2.95, SD = 1.47) were significantly higher than the mean scores of participants in the novice condition (M = 1.93, SD = 1.04), F (1, 44) = 7.66, p = .008. For cued recall experienced players (M = 3.90, SD = 2.06) also performed better on the memory tasks than novice players (M = 2.46, SD = 1.47), F (1, 44) = 11.281, p = .001, see figure 3.

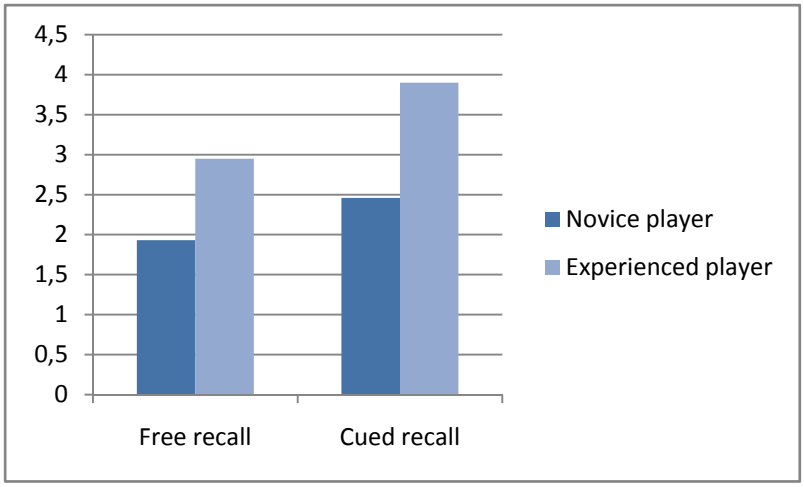

Figure 3. Mean performance scores on free and cued recall tasks for novice and experienced players, only for those who could recall at least one banner ad.

Skill game

Additional analysis to compare experienced and novice participants in the skill game condition shows that experienced players were able to mention more brands in the free recall task (M = 3.38, SD = 1.77) than novice players (M = 1.82, SD = 0.75), F (1,17) = 6.94, p = .017, see figure 4 on the next page. On cued recall the experienced players could also mention more brands (M = 4.67, SD = 2.06) than novice players (M = 2.28, SD = 1.64) and these differences were also significant, F (1, 25) = 10.75, p = .003).

Brain game

Just like the results of the earlier described analysis on novice and experienced players in the brain game condition, in the additional analysis also no significant differences between novice and experienced gamers on free and cued recall were found. For free recall the mean scores of novice and experienced players were not significantly different from each other,

F (1, 25) = 1.81, p = .191 and also for cued recall no significant differences were found, *F* (1, 39) = 3.09, p = .086.

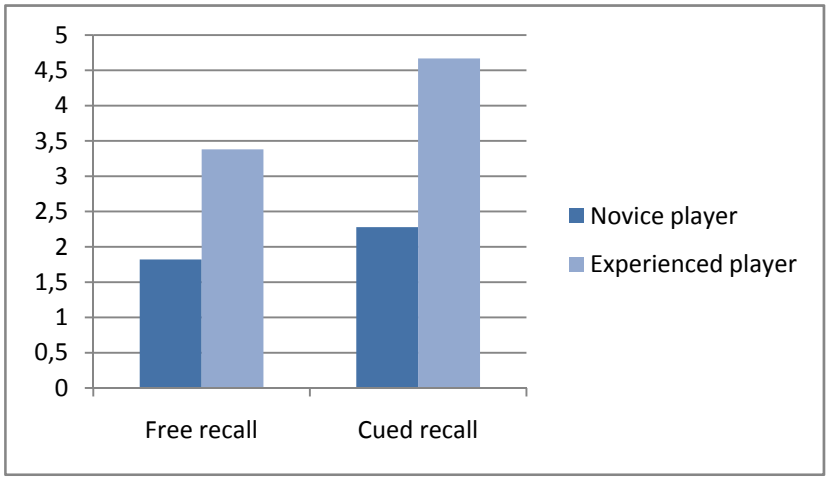

Figure 4. Mean performance scores on free en cued recall tasks for novice and experienced players in the skill game condition, only for those who could recall at least one ad.

Discussion

This study explored the effectiveness of banner ads on game portals and examined the influence of attention on the recall of these banner ads. Results indicate that attention plays an important role in processing banner ads placed on game portals. Performance on both recall and recognition tasks appeared to be very low. Participants could hardly recall one banner ad from a total of twelve and recognized only one third of the banner ads. This indicates a revaluation of the limited capacity model: playing a game requires so much attention of the participants that no attention is left for other processes like looking at banner ads and processing them. Results show that the effectiveness of banner ads on game portals is very low. Looking back at the title of this article, “Game portal banner ads, is anybody watching them?” the answer is no: nobody is watching them.

The low performance of participants on memory tasks is in concordance with other research regarding recall and recognition of banner ads in games (Chaney, Lin & Chaney, 2004; Yang, Roskos-Ewoldsen, Dinu, & Arpan, 2006; Kuhn, Pope & Voges, 2007). In this research, it was predicted that scores on free recall would be lower than cued recall, and that scores on recognition would be higher than the recall scores. Results show that this is indeed true, what is in line with Lang’s theory of information processing (2000). According to Lang, recognition is the easiest task to perform because the item to be recognized is presented to the subject and contains several cues to help the subject retrieve the information. Cued recall is a little more difficult because only one cue is presented to the subject to help the retrieval of an item from memory. Finally, free recall is the hardest one, because no cue to retrieve the information from memory is given at all. This is confirmed in other research regarding recall and recognition of banner ads (i.e. research of Danaher & Mullarkey, 2003).

This research furthermore looked at differences in performance on recall and recognition tasks between conditions of gaming experience and the type of the game. The first expected difference was between novice and experienced players. It was predicted that experienced players would score better on memory tasks. This was expected because they need less attentional resources for playing the game, due to the level of skills they obtained by playing the game. It was expected that experienced players would have more attention for the banner ads because they could play the game more automatically than novice players. It was assumed that experienced players have more attentional resources left for the banner ads. Nevertheless, the comparison between participants in both conditions shows no significant differences in performance on memory tasks. In this comparison, there was no distinction made between participants who played a skill game and participants who played a brain game. In further analysis, results indicate that there are differences between novice and experienced gamers in a skill and brain game. In a skill game experienced players scored better than novice players on recognition tasks. In the brain game no differences were found between novice and experienced players. It is likely that differences between these groups have influenced the results of the analysis.

It was expected that novice and experienced players of a skill game would differ in performance on recall and recognition tasks. Results indicate that there indeed is a difference between novice and experienced gamers. Participants in the experienced condition significantly recognized more banner ads than participants in the novice condition. However, these differences did not show up in scores on the recall tasks. Probably, the game needed so much attentional resources from both groups of participants, that no attention was left for processing the banner ads. A possible explanation for the fact that no differences between novice and experienced players in recall tasks were found is that participants in the

experienced condition were not experienced enough to devote the needed attention to the banner ads. Maybe experienced players had more attentional resources left to look at the banner ads (which explains the higher scores on the recognition task) but had no chance to fully process the banner ads, just like the novice players. Although the pretest demonstrated an exercise of five rounds was sufficient for improving the skills of participants, it is possible that more rounds are needed to achieve a complete automation of driving skills in the racing game. A recommendation for further research would therefore be to examine the learning curve for a racing game, and to find out when participants have completely automatic skills for the game. Maybe then, results would show significant differences.

Despite the fact that manipulating gaming experience does not directly demonstrate the importance of gaming experience and attention in the process of recall and recognition of banner ads, there are still results that provide evidence for the importance of gaming experience and attention. The first one is that for the brain game no differences were found between novice and experienced players, while for the skill game for recognition a significant difference between groups was found. This implies there are differences possible between novice and experienced players in certain types of games, and therefore also in attention. A second demonstration of the importance of gaming experience and attention can be found in the analysis of other important variables that affect recall and recognition of banner ads. It was found that for both free and cued recall, control of the game was an important factor. The more control participants experienced while playing the game, the more banner ads they could mention in the recall tasks. In recognition, besides control of the game, attention for the surroundings also seemed to be an important factor. The more attention participants had for the environment, the more banner ads they recognized. At last, a demonstration of the importance of gaming experience and attention can be found in the additional analyses that were done. These analyses were done for those participants, who could remember at least one

banner ad in the game. These analyses show several significant differences between novice and experienced participants in the skill game condition. The fact that gaming experience is an important factor in explaining memory for banner ads, is also demonstrated in research of Ferguson, Cruz and Rueda (2007), Lee and Faber (2007), Kuhn, Pope and Voges (2007) and Chaney, Lin en Chaney (2004). For example, research of Ferguson, Cruz and Rueda (2007) revealed that experience with playing video games is associated with enhanced performance on memory recall tasks.

An important question is: “Why could a difference in performance between novice and experienced players only be found for recognition, and not for free and cued recall? And how is it possible that the additional analysis succeeds in demonstrating these differences?”. There is no clear answer to these questions. Because only for recognition a significant difference was found, a possible influence is the forced way of completing the recognition task. Participants were forced to answer questions in this task, while in the free and cued recall tasks the participants were free to answer. It is possible that participants in the recall task were afraid to give a false answer, so they did not give any answer at all. Maybe they knew some answers, but were afraid to give them. It is possible that because of this reason, no significant differences were found for the recall tasks.

Another possible influence could be the mood of the participants. Analysis of factors that influence recognition shows that valence, the mood of the participants, is an important factor. It appears that the more uncomfortable participants felt, the more banner ads they could recognize. This seems strange, but research revealed that valence of one’s mood can affect cognitive processing and task performance (Verleur, Verhagen, & Heuvelman, 2007). Martin and Clore (2001) argue that individuals in negative moods process information more systematically than individuals in positive moods. Forgas (2002) argues that negative affect

produces a more accommodative, bottom-up and externally focused processing strategy. The negative mood of some participants in this experiment could have triggered a more systematical way to process the banner ads, which caused better results on the recognition tasks. Another possibility is that the game participants played induced a negative mood because the game was so difficult or boring that participants refused to focus their attention on the game. This could have resulted in more attention for the environment, which could have disturbed the results of the experiment.

It is also possible that the design of the experiment had a disturbing influence on the results. When participants in the experienced condition had to practice the game, other banner ads were shown. The reason for this was to keep the time equal the participants in both conditions were exposed to the target banner ads. It is possible that this disturbed the results of the experiment. Due to the limited capacity of memory, it is possible that these advertisements were mixed in memory with the new banner ads, which can make retrieval more difficult. Another possible influence can be the amount of the banner ads around the game. In 1956 Miller introduced his theory of magic number seven. He indicated that short-term memory could only contain seven plus or minus two elements. In the past years, many new theories are formulated on memory but there is accordance in the fact that a person is limited in retaining information in short term or working memory (Anderson, 2005, chapter 6). Because of this, it is not likely that a participant can remember all the 12 banner ads. Maybe if there were less banner ads, it had been easier for the participants to process the banners. To maintain the ecological validity of the research, the same amount of banner ads were used as normally on game portals are displayed. Perhaps in other research the influence of the amount of banner ads around the game can be examined by manipulating these.

Managerial implication

The finding that recall and recognition for banner ads placed on game portals is very low, would be very disappointing for advertisers. This research reveals that attention is a very important factor in the processing of these banner ads. An implication of this finding is that when advertisers want banner ads on game portals to be effective, they have to draw the players' attention. There is a variety of research done to reveal factors that track attention of customers to banner ads. For example, research on the use of sounds and animation (Rae & Brannan, 1998) or exposure time (Burke, Hornof, Nilsen & Gorman, 2005). However, results of these studies confirm the fact that banner recall and recognition remains low. Maybe game portals are just not the best environment to advertise and to communicate a brand message to consumers. Perhaps other kinds of advertising can be used, for example advergaming. In advergaming the marketing message is embedded in the game itself. By doing so, the possibility that people will simply avoid looking at the ad, will be eliminated (Deal, 2005). Research on advergaming shows promising results on recall (Winkler & Buckner, 2006). So maybe this is an alternative for advertisers to advertise their products.

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