Chapter 7
Branding Effects on Commercial Avoidance: An Eye Movement Analysis

7.1 Introduction

In the advertising business, there are various recommendations and guidelines about the optimal level of branding in television commercials. These branding guidelines consist of the timing, frequency, duration and modality (audio or video) of the brand element within a single TV commercial. For instance, Olgivy & Mather, among others, prescribe that their commercials present the brand name in the first 10 seconds to be effective (Ogilvy 1991), while Proctor and Gamble indicate that their commercials should wrap up with a tag line mentioning the brand (Sacharin 2001). More generally, advertisers are recommended to create commercials in which the brand name is shown at least two seconds on screen and the brand name is repeated during exposure (Rossiter and Percy 1997). Commercials for familiar brands are recommended to show the brand name both early and late in the commercial (Rossiter and Percy 1997). In addition, theoretical frameworks and empirical research in advertising research suggest that consumers’ identification of the brand in advertising is a crucial operation to meet the communication objectives of advertising (MaClnis and Jaworski 1989), that is, to create or increase category need, brand awareness, positive brand attitude, brand purchase intention and/or purchase facilitation (Rossiter and Percy 1997). However, these frameworks and empirical studies assume that consumers are exposed to entire TV commercials and do not explain how branding elements that change during commercial duration influence consumers’ attention during the course of TV commercials.

As Chapter 2 describes, in the past decades, various technological innovations have increased consumers’ control over their exposure to TV commercials and allow them to zap, zip and skip TV commercials at every desired point in time. However, academic research on viewers’ attention to

51 We would like to thank Aletta Attema and Yen Van Botter-La for their help in data collection for this research.
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branding elements during TV commercials and its influence on the decision to stop watching during commercials has not yet been conducted. Previous research showed that consumers’ attention levels to television do not remain constant and fluctuate as a function of a television message's structure and content (Lang 1995a; Reeves et al. 1985; Reeves and Thorson 1986; Reeves et al. 1985). In addition, previous empirical work on print advertising shows that the brand draws a disproportionately large amount of attention (Wedel and Pieters 2000; Pieters and Wedel 2003) and plays a key role in further processing the ad (Curlo and Chamblee 1998). Therefore the current research investigates how consumers’ attention to familiar brands promoted in TV advertising influence their decision to continue or discontinue viewing the commercial during its course, using eye tracking and self-controlled time exposure data.

The contribution of this study is in assessing moment-to-moment visual attention to the brand element in a TV commercial and its effects on consumers’ decisions to discontinue viewing the commercial. As Section 4.5 describes, past research on attention to TV commercials have made use of exposure-time, observations whether consumers really look at the screen or more indirect measures, such as electrical demand, water pressure and physiological responses. However, these measures only give insights into the overall amount of consumers’ attention to TV commercials and therefore cannot be used to gauge the moment-to-moment focus of attention and the effectiveness of moment-to-moment ad contents. As argued in Section 4.5.6, eye tracking is a reliable and valid measure of the amount and focus of consumers’ attention to different parts of the commercial over the time of its duration (Palmer 1999). In advertising research, the usefulness of eye tracking as a method to diagnose the consumers’ visual attention to (specific elements of) print advertisements is affirmed by several studies (e.g., Janiszewski and Warlop 1993; Krugman et al. 1994; Lohse 1997; Pieters et al. 1999; Pieters et al. 2002; Rosbergen et al. 1997; Wedel and Pieters 2000; see also Section 4.5.6 of Chapter 4). Not only for static stimuli, but also in dynamic situations, such as driving (Cohen and Studach 1977; Dishart and Land 1998; Land 1992; Land and Furneaux 1997; Land and Horwood 1995; Land and Lee 1994; Liu 1998), basketball foul shooting (Vickers 1995, 1996), golf putting (Vickers 1992), table tennis (Land and Furneaux 1997), baseball (Bahill and LaRitz 1984;
Shank and Haywood 1987), gymnastics (Vickers 1988), walking in uneven terrain (Patla and Vickers 1997), mental rotation (Carpenter and Just 1978; Just and Carpenter 1985), and interacting with computer screens (Deffner 1995; Goldberg and Schryver 1995; Goolkasian and Bunt 1980; Jacob 1991; Stampe and Reingold 1995), research has showed that eye movement data can be very well used as direct measures of people’s visual attention. This is the first research in marketing that uses eye tracking methodology to directly measure the moment-to-moment focus and amount of consumers’ attention to the brand element, a key element in TV advertising. It provides a methodology to assess consumers’ identification of the brand element in foveal vision, but also in parafoveal vision taking into account the continuously changes of the brand in presence, location, size, frequency, duration and timing during commercial duration. Then our study reveals how moment-to-moment consumer’s visual identification of the brand in foveal and parafoveal vision affects his/her decision to continue or discontinue watching them. Therefore this research provides insights into the relationship between a direct moment-to-moment measure (eye movements) and a voluntary behavioral measure (exposure time) of consumers’ attention (see Table 4.1), it extends studies that use overall measures of ad contents and consumers’ overall amount attention to investigate viewing behavior during TV commercials (see Table 1.1) and in addition, it confirms previous studies that people make behavioral decisions based on information in the parafoveal vision (Gould 1967; Williams 1967).

The next sections describe the theory about the role of the brand in TV commercials, hypotheses, the usefulness of eye movements as a direct measure of visual attention to TV advertising, the data collection and method of data analysis. Then, the empirical results are presented and discussed. The chapter ends with recommendations for advertising and suggestions for future research.

### 7.2 Branding in television advertising

Because of a lifetime of experience, today’s consumers know what to expect from advertisements (Friestad and Wright 1994) and see ads as messages that aim at encouraging a particular behavior, usually the purchase of a brand (Robertson and Rossiter 1974; Wright 1986). Russo
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and Johnson (1980) also point out, that much of consumers’ experience with for example advertising, point of purchase displays, and usage experience is brand based and the lifetime of consumer’s experience with advertising may lead to a consumer’s memory structure to be more organized around brands. The brand is the key identifier in advertisements to help consumers to understand the ad (Curlo and Chamblee 1998; Edell and Burke 1986; MacInnis and Jaworski 1989). Once consumers know which brand is advertised, they can call upon their own personal experiences with the brand and memories of past advertising by the brand to establish a context for the current advertising (Edell and Burke 1986).

A brand can be defined as “a name, term, sign, symbol, or design, or combination of them which is intended to identify the goods and services of one seller or group of sellers and to differentiate them from those of competitors” (Kotler 2003, p. 418). Because the brand name is seen as the main identifier of the brand (e.g., Bettman 1979; Bettman and Jacoby 1976; Jacoby, Szybillo, and Busato-Schach 1977; Kotler 2003) emphasis is put on the brand name in the current research. Several academic studies have investigated the influence of the brand name presence on commercial effectiveness, such as brand awareness, ad attitude, brand attitude, persuasion, comprehension and memory. Table 7.1 gives an overview of some of these studies. The table indicates, for each study, which dynamic branding decisions with regard to the brand name are investigated, how the dynamic branding decision(s) is (are) operationalized, what the dependent ad effectiveness variable(s) are and which results are found.

Table 7.1: Overview of studies that have investigated the relationship between brand name features and effectiveness of TV advertising

<table>
<thead>
<tr>
<th>Study</th>
<th>Dynamic branding features</th>
<th>Operationalization</th>
<th>Ad effectiveness</th>
<th>Significant outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alwitt (1985)</td>
<td>- Brand name mention</td>
<td>- Dummy variable that denotes whether the brand name is mentioned in audio in a 2-second fragment.</td>
<td>- Brain wave activity</td>
<td>- Influence of ad content on brain wave activity may be primarily due to brand message events (brand name mention, specific brand message, brand in use and product shot).</td>
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<tr>
<td>Alwitt, Benet, and Pitts (1993)</td>
<td>- First brand name identification</td>
<td>- Dummy variable that denotes whether the brand name is present in the first six seconds.</td>
<td>- Moment-to-moment ad likeability</td>
<td>- An introduction of a brand in the first part of the ad results in a more positive pattern of mtm likeability evaluations and a more rapid rate of increase in positive evaluations to a steady-state level.</td>
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attention to the brand and its influence on consumers’ self-controlled exposure time to commercials.

As discussed in Section 3.3, several researchers have argued that commercials have many of the characteristics of narration (e.g., Deighton 1985; Stern 1989a, 1989b, 1989c; Wells 1989) and that no TV commercial can be considered non-narrated because the electronic eye of the camera is an omnipresent narrative force shaping the stages events for the audience (Stern 1994). Since consumers know that commercials include stories that communicate a brand and how it is relevant to solving expressive and/or utilitarian needs (Rossiter and Percy 1997), TV commercials are very likely to be interpreted through the narrative mode of thought (Bruner 1986, 1990). Viewers try to understand the meaning of a narrative by creating an internal mental model of what will happen in the commercial (see also Chapter 3). Because the brand plays the key role in TV commercials, the narrative in TV commercials is naturally constructed around the brand. During exposure to a TV commercial, consumers may therefore also construct their mental model of expectations about the commercial story around the brand and update this mental model by information provided in the commercial. Because of its importance within the commercial story, consumers’ identification of the brand in the commercial plays a key role in the consumers’ internal model of the commercial story structure and is therefore expected to influence the consumers’ decision to continue or discontinue to watch the commercial.

Within the framework of consumers’ organization of the commercial story structure around the brand, hypotheses are developed in the next section.

7.3 Hypotheses

Studies shown in Table 7.1 have investigated the influence of several important aspects of branding features of TV commercials on overall ad effectiveness. These are: 1) the first brand name identification (in the video or auditory track), 2) the time to the first name identification, 3) the frequency of brand name appearances, 4) the total duration of brand name appearances and 5) whether there is a visual or auditory brand sign-off at
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</thead>
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<td>Alwitt, Benet, and Pitts (1993)</td>
<td>- Brand name frequency in video</td>
<td>- Commercials are divided in 3 groups: 1) whether number of visual brand name presences &gt; 3 in first 10 seconds, 2) frequency of brand name in audio cumulates to 3 or more times in the last 10 seconds and 3) all other commercials.</td>
<td>- Moment-to-moment ad likeability</td>
<td>- After three instances, more presentations of the brand name in a commercial do not contribute to a positive response with regard to that commercial.</td>
</tr>
<tr>
<td>Burke Marketing Research (1978)</td>
<td>- First brand identification - Time to first brand name identification</td>
<td>- Dummy that denotes whether brand name is identified in first 3 seconds.</td>
<td>- Recall</td>
<td>- Brand identification in first 3 seconds increases correct brand name recall.</td>
</tr>
<tr>
<td>Burke Marketing Research (1978)</td>
<td>- Brand name frequency in video</td>
<td>- Number of brand name appearances on screen.</td>
<td>- Recall</td>
<td>- No significant findings.</td>
</tr>
<tr>
<td>Burke Marketing Research (1978)</td>
<td>- Brand name frequency in audio</td>
<td>- Number of brand name mentions in audio.</td>
<td>- Recall</td>
<td>- The more frequent the brand name is mentioned in audio, the higher correct brand name recall is.</td>
</tr>
<tr>
<td>Edell and Anderson (1990)</td>
<td>- First brand name identification - Time to first brand name identification</td>
<td>- Early identification: Dummy that denotes whether the brand is identified in the first 5 seconds. - Middle identification: Dummy that denotes whether the brand is identified between the first 5 and 10 seconds. - Late identification: Dummy that denotes whether the brand is identified in the last 5 seconds.</td>
<td>- Brand or ad processing - Feelings - Recall - Ad attitude - Brand attitude</td>
<td>- Early brand name identification leads to a ad central processing strategy. - Middle brand name identification increases the number of support arguments, correct ad contents recall and more positive ad attitude based on ad evaluative thoughts. - Late brand name identification decreases correct ad contents recall, and less positive ad attitude based on ad evaluative thoughts, less upbeat and warm feelings and no ad processing (viewers wait to find out what the ad is for).</td>
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<tr>
<td>Fazio, Herr, and Powell (1992)</td>
<td>- First brand identification - Time to first brand identification</td>
<td>- Dummy that denotes whether first brand name identification is until the closing end of the commercial.</td>
<td>- Recall</td>
<td>- Higher correct brand name recall and stronger category - brand association for commercials in which the first brand identification is delayed to the end of the commercial that advertises a novel brand.</td>
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<tr>
<td>McCollum/Spielman and Co. (1976)</td>
<td>- Brand sign-off</td>
<td>- Dummy that denotes whether the brand name is visually presented in the last 5 seconds.</td>
<td>- Recalled</td>
<td>- Brand sign-off in a commercial increases brand awareness.</td>
</tr>
<tr>
<td>Stewart and Furse (1986)</td>
<td>- First brand identification - Time to first brand identification</td>
<td>- Time in seconds before brand name is identified.</td>
<td>- Recall</td>
<td>- The sooner the brand name in a commercial is identified, the more positive the commercial is related to correct brand name recall, comprehension and persuasion.</td>
</tr>
<tr>
<td>Stewart and Furse (1986)</td>
<td>- Visual brand sign-off</td>
<td>- Dummy that denotes whether the brand name is visible as the commercial ends.</td>
<td>- Recall</td>
<td>- Presenting the brand name at the end of the commercial increases the number of correct brand name recalls.</td>
</tr>
</tbody>
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<tr>
<td>Stewart and Furse (1986)</td>
<td>- Brand name frequency in video</td>
<td>- Times brand name is shown on screen.</td>
<td>- Recall</td>
<td>Increasing the number of brand name presences on screen increases the number of correct brand name recalls.</td>
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<td></td>
<td></td>
<td></td>
<td>- Comprehension</td>
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<td></td>
<td>- Persuasion</td>
<td></td>
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<tr>
<td>Stewart and Furse (1986)</td>
<td>- Brand name frequency in audio</td>
<td>- Times that the brand name is mentioned.</td>
<td>- Recall</td>
<td>The more times a brand name is mentioned in the audio track, the higher the number of correct brand name recall.</td>
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<td></td>
<td></td>
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<td>- Comprehension</td>
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<td>- Persuasion</td>
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</tr>
<tr>
<td>Stewart and Furse (1986)</td>
<td>- Brand name duration</td>
<td>- Time in seconds how long brand is on screen during the entire commercial.</td>
<td>- Recall</td>
<td>The longer brand name is shown, the higher the number of correct brand name recall.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Comprehension</td>
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<td>- Persuasion</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Recall</td>
<td>The sooner the brand name in a commercial is identified, the more positive the commercial is related to correct brand name recall.</td>
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<td></td>
<td>- Persuasion</td>
<td></td>
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<tr>
<td>Stanton and Burke (1998)</td>
<td>- First brand name identification</td>
<td>- Dummy that denotes whether the brand is mentioned in the first 5 seconds.</td>
<td>- Recall</td>
<td>Late brand name identification decreases correct brand name recall.</td>
</tr>
<tr>
<td></td>
<td>- Time to first brand name identification</td>
<td></td>
<td>- Persuasion</td>
<td>Early brand name mentioning increases (decreases) ad persuasion in 30-second (15-second) ads.</td>
</tr>
<tr>
<td>Stanton and Burke (1998)</td>
<td>- Brand name frequency in audio</td>
<td>- Dummy that denotes whether the number of brand mentions exceeds 3 times.</td>
<td>- Recall</td>
<td>The more times a brand name is mentioned, the higher ad persuasion and the number of correct brand name recall.</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>- Persuasion</td>
<td></td>
</tr>
<tr>
<td>Stout and Burda (1989)</td>
<td>- Brand duration</td>
<td>- Time in seconds that the brand name is visually present.</td>
<td>- Recall</td>
<td>A commercial in which the advertised brand appears on the TV screen for an extended period of time, increases correct brand name ad contents recall and recognition for commercials seen in normal speed, but also for commercials seen in “zipped” (fast-forward) speed, in particularly when the commercial has been seen in normal speed before.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Recognition</td>
<td></td>
</tr>
<tr>
<td>VandenAbeele and Madachian (1994a)</td>
<td>- Visual brand name presence</td>
<td>- Dummy that denotes whether brand name is present in scene of 3 seconds.</td>
<td>- Moment-to-moment warmth response</td>
<td>A scene of the commercial in which the brand is visible leads to an increase in the warmth response at the same moment.</td>
</tr>
</tbody>
</table>

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Except for the study of Stout and Burda (1989), consumers in the studies shown in Table 7.1 were exposed to the entire commercial, which does not conform to the real world, in which consumers have control over their commercial exposure. Only Stout and Burda (1989) allowed consumers to zip through commercials. Except for the studies of Alwitt (1985), Alwitt et al. (1993), and VandenAbeele and Maclachlan (1994a), consumers gave overall retrospective assessments of the commercials, after having seen the entire ad. These studies mainly find a significant influence of brand name appearance(s) on correct brand name recall: 1) a higher frequency of brand name and/or appearances during commercial exposure increases correct brand recall, because of learning effects and 2) brand name appearance at the beginning or the end of the commercial may increase brand recall, because of primacy and recency effects, although not every study supports this finding (e.g., Stanton and Burke 1998). Relying on in-process evaluations during commercial exposure, Alwitt (1985) found that brain wave activity increases during when the brand is mentioned in the audio track, while Alwitt et al. (1993) and VandenAbeele and Maclachlan (1994a) showed that ad likeability, respectively ad warmth increased during the scene that the brand is visible, but that soon after the brand visibility, the moment-to-moment ad liking responses reached a steady-state level. Also after three instances of brand presence on the screen, more brand presentations did not contribute to a more positive response to a commercial (Alwitt et al. 1993). These studies show brand name appearance influences consumers’ moment-to-moment responses during commercial duration. However, despite of these important findings, no study to date increases our understanding of how much attention consumers pay to the brand name and how this influences their decision to stop viewing during commercial exposure. Based on the motivation given in Section 4.3 we argue to rely on in-process measurements of consumers’
the end of the commercial. However, in comparison to these studies, we have a direct measure of consumers’ attention to the brand in the commercial and allow consumers to control their viewing behavior at every point in its duration. Because of the dynamical nature of the brand name element within TV commercials, the use of consumers’ eye movements and giving consumers the ability to stop viewing, the current study focuses on different branding aspects, but that are still very well comparable to the brand features mentioned above. These are: 1) the moments in which a consumer identifies the brand name for the first time (video or audio track), 2) the time in seconds when a consumer identifies the brand name for the first time, 3) the moment that a consumer identifies the brand name (in the video or auditory track), after s/he has already identified it for the first time and 4) the number of times that the consumer has paid attention to the brand name. We are interested why consumers continue or discontinue to watch a commercial because of their attention to familiar brands. The brand name itself should not be the focus of consumers’ attention because of its novelty or unfamiliarity, but more because of its presence within the commercial.

7.3.1 First brand name identification
Knowledge about a familiar brand and its position in the product category are included in a brand schema in consumers’ memory (Krishnan 1996; Park, Jaworski, and MacInnis 1986) and brand schemas are relevant in ad processing (Rossiter and Percy 1997). Research in psychology and consumer behavior indicates that categorization of people’s knowledge about brands directly links people’s expectations to their motivation to process and subsequent evaluations of stimuli related to these categories of e.g. brands (e.g., Fiske 1982; Sujan 1985). Categorization theory based on the schema-triggered affect theory from Fiske and Pavelchak (1986) specifies a less-labor intensive method of evaluation in which organized prior knowledge related to a category is used in evaluations. Such knowledge (Fiske and Neuberg 1990) contains information about category attributes, and their links, prototypic exemplars, and an affective tag assessing one’s attitude toward members of the category. When confronted with a stimulus, the perceiver automatically attempts to match it with an evoked category description. When there is a match, the perceiver will evaluate the stimulus on the basis of the affect in the category schema and
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no attempt is made to review and evaluate the attributes of the category (Fiske 1982; Fiske and Pavelchak 1986). If the categorization attempt fails, the category attributes and their associated affective tags are reviewed and evaluated (piece-meal processing; Fiske 1982; Fiske and Pavelchak 1986). Empirical evidence illustrates that this relationship is strengthened when task importance is low (Maheswaran and Chaiken 1991). Television commercials, because of constraints on opportunity to process their information, are typically low involvement in nature and stimulate relatively low levels of processing (e.g., Krugman 1965b; MacInnis et al. 1991). In the case of consumers’ identification of a familiar brand in the commercial, consumers’ brand schema and associated affective tag are activated. Then, the consumer is further toward a more attribute-oriented process (see Fiske and Neuberg 1990, p. 3) and s/he has no motivation to process further information in the commercial. Consumers’ likelihood to discontinue watching the TV commercial may therefore increase at the moment that the brand is identified.

A similar effect is expected from theories that explain people’s curiosity. As discussed by Menon and Soman (1999, pp. 7-8): “These theories state that curiosity arises when people become aware of the existence of a knowledge gap in a particular domain (Loewenstein et al. 1992; Loewenstein 1994). The awareness of knowledge gaps produces a feeling of deprivation or discomfort that can be alleviated only by obtaining the information needed to close the gaps (i.e., missing information, information that expands current knowledge structures or that reconciles discrepancies). Curiosity prompts people to generate hypotheses about their knowledge gaps and motivates them to seek information that confirms or disconfirms these hypotheses (Klayman and Ha 1987). When the gap in knowledge is perceived as manageable or moderate, and when consumers are able to link the missing information with preexisting knowledge in that domain, this motivation to resolve curiosity will manifest itself as a greater “longing for knowledge” (Loewenstein 1994) and greater search and exploratory behavior on the part of people (Berlyne 1960)”, and paying more attention to new information (Menon and Soman 1999). Then, Menon and Soman (1999, p. 8), describe that “research in psychology has suggested that the process of satisfying curiosity is very pleasurable (Hunt 1963; Loewenstein et al. 1992). However, once curiosity is satisfied, a
curiosity-generating strategies that provide curiosity-resolving information after a temporal delay allow consumers greater opportunity to engage in guessing and hypotheses generation about the solution and elaborate on the source of the curiosity. Advertisers already use the power of curiosity in “mystery” ads that reveal the brand identity only at the end of the advertisement (King 1991) and indirect support is found that mystery ads heighten consumers’ attention (Alwitt 2002). Therefore we expect that the longer it lasts for the consumers to identify the brand name for the first time during the course of the commercial, the more uncertainty and curiosity about the source of the commercial increases and the greater the relieve is, when the brand is identified (Zillman 1991; Edell and Anderson 1990) and the greater the “big deal” response of the consumer may be upon identifying the brand. Therefore, we suggest:

H2: The later the brand name is first identified in the commercial, the higher the consumer’s likelihood to discontinue viewing the commercial.

7.3.2 Brand name identification after the first time
Television is more watched for entertainment than information (Barwise and Ehrenberg 1987) and increasing the information of the entire commercial (Olney et al. 1991) or at a particular moment in the commercial (see Chapter 6) increases the consumer’s probability to stop watching. Because we expect brand name presence to enhance the information content of the commercial at a particular moment (see Chapter 6), we also expect that each consumer’s brand name identification after the first brand name identification increases the consumer’s motivation to stop watching. The same arguments can be used to reason that the more times that a consumer identifies the brand name increases his or her probability to stop watching. Arguing from theories about curiosity we expect a similar effect: By sampling enough data to confirm the consumer’s expectation which brand is advertised in the TV commercial, consumer’s interest in watching the commercial may decrease as soon as sufficient verification about the brand advertised is obtained. Indirect support for these hypotheses is found in the study of Alwitt et al. (1993; see Table 7.1). These researchers motivate that the consumer recognizes the brand after s/he has seen it
person generally feels disappointed with the actual information (Loewenstein 1994)." Brewer and Lichtenstein (1981) also show that suspense narratives in which the discourse order matches the event order according to the consumers' story schema show a sharp drop in suspense (resolution) at the point in the discourse where the missing information is revealed. Until the first consumers' brand identification consumers are withheld from an important piece of information that they expect to be existent in every TV commercial, namely the brand. Realization of this information gap and curiosity about which brand is communicated prompts the consumer to generate hypotheses about this brand and motivates him/her to seek information that confirms or disconfirms these hypotheses, thus to pay attention to the commercial to find out what the commercial is all about (Alwitt 2002; Menon and Soman 1999; Zillman 1991). As soon the brand is identified and the consumer's curiosity about the brand is resolved, consumers may also feel a sense of anti-climax (a “big deal!” response, Fazio et al. 1992, p.10) when the brand is already familiar to consumers. As reasoned by Fazio et al. (1992), consumers, having invested effort to figure out the ad, may be at least moderately disappointed when the brand's identity is at last revealed. All too familiar with the brand’s existence, they may even feel slightly foolish for having become in the mystery at all: Motivation to watch the commercial may then decrease. Both research streams suggest the following hypothesis:

**H1:** The first consumer’s identification with the brand name during exposure to a TV commercial increases the consumer’s likelihood to discontinue viewing the commercial.

Research on event schemas and story structures (e.g., Brewer and Lichtenstein 1981) suggests that story lines that build up suspense for a long time are preferred to those that have a shorter suspense span. A longer anticipation period about how the narrative may end results in greater suspense (de Wied 1994). Similarly, as discussed by Menon and Soman (1999), researchers such as Loewenstein (1987) and Loewenstein and Prelec (1993) have found that people often prefer delayed over instant gratification when faced with a bounded sequence of events or experiences. For example, Loewenstein (1987) reported that subjects in his study were willing to pay more to experience a kiss delayed for three days than an immediate kiss. Menon and Soman (1999) also argue that
more times and little information is gained from additional brand presentations once this recognition threshold is reached (Attneave 1959). Also Berlyne (1970) argued that learning reduced uncertainty, and this reduction in uncertainty was experienced in positive affect, whereas satiation created boredom that was perceived as negative affect. Therefore, the following hypotheses are developed.

**H3:** Each time the brand name is identified after the first brand name identification in a TV commercial, consumer’s likelihood to discontinue viewing the commercial increases.

**H4:** The more times a consumer has identified the brand name, the higher the consumer’s likelihood to discontinue to view the commercial.

Although hypotheses 3 and 4 are linked to each other, hypothesis 3 proposes an effect of each separate time point that a consumer identifies the brand name, while hypothesis 4 suggests an effect of the cumulative frequency of consumers’ brand name identification on the likelihood to stop watching.

### 7.3.3 The brand name in the video or audio track

The brand name in a TV commercial can appear in different modalities: visually and auditory. It may be the case that the effect of consumer’s first identification of the brand name and also his/her attention paid to the brand after that on the decision to stop watching the commercial depends on the modality in which the brand name is presented. Television is a visual medium that relies largely on images (and not words) to convey its message (e.g., MacInnis and Price 1987). People generally have the tendency to visually orient to a stimulus to verify its presence (Palmer 1999). Individuals who are paying more visual attention to the message are likely to be more involved in processing a commercial message, thus exerting more mental effort (Krugman 1965a, 1977). Laboratory studies have found visual orientation to the screen increases the comprehension of material (Anderson and Levin 1986; Krugman et al. 1995; Thorson, Zhoa, and Friestad 1987). This may suggest that consumers’ (first) visual identification has a greater effect on the consumer’s likelihood to stop viewing the commercial than (first) auditory attention to brand name. On the
other hand, Alwitt et al. (1980) find that auditory features appear to be the most influential in consumers’ attention to TV commercials, probably because they can be perceived regardless of whether the viewer is visually attentive (Alwitt et al. 1980). Therefore we investigate whether the effect of a consumers’ (first) brand identification on his/her likelihood to stop watching depends on the modality of the brand identification.

7.3.4 Heterogeneity in product categories
Rossiter and Percy (1997) argue that advertisements promoting brands from different product categories differ in the way the ad communicates to the consumers and differ in their contents and executional cues. Therefore we reason that, different effects occur for a consumer’s first identification of brands belonging to different product categories on consumers’ likelihood to stop watching the commercial. Following Rossiter and Percy (1997) we make a distinction between brands that belong to high versus low involvement product categories as well as between transformational versus informational product categories. A brand belongs to a high involvement product category when purchase of such a brand is perceived as high-risk. High involvement brands require to communicate more information to and thinking from the consumers. Also, because people are not motivated to watch commercials for information (Olney et al. 1991) and a high level of information at one moment in the commercial increases consumers’ likelihood to stop watching the commercial at that moment (see Chapter 6), we suggest the following hypothesis:

**H5:** After the first brand identification, consumer’s likelihood to discontinue viewing is greater for a commercial that advertises a brand belonging to high involvement product category in comparison to a low involvement product.

A brand belongs to a transformational product category when such a purchase is based on a “reward” (positively originated) purchase motivation and a brand belongs to an informational product category when such a purchase is based on a “relief” (negatively originated) purchase motivation (Rossiter and Percy 1997). In comparison to advertising an informational brand, the whole idea behind commercials that advertise a transformational brand is to get the consumer emotionally into the role of using the
advertised brand. These commercials do not have to argue that the brand solves a problem or that the brand delivers sensory gratification, intellectual stimulation, mastery or social approval, but the commercial shows it or implies it by association (Rossiter and Percy 1997). Commercials for informational products provide more information about the benefits of the product and its problem-resolving character. Consumers’ liking of the commercial execution is most important for commercials that advertise transformational brands, while the information content is more important for informational products. Generally, it is found that entertainment is more important for TV commercials in comparison to information (Biel 1998) and television appears to be watched mainly for entertainment (Barwise and Ehrenberg 1988). The studies in Chapter 6 also found that more consumers stop watching during high information levels in commercial contents. Also because a transformational brand is more integrated in the execution of a commercial advertising than an informational brand, we suggest that:

**H6:** After brand identification, consumer’s likelihood to discontinue viewing is smaller for a commercial that advertises a brand belonging to a transformational product category in comparison to an informational product category.

Empirical support for all six hypotheses would show that consumers’ moment-to-moment identification of the brand name element influences consumers’ moment-to-moment decisions to continue or discontinue exposure to TV commercials. First, we need an unbiased measure of consumers’ identification of the brand name in a TV commercial. Only measuring brand presence does not suffice, because it does not indicate whether a consumer has really identified it. Consumers’ eye movements enable us to determine both the focus and amount of attention to the brand name in the commercial.

### 7.4 Eye movements and attention to the brand

As Section 4.5.6 motivates, eye tracking is the method to assess consumers’ visual attention, particularly to measure the focus and amount of attention to physical properties of an ad, such as the brand name.
Consumers’ Moment-to-Moment Processing of TV Commercials

Although Anderson (1985) argued that eye movements provide little information about consumers’ attention to TV commercials and it is better to use self-controlled exposure time as a measure of attention, exposure time is a behavioral measure of consumers’ overall attention to the entire commercial. It does not measure consumers’ moment-to-moment attention to separate commercial properties (see Section 4.5.5).

Based on our reasoning in Section 7.3, we think that consumers’ attention to the brand name plays an important role in consumers’ decision to stop watching a commercial. Because the brand name continuously changes in nonpresence/presence, size, location, frequency and duration during commercial exposure, exposure times do not suffice in measuring consumers’ moment-to-moment attention to the brand. However, eye movements enable us to determine consumers’ moment-to-moment focus to the brand and hence eye tracking is necessary to test the hypotheses developed in the previous sections. Since eyes go where attention is allocated (Rayner 1998), eye movements provide reliable indicators of consumers’ visual attention. Apart from several smaller, corrective eye movements, eye movement data are composed of fixations and saccades. Fixations are periods of relative immobility of the eyes and visual information is extracted and processed primarily during fixations (see Wedel and Pieters 2000). Saccades are rapid eye movements between fixations during which vision is essentially suppressed. Examination of consumers’ visual attention should therefore be based on the duration, position and pattern of fixations (Kroeber-Riel 1992; Viviani 1990). The exact position of the eye movements is particularly relevant in our study, because our goal is to determine whether a consumer is able to identify the brand name, when present in the commercial moment. However, at each eye fixation the visual field covers more than just the exact information point due to foveal (“yellow spot”) and parafoveal (the area directly surrounding the fovea) vision (McConkie and Rayner 1975). It is known that the useful visual field is substantially larger for images than for texts (Loftus 1983; Rayner and Fischer 1996; Rayner and Pollatsek 1992). Therefore, Intraub (1981) and Loftus (1983) argue that large amounts of parafoveal processing must be possible during visual scanning, since the gist of a scene is usually required during the first fixation on that scene. Since, people’s visual field covers not only the foveal vision, as expressed through
the exact fixation positions, but also parafoveal vision (e.g., Cohen 1981; Gould 1967; Henderson 1993; Rayner 1995), larger parts of the commercial may be attended during a single fixation than is suggested by its exact position (Loftus 1983; Kroeber-Riel 1992). Therefore it is important for the objective the current study, to obtain a measure of consumers’ identification of the brand in the foveal, but also in the parafoveal vision.

We performed a study in which 71 consumers were exposed to 18 commercials during which their eye movements were collected. The next sections describe this study, the methodology to measure a consumer’s attention to the brand name element and to relate this to his/her probability to stop watching a commercials, and empirical findings.

7.5 Data collection

The data set used in experiment 1 described in Chapter 6 was used in the current research. In addition, eye tracking data were collected from the same consumers whose viewing bahvior was measured in experiment 1 in Chapter 6. A detailed description of the commercials, respondents and data collection procedure can therefore be found in Section 6.4. Additional data collected for this experiment are described next.

7.5.1 Eye tracking

To collect eye tracking, consumers were seated in front of a television screen, on which the TV commercials were shown, and they were instructed to place their chin on a small, comfortable chin rest after being seated. The television screen (40 by 30 cm) was on a distance of 80 cm from them. Eye movements were recorded by infrared corneal reflection. An infrared camera was located toward the left side of the respondents, such that it did not interfere with normal viewing behavior (Young and Sheena 1975; Duchowski 2003; p. 57). Contact lenses fitted tightly over the cornea of respondents’ eyes allowed infrared rays to reflect off the surface of the consumer’s right eye while measuring the position of the pupil (Haber and Hershenson 1980; Young and Sheena 1975). After an explanation of the eye-tracking system, calibration to the respondent’s eye took place. The x, y locations of the eye positions on the television screen were recorded.
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fifty times a second\textsuperscript{52}. All respondents had normal corrected-to-normal vision. Having collected the eye tracking data, consumers were exposed to parts of the 18 commercials and asked two questions on a 10-point scale. These were 1) how entertaining do you find this commercial? (1 = not entertaining at all, 10 = very entertaining) and 2) how relevant do you find the information in this commercial? (1 = very irrelevant, 10 = very relevant).

7.5.2 Branding moments and surfaces

First, a group of 5 trained undergraduate students (2 males and 3 females) rated the presence or absence of the brand name in each second on the digitized commercial, separately in video and audio (see also Stewart and Furse 1986). Judges were allowed to play the commercials as many times as they wanted, to forward or rewind (in slow motion) the commercial and to pause the commercial on the screen at each time that they liked. Each judge rated the commercials in a different order. Across commercials and 0.1 seconds the agreement between judges was 100 %. Judges were paid the equivalent of $30 for their participation.

Next, for every 0.2 second that a brand name visually appeared in a commercial, two other female judges measured independently the location and size of the brand name on a 20 by 15 cm computer screen (half of, but proportional to the original screen). The judges recorded the \( x, y \) coordinates of every millimeter square that the brand name covers on the screen by use of a transparent and a millimeter-blocked paper

\textsuperscript{52} As Rosbergen (1998, p. 67) describes: “Eye positions are typically measured 50 to 100 times per second. Since these individual measurements can be distorted by factors, such as blinking of the eyes and the amount of tear fluid in the eye, a common practice is to combine a limited number of successive measurements into a single data point to increase reliability of the eye-tracking data (i.e., aggregation over time). Besides, in most research on eye movements some aggregation across space is carried out as well to account for the fact that small eye movements, such as tremors, drifts and microsaccades, which do not change the focus of attention, are of no interest to researchers examining visual attention.” In the current study, we use the algorithm of Verify International to aggregate individual measurements in such a way that those smaller eye movements fall within the area of fixation. After these aggregations have been completed, raw eye-tracking data are reduced to a series of fixations interspersed by saccades from one fixation point to the next (see also Duchowski 2003).
corresponding to the screen size. To overcome fatigue effects, judges were allowed to perform these measurements for no more than 2 hours per day. For each judge the measurement procedure took approximately 4 weeks and dependent on the frequency, duration, difference in location and size of brand name appearance in each commercial, the measurement time ranged from approximately 10 minutes to 11 hours per commercial. Judges were paid the equivalent of $100 for their participation.

Across the locations and sizes of the brand name appearance, judges agreed in 92% of the cases. The differences in brand name size and location were minor in the other 8%. However, a third female judge measured the location and size for these brand name appearances on which the two judges disagreed following the same procedure. Agreement was achieved by comparison and discussion. Next the x, y coordinates of the brand name areas were converted to the original television screen. This measurement procedure results in the x, y coordinates that every brand name area covers for each commercial, when present on every multiple of 0.2 seconds of its duration.

7.5.3 Brand familiarity
A group of 25 undergraduate students (13 males and 12 females) participating in an advanced marketing research course individually split 124 cards with existing and non-existing brand names into one group with familiar brand names and one group with unfamiliar brand names. Next, students were asked to split the group of familiar brand names into one group with very familiar brand names and one group with somewhat familiar brand names (Pieters et al. 2002; Pieters and Wedel 2003). The task was part of a class assignment. Intercoder reliabilities for the brand names ranged from 68% to 100% with a median of 100%.

7.5.4 High versus low involvement product categories
A sample of 25 undergraduate students (13 males and 12 females) participating in a marketing introduction course were given 86 different product categories or services including the product categories and services advertised in the target commercials. In addition they were given a description of high involvement products (“products and services that I think a lot about whether to purchase them, a decision about this is (very)
important for me”) and a description of low involvement products (“products and services that I do not think a lot about whether to purchase them, a decision about this is not (very) important for me”) (see also Rossiter et al. 1991; Vaughn 1980 1986). After having familiarized themselves with the scales, they sorted the cards in one group of high involvement products/services and another group of low involvement with products/services (Pieters and Wedel 2003). The task was a part of a class requirement. Intercoder reliabilities ranged from 64 % to 100 % with a median of 96 %.

7.5.5 Transformational versus informational product categories
Another group of 25 undergraduate students (12 males and 13 females) participating in the same course and following the same procedure divided the 86 product categories and services in a group of transformational products/services (“products and services that I purchase because they make me feeling good and/or they are good for my development”) and a group of informational products/services (“products and services that I purchase because I need them or because they solve or prevent a problem”) (see also Rossiter et al. 1991; Vaughn 1980, 1986). Intercoder reliabilities ranged from 60 % to 100 % with a median of 80 %.

7.6 Method of analysis
First we explain the methodology to measure a consumer’s attention to the brand element during the course of a commercial. Next, a hazard model is presented to relate brand attention to viewing behavior.

7.6.1 Analysis of attention to the brand in foveal vision
First, we are interested whether and how long an individual consumer attends to the brand name in a particular commercial. Consumers extract information from e.g. commercials and their elements during eye fixations, which reflect the moments of visual attention (Sperling and Weichselgartner 1995). We assume that as a consumer’s eye fixation is located in the brand
name area, the consumer has paid full attention to the brand name and has identified it.

However, as discussed in Section 7.4, some of the visual stimuli occurring in the parafoveal vision may be detected, processed, and identified by the individual without the necessity of eye movements. Other events in the parafoveal vision have a certain probability of being detected and perhaps partially processed, but not completely identified. In these latter cases, the individual may move the eyes in order to place the events onto the more sensitive fovea for detailed examination. In studies on reading and picture viewing, it is revealed that attention is asymmetrically in the direction of the next eye movement (e.g., Henderson 1993; Shepherd, Findlay, and Hockey 1986) and that the visual field is asymmetrically distributed around the fixation point (e.g., Henderson, Pollatsek, and Rayner 1989; McConkie and Rayner 1975; Pollatsek et al. 1981). Attention is allocated dynamically during each fixation to the location to be fixed next (Henderson 1993). It is therefore suggested that each fixation's position depends on the directly preceding fixation point (Molnar and Ratsikas 1987) and it is suggested that this position is located in the parafoveal region of the preceding fixation (Rayner 1998; Widdel 1983). The area of the visual field also depends on stimulus ("bottom-up") and individual ("top-down") differences (e.g., Bertera and Rayner 2000; Findlay and Gilchrist 1998; Holmes et al. 1977; Ikeda and Takeuchi 1975). Still, the visual system is organized so that detailed processing occurs in the central foveal vision and processing ability declines outside this region (Anstis 1974). Therefore we also would like to "control" for consumer's attention for the brand name in his or her parafoveal vision.

**7.6.2 Analysis of attention to the brand in parafoveal vision**

Based on these theoretical and empirical findings in the eye movement literature, we suggest a method to "measure" the visual field of a consumer for each commercial and to obtain a probability of having seen the brand in a consumer's parafoveal vision for a particular commercial. Although the visual field has been widely used in models of visual attention

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53 We very much appreciate the valuable suggestions of Ralf van der Lans, University of Tilburg, the Netherlands.
(Rayner 1998), there is not yet a common agreement upon definition or method of measurement of the visual field. As described by Bertera and Rayner (2000), the visual field has been estimated from psychophysical experiments in which (1) arrays are presented for short durations (so that respondents cannot make eye movements), and accuracy of identifying targets at different distances from fixation is determined, or (2) the moving window method is used in which the area that the respondents can see (window) is varied, and the disruption effect of the window size on the pattern of eye movements is investigated or (3) eye movements are recorded with a great deal of weight put on the size of the saccade from fixation $n - 1$ to fixation $n$ (when the target is fixated) and the size of the visual field is based on average saccade length from fixation $n - 1$ to $n$.

Because the first two methods are practically impossible to determine people’s visual field for dynamic stimuli, we determine the visual field based on the latter method (Van der Lans 2003). We estimate the visual field around a consumer’s eye fixation point for a particular commercial based on the horizontal and vertical components of the saccade length between successive fixations. Let $p = 1,...,P$ consumers, $i = 1,...,I$ commercials and $q = 1,...,Q_p$ the number of one-second intervals that consumer $p$ is potentially exposed to commercial $i$. If consumer $p$ has $n$ fixations for commercial $i$, we compute $n - 1$ horizontal and vertical components of successive fixations, so that we obtain $(\Delta x, \Delta y)$ pairs of corresponding horizontal and vertical distances of successive fixations of consumer $p$ for commercial $i$. We assume that these $(\Delta x, \Delta y)$ pairs follow a bivariate normal distribution. As we estimate the parameters of this distribution, namely the mean vector $\mu = (\mu_{\Delta x}, \mu_{\Delta y})'$ and variance-covariance matrix

\[
\Sigma = \begin{bmatrix}
\sigma_{\Delta x}^2 & \rho \sigma_{\Delta x} \sigma_{\Delta y} \\
\rho \sigma_{\Delta x} \sigma_{\Delta y} & \sigma_{\Delta y}^2
\end{bmatrix},
\]

we obtain a probability distribution of the visual field around a fixation point of consumer $p$ for commercial $i$. Then, given that the brand name is visually present during a fixation of consumer $p$, we are able to compute the probability of consumer $p$ of having identified the brand name in commercial $i$ in parafoveal vision using basic statistical procedures.
First we present the procedure to estimate $\mu$ and $\Sigma$. Next we illustrate the computation of a consumer’s probability of having identified the brand name in commercial $i$ during a particular second. $y_p$ is the $(2xn)$ matrix with $n-1$ pairs of horizontal and vertical distances ($\Delta x, \Delta y$) of a consumer $p$ for commercial $i$. We could estimate $\mu$ and $\Sigma$ by only using the observations of consumer $p$ for commercial $i$, but if the number of observations is very small, unreliable estimates are obtained. Therefore we use an empirical Bayesian approach and assume a conjugate prior distribution for $(\mu, \Sigma)^{54}$, where: $\Sigma \sim \text{Inv-Wishart}_{v_0} \left( \Lambda_0^{-1} \right)$ and $\mu | \Sigma \sim N(\mu_0, \Sigma / \kappa_0)$ with $v_0$ and $\Lambda_0$ describing the degrees of freedom and the scale matrix for the inverse-Wishart distribution on $\Sigma$ (Gelman et al. 2000). By first computing the maximum likelihood estimates of $\hat{\mu}_p$ and $\hat{\Sigma}_p$ for each person $p$ across all commercials, we compute $\Lambda_0 = (v_0 - 3) \hat{\Sigma}_p$ and $\mu_0 = \hat{\mu}_p$. The posterior distribution for $(\mu, \Sigma) | y$ is then given by $\Sigma | y \sim \text{Inv-Wishart}_{v_n} \left( \Lambda_n^{-1} \right)$ and $\mu | \Sigma, y \sim N(\mu_n, \Sigma / \kappa_n)$ where:

$$
\mu_n = \frac{\kappa_0}{\kappa_0 + n} \mu_0 + \frac{n}{\kappa_0 + n} \bar{y}
$$

$$
\kappa_n = \kappa_0 + n
$$

$$
v_n = v_0 + n
$$

$$
\Lambda_n = \Lambda_0 + S_y + \frac{\kappa_0 n}{\kappa_0 + n} \left( \bar{y} - \mu_0 \right) \left( \bar{y} - \mu_0 \right)^\prime
$$

with $(2x1)$ vector $\bar{y}$ giving the row means of $y$ and $S_y = \sum_{i=1}^{n} (y_i - \bar{y})(y_i - \bar{y})^\prime$ denotes the cross products matrix for $y$. We find the posterior mean $(2x1)$ vector $\mu | y$ by $\mu = E(N(\mu_n, \Sigma / \kappa_n)) = \mu_n$ and the

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54 The indices $p$ and $i$ are omitted for clarity.
posterior $(2 \times 2)$ covariance-variance matrix $\Sigma|y$ of the bivariate normal distribution by $\Sigma|y = E(\text{Inv} - \text{Wishard}_v(\Lambda^{-1}_n)) = (\nu_n - 3)^{-1} \Lambda_n$.

We set the parameters $\kappa_0 = 15$ and $\nu_0 = 15$, such that the likelihood weights very highly in the posterior distribution, when $n$ is large and the prior distribution starts weighting more in finding the posterior distribution when the number of observations is about three times less than the number of parameters to be estimated.

Having estimated the parameters of the bivariate normal distribution of the visual field around the fixation points of consumer $p$ for commercial $i$, we illustrate in the appendix (Section 7.9) of this chapter how the probability of consumer $p$ to identify the brand name in commercial $i$ at a particular second $q$ is obtained, when his/her fixation is not located in the brand area. In the end we have a dummy $VB_{pq}$ that denotes whether consumer $p$ has identified the brand name in his/her foveal vision and probability $PB_{pq}$ that consumer $p$ has identified the brand name in his/her parafoveal vision at second $q$ of commercial $i$.

By following this procedure we assume that consumers have identified a brand name when it appears in their foveal vision, but that processing also can take place in the parafoveal vision. Our approach takes into account that 1) the visual field differs across consumers and commercials, 2) the visual field may be asymmetrical in the direction of the next eye movement, 3) consumers’ processing ability declines outside this region and 4) larger brand name surfaces have higher probabilities to be processed.

### 7.6.3 A hazard model for probability to stop viewing

A random effects hazard model, similar to the one in Section 6.5.2 of Chapter 6 is used to relate consumer $p$’s attention to the brand to the likelihood to stop watching at second $q$ in commercial $i$:

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55 We work with one-second time intervals in the hazard methodology.

56 A discrete time hazard model using one-second time intervals is estimated. It would be theoretically optimal to use time intervals at the fixation level. However, this would generate
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Equation 7.2:  
\[ h_{ipq} = h_p(t_q) \ast h_t(X_{iq}) \ast h_z(Z_{iq}) \ast h_1(U_{ip}), \]  
with  
\[ h_p(t_q) = \exp(\alpha_{0ip} + \alpha_{1ip}t + \alpha_{2ip}t^2 + \alpha_{3ip}\ln t) \]  
\[ h_t(X_{iq}) = \exp(\beta_1VB_{1ipq} + \beta_2AB_{1iq} + \beta_3VBA_{ipq} + \beta_4ABA_{ipq} + \beta_5PB_{ipq} + \beta_6VB_{1t_{ipq}} + \beta_7VBCD_{ipq} + \beta_8INV_{ipq} + \beta_9TRA_{ipq}) \]  
\[ h_z(U_{ip}) = \exp(\gamma_1ENT_{ip} + \gamma_2 REL_{ip} + \gamma_3 CUTI_{ip} + \gamma_4 CUST_{ip} + \gamma_5 FI_{ip} + \gamma_6 LA_{ip}) \]  
\[ h_1(Z_{iq}) = \exp(\gamma_{6ip}U_{ip} + \gamma_7\text{FAM}_i) \]  

with dummy \( VB_{1ipq} \) denotes whether the brand is identified in the foveal vision by consumer \( p \) for the first time in video in second \( q \) of commercial \( i \), while dummy \( AB_{1iq} \) that denotes brand is identified for the first time in audio. We assume that the probability of having heard the brand in second \( q \) is equal to 1, if the brand is mentioned in the audio track in second \( q \), otherwise it is equal to zero. The dummy \( VBA_{ipq} \) denotes whether the brand is identified by consumer \( p \) in video at second \( q \) after the first brand identification of consumer \( p \) in commercial \( i \). \( ABA_{ipq} \) denotes a similar variable for consumer \( p \)’s brand identification in audio. \( PB_{ipq} \) denotes the probability that consumer \( p \) has seen the brand name in parafoveal vision at second \( q \) in commercial \( i \). \( VB_{1t_{ipq}} \) denotes the interaction between time and the variable \( VB_{1ipq} \). \( VBCD_{ipq} \) denotes the number of times that consumer \( p \) has identified brand in foveal vision until second \( q \) for commercial \( i \). The dummy \( INV_{ipq} \), after consumer \( p \)’s brand identification in commercial, whether the brand belongs to a high involvement product category. The variable \( TRA_{ipq} \) denotes a similar variable, but then for a brand belonging to a transformational product category. \( ENT_{ip} \) and \( REL_{ip} \) denote how entertaining and relevant consumer \( p \) finds commercial \( i \), \( CUTI_{ip} \) denotes the total time consumer \( p \) has viewed different time intervals for each consumer and commercial and estimation problems because of very small variation in the dependent variable. Estimation of the model on simulated data confirmed this.

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the commercials preceding commercial $i$, $CUST_p$ denotes the number of commercials that consumer $p$ has stopped watching prior to commercial $i$, $FI_p$ is a dummy that denotes whether commercial $i$ belongs to the first 5 commercials that consumer $p$ has seen and $LA_p$ denotes a dummy whether commercial $i$ belongs to the last 5 commercials that consumer $p$ has seen. Further on, $UN_i$ and $FAM_i$ denotes the uniqueness, respectively familiarity score of commercial $i$. Other variable definitions and the estimation procedure are found in Section 6.5.2.

7.7 Results

7.7.1 Descriptives of consumer’s attention to TV commercials
The commercials in the study advertise very familiar brands. Four commercials advertised a high involvement product, and 11 commercials advertised a transformational product. Descriptives of the percentages of consumers stopping the commercials on second- and commercial level are found in Section 6.6.1. Because of significant measurement errors and non-response in the eye tracking data for one commercial, this commercial was excluded from further analysis. The average number of fixations per commercial was 59 ($SD = 39$) and average fixation duration was 0.28 seconds ($SD = 0.26$). The average saccade length was 4.28 cm ($SD = 4.20$). On average, 30.5 % of the consumers did not identify the brand at all during their exposure time to a commercial, either because the brand did not appear in audio or video or they did not see it during exposure. When the brand was visually present at least for one time during commercial exposure, 28.4 % of the consumers did not see the brand at all. Conditional on the seconds in which the brand name was visually presented, only 39.5 % of the consumer’s identified the brand in their foveal vision during that second. Conditional on the consumers who identified the brand at least once during commercial exposure, the time to the first visual identification in their foveal vision ranged from one to 24 seconds ($SD = 6.5$) and time to which consumers heard the brand in audio ranged from one to 26 seconds ($SD = 5.8$).
7.7.2 Estimation of visual fields

Estimation of the visual field of each consumer per commercial gives an average horizontal distance $m_{\Delta x}$ of 0.00 ($SD = 0.13$) and an average vertical distance $m_{\Delta y}$ of 0.00 ($SD = 0.11$) indicating that the visual field is approximately centered around the eye’s fixation. An average standard deviation of the horizontal distance $s_{\Delta x}$ of 4.08 ($SD = 0.86$) and an average standard deviation of the horizontal distance $s_{\Delta y}$ of 3.09 ($SD = 0.70$) is obtained. An average correlation $r_{\Delta x\Delta y}$ of 0 ($SD = 0.20$) is obtained.

Figure 7.1: Bivariate normal distributions of the visual field of 8 persons-ads

On x-axis: $\Delta x$, on y-axis: $\Delta y$, on z-axis: probability
Figure 7.1 continued: Bivariate normal distributions of the visual field of 8 persons—ads

<table>
<thead>
<tr>
<th>Consumer 17, ad 4</th>
<th>Consumer 14, ad 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer 16, ad 7</td>
<td>Consumer 16, ad 5</td>
</tr>
</tbody>
</table>

On x-axis: \( \Delta x \), on y-axis: \( \Delta y \), on z-axis: probability

Figure 7.1 shows the estimated bivariate normal distributions of eight consumer-commercials that differ in their number of observations and shape of their visual field. These results and Figure 7.1 indicate that the visual fields have an elliptical shape, are asymmetrical around the fixation point and differ across consumers and commercials. The lower part of Figure 7.1 also shows that even with a few observations, the visual fields are well estimated.
Given that the consumer’s eye fixation is not in the brand area in a particular second, we are able to compute the probability a consumer identifies the brand in his/her parafoveal vision using these distributions and basic statistical procedures, as shown in the appendix (Section 7.9) of this chapter\textsuperscript{57}. Given that the brand is visually present and the eye is not in the brand area in a particular second, the probability to identify the brand in parafoveal vision range from 0 to 0.45 with an average of 0.02. These probabilities depend on how far the brand name appears from the eye fixation or how far the eye fixation is from the brand area, the size of the brand name surface and the shape of the visual field of a consumer for a particular commercial. These factors are taken into account by the followed procedure.

### 7.7.3 Results of the random effects hazard model estimation

Results of the estimation of the random effect hazard model are found in Table 7.2 on the following page. The pseudo-$R^2$ is 13.2 \%. The results are discussed next\textsuperscript{58}.

### 7.7.4 Control variables

Except for the ad placement variables, the control variables have the hypothesized effect on consumer’s probability to discontinue viewing a TV commercial\textsuperscript{59}. The shorter the consumer has watched previous commercials (-.303, $p < .05$) and the more commercials the consumer has watched previous to the current one (-.141, $p < .05$) the more likely a consumer is to discontinue viewing the commercial. The condition index of the explanatory variables is relatively high indicating there may be some degree of multicollinarity (Judge et al. 1988). Tests show that it is unlikely that some systematic bias of the results due to multicollinarity is present. Also, models in which measures of moment-to-moment entertainment and information value (see Chapter 6) were included did not give reliable estimates due to severe multicollinarity problems. The coefficients are in direction similar to coefficients estimated in Chapter 8. Differences in magnitude exist because in the current analysis, one commercial and some other consumer-commercial combinations were excluded due to non-response and measurements errors. These represent less than 3 \% of the original data set.

\textsuperscript{57} When the eye is in the brand area during a particular second, we assume that the probability that a consumer identifies the brand is 1 for this second and this is taken account by the dummies $\text{VB}I_{pq}$ and $\text{VBA}I_{pq}$ in Equation 7.2.

\textsuperscript{58} The condition index of the explanatory variables is relatively high indicating there may be some degree of multicollinarity (Judge et al. 1988). Tests show that it is unlikely that some systematic bias of the results due to multicollinarity is present. Also, models in which measures of moment-to-moment entertainment and information value (see Chapter 6) were included did not give reliable estimates due to severe multicollinarity problems.

\textsuperscript{59} The coefficients are in direction similar to coefficients estimated in Chapter 8. Differences in magnitude exist because in the current analysis, one commercial and some other consumer-commercial combinations were excluded due to non-response and measurements errors. These represent less than 3 \% of the original data set.
stopped watching prior to the target commercial (.928, \( p < .001 \)), the higher the consumer’s likelihood to stop watching the commercial.

Table 7.2: Effects of consumer’s attention to branding variables on the probability to stop watching a TV commercial

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Estimate</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baserate:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-3.568</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Variance of constant</td>
<td>1.195</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Time</td>
<td>-0.650</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Time * Time</td>
<td>1.070</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Log of Time</td>
<td>1.176</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Covariates:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accumulated previous viewing time</td>
<td>-0.303</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Number of previous stops</td>
<td>0.928</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Entertaining</td>
<td>-0.255</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Relevant news</td>
<td>-0.415</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Dummy first 5 commercials</td>
<td>0.128</td>
<td>0.106</td>
</tr>
<tr>
<td>Dummy last 5 commercials</td>
<td>-0.169</td>
<td>0.068</td>
</tr>
<tr>
<td>Uniqueness of commercial</td>
<td>-0.340</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Familiarity of consumer with commercial</td>
<td>0.124</td>
<td>&lt;.05</td>
</tr>
<tr>
<td><strong>Branding variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seen brand for first time</td>
<td>0.195</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Heard brand for first time</td>
<td>0.001</td>
<td>0.448</td>
</tr>
<tr>
<td>Seen brand after first time</td>
<td>0.143</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Heard brand after first time</td>
<td>0.013</td>
<td>0.297</td>
</tr>
<tr>
<td>Probability to see brand in parafoveal vision</td>
<td>0.107</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Time*seen brand for first time</td>
<td>0.061</td>
<td>0.076</td>
</tr>
<tr>
<td>Cumulative # of seconds to have seen brand</td>
<td>0.219</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Brand is identified and brand is high involvement product</td>
<td>0.209</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Brand is identified and brand is transformational product</td>
<td>-0.337</td>
<td>&lt;.001</td>
</tr>
<tr>
<td><strong>Fit measures:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>55755</td>
<td></td>
</tr>
<tr>
<td>BIC</td>
<td>108912</td>
<td></td>
</tr>
<tr>
<td>SLL</td>
<td>-5298</td>
<td></td>
</tr>
<tr>
<td>Pseudo R(^2)</td>
<td>13 %</td>
<td></td>
</tr>
</tbody>
</table>

As the consumer finds the commercial entertaining (-.255, \( p < .001 \)) and the information in the commercial relevant (-.415, \( p < .001 \)) and as the
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commercial is more unique (-0.340, \(p < .001\)), the consumer’s likelihood to discontinue viewing the commercial decreases. The more familiar the commercial is, the higher the likelihood to stop watching (0.124, \(p < .05\)). The ad placement variable do not have significant effects on consumers’ likelihood to stop watching (First 5: 0.128, \(p < .11\); Last 5: 0.169; \(p < .07\)), although later commercials seem to be stopped less.

7.7.5 Baseline hazard

All three terms in the baseline hazard are significant (see Table 7.2) and the standard deviation of the random intercept is significant (1.195, \(p < .001\)). These results are similar to the results presented in Chapter 6 and are not discussed further here.

7.7.6 Influence of consumer’s attention to the brand

Strong support is found for all hypotheses. As a consumer has identified the brand for the first time, the higher the consumer’s probability to discontinue viewing the commercial (.195, \(p < .001\)), and every time as the brand is seen after the first identification, the likelihood to stop watching increases (.143, \(p < .001\)). This supports hypothesis 1 and 2. Only the consumer’s visual identification of the brand significantly influences her viewing behavior, because the first brand identification in audio (.001, \(p = .448\)) and after identification of the brand in audio after that (.013, \(p = .297\)) have insignificant effects. This indicates that the same brand element presented in different modalities have different effects on consumers’ decisions to stop watching a commercial. Marginal support is found for hypothesis 3: The longer the time to the first consumer’s visual brand identification, the higher consumer’s likelihood to stop watching (.061, \(p < .08\)). But as the times that a consumer has seen the brand enhances his/her likelihood to discontinue viewing the commercial significantly increases (.219, \(p < .001\)). This supports hypothesis 4. Not only brand identification in the foveal vision, but also in the parafoveal vision increases the likelihood to stop watching the commercial, however for a lesser extent (.107, \(p < .001\)). After the brand has been identified and the brand belongs to a high involvement product category (versus a low involvement product category), the consumer’s likelihood to stop watching increases after his/her first brand identification (.209, \(p < .001\)), supporting hypothesis 5.
When the consumer finds out that the brand belongs to transformational product category (versus a informational product category) after his/her first brand identification, the likelihood to stop viewing the commercial advertising decreases (-0.337, \( p < .001 \)). This supports hypothesis 6.

This experiment demonstrates that with eye movements, consumers’ moment-to-moment attention to the brand name in TV commercials is very well measured. Then, results show systematically that when aiming to retain consumers until the end of a commercial, consumers’ visual brand identification in foveal, but also in parafoveal vision negatively influence consumers’ viewing behavior during exposure.

### 7.8 Discussion and concluding remarks

This research has shown how moment-to-moment consumers’ visual identification of the brand, not only in foveal, but also in parafoveal vision, affects consumers’ decisions to continue or discontinue watching TV commercials. We showed that eye movements are very useful in measuring consumers’ moment-to-moment attention to the brand element in TV commercials and eye tracking methodology complements exposure times to explain consumers’ viewing behavior during TV commercials. This research extends the studies of using eye movements in dynamical situations (Bahill and LaRitz 1984; Carpenter and Just 1978; Cohen and Studach 1977; Definer 1995; Dishart and Land 1998; Goldberg and Schryver 1995; Goolkasian and Bunt 1980; Jacob 1991; Just and Carpenter 1985; Land 1992; Land and Furneaux 1997; Land and Horwood 1995; Land and Lee 1994; Liu 1998; Patla and Vickers 1997; Shank and Haywood 1987; Stampe and Reingold 1995; Vickers 1988, 1992, 1995, 1996), and it is the first research in marketing that uses eye movements as measurements of consumer’s attention to TV commercials. In addition, the current research confirms results of other studies that identification of objects in parafoveal vision influence consumers’ behavioral responses (Gould 1967; Williams 1967). The findings increase the understanding of marketers and advertisers how moment-to-moment consumer’s attention to a familiar brand name influences their viewing behavior during commercial
exposure and it presents methods to measure consumers’ moment-to-moment foveal and parafoveal vision to important commercial properties.

The average fixation duration of 0.28 seconds in our study confirms the average length of fixations between 0.2 and 0.3 seconds found in other studies (e.g. Haber 1976; Kroeber-Riel 1992, 1993; Land 1992; Loftus and Mackworth 1978; McConkie 1983; Rayner 1998; Rosbergen et al. 1997). Our results demonstrate that, as we argued, that the first visual brand identification has a negative effect on consumer’s viewing of the commercial, and every visual identification after the first one, does the same. Also brand identification in parafoveal vision increases consumers’ likelihood to stop watching the commercial. When we compare the coefficients of these variables (see Table 7.2), we conclude that the first visual brand identification is largest in magnitude, followed by visual brand identification after the first one, and the probability of identifying the brand in parafoveal vision has the smallest magnitude. These results correspond to curiosity theories (Loewenstein 1994) and research by Fazio et al. (1992) in which consumers curiosity level drops as the piece of missing information (the brand) is identified and consumers may feel a sense of anti-climax when the brand is already familiar to consumers.

Marginal support is found for an additional increase in the consumer’s probability to stop watching as the brand identification is delayed to the end, which may be explained by the fact that after having waited so long for the familiar brand, curiosity about: “What is it?” has increased and resolution through brand name exposure may drop curiosity levels even more. As the categorization theory based on the schema-triggered affect theory from Fiske and Pavelchak (1986) indicate, it may also be the case that consumer’s first brand identification motivates to rely on its own brand schema and not to explore the information in the commercial in further detail. For these reasons the likelihood to stop watching may be highest, after having identified the brand for the first time. Every other brand identification after the first identification and the more times of identifying the brand may increase consumer’s likelihood to discontinue viewing because additional brand name appearances confirm consumer’s hypothesis about which brand is advertised causing curiosity levels to drop, or do not teach the consumer significant more information (Alwitt et al. 1993).
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Gould (1967) suggested that peripheral vision would not fundamentally differ from foveal vision. Only the quality of peripherally presented information is worse than foveal information. Both Gould (1967) and Williams (1967) emphasized the capability of an individual to decide on the basis of parafoveal information about whether a stimulus is a target or not. This would mean that a familiar brand identified in the parafoveal vision may be sufficient to identify the brand and based on reasons given above, consumer’s likelihood to stop watching the commercial may increase. This is exactly what we find. The coefficient of the probability to have seen the brand in parafoveal vision is smaller in magnitude, because consumers may be less certain about which brand is advertised when identifying the brand in parafoveal vision in comparison to foveal vision. Brand name mentioning in the auditory did not influence consumers’ behavior during commercials. This may be explained by that the fact that television is a medium in which visual cues and movements are most influential (see also Palmer 1999).

An interesting finding is that when a consumer identifies the brand and it belongs to a high involvement product, the consumer’s likelihood to stop watching increases even more. High involvement products may make consumers to realize that upon brand identification of a brand belonging to a high involvement product category, more thinking is needed during commercial exposure, which they may not like (see also Chapter 6). However, when a brand belonging to a transformational product category is identified, it may decrease consumer’s likelihood to stop watching, because consumers may know upon brand identification that less information is given in the commercial (in comparison to a commercial that advertises a brand belonging to an informational product category) and the commercial may be more “relaxing” and enjoying to watch.

Several other topics for discussion remain. Issues with respect to laboratory character of the present research, our definition of consumers’ stopping to view a TV commercial, the operationalization of ad familiarity, programming material surrounding the commercials and mediating processes between contents of television commercials and their probability to be stopped can be found in Chapter 6.
Although our model takes into account differences between consumers and commercials, it does not give insight into how consumers with different ad processing styles pay attention to the brand and relate this to their exposure time. When the consumer’s goal is to learn (more) about the brand, consumers tend to focus more on brand-related information including the brand name and use a “brand-based” central processing strategy to either form an evaluation of the brand or to obtain information about the brand (Mitchell 1983; Petty and Cacioppo 1981). For these consumers more exposure to the brand could therefore have a positive effect on their viewing behavior. When the consumer has another more peripheral goal (e.g., enjoying the entertainment aspects of the ad), the consumer pays more attention to the more non-brand executional ad elements (Mitchell 1983; Petty and Cacioppo 1981) and identifying the brand name too many times could decrease their commercial exposure due to reasons discussed in this chapter.

Although the brand name is the most important identifier of a brand\(^{60}\), other brand identities such as slogans, jingles, colors and celebrities could also be good identifiers of the brand advertised and therefore influence consumers’ attention and viewing behavior during commercials exposure. Therefore, the methodology in this study could be used to examine the effect of other brand identifiers than the brand name on consumers’ moment-to-moment processing of TV advertising. The study could also be extended for unfamiliar brands in which different effects than in the current study may be found; consumers tend to watch unfamiliar stimuli longer (Berlyne 1960), consumers do not have a brand schema for unfamiliar brands and identifying an unfamiliar brand may increase instead of decrease curiosity levels.

Zufryden et al. (1993) report that zappers of TV commercials show only a slightly reduced commercial recall to nonzappers and they conclude that zapping behavior itself may have a positive impact on advertising recall in that it forces viewing action back to the TV set when the viewers might

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\(^{60}\) We did a small pilot study in which 10 respondents were exposed to 40 unfamiliar commercials. They were required to stop the commercials as soon as they thought to know which brand was advertised. Then they had to indicate which element gave them the verification to know which brand was identified. In 95% of the cases the brand name was mentioned.
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otherwise not be attentive. These authors also found that zapped commercials were significantly more effective than noninterrupted ads with respect to their impact on brand-purchase behavior. It is hypothesized that a reason for this phenomenon is the potential increase in viewers’ attention to the commercial at the time of a zap (Zufryden et al. 1993, p. 5). This is likely to lead to more active processing of advertising around the time of the zap and consequently to greater effectiveness for those commercials. Taken the results of the current research into consideration, we may conclude that people may be very aware of the time they stop viewing a commercial, namely at the time that the brand is identified and may therefore still be able to recall the brand name correctly. Also having processed the brand name more elaboratively than people, who did no stop the commercial at that moment, may be more eager to consider this brand at the point of purchase. From a managerial point of view this suggests that the potential negative impact of lost viewing audience due to interrupting the commercial may be partially offset by the improved effectiveness of ads, which are interrupted. This should be investigated in future research.

It is remarkable that previous research in TV advertising has taught us surprisingly little about the role of the brand in consumers’ attention to TV commercials, the element that is most informative to consumers and most important to advertisers and ad agencies. Based on our findings, advertisers and ad agencies would be well advised to examine in detail the role of dynamic branding guidelines in copy-testing and pay due attention to it in the development of copy strategy. Of course, our model is only a first step in doing so, and many of its aspects need further detail and future testing. It may be extended, for example, to investigate in further detail the parafoveal identification of commercial properties, to accommodate the effects of repeated exposure to commercials, to include the effects of consumers’ attention to other unfamiliar brands, brand identities or ad contents, media planning variables and consumers’ ad processing style. Also, we assume that when the brand appears in the audio track, consumers pay attention to it. Unbiased moment-to-moment measurement of consumers’ auditory attention in combination with moment-to-moment measurement of visual attention to TV commercials is a new avenue in future research for which the current research makes the first step.
7.9 Appendix

This appendix explains how we compute the consumer’s probability to identify the brand name in parafoveal vision in a particular second \( q \). Let’s assume that consumer \( p \) has the following estimated coefficients of the bivariate normal distribution of her visual field for commercial \( i \): \( m_{x} = 0.01 \), \( m_{y} = 0.03 \), \( s_{x} = 3.39 \), \( s_{y} = 3.15 \) and \( r_{xy} = 0.55 \). These parameters yield the visual field of respondent 14 for commercial 16 shown in Figure 7.2.

From second 1 to 2, this consumer has two fixations with \( x, y \) locations (a) 26, 6 from second 1 to 1.56 and (b) 28, 12 from second 1.56 to 2. The brand name is present from second 1.2 to 1.8 and changes from location and size at second 1.6. To obtain the probability that consumer \( p \) has seen the brand name from second 1 to 2 in commercial \( i \) we do the following: We distinguish five situations as illustrated in Figure 7.2.

Then, we compute the probability that consumer \( p \) has seen the brand name for each of these situation as illustrated below:

1. Because the brand is not present, the probability is equal to zero.

2. The probability is computed as:

\[
\int_{\text{Area } A} \phi(\Delta x, \Delta y) d\Delta x d\Delta y = \int_{\max[|x_1-x_p|,|x_2-x_p|]}^{\min[|x_1-x_p|,|x_2-x_p|]} \int_{\max[|y_1-y_p|,|y_2-y_p|]}^{\min[|y_1-y_p|,|y_2-y_p|]} \phi(\Delta x, \Delta y) d\Delta x d\Delta y
\]

where \( \phi(\Delta x, \Delta y) \) denotes the bivariate normal distribution of the visual field of consumer \( p \) for commercial \( i \) with the specific coefficients as obtained above. In this situation, the probability is equal to

\[
\int_{\text{Area } A} \phi(\Delta x, \Delta y) d\Delta x d\Delta y \approx 0.21
\]

This probability is computed by using the \( \text{cdfbvn} \) function in Gauss and applying the appropriate data transformations.
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Figure 7.2: Illustrations of fixation points and brand area from second 1 to 2, situation 1 and 2

Situation 1: Fixation point from second 1 to 1.2

Situation 2: Fixation point and brand area from second 1.2 to 1.56
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Figure 7.2 continued: Illustrations of fixation points and brand area from second 1 to 2, situation 3 and 4

Situation 3: Fixation point and brand area from second 1.56 to 1.6

Situation 4: Fixation point and brand area from second 1.6 to 1.8
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Figure 7.2 continued: Illustrations of fixation points and brand area from second 1 to 2, situation 5

Situation 5: Fixation point from second 1.8 to 2

3. The probability is equal to \( \int_{-2}^{8} \int_{-10}^{0} \phi(\Delta x, \Delta y) \, d\Delta x \, d\Delta y = 0.06 \)

4. The probability is equal to \( \int_{\text{Area A}} \phi(\Delta x, \Delta y) \, d\Delta x \, d\Delta y + \int_{\text{Area B}} \phi(\Delta x, \Delta y) \, d\Delta x \, d\Delta y \)
\[ = \int_{0}^{2} \int_{0}^{2} \phi(\Delta x, \Delta y) \, d\Delta x \, d\Delta y + \int_{2}^{4} \int_{-2}^{2} \phi(\Delta x, \Delta y) \, d\Delta x \, d\Delta y = 0.16 + 0.08 = 0.24 \]

5. As in situation 1.

Finally, the probability for our consumer \( p \) to have seen the brand name in commercial \( i \) in the period from 1 to 2 seconds is equal to:

\( 0.20 \times 0 + 0.36 \times 0.21 + 0.04 \times 0.06 + 0.20 \times 0.24 + 0.20 \times 0 = 0.126. \)
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In this example we use simple shapes of the brand name area. In the current study complex shapes of the brand name area are also present.
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