The Gender Gap
Brain-Processing Differences Between the Sexes
Shape Attitudes About Online Advertising

Prior research suggested that males are more selective information processors and females are more detailed processors, but effects on advertising attention and attitudes have been largely unstudied. In particular, mere-exposure effects (more favorable attitudes with little or no advertising attention) are expected to be more pronounced for males than for females, due to less comprehensive heuristic processing by males. Furthermore, gender differences in hemispheric (brain) processing are predicted, with males expected to have more favorable attitudes from advertisements on the left of the page and females expected to have more favorable attitudes from advertisements on the right of the page. Hypothesized marketing outcomes are generally supported. Management implications are discussed.

INTRODUCTION
Prior marketing research into gender-specific processing has found that men tend to be “selective processors” who rely on heuristics (i.e., simple decision rules with little processing effort), whereas women tend to be “comprehensive processors” who focus on integrating detailed information (e.g., Meyers-Levy, 1989; Meyers-Levy and Maheswaran, 1991; Meyers-Levy and Sternthal, 1991). The prior research (Meyers-Levy, 1989) studied gender-specific hemispheric processing differences in the brain by analyzing categorization, sorting, and linguistic tasks but called for greater exploration of the activation of right- and left-hemisphere processing styles.

In general, the right hemisphere of the brain is geared toward holistic commonalities and categorization (better for processing pictures/graphics) and the left hemisphere toward detailed analysis (better for verbal processing; Bradshaw and Nettleton, 1981; Hansen, 1981). Other marketing-related research utilized relatively simple visual stimuli and left-versus-right placement to study hemispheric processing effects, but gender was left

Management Slant
- In this study, males showed greater attention toward graphical stimuli, such as banner advertisements.
- Males had wider swings in attitude based on attention to an advertisement.
- Females indicated more favorable attitudes to advertisements on the right of the page and males exhibited more favorable attitudes to advertisements on the left of the page.
- Advertisers should consider targeting more graphics-oriented advertisements toward males to optimize attention.
- Advertisers should place advertisements on the right of the page for females, and on left of the page for males, to optimize attitudes.
unexamined (e.g., Janiszewski, 1988, 1990). Surprisingly, marketing research focusing on gender and hemispheric processing differences seemed significantly decreased in the early 1990s, despite substantial research within the psychological and neurological fields.

The purpose of the current research is to evaluate potential gender-based hemispheric processing differences and address a gap in the marketing literature by examining gender-specific processing from a different perspective. Rather than attempting to evaluate differences in thoughts and processes (e.g., Meyers-Levy, 1989), this study examines potential effects of advertising location and gender on attention and attitudes, controlling for other factors. Theories of hemispheric processing are leveraged and updated for this purpose. The author believes that no prior research has explored advertising location effects that specifically relate to gender-specific hemispheric processing.

Furthermore, this study extends prior research (e.g., Fang, Singh, and Ahluwalia, 2007; Heath, Brandt, and Nairn, 2006) into mere-exposure effects (changes in attitude with little or no stimuli attention/cognition) by specifically focusing on gender differences, largely unexamined in the marketing literature. Women, for example, might process advertisements quite differently, according to attention levels or page location.

Therefore, results of this online study could be useful to the marketing practitioner community. With Internet advertising accounting for $36.57 billion in revenue for 2012 (PricewaterhouseCoopers/IAB, 2013), the Web is an increasingly important advertising medium, but standard banner advertising click-through rates have fallen to 0.10 percent (MediaMind, 2012). Marketers, Web designers, and advertising agencies could greatly benefit from new ideas for targeting, designing, and placing advertisements more effectively. Furthermore, although this study was conducted in an online environment, the findings regarding advertising location and the relationship between attention and attitude also may be generalizable to traditional media (see Discussion below).

LITERATURE REVIEW

Evolutionary-versus-Societal Conceptualization of Gender-Processing Differences

Some neurological researchers believe that women process language simultaneously with both brain hemispheres, whereas men tend to process in the left side only (Shaywitz et al., 1995). The corpus callosum, a large tract of neural fibers that connect both brain hemispheres, is larger in females than in males (Bishop and Wahlsten, 1997). Females’ stronger neural connections and associations between hemispheres (e.g., Bishop and Wahlsten, 1997; Sowell et al., 2007) provide more symmetric (i.e., integrated) hemispheric organization (Everhart et al., 2001). These hemispheric connections, along with larger female frontal and temporal lobes (Schlaepfer, Harris, Tien, Peng, Lee, and Pearson, 1995) related to language, provide some biological support of women’s verbal superiority.

Conversely, a brain region in the cortex called the inferior-parietal lobule (IPL) is significantly larger in men than in women. The IPL is involved with spatial perception and mentally rotating 3-D figures (Frederike, Lu, Aylward, Barta, and Pearson, 1999), pointing to a biological basis for men’s relative strength in visual spatial tasks. In evolutionary terms, developing visuospatial navigation skills may have enabled men to become better suited to the role of hunter, whereas the advantage of women’s verbal skills might have been to gain social advantage (Geary, 1998).

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Other researchers, however, have emphasized that conceptual models of cognitive differences between genders should integrate both neurological and sociocultural components. An “interactionist” approach interprets gender differences as being caused by a continuous interaction between environmental factors (experienced based) and biological factors (natural predispositions; Sherman, 1978).

Consequently, males, naturally preferring spatial activities, would actively search for high-spatial experiences that enhance spatial ability development and increases gender differences. Furthermore, social cognitive theory of gender-role development asserts that gender conceptions are constructed from experiences that guide gender-linked behavior (Bussey and Bandura, 1999). Thus, gender conceptions are the product of a network of interdependent social influences.

Although human evolution plays a role, a range of possibilities rather than predisposed gender differentiation is proposed. Similarly, gender schema theory (Bem, 1981) proposed that sex typing derives from processing information based on gender-linked associations and society’s emphasis on gender dichotomy. Under this theory, self-concept gets assimilated into gender roles, eliciting greater readiness to process information in a gender-appropriate way.
Although the reasons still are debated, there appear to be differences in gender processing, causing some fields (education, for instance) to take note.

In education research, gender-processing differences have been conceptualized along verbal, quantitative, and visual-spatial dimensions. Using the planning, attention, simultaneous, successive (PASS) cognitive-processing theory built on neuropsychological research (Luria, 1973), gender differences were found.

Girls outperformed boys on the planning (e.g., connecting individual numbers and letters) and attention (e.g., memory for detail, detection; Naglieri and Rojahn, 2001). Girls performed better than boys in verbal fluency, mathematical calculation, and written language—all of which have been described as requiring planning processing from the PASS theory (Halpern, 1997). Female advantages also were found on proofing, dictation, passage comprehension, and letter-word identification. Proofing, for example, requires the child to find errors in a written sentence, demanding careful examination of stimuli and error detection. Thus, prior research found that girls usually do better than boys on verbal tasks but that boys tend to outperform girls on tests that involve spatial representation (e.g., Weiss, Kemmler, Deisenhammer, Fleischhacker, and Delazer, 2003).

**Selective Processing**

Prior marketing research generally has supported gender differences in processing of information. One marketing study noted superior attitudes toward verbal advertisements by females and more favorable attitudes toward simple, attribute-oriented advertisements by males, attributed to unique thoughts and processing styles for each gender (Putrevu, 2004). Another study evaluated gender differences in information processing strategies, supporting greater selective processing for males (Darley and Smith, 1995).

Furthermore, neurological research has indicated that women show larger signal strength in temporal networks, suggesting spontaneously deeper semantic analysis for faster and deeper word processing (Wirth et al., 2007) during passive, no-task conditions (Pravitha, Sreenivasan, and Nampoori, 2005). Females tend to use reflective-sequential problem solving (Halpern and Tan, 2001; Klinteberg, Lander, and Schalling, 1987) and males prefer a more impulsive-global strategy. Not surprisingly, it has been found that women more frequently use verbal processing strategies than do men (Frings, Wagner, Unterrainer, and Speer, 2006).

Thus, males rely more highly on “selective processing” (e.g., Meyers-Levy, 1989) by using schemas and heuristics rather than more detailed processing. Schemas and heuristics are related concepts but have slightly different characteristics. Both schema- and heuristic-based processing can be seen as types of alternative strategies to deeper processing of information, which require significant resources.

- Heuristics are simple decision rules (versus systematic evaluation of message arguments [Chaiken, 1980]) that involve comparatively little processing effort and might take the form of non-content cues (Chaiken, 1980). Banner advertisements can be seen as a type of cue, since pictures or phrases often are used as a cue to product features or quality (Chaiken, 1980; Petty, Cacioppo, and Schumann, 1983). If males are selective processors, they might be expected to pay greater overall attention to pictorial images (e.g., banner advertisements) than would females, who would focus more comprehensively on different types of page stimuli.

Web-related marketing research into gender processing differences has indicated that women tend to perform more comprehensive and intensive information searches, whereas men engage in more selective information searches (Laroche, Saad, Kim, and Browne, 2000). Such differences also appear to affect Web navigation, with men showing less site exploration and lower involvement than women (Richard, Chebat, Yang, and Putrevu, 2010). In eye-tracking studies, males have exhibited significantly longer mean Web-image fixation durations than do females, consistent with male focus of attention on fewer areas versus female processing of all available information (Pan et al., 2004).
More specifically, women focus more strongly on text, and men focus more strongly on images (Schiessl, Duda, Thölke, and Fischer, 2003). Thus, there appear to be some fundamental processing differences between genders.

**“Mere-Exposure” Effects**

Starting in the 1970s, research into “mere-exposure” effects began to emerge, which suggested that affective judgments can be independent of (and precede) cognitive operations (e.g., Zajonc, 1980). Subsequent research supporting such implicit effects (e.g., Bornstein, 1989; Janiszewski, 1988, 1990) now appears to be well-documented (Johar, Maheswaran, and Peracchio, 2006).

Most models of mere-exposure effects have attributed the effect to perceptual fluency (e.g., Fang et al., 2007; Jacoby and Kelley, 1987; Lee, 2001) or feelings of familiarity with a stimulus, which leads to increased liking. Recent research has identified mere-exposure effects in incidental, low-attention situations (e.g., Fang et al., 2007; Heath et al., 2006) such as Web browsing, in which more favorable attitudes are associated with lower attention.

The terminology for “mere-exposure” types of conditions has been quite inconsistent in the marketing literature, with various terms being used such as “low attention,” “pre-attentive,” “implicit,” “subconscious,” and “incidental.” Perhaps the reason for this lack of consistency has been the great difficulty of measuring the extent to which a stimulus has been attended.

Traditionally, mere-exposure effects have been tested by measuring a lack of recognition of having seen an advertisement. For example, “incidental advertisement exposure” implies that an advertisement receives minimal attention, but had been tested by measuring recognition (Shapiro, MacInnis, and Heckler, 1997). More recently, other research has used the word “attention” in referring to mere-exposure effects, without ever measuring attention in the study (e.g., Fang et al., 2007; Heath et al., 2006).

Interestingly, stimulus awareness (Bornstein, 1989) and longer exposure durations (e.g., from 5 and 500 milliseconds; Bornstein and D’Agostino, 1989) somehow inhibit the mere-exposure effect. Advertisement exposure under low-attention or incidental conditions, however, with attention focused elsewhere (such as browsing a Web page), elicits a mere-exposure condition (Fang et al., 2007; Heath et al., 2006).

**Hemispheric Processing Research**

Prior hemispheric processing research has suggested that the right hemisphere establishes holistic commonalities and categorizes stimuli, whereas the left hemisphere pursues a detailed analysis of individual stimuli (Bradshaw and Nettleton, 1981).

Thus, the right hemisphere tends to better comprehend pictorial stimuli (Hansen, 1981), whereas the left hemisphere is more adept at comprehending verbal material. Such findings are consistent with early hemispheric marketing research (Janiszewski, 1988), which defined left-hemispheric processing as sequential/integrative and right-hemispheric processing as more global and holistic.

More recent support for hemispheric processing has come from functional magnetic resonance imaging analysis, which have shown that the right hemisphere uses a more holistically based visual processing strategy, whereas left-hemisphere processing is more item-based (Koutstaal et al., 2001). Thus, pictorial stimuli (e.g., a banner advertisement) should tend to activate the right hemisphere, but verbal stimuli (e.g., Web-page content) tend to should activate the left hemisphere (e.g., Meyers-Levy, 1989).

Hemispheric processing research (e.g., Bouma, 1990; Coltheart, Hull, and Slater, 1975; Kimura, 1969) also has found evidence that genders process information fundamentally differently, with males depending more greatly on the right hemisphere and females depending more on the left hemisphere.

For example, men perform spatial tasks more accurately in the left visual field (right hemisphere), reflecting greater contribution of the right hemisphere to visuospatial ability (Kimura, 1969). Females use more left-hemisphere processing, which positively affects language development and verbal problem-solving strategies (Annett, 1992). Thus, gender-related differences in brain activation are associated with different cognitive strategies, with males making greater use of verbal mediations with the left hemisphere (for both verbal and even “nonverbal” tasks; Kimura, 1969; McGlone and Kertesz, 1973), whereas males prefer right-hemisphere, non-verbal systems.

Neurological research has supported differences in hemispheric processing by gender. Functional magnetic resonance imaging analysis reveals distinct differences in neuronal activation between genders, with brain activation significantly more right lateralized in men and left lateralized in women (Frings et al., 2006).

Laterlization (hemispheric activation and specialization) has been found in many different areas of the brain (e.g., parietal and occipital lobes [Bell et al., 2005]; prefrontal cortex [Speck et al., 2000]; amygdala [Cahill, Uncapheer, Kilpatrick, Alkire, and Turner, 2004]; and hippocampi [Frings et al., 2006]), affecting tasks involving working memory.

Thus, females are generally considered to be more left hemisphere–dominant and men as more right hemisphere–dominant. Logically, verbal stimuli should activate greater left hemisphere
Neurological research has supported differences in hemispheric processing by gender.

processing, especially for females. Pictorial stimuli should activate greater right hemisphere processing, especially for men.

CONCEPTUALIZATION AND HYPOTHESES
Prior research into gender differences in information-processing strategies seems to be generally well founded, suggesting that males are more “selective processors” who rely on heuristics, whereas females are “comprehensive processors” who focus on integrating detailed information (Meyers-Levy, 1989; Meyers-Levy and Maheswaran, 1991; Meyers-Levy and Sternthal, 1991).

Such processing differences might yield differences in attention to stimuli, which could have an impact on mere-exposure effects on attitudes. Furthermore, as noted earlier, males tend to be more right hemisphere-dependent and females more left hemisphere-dependent. The right hemisphere tends to be more specialized in processing visual spatial information such as pictures and graphics, whereas the left hemisphere is more adept at verbal and item processing.

Logically, then, a pictorial/graphical stimuli directed to the right hemisphere (leftward placement) should be processed more favorably than stimuli directed toward the left hemisphere (rightward placement) (e.g., Janiszewski, 1988), especially for males.

The author believes, however, that no prior research has examined advertising-stimuli location effects by gender. If males are truly right hemisphere–dominant, one would expect that leftward stimuli would be processed more favorably by males than by females. And, if females are more left hemisphere–dominant, rightward stimuli would be processed more favorably by females than by males. As males have more pronounced brain lateralization, differential hemispheric effects should be quite clear (Meyers-Levy, 1989) compared to females, who exhibit a less lateralized processing pattern and tend to use both hemispheres in processing.

Predicted effects of gender-processing differences on attention and attitudes are described below, using prior research and information processing theory as a guide.

Advertising Attention
Studies related to advertising attention, whether they specifically measured attention (e.g., Pieters and Wedel, 2004) or did not (e.g., Fang et al., 2007; Heath et al., 2006), rarely have included a discussion of gender differences. Thus, prior research into gender attention differences is scant. The selectivity hypothesis—that women have lower attention thresholds (Meyers-Levy, 1989)—suggests, however, that little attention is required to trigger elaboration for females, resulting in more comprehensive processing of multiple stimuli. Females more likely spread their attention, therefore, across a larger number of stimuli than do men.

Subsequent consistent research has indicated that females comprehensively analyze both objective and subjective advertising information (Darley and Smith, 1995), suggesting greater distribution of attention across stimuli.

There also are gender differences in attention to verbal versus graphical stimuli. Females tend to focus more highly on text, consistent with a comprehensive processing strategy, whereas males tend to focus on graphics and images (Pan et al., 2004; Schiessl et al., 2003), consistent with heuristic processing. Thus, compared to females, males should show greater attention to the online advertisements, due to their tendency toward heuristic-based processing.

H1: Males will pay relatively greater attention to the online advertisements than will females.

Attention appears to reduce favorable mere-exposure effects on attitude (although attention was not directly measured in prior studies (e.g., Fang et al., 2007; Heath et al., 2006). Mere-exposure theory would predict that lower attention to the advertisement (in an overall low-attention environment like the Internet (Fang et al., 2007; Heath et al., 2006) would correspond to more favorable attitudes. Thus, one would expect a negative relationship between advertising attention and mere-exposure effects in the current study.

H2: The lower the attention to the advertisement, the more favorable will be the attitude, consistent with mere-exposure theory.

Males, through greater use of heuristics, might tend to interpret information and “become familiar” with a stimulus more quickly, leading to a more dramatic change from unfamiliarity to familiarity. With greater variation in attention and attitude, wider swings in the mere-exposure effect might be evidenced for males than for females.

Interestingly, a less evaluative approach has been found to leave people more susceptible to mere-exposure effects (e.g., Hoch, 2002). Reliance on schemas and heuristics, more predominant in men, is less detailed and evaluative than is
 Interestingly, a less evaluative approach has been found to leave people more susceptible to mere-exposure effects.

Because males tend to use a more selective, schema-driven approach, there potentially will be greater mere-exposure effects for males than for females, who tend to use a more comprehensive, evaluation-intensive approach. It should be reiterated that, although higher overall advertising attention is expected for males, the attention measures take place in relatively low attention environment (online environment, no motivational goals instructed, etc.), allowing mere-exposure effects to occur.

H3: Compared to females, males will be more susceptible to the mere-exposure effect.

Hemispheric Processing

Prior research indicates that advertising stimuli directed to the “optimal” hemisphere generates significantly more favorable attitudes (e.g., Janiszewski, 1988). Holistic stimuli such as banner advertisements, therefore, should be processed more fluently by the right hemisphere (on the left side of the page). Thus, it is expected that banner advertisements on the left of the page will be more highly favored by males and that advertisements on the right side of the page (goes to the left hemisphere) would be more highly favored by females. Results are expected to be somewhat less hemispherically differentiated for females, as females tend to blend right and left hemispheric processing (Meyers-Levy, 1989) more than males.

H5: Males will have more favorable brand attitudes from leftward advertisements than from rightward advertisements. Females will have more favorable brand attitudes from rightward-placed advertisements than leftward-placed advertisements.

METHODOLOGY

Design and Data Collection

Participants were recruited from a voluntary U.S. panel of a major online survey firm, Survey Sampling International. Gender was recorded for each participant to capture potential gender effects. Of the 882 participants, 482 were female, 400 were male. A variety of family compositions, ages, and educational backgrounds were represented (See Table 1).

Survey recruitment adhered strictly to ESOMAR codes and guidelines for access panels (www.esomar.org). No monetary reward was offered for completion, although respondents could support charities, have a chance to win prizes, and the like. The independent variables in this study are advertising location (left or right of Web page) and gender.

The study also controlled for page type (textual or graphics-oriented page) and other demographic variables (e.g., age, education level). Each participant was randomly assigned to a target stimulus. The dependent measures are attention to the advertisement (see Measure Development) and brand attitude.

A major Web portal that requested it not be identified, and Pogo.com, a gaming site owned by Electronic Arts Pogo, provided home-page images to provide different page backgrounds (measured and controlled in the Results section). The consumer products company, Philips Norelco, provided banner-advertising images. Vertical (160 × 600 IMU “skyscraper”) banners were used, as the dimensions were most applicable to right–left placement on the Web page.

Interestingly, dramatic differences in right–left placement might not be

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<td><strong>Participant Characteristics</strong></td>
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<td><strong>Age</strong></td>
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necessary to elicit hemispheric processing effects. Prior research has found that images presented only 4 degrees from a central fixation point yield hemispheric differences (Bourne and Hole, 2006). The advertising stimuli featured a brand of electric shaver. Post-study analyses showed no significant attitude differences between genders, suggesting similarity in judgments toward the product.

**Measure Development and Validation**

Attention was tracked online in real time using attention tracking, a technology that exploits the fact that visuospatial attention generalizes across response effectors (eye, hand, and head movements; Scheier, 2003). Attention can be inferred by tracking eye movements, as in traditional eye tracking, but can also be measured by tracking pointing movements with the hand or with a computer mouse. A click corresponds to a fixation of the eye, which, in turn, corresponds to a fixation of visuospatial attention.

Empirical evidence has indicated that this methodology provides a valid and reliable measure of visuospatial attention (Scheier, 2003). In particular, it has been shown that fixations measured with this methodology are significantly correlated with fixations measured by traditional eye-tracking devices ($r = 0.90, p < 0.01$). This measure of attention has already been utilized and documented in the marketing literature (e.g., Goodrich, 2010).

This study adopted an attention-based definition of mere exposure, which “occurs under incidental conditions where the audiences’ attention is focused elsewhere” (Fang et al., 2007), such as reading a magazine or browsing a Web page. The current study, however, actually uses a measure of attention as an independent variable, in contrast to prior mere-exposure studies in which attention to the advertisement was not specifically measured.

Participants were instructed to use the mouse as a pointing device. After a short training procedure, participants clicked whatever caught their eye on the series of eight Web pages, each presented for 10 seconds. This attention-tracking methodology is best used for measuring relative attention to different stimuli on a Web page.

The definition of attention was adapted using standards from eye tracking called “percent attention,” which measures the percentage of fixations in a pre-specified area of the visual field. Thus, for the attention-tracking methodology used in this study, “attention” is defined as “the percent of clicks on a particular region (e.g., a banner advertisement) divided by the total number of clicks on the page, resulting in a continuous variable with theoretical values from zero to 100.”

Participants then were asked to complete an online questionnaire designed to measure brand attitude, which was measured using five attitude items (“good,” “appealing,” “attractive,” “likeable,” and “pleasant” (Janiszewski, 1988, 1990) on a 7-point Likert scale (7 is highest, and 1 is lowest). Janiszewski measured attitude toward advertising (1988) and brand name evaluation (1990). In this study, however, brand attitude is measured, which is related positively to attitude toward the advertisement in low involvement situations (Droge, 1989; Vakratsas and Ambler, 1999).

**RESULTS**

The five items measuring attitude all loaded onto a single factor, with individual loadings above 0.80. Reliability was strong, with a Cronbach’s alpha of 0.94. Attitude scores were then summed and used as an overall indicator of attitude. Cell means and standard errors are reported in Table 2.

All analyses controlled for other variables that might influence advertising attention and attitude, including age, education level, and page background.

**Branding Attention**

Potential gender effects on attention were tested using analysis of covariance (ANCOVA), with attention as the dependent variable, gender as the fixed factor, and control variables of age, education level, advertising location (left versus right), and page background (text or graphics-oriented).

The results indicated a significant main effect of gender ($F(5,882) = 4.00, p < 0.05$), with males showing higher attention to the advertisement ($M = 14.3$) than females ($M = 12.5$), supporting H1. No other variables were significant. Thus, males showed greater attention to the advertisement in this study environment (Table 3).

**Attitude**

The hypotheses relating to attitude (mere exposure and hemispheric processing effects: H2–H5) were tested using an ANCOVA, with brand attitude as the dependent variable.

**TABLE 2**

Summary of Cell Means: Advertising Effects by Gender and Advertising Location

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<th>Male Left</th>
<th>Male Right</th>
<th>Female Left</th>
<th>Female Right</th>
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<tr>
<td>Attention (%)</td>
<td>13.3 (0.95)</td>
<td>15.3 (0.93)</td>
<td>12.9 (0.86)</td>
<td>12.1 (0.85)</td>
</tr>
<tr>
<td>Attitude (sum scales)</td>
<td>16.5 (0.50)</td>
<td>14.8 (0.49)</td>
<td>15.5 (0.45)</td>
<td>15.8 (0.45)</td>
</tr>
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*Standard errors are in parentheses.*
dependent variable, gender and advertising location (left versus right) as fixed factors, and attention, age, education level, and page background (text or graphics-oriented) as covariates. The relationship between attention and attitude was significantly negative ($F(7, 882) = 5.41, t = -2.32, p < 0.05$), supporting H2 and predicted mere-exposure effects.

To test potential gender differences in the mere-exposure effect, the ANCOVA was modified slightly to use attention as a fixed factor rather than a covariate to highlight the potential gender interaction with attention. A dichotomous variable for attention was created, using a low-attention group (attention < 10, which is less than chance) and a high-attention group. The interaction between gender and attention on attitude was significant ($F(10, 882) = 3.94, p < 0.05$), with males showing the most favorable attitudes at low attention ($M = 16.9$) but the least favorable attitudes at high attention ($M = 14.7$), compared to relatively stable attitudes for females ($M = 15.9$ and $M = 15.6$, respectively), supporting H3’s prediction of a greater mere-exposure effects for males (See Figure 1).

Advertising location (left versus right placement) did not have a significant main effect on attitude, although attitude with leftward advertisement placement ($M = 16.0$) was directionally higher than rightward placement ($M = 15.3, p = 0.11$). Interestingly, there was a significant interaction between gender and advertising location on attitude ($F(7, 882) = 4.48, p < 0.05$), with males having the most favorable attitudes for leftward advertisements ($M = 16.5$) and the least favorable attitudes for rightward advertisements ($M = 14.8$), whereas females showed greater hemispheric balance ($M = 15.5$ and $M = 15.8$, respectively), supporting H5. Thus, the prediction of more favorable male attitudes associated with leftward advertisements and more favorable female attitudes (slightly) for rightward advertisements is supported. (See Figure 2 for an illustration of the interaction between gender and advertising location on attitude.)

**DISCUSSION AND IMPLICATIONS**

Overall, the results of this study support fundamental gender differences in the processing of advertising information. These results suggest actionable recommendations for marketers, which are summarized here and then further explained in relation to the study’s findings:

- To optimize advertising attention, target more graphics-oriented advertisements for males and more text-based appeals for females.
- To optimize mere-exposure effects (low advertising attention associated with favorable attitudes), target more online advertisements for males and more detailed explanations of product benefits for females.

![Figure 1 Brand Attitude by Gender and Attention Level](image-url)
To elicit the most favorable brand attitudes (gender-specific hemispheric processing effects on attitudes), place online advertisements on the left of male-oriented Web pages (e.g., ESPN) and on the right of female-oriented Web pages (e.g., iVillage).

Females tend to be more comprehensive processors than males, who process more heuristically (e.g., Meyers-Levy, 1989). Consistent with prior gender processing theory, males in the current study showed greater attention toward the graphical advertising stimuli, whereas attention of females was more evenly distributed between text and graphics. Greater male attention to the banner advertisement was consistent with a preference to process heuristically, whereas greater female attention to other page elements was consistent with comprehensive processing.

Thus, marketers should consider developing more graphics-oriented advertisements for males to appeal to their preference for heuristic processing, and more text-based appeals for females, who tend to prefer more comprehensive processing. Furthermore, more detailed full-page advertisements with substantial textual information would likely be more appropriate for females than for males.

The results also indicate a mere-exposure effect in online advertising, supporting inferences from prior research that did not specifically measure attention (e.g., Fang et al., 2007; Heath et al., 2006). In this online study environment, lower attention to the advertisement was associated with more favorable attitudes, supporting suggestions from prior research. Interestingly, however, males appeared to be more susceptible to the mere-exposure effect than are females. Males showed more favorable attitudes at low advertising attention and less favorable attitudes at high advertising attention than did females.

If mere exposure “works” better with males, males might be targeted more heavily for Internet banner advertising, as the Web’s generally low advertising attention and less elaborative processing offer a potentially strong environment for mere-exposure effects. If females are less susceptible to mere exposure, advertising that attracts their attention (as long as it is not perceived to be manipulative) and explains product benefits in detail would be recommended.

This study found significant gender differences in attitudes resulting from advertisement location (left or right of the page), supporting hemispheric processing differences by gender.

Males had more favorable brand attitudes from leftward-placed advertisements and females had more favorable attitudes from rightward-placed advertisements. Leftward advertisements are directed to the right hemisphere—optimal in males—whereas rightward advertisements are directed to the left hemisphere—optimal in females.

Logically, marketers should attempt to place advertisements on the right of female-oriented Web pages (e.g., iVillage) and on the left of male-oriented Web pages (e.g., ESPN.com) to elicit the most favorable brand attitudes. This would mean maintaining the typical rightward banner advertisement placement for females but would require a more dramatic repositioning of advertisements on the left of the page for males.

**Potential Limitations, Generalizability, and Future Research**

It should be noted that the results of this study were performed in a specific type of online environment and that the results may not necessarily be replicable to other environments. For example, Web page
images rather than “live” Web pages were used, allowing greater control of page exposure time (10 seconds per page) and page sequence for a more comparable user experience. Future research might use live Web pages to better understand visitor navigation and clickstreams.

Although this study was conducted in an online environment, the findings are potentially generalizable to traditional media. For example, the positioning of advertisements on the right versus left of the page for optimal hemispheric processing could be equally applicable to print advertisements (magazines, newspapers, etc.) as to banner advertisements.

Similarly, gender differences in attention to graphical versus textual stimuli might generalize to other media. Caution should be taken in generalizing mere-exposure results, however, as the Web is a particularly appropriate venue for capturing these effects (e.g., Fang et al., 2007).

Future research should be conducted in offline environments to test potential correspondence of results. Other potentially interesting areas for future research include using neuromarketing to test gender processing differences and exploring gender-related processing differences with higher attention appeals.

Although there has been extensive gender-based neuroscience research in the past two decades (e.g., Bell et al., 2005; Cahill et al., 2004; Frings et al., 2006; Speck et al., 2000), neuroscience research has not yet explored gender differences in response to advertising effects. This would be an excellent way to explore the physiological dynamics of gender processing differences.

Although prior research has explored gender differences in responses to higher-attention advertising appeals (comparative versus non-comparative advertising, manipulative advertising, etc.), it would be interesting to explore potential gender processing differences in these higher-attention environments (versus in a lower-attention online environment). The results could yield interesting interactions of gender processing differences with social/psychological variables such as perceived manipulation intent, attributions, cognitions, and the like.

CONCLUSION

This study provides potentially useful insights for both the academic and practitioner communities. The research addresses a gap in the marketing literature by extending theories of hemispheric processing and mere-exposure to examine potential gender differences. The findings also may help practitioners improve the targeting of marketing communications by gender, enhancing their marketing precision and profitability.

Through greater insight into how advertising stimuli might interact with gender, it is hoped that advertising strategy and design can be more closely matched to marketing goals.

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REFERENCES


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