**Brand Placement in Virtual
Environments: Impact of Flow
on Brand Recognition and Recall**

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Abstract

This research assesses the impact of the various states of mind of Flow psychological theory (Csíkszentmihályi 1990) in relation to brand recall and recognition in video games. After playing a video game, the emotions felt by the participants allowed us to categorize them into distinct groups corresponding to the four-channel Flow model (Massimini and Carli 1988): Flow, anxiety, boredom and apathy. We found that these states of mind had significantly influenced the number of brands identified. In particular, the participants in Flow could recognize a larger number of brand placements than those in the three other groups.

Résumé

Cette recherche évalue l'impact des différents états d'esprit de la théorie psychologique du Flow (Csíkszentmihályi 1990) par rapport à la reconnaissance de marques de produits dans les jeux vidéo. Après avoir joué un jeu vidéo, les émotions ressenties par les participants nous ont permis de les classer en quatre groupes distincts correspondant aux quatre canaux modèle du Flow proposé par (Massimini and Carli 1988): le Flow, l'anxiété, l'ennui et l'apathie. Nous avons constaté que ces états d'esprit ont influencé de façon significative le nombre de marques identifiées. En particulier, les participants en état de Flow peuvent reconnaître un plus grand nombre de marques de produits que ceux dans les trois autres groupes.

Advertisers must always be on the lookout for new techniques or approaches to adequately disseminate their messages, and brand placement is becoming a more widely used form of communication. This practice has been a standard in the film and television industry and is now making its mark in the video game industry (Faucher 2006) . Frank Rose, in Wired Magazine (2007), is predicting significant growth for this practice, and based on statistics from the Yankee Group, evaluates that the market was worth US$56 million in 2005, and will reach US$732 million in 2010. There are several reasons for this phenomenon.

This practice first started in the early 20th century as informal sponsorships, and since the 1970s it has seen considerable expansion (DeLorme 1998). In fact, from that period onward, it became quite conceivable that production companies would be paid to have products displayed in their film or television productions (Moser et al. 2004). This practice has since evolved and brand placement as a marketing communication technique has now become deeply rooted in the video game industry. The most recent brand placement research has preferred to focus on traditional media, such as film and television, and as such the video game industry has been left virtually unexplored. This research made it possible to evaluate the effectiveness of brand placement, or more precisely assess the impact of the various states of mind of Flow psychological theory (Mihály Csíkszentmihályi) in relation to brand recall and recognition in video games.

In the laboratory, after playing a game for about fifteen minutes, participants completed a questionnaire regarding the emotions they felt during their game, and these emotions were then categorized. A section on brand placement in the questionnaire allowed us to calculate the number of placements participants could remember, and through applying cluster analysis, four distinct groups corresponding to the four-channel Flow model (Massimini and Carli 1988) were identified: Flow, anxiety, boredom and apathy.

We suggest that these various states of mind had significantly affected the number of brands participants could identify. Those participants in Flow were able to use all their skills and fully focus on the task at hand (Csíkszentmihályi 1990). Thus the group of participants in Flow category during the game could recognize a larger number of brand placements than those in the other groups (apathy, anxiety and boredom). Moreover, we ascertained that a unique interaction relation existed between the attitude toward the subject and the group in a state of Flow. In fact, the more participants were in Flow, the greater their interest in the topic at hand, and the greater their ability to recognize a large number of brands. On the other hand, among individuals in a state of boredom, anxiety or apathy, this effect was non-existent.

Background

Traditional media are losing speed, and thus the use of non-traditional media as a form of communication is becoming much more interesting for advertisers. To compete, it is almost becoming a must for advertisers to be present in these new forms of media and entertainment. Young adults are watching television less and less (Moser et al. 2004). This phenomenon is due to the emergence of new technologies such as personal video recorders (PVR), leading people to watch their favorite TV channels off line. Once viewers have recorded these programs, they can watch them without any advertising breaks (Moser et al. 2004). The audience fragmentation resulting from the emergence of specialized channels has also complicated the task of any advertisers attempting to reach mass numbers of people (Gupta and Balasubramanian 2000). Recent studies show that a portion of this audience is replacing this leisure time with game playing on video game consoles (Duncan 2005). This same study shows that 12% of men aged 18 to 34, watch less television, and instead prefer switching to video games during part of this

leisure time. Faced with this new situation, marketing managers now need to develop new and innovative advertising techniques (Gupta and Lord 1998; Gupta and Balasubramanian 2000).

Video Games as Media

This media's unique characteristics, including interactivity and sensory immersion, (Vorderer 2000) suggest that video games are more engaging than movies (Steuer 1992) and are more apt to stimulate creative thinking and perception. Marketing managers are now able to place, within these, highly targeted brands, which should lead to increased consumer attentiveness, and thus increased brand involvement (Nelson 2002). According to Nelson (2002), brand exposure time constitutes another advantage for advertisers since the average game is played 30 hours and this difference in exposure time would inevitably increase consumer attention and brand involvement

For video game producers, the insertion of advertisements within video game content is becoming a very important factor, for both the financing and the production of these. Production and publicity budgets for video game creation now reach fairly large sums of money.

The purpose of this study is to demonstrate how video game players' state of mind will influence the number of brands they remember after playing the game. We will thus dwell on the concept of brand placement, as well as its efficiency and unique characteristics as a marketing communication technique. In doing so, we will develop a better understanding of all variables affecting participants' cognitive processes. Our interest here is in cognitive psychology, and more specifically the *Flow* model developed by Mihály Csíkszentmihályi (1990). We will make use of this theory and the typologies emanating from it to categorize all our participants.

We will also seek to understand how the state of mind can impact on a participant's memory. As such, our third objective is to describe recall and recognition, the variables most likely to be influenced by brand placement and *Flow*.

In order to properly demonstrate the existence of a link between individuals' state of mind and their memory ability, we will show proof that a relationship does indeed exist between these two variables. Thus as a fourth objective we will show the impact that individuals' states of mind may have on their recall and recognition, while describing theories in cognitive psychology.

Lastly, we will describe certain variables that could cause a moderating effect on state of mind. In fact, we will describe those variables susceptible of having a moderating effect: attitude toward brand placement, attitude toward the product (video game console) and the consumer's general interest in the game type.

Brand Placement

Brand placement is defined as the inclusion, for promotion purposes, of a product, brand or company name within a film or television program content. The objective of this strategy is to increase brand recognition, and ultimately lead to a positive impact on purchase preference or intent (d'Astous and Chartier 2000). This definition is equally valid for video game media platforms. Most research on brand placement has focused on two major themes, namely placement effectiveness with four identified criteria (prominence, clarity, integration within scenario, location on screen, Lehu 2005) (Karrh 1994; Babin and Carder 1996; Gupta and Lord 1998; d'Astous and Chartier 2000; Gupta and Balasubramanian 2000; Russell 2002;

Lehu 2005; Schneider and Cornwell 2005; Russell and Stern 2006) and its ethical acceptability (Gupta and Gould 1997; d'Astous and Séguin 1999; Nelson 2002).

Although most studies on brand placement found in the literature cover television and film, few studies focus specifically focus on video games, for example: Nelson (2002) and Schneider and Cornwell (2005).

In an article exploring brand placement effectiveness in car racing games, Nelson sought to determine why respondents remember certain brands, both in the short term (directly after a game), and in the medium term (five months later). Once brands were identified, she attempted to determine what might influence recall and if retention level was dependent on specific brand characteristics, such as recently advertised or local brands, atypical brands or those appropriate for the player. The results demonstrated that recent brands tended to be more deeply engraved in memory, in the short and medium term, and that local brands scored better than international brands. On the other hand, in no instance did brand familiarity seem to affect participant recall. Moreover, this study also sought to understand attitudes toward brand placement. Generally, players expressed positive attitudes toward brand placement in video games, specifying that they did not consider the practice misleading. Several players even asserted that brand placement increased the game's level of realism. On the other hand, brand placement acceptability was for the most part directly dependent on the type of game in which brands were viewed. Sports, racing and wrestling are, for example, some game types in which brand placement is considered acceptable. On the other hand, it would be inconceivable to see brands displayed in a fantasy world, where their placement would be unrealistic.

The article by Schneider and Cornwell (2005) also deals with brand recognition and recall in the video game content. More specifically their study examines the impact of banner prominence, the results show that banner prominence leads to greater recognition and better recall among participants. For those banners less apparent to players but with which they interacted directly, there was greater recognition and better recall. Csíkszentmihályi (1990) also attempted to verify the impact that Flow had on better recall, but none of his hypotheses proved to be significant, probably due to sampling problems. Given that the psychological immersion can vary on two dimensions, personal ability and challenge levels, volunteers participating in this study were generally experienced in playing video games. Consequently, the game was not challenging enough for players regarding their personal skills, and this prevented them from moving above the critical threshold needed to generate a psychological immersion.

FLOW

Psychological Concept

Flow may be defined as the motivation intrinsic to an optimal state of mind, which occurs when an individual's challenges and skills are in equilibrium (Csíkszentmihályi 1975). Flow can result in multiple effects, the first being when individuals experience an optimal psychological immersion; they become fully focused on the task at hand. Because they are fully focused on the activities at hand, they are in a state of Flow. This allows them not only to forget any life-related problems, but also to temporarily lose any awareness of "ego" which would normally interfere with their awareness (Csíkszentmihályi 1990; Csíkszentmihályi and Csíkszentmihályi 1992). This routine interference causes negative emotional energy, which in turn causes individuals to divert their attention away from the task at hand (Csíkszentmihályi 1990). Thus in a state of Flow, an individual's ability to concentrate is totally focused on the activity being carried out. Flow is a perception of space-time distortion, meaning that hours may seem like minutes, or a few seconds may drag on for hours (Csíkszentmihályi 1990).
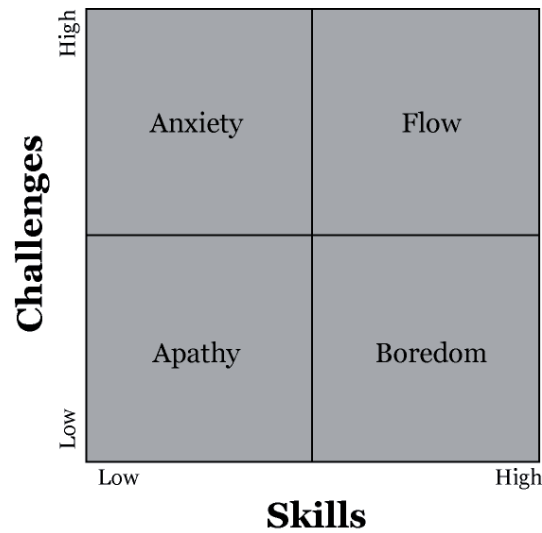
Figure 1: Four Channel Flow Model

Ultimately, whenever challenge and skills are in equilibrium, individuals no longer seem to be aware they are carrying out a task; rather they are in the game situation.

Models

Several models have been developed to explain this issue. The original model developed by Csíkszentmihályi (1975) consists of three distinct channels representing the various states of mind individuals might experience when completing a specific activity. Since it generally involves two variables, this theory can be attributed to a number of activities: skills applied by individuals to complete a specific task, and the level of challenge involved in the task at hand.

Massimini and Carli (1988) expanded upon the original theoretical model and identified four distinct psychological states that control human activity. The reason for this change stems from the hypothesis that Flow can only exist when challenges and skills are in equilibrium, but for Flow to occur this equilibrium must rise above a critical threshold. In short, individuals with low skill levels who are performing not very challenging tasks cannot experience an immersion state, simply because they have no interest in completing this task. Figure 1 shows the Massimini and Carli (1988) model, consisting of four separate channels.

These four channels are described as follows:

1. Flow: occurs when skill and challenge levels are high. This equilibrium between challenge and skill raises the state of mind to a level above a critical threshold.
2. Anxiety: occurs when the challenge level is high and the skills that a person has to complete the task are low.
3. Boredom: occurs when skill levels are high and the challenge level needed to complete the task is low.
4. Apathy: occurs when the skill and challenge levels are below a critical threshold.

A natural extension of the four-channel model comprises eight channels, meaning intermediate states can be added. This model in fact moderates skills and challenges through identifying
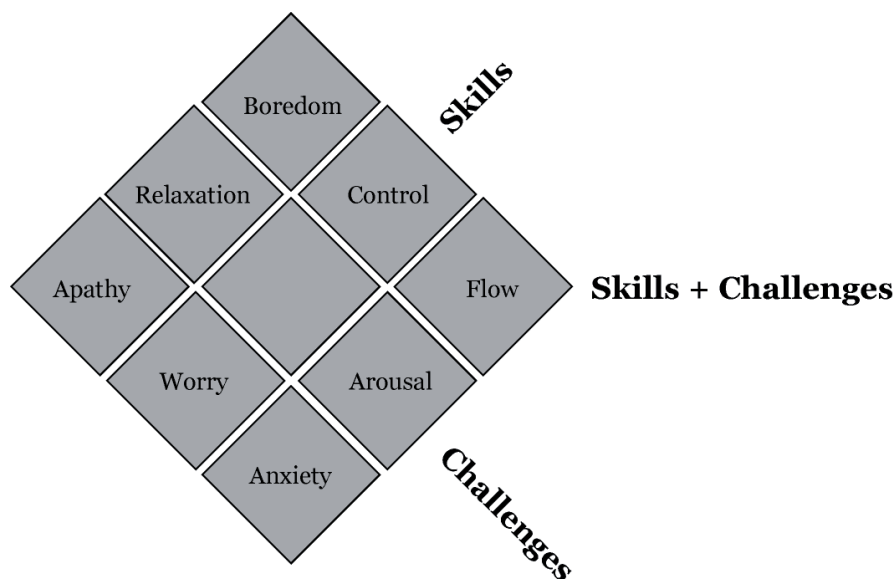
Figure 2: Eight Channel Flow Model

four new channels: excitement, control, relaxation and anxiety (Massimini and Carli 1988; Ellis et al. 1994; Novak and Hoffman 1997).

The four channel model (Massimini and Carli 1988) thus suggests four bipolar constructs based on two dimensions, and within which these dimensions consist of orthogonal vectors representing the skills and challenges found in the eight channel model (Novak and Hoffman 1997). Figure 2 shows this model.

Variables other than challenge and skill levels will impact on the state of mind participants feel during the experiments. Although, for part of the research, the objective is to determine whether participants experience various states of mind while playing video games, the central focus is to ascertain that these states of mind have an important impact on participants' recall ability. Thus, in the next section, we will define the two independent variables: memory and recognition.

MEMORY AND RECOGNITION

Research has indicated that brand placement is an important method of supplementing the promotional mix. It has in fact been demonstrated that applying this technique as a means of marketing communication may indeed have an effect on consumers' memories (Babin and Carder 1996; Gupta and Lord 1998; Nelson 2002; Russell 2002; Lehu 2005), and ultimately stimulate product purchase.

Recall

In various research projects, recall is the variable used to verify the effectiveness of brand placement. The reason for using this concept to verify the technique's effectiveness is explained perfectly by Balasubramanian (1994). The theoretical context, for evaluating the impact of brand placement on attentiveness and memory, is provided by a phenomenon linked to recall, as aptly described by (Lynch Jr and Srull 1982): "Information that is novel or unexpected

seems to capture one's attention, is processed more extensively, and subsequently is much more likely to be recalled than information that is redundant or expected to appear in a given context. For example, von Restorff (1933) found that almost any technique that served to increase the novelty of particular items or led them to be unexpected enhanced the subsequent recall of those items. This has become known in the memory literature as the *von Restorff effect*".

Recognition

Although the ultimate goal is increased sales, *a priori* the element to be stimulated is brand recognition. This variable is in fact located at the base of the traditional communication effect hierarchy (Rossiter and Percy 1983). A single exposure can increase the attention given to any particular brand. Brand recognition is defined as the brand's prominence in an individual's recall. Thus, by increasing the attention given to a particular brand within a given category, the attention given to competing brands is obstructed (Alba and Chattopadhyay 1986).

State of Mind

As mentioned previously, some authors stipulate that state of mind can affect individuals' behavior. Some researchers have focused on behavioral changes, such as the number of hours individuals spend at a computer using search engines (Novak et al. 2000; Novak et al. 2003) or other more psychological aspects having a much greater influence on recall than state of mind (Csíkszentmihályi 1975; Csíkszentmihályi 1990; Schneider and Cornwell 2005).

The next section deals with cognitive psychology. It will demonstrate how various states of mind, including Flow theory, can change an individual's behavior.

COGNITIVE PSYCHOLOGY

To understand the link between Flow theory as it relates to recall and recognition, cognitive psychology explains how individuals' cognitive state can affect their ability to retain information.

Flow

Through evolution, human beings have become conscious of their decision-making powers related to any activities they need to carry out. If humans were nothing more than a series of nervous reflexes, then whenever they felt some sort of need such as hunger, they would automatically behave in a specific way in order to satisfy that need. On the other hand, given their ability to make decisions, they could well go against this tendency and adopt some diametrically opposite behavior, such as fasting. Humans thus possess the ability to focus their attention in a specific direction, and for this reason they can reflect, experience desires and recall certain information, according to their own personal choices. Whenever individuals discover this power, a new agent known as the *ego* develops in parallel to the primary functional system in their consciousness, and that is attention. The ego constitutes an epiphenomenon within consciousness and it results from consciousness becoming aware of the existence of *ego* (Csíkszentmihályi and Csíkszentmihályi 1992).

Once the ego has become rooted within the consciousness, its main purpose is to ensure its own survival. The outcome is that the three functional systems, being attention, recognition and recall, move toward states of consciousness that are satisfactory to the *ego*, while at the

same time eliminating other stimuli that might threaten its existence. Flow is thus obtained when the functional systems within consciousness operate in harmony with each other and with the goals defined by the *ego*. Briefly the phenomenon of Flow becomes particularly apparent when individual skills and challenges involved in completing a given activity rise above a critical threshold.

Challenges and Skills

The universal condition needed by individuals to experience Flow is the need to complete a particular activity, and also to possess the skills necessary to accomplish it. These individuals therefore need equilibrium between their personal skills and the challenge they face.

In everyday life, it is very rare that the challenges faced by individuals are in perfect equilibrium with their skills. This phenomenon results from two diametrically opposed situations. First, of all individuals often have too many things to do and thus they experience some form of anxiety or concern when confronted with these various tasks. On the other hand, individuals may have absolutely nothing to do, and this causes them to feel bored. For this reason, the Flow state of mind occurs most often in structured activities where challenges and skills may be adjusted. In other words, the environment can be controlled (Csíkszentmihályi and Csíkszentmihályi 1992).

Consequences

Since Flow creates harmony within the *ego*, individuals may fully focus their attention on executing the activity at hand and they are not subject to various external stimuli. The activity being carried out thus requires that participants devote their full attention to it (Csíkszentmihályi and Csíkszentmihályi 1992). In doing so, they allow everyday concerns to fade into the background, thus cancelling any psychic entropy in their consciousness. Then, once their consciousness is fully active and organized, hours may pass as if only a few minutes, and seconds can stretch to an infinite period of time.

When the *ego* becomes aware of itself, not only does it become less effective, but it is normally unpleasant (Wicklund 1975; Carver and Scheier 1981; Csíkszentmihályi and Figurski 1982). On the other hand, when individuals are in a Flow situation, their ego is fully functional but not consciously aware of itself. This allows them to focus all their skills on the task at hand (Csíkszentmihályi and Csíkszentmihályi 1992). Whenever facing a challenge, individuals are forced to focus on certain very limited and specific stimuli; their attention remains more coherent and is focused on a single goal, which inevitably becomes more precise. In short, the individuals fully apply their mental skills and work in harmony in order to meet the challenge at hand.

Moderator variables

Brand recognition and recall cannot result solely from psychological states, and for this reason we believe that three moderator variables (Baron and Kenny 1986) should be used to define the phenomenon. We believe that individual attitudes toward brand placement (Gupta and Gould 1997; Gould et al. 2000) will have a moderator effect on them. In fact, when individuals have negative attitudes toward this marketing communication technique, their perception of the messages conveyed could indeed change.

We also believe that another variable should be considered. Indeed, given that consumer attitudes regarding stimuli will have an impact on brand recall (d'Astous and Chartier 2000),
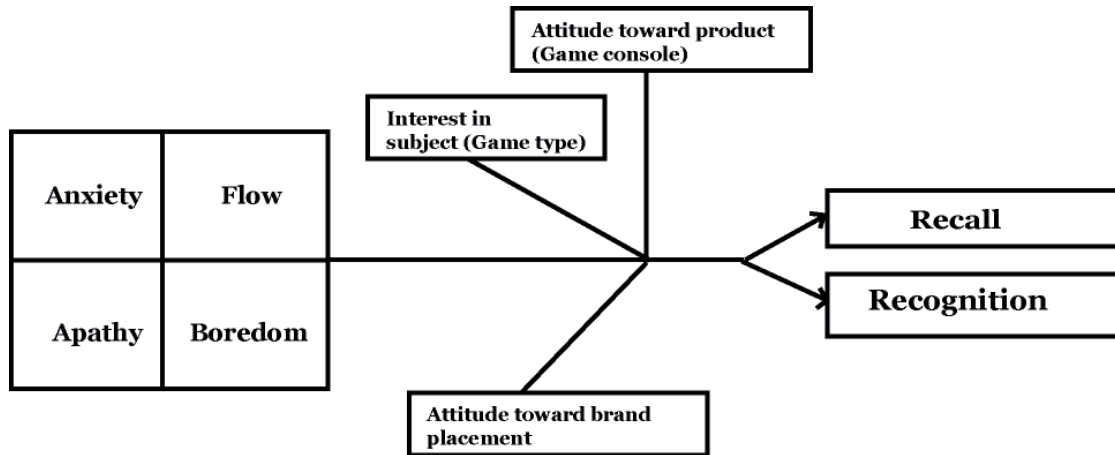
Figure 3: Conceptual Framework

we believe it important to use these attitudes toward the medium (video game) as a variable (Roehm and Sternthal 2001). Ultimately, a participant's interest in the type of game would have an impact on their recall. Indeed, anyone greatly interested in car racing would have to know more about brands linked to car racing than would those individuals not interested in cars, given that brand placement will affect brand prominence during consumer recall.

CONCEPTUAL FRAMEWORK AND RESEARCH HYPOTHESES

Conceptual Framework

The model shown in Figure 3 outlines the scope of our study on recall and recognition assisted by participants' various states of mind. The model establishes direct links between the individual's state of mind and memory, and also indirect links between the following variables: attitude toward brand placement, attitude toward product (video games) and the individual's general interest in game category. In this model, these latter variables were in fact considered to be moderators of the participants' states of mind. Other consumer characteristics (sex, age, nationality, situational factors and education level) were also deemed to have moderator effects on variables, but since we cannot claim an exhaustive study, they were not included within our conceptual framework. The next section provides a detailed description of the measurements used for each variable.

Based on this conceptual framework, we can now formulate our research hypotheses.

Research hypotheses

Given that literature on brand placement in video games is almost nonexistent, we have based our work on literature reviews covering brand placement in film and television. From among texts written on Flow, we considered Hoffman and Novak, including their 1997 studies on Flow covering search engine and e-commerce contexts. To fully understand our hypotheses, readers should note that our study focuses on a single experimental condition to which all participants will be submitted. Thus, in studying relationships between individuals and levels of perceived challenge, along with other indicator variables, we were able to apply cluster analysis, and

this helped us identify the psychological states that characterized our participants during the experiments. See the next section for details on the methodology described.

State of Mind

Given that Flow creates harmony in the ego, individuals can fully focus their attention on carrying out the activity at hand and they are not subjected to various external stimuli. The activity being carried out is thus totally important to the participants (Csíkszentmihályi and Csíkszentmihályi 1992).

We saw that individuals were likely to experience anxiety whenever the challenge faced by them was greater than their capabilities. The literature explains that in the Flow model anxiety is evidenced by high levels of concentration and excitement at the beginning of an activity, which is comparable to Flow, but that these levels decrease as the activity continues (Csíkszentmihályi 1975; Csíkszentmihályi 1990).

When ability levels surpass the tasks level of difficulty, participants usually experience boredom. Just as in anxiety, ability and challenge become unbalanced. On the other hand and in contrast to anxiety, participants do not experience excitement.

According to the postulate for the four-channel model, Flow can exist when challenge and skill exist in equilibrium. Actually, in order for Flow to occur, this equilibrium must rise above a critical threshold. In short, individuals, having low skills levels and performing unchallenging tasks, may not experience an immersion state, simply, because they have no interest in completing this task.

Thus, we can assume that:

H1a): *Individuals in a state of Flow will be able to recall a larger number of brand placements, followed* **in order** *by those in a state of boredom, anxiety and then apathy.*

H1b): *Individuals in a state of Flow will be able to recognize a larger number of brand placements, followed* **in order** *by those in a state of boredom, anxiety and then apathy.*

Attitude toward Product

As we read in the literature, we had to consider other variables in order to define the various facets that may influence our participants' recall and recognition. Thus, we decided to add attitude toward product to the model. In fact, given that consumers' attitudes related to stimuli have an impact on brand recall (d'Astous and Chartier 2000) we believe it important that attitude toward the media (video game) be made a variable (Roehm and Sternthal 2001). For this reason, we are able to state the following hypotheses:

H2a): *Individuals with poor attitudes toward the media will have lower recall rates than those having more favorable attitudes.*

H2b): *Individuals having poor attitudes toward the media will have lower recognition rates than those having more favorable attitudes.*

Attitude toward Brand Placement

We believe that attitude toward brand placement (Gupta and Gould 1997; Gould et al. 2000) will also have a moderator effect on participants. We can assume that participants' perception of messages may vary according to their attitudes toward this form of advertising. Thus, we assume that:

H3a): *Individuals having poor attitudes toward brand placement will have lower recall rates than those having more favorable attitudes.*

H3b): *Individuals having poor attitudes toward brand placement will have lower recognition rates than those having more favorable attitudes.*

Interest in subject

Since we know that brand placement influences brand prominence (Alba and Chattopadhyay 1986) in the minds of individuals, we can assume that car racing fans (game type used in study) will normally be more skilled at noticing brands within a racing game, since they have already had contact with these brands. Thus, we can assume the following hypotheses:

H4a): *Individuals having a strong interest in the subject will have higher recall rates than those having less interest.*

H4b): *Individuals having a strong interest in the subject will have higher recognition rates than those who having less interest.*

METHODOLOGY

This study was conducted in March 2007 at the Ubisoft Research Laboratory in Montreal, where our participants were invited to play **Formula One Championship Edition**, a racing game on a PS3 console. As much as possible, this laboratory was designed to accurately represent a typical player's environment. After completing seven laps on a given racetrack (requiring 13 to 15 minutes), the participants were asked to fill out a questionnaire. The information provided would allow us to learn more about emotions felt during the game and also measure the recall and recognition of observable brand placements.

Several factors led us to select this game. Firstly, it was a racing game and players thus had to follow a specific route and drive several times past ads displayed along the racetrack. Secondly, this game allowed us to minimize any prior exposure to the experiment, which could have influenced our results (Burke and Srull 1988). The survey was in fact conducted within a few weeks after the game's release on the market. In addition, the game was only available on a PS3 platform, which at this time was hard to find in stores, and as a result, none of the 107 respondents in our survey had previously used this racetrack. Moreover, playing a new game on a new console meant that their interest was greatly stimulated, making it easier to recruit subjects. As for the racetrack, we selected the Budapest circuit because it seemed most appropriate for the study: the track's layout allowed more effective brand placement. This track included several turns, so the cars had to slow down considerably and players were able to get a good look at the ads. The participants could not change the view plane from their cars, so they all had comparable exposure to the brand placements.

Participants started the race in last position (22nd), and we asked them to try to finish first. As a result of this manipulation, participants were involved in a goal-directed activity, an essential element for Flow (Novak and Hoffman 1997). In order to avoid tainted results, participants were kept unaware of study's goal. For this reason, the first page of the questionnaire mentioned the game's realism. The participants were led to believe this was the focus of the game.

The Sample

Our sample consisted of 107 adults living in the Montreal (Canada) area. The women in this sample were significantly underrepresented (11%). Our goal, however, was to sample representative users of this video game type, and not the general population. Although 38% of game players are women (ESA 2006), 76% of them play mostly "casual" games, such as Tetris, Sudoku and solitaire (Faucher 2006). Thus given that the game used in this experiment is not a "*casual*" type game, we do not think the study's outcome should lead to any bias with respect to the population studied. Moreover, there were no significant differences between the sexes with respect to brand placement recall or recognition.

We would like to discuss another important aspect of our sample, comprising 59 Ubisoft employees. These respondents worked in other departments and before entering the laboratory they were not aware of the research objective. Another important detail is that the game was not designed by Ubisoft. Thus we decided to allow these employees to participate in the study because we considered them to be somewhat representative of the population of video game users. It is also very important to mention that there were no significant differences between employees and other participants in terms of recall and brand placement recognition rates.

Questionnaire and Validity Scales

All participants had to answer a questionnaire containing several measurements evaluated by means of sixty questions (see Appendix 1 for the questionnaire's contents). Most questions used originated from subjects already tested and validated in comparable but different studies. Some items were however adapted to brand placement situations in video games. For each measurement, a factor analysis was conducted to verify that the statements chosen were properly constructed. For two of these measurements (challenge and the one comparing anxiety to boredom), the analyses clearly revealed two distinct underlying dimensions, and these scales were thus subdivided. Table 1 lists all relevant information pertaining to these measurements along with their internal validity (Cronbach's α).

RESULTS

Through applying hierarchical classification analysis, we will be able to determine whether participants could be classified according to their state of mind felt while taking part in the experiment. The selection of variables (scales) was made in accordance with cognitive psychology models (Csíkszentmihályi 1990; Novak and Hoffman 1997) and the analyses results described in the previous section. Table 2 describes these scales and their types. Note that for bipolar-type scales, a higher score for any given variable corresponds to the first name given to the variable.

Based on this hierarchical cluster analysis, we identified four relatively homogeneous segments. Table 3 lists the means for all variables, according to each segment (group). Based mostly on our results shown in bold type, we determined specific characteristics for each one of the groups.

This configuration is consistent with the 4-channel model described early:

- **Flow** (Group 4). This group comprises individuals having the highest skill levels. These same individuals also obtained high scores on variables used to measure challenge. These individuals thus obtained the highest scores for the Challenge + Skill variable. Note also that this group obtained the lowest mean for the Apathy/Flow variable.

Table 1: Information on Measurements Used

Measurement/ Scale	Origin	Related hypothesis	Items	Cronbach's α
Interest in car racing	NA	H4a)-b)	Q6 to Q9	0.88
Player's skill	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Q10 to Q19	0.94
Game's challenge	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Challenge (general): Q20 to Q25	0.90
			Challenge (Ability): Q26 and Q27	0.88
Apathy vs. Flow	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Q28 and Q29 (Q30 withdrawn)	0.88 (0.77 with Q30)
Control vs. Anxiety	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Q31 to Q33	0.66
Relaxation vs. Excitation	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Q35 and Q36 (Q34 withdrawn)	0.81 (0.62 with Q34)
Anxiety vs. Boredom	Adapted from Novak and Hoffman (1997)'s scale	H1a)-b)	Anxiety/boredom compared to skill (Q37)	NA
			Anxiety/boredom compared to challenge (Q38)	NA
Recall	Number of brands recalled (Schneider and Cornwell, 2005)	H1b) to H4b)	Q41 to Q43	NA
Assisted recognition	Number of brands in list recognized (Schneider and Cornwell, 2005)	H1a) to H4a)	Q44 and Q45	NA
Attitude toward brand placement	Adapted from Gould, Gupta et al. (2000)'s scale	H3a)-b)	Q46 to Q50	0.87
Attitude toward media	Adaptated from Roehm and Sternthal (2001)'s scale	H3a) - b)	Q51 to Q58	0.90

- **Anxiety** (Group 1). This group obtained the highest mean on the "anxiety/boredom" bipolar scales. Except for that and a much lower score on the skill scale, this group shared many similarities with the Flow group.
- **Boredom** (Group 2). This group stands out because of its low challenge and skill scores. Practically as high as those of the group in a Flow situation, with respect to their mastery of the game's controls. This suggests that their boredom with the game was not due to lack of interest, but rather a lack of competition from their (virtual) opponents.
- **Apathy** (Group 3). This group stands out because of its strong negative correlation (-0.453) between participants' mean challenge and skill levels. Moreover, this group happened to obtain the highest mean for the Apathy/Flow variable.

Validation of hypotheses 1a) and 1b)

The interval plot in Figure 4 shows plausible values for the mean of the "Recall" and "Assisted Recognition" response variables for each of the groups obtained. The trend observed here is the one suggested by research hypotheses 1a) and 1b): on average individuals in the Flow group recall and recognize a greater number of brands than others. Following them are the

Table 2: Scales Used for Classification

Name	Items	Type of Scale
Skill	Q10 to Q19	Likert
Challenge	Q20 to Q25	Likert
Challenge (Ability)	Q26 and Q27	Likert
Skill + Challenge	Q10 to Q27	Likert
Apathy/Flow	Q28 and Q29	Bipolar
Control/Anxiety	Q31 to Q33	Bipolar
Relaxation/Excitation	Q35 and Q36	Bipolar
Anxiety/Boredom (Skill)	Q37	Bipolar
Anxiety/ Boredom (Challenge)	Q38	Bipolar

Table 3: Means by Group Obtained during Classification*

Group	N	Skill	Challenge	Challenge (Ability)	Skill + Challenge	Apathy Flow	Control Anxiety	Relaxation Excitation	Anxiety Boredom (Skill)	Anxiety Boredom (Challenge)	Name
1	20	4.31	6.33	5.83	16.46	2.38	6.38	2.48	7.65	4.45	Anxiety
2	19	5.70	3.31	2.16	11.17	2.90	7.07	4.13	5.32	3.37	Boredom
3	34	4.85	5.27	4.54	14.66	5.29	4.79	5.29	5.91	3.59	Apathy
4	34	7.29	5.37	5.44	18.10	2.18	7.55	2.59	4.77	3.32	Flow

*We used the Ward method to combine groups during this hierarchical clustering and we used the Cosine distance to measure similarity between two individuals. To avoid placing more importance on scales with the largest variances, these scales were standardized first.

Anxiety and Boredom groups, and finally the Apathy group. Empirically, there was little difference between the groups with respect to the "Recall" variable, but the difference is a little clearer upon examining the recognition variable.

Fischer's mean equality test (one-way ANOVA) between the four groups did not reject the equality of means for the "Recall" variable (F = 0.84, p-value = 0.478), but rejected this equality for the "Recognition" variable (F = 3.12; p-value = 0.029). Note that the Kruskal-Wallis non-parametric test leads us to draw similar conclusions, with a p-value of 38.9% (Chi square = 3.02) for the "Recall" and 2.5% (Chi square = 9.38) for the "Recognition" variables.

- **Hypothesis 1a)**: the right panel in Figure 5 shows a trend somewhat coherent with postulate in hypothesis 1a). However, based on this sample the trend was insignificant and thus **we cannot accept research hypothesis 1a).**
- **Hypothesis 1b)**: based on our equal-mean rejection of the "Recognition" variable with the Fischer test, we can assert that a significant difference exists for at least one mean pair, but it is not sufficient to accept research hypothesis 1b). However, a test put forward by Bartholomew (1961) was especially constructed to handle the equal-mean hypothesis versus an ordered alternative hypothesis, such as hypothesis 1b) (Flow>Anxiety>Boredom>Apathy). The p-value for this test being 0.027 (F-ratio = 3.18), **we can thus accept the research hypothesis 1b)**. Note that there is an alternative non-parametric version of this test (see Jonckheere, 1954) and its p-value is comparable to that of Barthlomew's test (Z-stat = 1.83, p-value = 0.033).
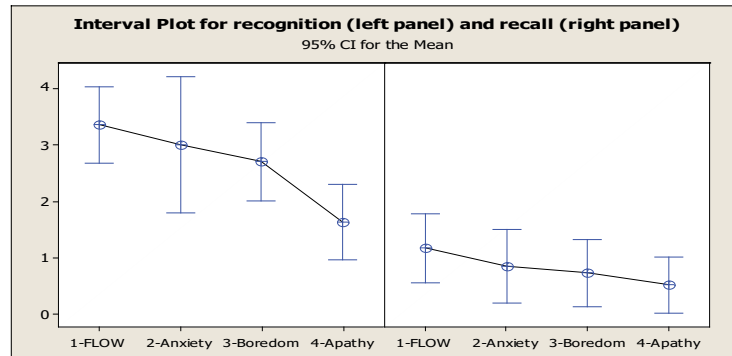
Figure 4: Mean's Distribution, According to Groups Obtained

Validation of other hypotheses

Hypotheses 2a) to 4b) attempt to explain the relationship between our response variables and the scales measuring attitudes toward the media (video games), attitudes toward brand placements, as well as attitude toward the subject (racing). The six hypotheses could thus be tested using a linear regression model for dependent variables, according to one of the scales.

- **Hypothesis 2a)**: the linear regression with our sample suggests an inverse though insignificant relationship between attitude toward video games and number of brands recalled (T = -0.27; p-value = 0.393), **thus we cannot accept research hypothesis 2a)**.

- **Hypothesis 2b)**: the linear regression with our sample suggests an inverse though insignificant relationship between attitude toward games and number of brands recognized (T = -1.53; p-value = 0.065), **thus we cannot accept research hypothesis 2b)**.

- **Hypothesis 3a)**: the linear regression with our sample suggests a positive though insignificant relationship between attitude toward brand placement and number of brands recalled (T = 0.82; p-value = 0.209), **thus we cannot accept research hypothesis 3a)**.

- **Hypothesis 3b)**: the linear regression with our sample suggests a positive though insignificant relationship between attitude toward brand placement and number of brands recognized (T = 1.49; p-value = 0.07), **thus we cannot accept research hypothesis 3b)**.

- **Hypothesis 4a)**: the linear regression with our sample suggests a positive and significant relationship between attitude toward the subject (racing) and number of brands recalled (T = 2.93; p-value = 0.002), **thus we can accept hypothesis research 4a)**.

- **Hypothesis 4b)**: the linear regression with our sample suggests a positive and significant relationship between the attitude toward subject and number of brands recognized (T = 3.41; p-value = 0.001), **thus we can accept research hypothesis 4b)**.

Since attitude toward the subject and state of mind are two significant variables used to explain the behaviour of the "Recognition" variable, it could be worthwhile verifying whether or not attitude toward subject is a moderator variable, should we wish to explain the effect of state of mind has on the dependent variable. Analysis shows that the two variables are

significant when they occur together in the model (State of mind: df = 3, F = 3.28; p-value = 2.4%. Attitude toward subject: df = 1; F = 6.31, p-value = 1.4%).

Further analysis of the interaction between these two variables reveals some interesting results: interest in subject has no significant impact on individuals in states of boredom, apathy and anxiety. However **for individuals in Flow, the greater their interest in the subject of the study, the greater their ability to recognize a large number of brands** (T = 3.37; p-value = 0.001).

DISCUSSION AND CONCLUSION

Summary of study's principal results

Cognitive Psychology Theory

First, based on our experiments we were able to identify four homogeneous groups of individuals experiencing various states of mind. Thus, for our sample we were able to uphold the Flow model developed by psychologist Mihály Csíkszentmihályi (1975). We identified four distinct groups: Flow, anxiety, apathy and boredom, and these correspond to the original model extension developed by Massimini and Carli (1988). Given the meaningful results of our typological analysis, from now on the various states of mind will have to be considered during studies on recall. We demonstrated that the effect caused by state of mind, though not a principal effect, may in several models have a moderator effect on a number of variables that could influence recall. Previous studies on brand placement involving Flow theory, such as that of Schneider and Cornwell (2005), considered Flow to be a linear variable that evolves over a continuum (deep state of psychological immersion versus very light state). In our approach we established a methodology that would allow greater levels of accuracy to be obtained, thus demonstrating that it was possible to use an extension of the original model (Csíkszentmihályi 1975; Csíkszentmihályi 1990; Csíkszentmihályi and Csíkszentmihályi 1992) replaced by the four channel version used by Massimini and Carli (1988), and thus classify all participants according to the state of mind they experienced during testing.

Contrary to initial expectations, the results showed no significant relationship between recall (recall variable) and the various states of mind. For the recognition variable however we did confirm our hypothesis. We demonstrated that participants in a state of Flow were, in mean, able to recognize a larger number of brands than those experiencing anxiety, followed by those experiencing boredom, and finally those feeling apathy. These results align with the theory demonstrating that individuals' the cognitive capacities are limited in relation to maximum amount of information they can process (Atkinson and Shiffrin 1968; Shiffrin 1976; Hasher and Zacks 1979; Neisser et al. 1981; Nusbaum and Schwab 1986), and that in Flow state they are able to focus all their attention on the activity at hand (Csíkszentmihályi 1990; Csíkszentmihályi and Csíkszentmihályi 1992), and this in turn has an impact on their recall ability.

Moderator Variables

We stated three hypotheses on variables that have a moderating effect on state of mind, relative to the participants' recall ability. Attitude toward the media and also attitude toward brand placement did not prove to have significant moderating effects (Baron and Kenny 1986). On the other hand, attitude toward the subject did prove to be a moderator. For participants in a state of Flow, the greater their interest was in the subject, the greater their ability to recognize a large number of brands. This phenomenon can be explained by the theory

on brand prominence in participants' minds (Chattopadhyay and Alba 1988). Given that participants are fully focused on the activity at hand, if they know the subject well, then the brands encountered within the video game will already be well entrenched in their recall. They will thus be stimulated by thy ads and should consequently be able to recognize many of them. Other participants in a state of Flow who have little interest in the subject will focus on the games playability and make an effort to attain the game's objectives, without really paying much attention to non-essential elements (ads). Their first priority is driving the car properly and finishing the race.

Scope of research

It might have been meaningful to increase our sample size ($N = 107$), thus enabling further analyses of various research hypotheses, and potentially allowing us to confirm more of them. On the other hand, differences in available time and equipment prevented us from obtaining a greater sample size. In fact, carrying out this research required the setting up of a laboratory and the accompanying components, some of which were acquired with great difficulty. The university was not able to provide us with the five high-definition TV sets, five PS3 consoles, the video games and a suitable location needed to carry out the study. Given that our budget was limited, we had to rely on an external laboratory to carry out our research. This resulted in the opportunity to collaborate with Ubisoft's research lab in Montreal. This company was especially helpful due to their collaboration in making their equipment available. Nonetheless, we had to abide by a schedule imposed by the company, whose research lab was also conducting various studies needing the same equipment. For this reason, we extended our data collection over a three-week period. With more time, however, we could have carried out a study much larger in scale.

Even though we were not able to confirm our hypotheses on the recall variable, it is plausible that by doing our research again on a larger sample size, we might see significant differences in all the various states of mind stemming from the Flow theory. Indeed, an empirical analysis of the results demonstrates identical tendencies for both the recall and recognition variables, although statistically only the latter revealed significant differences.

It would also be challenging to use a game other than *Formula One Championship Edition PS3*. In F1 car racing, European and Asian brands are often displayed. Given that brand placement affects brand prominence in a player's mind, we would have probably obtained higher scores for the recall variable if more American brands had been displayed. Obtaining higher scores could probably have led to greater and therefore more statistically significant differences.

Future research

The video game industry is still an unknown sector in the academic world, and as such there are many avenues of study available to marketing researchers.

First, it would be appropriate to repeat this study with a substantially larger sample size. The results shown in this article are promising and it would be interesting to validate all hypotheses made on recall or recognition.

Moreover, it would also worthwhile carrying out a similar study on other media. Several studies have in fact been done on brand placement in film and television (Karrh 1994; Babin and Carder 1996; Gupta and Gould 1997; Gupta and Lord 1998; DeLorme and Reid 1999; Gould et al. 2000; Gupta and Balasubramanian 2000; Russell 2002; Moser et al. 2004; Lehu 2005; Russell and Stern 2006). Since none of these studies considered the viewer's state of

mind as a pertinent variable, it would thus be appropriate to validate the Flow theory's impact with other media, and then determine whether state of mind would have a direct impact on viewers' recall as well as recognition skills, and these could possibly have moderating effects on other variables, such as brand placement acceptability and attitude toward brand placement.

Finally, video games still represent an unknown media and it would be worthwhile carrying out further research on this communication method as well as its specific characteristics. In fact, the concept of immersion control could pave the way for a great deal of additional research.

On the other hand, we carried out our study using a car racing game, and this required participants to spend a lot of time in front of the same ads. Given that most video games provide players with much greater freedom of action, it would be appropriate to repeat this type of study in a more open environment, without players being limited to a specific track. There is a vast universe of virtual environments available and a great deal more work would be needed to capture this innovative media's potency.

Conclusion

The objective of this study was to verify whether various states of mind could impact on an individual's memory skills, especially within the context of a virtual environment. We were able to set up the methodology needed to validate this impact and found that individuals in a state of Flow were indeed able to recognize a greater number of brands; they were respectively followed by individual in the anxious, boredom and apathy groups. Additional study would be needed to validate this methodology in relation to other contexts. The video gaming world is still virtually unexplored and it would be worthwhile pursuing further research on this subject so as to obtain a better understanding of this media's specific potency and characteristics. Several analysts have predicted that over time the video game industry will continue to grow and will one day surpass the film industry in terms of revenue. It would thus be extremely pertinent to pursue additional research in this activity sector, thus providing us with a better understanding of the potential of this emerging media.

In an era when consumers are being stimulated from far and wide, marketing agencies must make continuing efforts to ensure their messages will stand out above the masses. They need to demonstrate extensive creativity in developing their communication plans. Therefore, to distinguish themselves from the crowd, the creative personnel in advertising agencies need to concentrate on message creativity, while others on the creativity generated by broadcast media. This new situation will lead to reductions in the use of certain traditional media, and advertisers will instead opt for hybrid communication forms (Balasubramanian 1994). These so-called hybrid communications might combine non-traditional methods – brand placement – with other more traditional techniques, such as television advertising. The use of strategies such as these will provide advertising, as well as media placement agencies, with much more flexibility in designing their campaigns. As such, it would be possible to create integrated communication strategies in which the various media support each other. With methods such as these, some form of communication between the customer and the brand could be developed, resulting in much less aggressive and intrusive methods than more traditional communication techniques (Gupta and Lord 1998).

APPENDIX 1: The questionnaire

1. How many hours do you spend on a weekly basis playing video games?

   After playing **"Formula One Championship Edition"** do you think that:

   (Questions 2–4 were evaluated using a Likert scale going from 1 = "Totally disagree" to 9 =' 'Totally agree")

2. This game is very realistic.
3. This game has really good graphics.
4. You feel that you are driving a real car.
5. Did you ever play **"Formula One Championship Edition"** before (if you answer "yes", please specify how many hours).

   (Questions 6–9 were evaluated using a Likert scale going from 1 = "Not at all" to 9 = "Yes, a lot")

6. Do you have any interest in car racing?
7. Do you have any interest in F1 racing?
8. Do you ever watch television show that has automobile or racing content?
9. Do you ever read magazines that have automobile or racing content?

   (Questions 10–27 were evaluated using a Likert scale going from 1 = "Totally disagree" to 9 = "Totally agree")

10. I am very skilled at playing racing games.
11. I am very skilled at playing **"Formula One Championship Edition"**.
12. I consider myself knowledgeable about racing videogames.
13. I find racing games easy to use.
14. I find **"Formula One Championship Edition"** easy to use.
15. I am skilled with driving simulation control.
16. I am skilled with **"Formula One Championship Edition"** control.
17. It's hard for me to perform well in racing video game.
18. It was hard for me to perform well in **"Formula One Championship Edition"**.
19. I know less about using racing games than most users.
20. Playing racing video games challenges me.
21. Playing **"Formula One Championship Edition"** gave me a good challenge.
22. Playing racing video games challenges me to perform to the best of my ability.
23. Playing **"Formula One Championship Edition"** challenges me to perform to the best of my abilities.
24. In general, playing racing games provides a good test of my skills.
25. Playing **"Formula One Championship Edition"** provides a good test of my skills.
26. I find that playing racing video games stretches my capabilities to the limits.
27. I find that playing **"Formula One Championship Edition"** stretches my capabilities to the limits.

During my gameplay, I fell that I was:

(Questions 28–38 were evaluated using a bipolar scale going from 1 = "Left hand side" to 9 = "Right hand side")

28. Totally absorbed VS Apathetic.
29. Active VS Passive.
30. **"Formula One Championship Edition"** challenges my capabilities to their limits VS **"Formula One Championship Edition"** didn't challenge my capabilities to their limits.
31. Worried VS In control.
32. Clearly know the right thing to do VS Feel confused about what to do.
33. Frustrated VS Not frustrated.
34. Calm VS Excited.
35. Stimulated VS Relaxed.
36. Alert VS Soothed.
37. I've lost interest in playing racing games lately because I'm too skilled VS I'd enjoy playing racing games more if I were more skilled at it.
38. When I encounter a problem playing games, I get stuck because I don't know what to do next VS Video game isn't as challenging to me as it used to be.
39. Could you recall seeing any banners advertisements brand or product promotions **along the track, on your car or on the competing cars** in **"Formula One Championship Edition"**? If your answer is no, go directly to question 44 in the next section of this questionnaire.
40. If yes, how many brands or products do you remember?
41. Name the brands/products that you remember seeing.
42. For each brand/product mentioned, what caused you to specifically remember these brands/products?
43. To what extent are you sure of your previous answers? *(Likert scale from 1 = "Very uncertain" to 9 = "Very certain")*
44. Circle the letter of the logos that you remember seeing. If you recall none of the logos, go ahead to question 46. *(the respondents then had to select among 13 logos, 8 of them were indeed along the track and 5 were not)*
45. To what extent are you sure of your previous answers? *(Likert scale from 1 = "Very unsure" to 9 = "Totally sure")*

(Questions 46–50 were evaluated using a Likert scale going from 1 = "Totally disagree" to 9 = "Totally agree")

46. I prefer to see real brand name in video games rather than fictional brands.
47. Video games should use fictional brands rather than real brand names.
48. Having real brand names in video games, make the game more realistic.
49. I don't mind if I see real brand names in a video game.
50. Brand placement in video games should be banned.

(Questions 51–58 were evaluated using a bipolar scale going from 1 = "Left hand side" to 9 = "Right hand side")

51. Like VS dislike.
52. Useful VS not useful.
53. Good VS bad.
54. Practical VS impractical.
55. Worth owning VS not worth owning.
56. Impressive VS not impressive.
57. Valuable VS not valuable.
58. Advanced VS not advanced.
59. How old are you?
60. You are a man or a woman?
61. Which country are you from?
62. What is the highest degree you obtained?

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