

How Do Adolescents Process Advertisements? The Influence of Ad Characteristics, Processing Objective, and Gender

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This study investigates the influences of print advertisements on the affective and cognitive responses of adolescents. Junior and senior high school males ($n = 111$) and females ($n = 84$) were randomly assigned to either a low- or high-elaboration condition to process primarily visual and primarily verbal print advertisements. The students then responded to questions measuring three dependent variables—memory of specific facts, inference, and emotional response. Three-way ANOVA results indicated that predominantly visual advertisements elicited memory of more facts, more inferencing, and more intense emotional responses than predominantly verbal ads. In addition, females remembered more facts, made more inferences, reported stronger emotional responses, and detected the explicit claim of the ad more frequently than males. Finally, students in the high-elaboration condition remembered more details than students in the low-elaboration condition. The results are discussed in terms of implications for advertising media literacy. © 2000 Academic Press

Advertising is a pervasive and persuasive force in our consumer-oriented society, with every age group confronted by the ubiquitous advertisement. Adolescents are primary targets, as marketing specialists recognize their immense buying power for products ranging from perfumes to jeans to cigarettes. Even the traditionally advertisement-free environment of the school classroom now hosts ads for athletic shoes and other products that appeal to young people with the widespread availability of Channel One (Gwynne, 1995) and classroom magazines, such as *Weekly Reader* and *Scholastic* (Karparkin & Holmes, 1995). A report, *Captive Kids* (Consumers Union, 1995),

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reveals that some ads are even masked as educational materials (e.g., Domino Pizza's "Encounter Math"; Oxy 10's "\$10,000 Scholarship Contest"; and BIC's "Quality Comes in Writing"). Even greater exposure to advertising occurs outside of the classroom in numerous magazines published exclusively for the teenage audience, such as *Sassy*, *Young and Modern*, *Teen*, *Seventeen*, and *Young Sisters & Brothers*, which are filled with sophisticated advertisements targeting adolescents.

Early consumer research downplayed the vulnerability of adolescents to potent advertising messages, for findings indicated that as children grow older, knowledge about the purpose of advertising, skepticism, and negative attitudes about advertising in general increases (Ward, Wackman, & Wartella, 1979). Yet Linn, de Benedictis, and Delucchi (1982) found that although adolescents are skeptical of advertisers generally and recognize procedural flaws, they still *believe* advertisements and *accept* misleading claims. Recent interviews of adolescents also revealed a lack of media savvy (Fox, 1995). These adolescents tended to trust advertisers' motives and viewed ads as beneficial, some even confusing commercials for public service announcements and concluding that the kids in a Pepsi commercial were not paid actors. Growing concern about advertising designed specifically to appeal to teens has led to the removal of "Joe Camel" an immensely popular character in cigarette ad campaigns (Associated Press, 1998; Report of the Surgeon General, 1994; Woodward, 1998).

What factors influence adolescents' processing of print advertisements? Dubow (1995) found that memory for advertising varies as a function of age, with teens remembering advertising better than young adults and older adults. We know little, however, about the specific mechanisms responsible for the affective and cognitive responses of the adolescent consumer to advertising. Research conducted on adults' processing of print advertisements identifies three factors that affect the memory processes and subsequent responses of adults. They are (a) the characteristics of the advertisement, primarily visual imagery; (b) processing objective; and (c) the gender of the perceiver.

The first factor pertains to the visual imagery present in the print ad. It is well established that visual imagery increases the comprehension and recall of words, sentences, paragraphs, and stories (McDaniel & Pressley, 1987; Sadoski & Paivio, 1994). According to Paivio's dual coding model (1991), information can be stored in two separate, but connected, mental systems, the verbal system and the nonverbal system, often referred to as the imagery system. Information that is encoded in both systems is more likely to be recalled due to the increased associative connections afforded by the two systems. Research on advertisements supports the premises of the dual coding model. Advertisements that contain more visual information relative to verbal information are better remembered by adults (Percy & Rossiter,

1983). The use of visual imagery in advertisements also elicits affective responses in the adult viewer that affect recall (Friestad & Thorson, 1986; Stuart, Shimp, & Engle, 1987) and induce the generation of mental imagery and elaboration, which facilitates recall and inferences (Gaeth & Heath, 1987; Kisielius & Sternthal, 1982). Verbal information also is better remembered when linked with visual elements (Kisielius & Sternthal, 1982), particularly when combined interactively (Lutz & Lutz, 1977).

A second factor that affects the information processing of adults is the processing objective of the perceiver, which influences what information is attended to and encoded in memory. When a perceiver processes material more deeply, more elaborations are made and more extensive connections are made to prior knowledge (Anderson & Reder, 1979; Craik & Lockhart, 1972; Loken & Hoverstad, 1985). Two types of processing objectives for advertisements have been investigated: (a) a low-elaboration or memory-based goal, which focuses on superficial aspects of the advertisement; and (b) a high-elaboration or evaluative objective, which involves a deeper level of processing. When adults viewing ads use elaborative processing, they relate the ad content to existing knowledge and/or embellish it which, when asked to evaluate the product, results in a quicker response time (Lichtenstein & Srull, 1985). A high-elaboration processing objective also fosters better comprehension of the message than a low-elaboration processing objective (Friestad & Thorson, 1986).

The third factor that differentially affects adults' recall of an ad and affective response is gender. Meyers-Levy (1989) proposed the selectivity hypothesis to explain gender differences in processing. According to the selectivity hypothesis, adult males often do not comprehensively process all available information. Instead they tend to use heuristic devices to simplify the processing task, focusing on a single, highly salient, and often self-related cue from the message. In contrast, adult females tend to use a comprehensive strategy to process information. Females attempt to assimilate all available cues and engage in more detailed elaboration of specific message content than males. Females' detailed elaboration of a message's content sometimes results in a heightened sensitivity to the specific features of message claim. Although Meyers-Levy (1989) suggested that the selectivity hypothesis can be used to interpret a wide variety of observed gender differences, empirical support for the selectivity hypothesis is found mainly in research on adults' processing of advertisements (Darley & Smith, 1995; Meyers-Levy 1989). If contextual factors motivate males to also engage in more comprehensive processing of advertisements, then the gender differences are greatly reduced (Meyers-Levy & Maheswaran, 1991).

In summary, ad characteristics, processing objective, and gender of the perceiver influence adults' processing of advertisements and subsequent cognitive and affective responses. How do these three factors influence adolescents' processing of ads? The purpose of this study was to investigate the

effect of these factors on adolescents' memory of, inferences about, and emotional response to specific advertisements. Their ability to detect the explicit claim of an advertisement also was tested.

METHOD

Subjects

The participants for the study were 195 junior high and senior high students (84 females and 111 males). The students in the sample were representative of diverse ability levels and socioeconomic groups. The average age of the student sample was 14.7.

Design

The experiment was a $2 \times 2 \times 2$ factorial design, with two between-subjects factors and one within-subjects factor. The two between-subjects factors were (a) gender and (b) processing objective (low or high elaboration). The within-subjects factor was type of advertising stimulus (visual or verbal content).

Materials

Advertising stimuli. Six advertisements selected from teen magazines and photographed on slides served as the experimental stimuli. The ads were selected from a pool of approximately 50 ads generated from magazines named by 10th-, 11th-, and 12th-grade students as "magazines they purchased to read." These ads were initially selected because of high visual content, high verbal content, product relevance to the age group, and product appeal to both genders.

Content analysis of the advertisements was performed by 15 students in a graduate class on evaluation methods. The graduate students judged (a) the strategy appeal, (b) the amount of visual content, and (c) the amount of verbal content using a 6-point Likert scale (1 = *extremely strong* to 6 = *extremely weak*). The first attribute, strategy appeal, refers to the advertisers' appeal or strategy for gaining attention and influencing the viewer and includes such tactics as the use of (a) graphic devices and (b) product information and the application of (c) classical conditioning and (d) observational learning principles. Graphic devices include bold contrasts of colors, shapes, and textures or distinctive use of composition or photographic imagery. Product information refers to the presentation of information about relevant product attributes such as providing information concerning gas mileage and engine specifications when advertising an automobile. The final two strategy appeals utilize principles of classical conditioning and observational learning. In advertisements using principles of classical conditioning, two stimuli are paired together to elicit an emotional response in the viewer (Stuart, Shimp, & Engle, 1987). For example, the pairing of a rosebud glistening with dew drops with a product such as women's make-up in an ad generates a positive viewer response to the product. In advertisements using principles of observational learning, peer or celebrity models may be portrayed as obtaining emotional, psychological, or experiential benefits from using the advertised product. One example would be an advertisement depicting a teenage girl wearing name-brand jeans in the center of several males who appear to be flirting with her. The model's behavior, that is, wearing the advertised brand of jeans, is reinforced by the attentive responses of her friends. Vicarious reinforcement of the viewer potentially leads to the viewer's imitation of the observed behavior (Bandura, 1986).

Interrater reliability in the content analysis for strategy appeal of the ad and verbal/visual content was high. All groups were unanimous on the appeal dimension and on classifying the ad as predominately either visual or verbal. They varied slightly on the relative strength of the visual and verbal dimension, yielding reliability coefficients of α of .98 and .90 respectively. Six ads were chosen for the present study. Four ads with high visual content representing

three of the appeals frequently used by advertisers [one graphic, one classical conditioning, and two observational learning (one peer and one celebrity model)] and two ads with high verbal content representing a fourth appeal (product information) were used as stimuli.

Dependent measures. An instrument was developed consisting of questions which tested memory of specific facts, number of inferences made, intensity of emotional response, and ability to detect the explicit claim of six specific advertisements. Revisions were made to the questionnaire based on information obtained from two pilot tests, the first with 34 graduate students and the second with 20 high school students.

On the revised questionnaire, students completed a series of 16 questions (each series developed for a specific ad) immediately after viewing each of six advertisements. Each series of questions included four questions (two correct and two incorrect factual statements) testing memory of specific facts, five true/false items testing inferences and ability to detect the explicit claim, three items in which students rated emotional intensity, and four items which assessed the degree to which particular ad claims were perceived as misleading and relevant. The questionnaire thus consisted of a total of 96 items: 24 memory items, 24 inference items, 6 explicit claim items, 18 emotional intensity items, and 24 misleading and relevant ad claims items.

The questions testing memory of specific facts of the ad required a *Yes, No, or Don't Remember* response. For example, memory questions for a cologne advertisement were "Were two colognes advertised?"; "Was the guy barefooted?"; "Was the name of the advertised product _____ (incorrect name)?" and "Was the girl's blouse white (incorrect color)?" The memory score is the number of specific facts students correctly remembered.

To determine the number of inferences made about each ad, students read five statements and judged them as *True, False, or Don't Know*. Students were told to base their answers to the inference questions solely on the advertisement they had seen. Four of the five statements were inferences that could be made from the advertisement's visual and verbal information but were not necessarily true statements. Examples of inference statements about the cologne ad are "People should wear cologne mainly when going out with the opposite sex" and "I'd feel special if I bought this cologne," which are not explicitly asserted in the ad but may be inferred from the visual information. Some of the inferences, while plausible, may lead to misconceptions. For example, plausible yet false inferences drawn from the visual image is "This cologne has a magical quality that attracts the opposite sex" and "When you wear _____, it's OK to feel wild." The remaining statement was the explicit assertion or main claim of the ad. An example of the main claim of the ad is "_____ is made from a fragrant oil found only in nature." The total of *True* responses for each ad (not including the statement that was the explicit claim of the ad) yielded the number of inferences. Maximum number of total inferences was 24. A *True* response to the explicit assertion of the ad indicates that the student detected the main claim of the ad.

Emotional responses were measured by asking the participants to rate the strength of three feelings evoked by each ad on a semantic differential scale of 1 to 7 (*weak to strong*). Emotional descriptors were derived from an emotional index topology developed by Holbrook and Westwood (1989) which yielded reliability coefficients ranging from .85 to .97 when tested on viewer reactions to television commercials. The three emotional descriptors provided for each ad in this study were compiled by a group of 10 graduate students who were given a larger list of descriptors derived from the topology of Holbrook and Westwood (1989) and asked to choose two emotional responses likely to be evoked by a specific ad and to list a response not listed that may be evoked. The three emotional descriptors chosen by the majority of the group as the feelings most likely to be evoked by a particular ad were used for measuring emotional response. Thus, emotional response was measured on a scale of 1 to 7 for each of three descriptors. Total emotional response to a specific ad was computed by summing the scores for the three descriptors. The range for possible emotional response scores was 18 to 126.

Procedures

The procedure was conducted in a total of 10 classrooms with each class consisting of 15 to 20 students. Using a randomized block design to assure proportionate representation of gender, the students were assigned to a low-elaboration or a high-elaboration processing condition and instructed about the processing objective of the task. The instructions for the low-elaboration condition were as follows:

You will view slides of six advertisements from recent magazines and answer some questions about them. We are interested in what you remember about specific ads. Please look carefully at each advertisement, noting the wording and images used. For example, check to see if the ad is worded correctly. Try to remember as many of the details as you can.

The instructions for the high-elaboration condition were as follows:

You will view slides of six advertisements from recent magazines and answer some questions about them. We are interested in your evaluation of specific ads. Please look carefully at each ad and form an opinion about it. Rely on your imagination as you view each ad. Close your eyes and visualize the product and the advertisement. Decide how you feel about the product and about the ad.

After reading the instructions, the students viewed the six stimulus slides projected onto a screen for 20 s. The order of presentation of the slides was randomized for each group of students to control for primacy and recency effects. The students then completed the dependent measure for all six slides in the same order in which the slides had been viewed. Each slide was flashed on the screen for 1 s to cue the students to answer the questions about that particular ad.

RESULTS

A univariate 2 (gender) \times 2 (processing objective: high elaboration vs low elaboration) \times 2 (type of ad: visual vs verbal) ANOVA mixed-effects model was used to analyze the main effects of type of advertising stimuli, processing objective, and gender on each of the three dependent measures, with visual vs verbal type of ad as the within-subject variable.

Memory of Specific Facts

Advertisements classified by content analysis as high in visual imagery elicited greater memory for specific facts than ads high in verbal content, $F(1, 194) = 833.39, p < .001$. Females scored significantly higher than males on the memory measure, $F(1, 194) = 16.06, p < .001$. There was also a significant main effect of processing objective on the number of facts remembered, $F(1, 194) = 12.27, p < .001$. Students in the high-elaboration processing condition remembered more details than students in the low-elaboration processing condition across all advertisements (Table 1).

An interaction was found between gender and processing objective for the memory measure $F(1, 195) = 5.27, p < .001$. In the high-elaboration condition, the difference between males and females was smaller (males $\bar{X} =$

TABLE 1
Means and Standard Deviations for Memory of Advertisements

Processing objective	<i>n</i>	Type of advertising stimulus		
		Verbal mean (<i>SD</i>)	Visual mean (<i>SD</i>)	Total ads mean (<i>SD</i>)
Low elaboration				
Males	57	3.93 (1.93)	7.43 (2.22)	6.26 (2.60)
Females	39	4.52 (1.53)	8.55 (2.30)	7.21 (2.81)
Total low	96	4.17 (1.55)	7.87 (2.31)	6.11 (2.72)
High elaboration				
Males	54	4.57 (1.36)	8.36 (2.64)	7.10 (2.91)
Females	45	4.50 (1.58)	8.91 (2.58)	7.44 (3.09)
Total high	99	4.54 (1.46)	8.62 (3.22)	6.59 (2.99)
Total males	111	4.24 (1.48)	7.88 (2.47)	6.07 (2.78)
Total females	84	4.51 (1.55)	8.75 (2.46)	6.62 (2.96)
Total students	195	4.36 (1.52)	8.25 (2.50)	6.95 (2.88)

7.10, females $\bar{X} = 7.44$) than the difference between males and females in the low-elaboration condition (males $\bar{X} = 6.26$, females $\bar{X} = 7.21$).

An interaction also was found between gender and type of advertising stimulus for the memory measure $F(1, 195) = 4.39, p < .05$. Females remembered more facts about the visual advertising stimulus than males (females $\bar{X} = 8.75$, males $\bar{X} = 7.88$). The difference in memory for specific facts between females and males for visual stimuli was greater than the difference in memory between females and males who viewed verbal stimuli (females $\bar{X} = 4.51$, males $\bar{X} = 4.24$).

Inferences

A significant main effect of gender existed, with females making a greater number of inferences than males across all ads, $F(1, 195) = 14.56, p < .001$. Inferences also were influenced by type of advertising stimulus, with visually based ads eliciting more inferences, $F(1, 195) = 602.48, p < .001$. The main effect of processing objective did not significantly influence the number of inferences $F(1, 195) = 1.54, p > .05$ (Table 2).

An interaction was found between gender and type of advertising stimulus for the inference measure, $F(1, 195) = 11.81, p < .001$. The difference in inferences between males and females was greater for the visual advertising stimulus (males $\bar{X} = 6.47$, females $\bar{X} = 7.70$) than for the verbal stimulus (males $\bar{X} = 2.97$, females $\bar{X} = 3.05$).

TABLE 2
Means and Standard Deviations of Inference Measure

Processing objective	<i>n</i>	Type of advertising stimulus		
		Verbal mean (<i>SD</i>)	Visual mean (<i>SD</i>)	Total ads mean (<i>SD</i>)
Low elaboration				
Males	58	2.83 (1.69)	6.60 (2.76)	5.34 (3.03)
Females	38	2.97 (1.59)	7.34 (3.09)	5.89 (3.38)
Total low	96	2.88 (1.65)	6.90 (2.91)	5.56 (3.18)
High elaboration				
Males	54	3.13 (1.76)	6.33 (3.43)	5.26 (3.34)
Females	45	3.11 (1.51)	7.99 (2.71)	6.37 (3.31)
Total high	99	3.12 (1.65)	7.10 (3.22)	5.77 (3.37)
Total males	111	2.97 (1.73)	6.47 (3.10)	5.31 (3.18)
Total females	84	3.05 (1.55)	7.70 (2.90)	6.15 (3.35)
Total students	195	3.01 (1.65)	7.00 (3.07)	5.66 (3.28)

Detection of Explicit Claim

For each of the advertising stimuli, the explicit assertion of the ad was stated as an item in the inference measure. Forty-four percent (522) of the explicit claims of 1174 total observations (six observations per subject) were not detected by students. A 2×2 chi-square was performed to determine if the gender of the viewer influenced the ability to detect the explicit claim of the advertisement. The results indicate a significant effect for gender on claim detection, $\chi^2(1, n = 1174) = 8.66, p < .005$, with females detecting the explicit claim of advertisements more frequently than males. A 2×6 chi-square was performed to determine if the six ads used in the study representing different strategy appeals influenced the ability of students to detect the explicit claim of the advertisement. The results indicate a significant effect for the type of stimulus on explicit claim detections, $\chi^2(5, n = 1174) = 157.2, p < .0001$. More than half of the students detected the explicit claim of only two ads—the observational learning with celebrity model ad and one of the two verbal product information ads. The explicit claim was not detected by over half of the adolescents in four of the six ads. For instance, 59% of the students (73 males and 43 females) failed to detect the explicit claim of the advertisement representing the use of classical conditioning and 54% (63 males and 41 females) failed to detect the explicit claim in the advertisement depicting the use of observation learning with a peer model. Fifty-three percent of the students (59 males and 44 females) failed to detect the explicit claim of the ad with graphic appeal. Fifty-three percent (62 males

TABLE 3
Means and Standard Deviations of Emotional Response

Processing objective	<i>n</i>	Type of advertising stimulus		
		Verbal mean (<i>SD</i>)	Visual mean (<i>SD</i>)	Total ads mean (<i>SD</i>)
Low elaboration				
Males	58	20.92 (6.12)	40.88 (12.74)	34.31 (14.46)
Females	38	21.16 (6.07)	41.79 (11.25)	34.91 (13.84)
Total low	96	21.86 (5.84)	41.23 (12.17)	34.55 (14.21)
High elaboration				
Males	54	20.78 (5.57)	40.04 (13.67)	33.60 (14.75)
Females	45	21.89 (5.77)	43.07 (12.33)	36.04 (14.57)
Total high	99	21.29 (5.67)	41.45 (13.14)	34.73 (14.70)
Total males	111	20.86 (5.84)	40.48 (13.19)	33.97 (14.59)
Total females	84	21.56 (5.90)	42.50 (11.86)	35.53 (14.24)
Total students	195	21.16 (5.87)	41.35 (12.67)	34.64 (14.46)

and 41 females) also failed to detect the explicit claim of the other verbal product information ad. Students who did not detect the explicit claim of an ad nevertheless were likely to report that the ad claim “made sense to them” (ranging from 53 to 87% across the four ads).

Emotional Response

The results of the analyses indicate that visually based ads elicited stronger emotional responses than verbally based ads, $F(1, 194) = 880.79, p < .001$. In addition, there was a significant main effect of gender on emotional response, $F(1, 194) = 3.74, p < .05$, with females’ emotional responses stronger than those of males. Processing objective, however, did not significantly influence the intensity of emotional response $F(1, 194) = .14, p > .05$ (Table 3).

DISCUSSION

This study was an initial step toward developing a better understanding of how print ads influence cognitive and affective responses of adolescents. This beginning effort to understand the dynamics points to key components of several skills that adolescents need to acquire to become better processors of print ads, i.e., to increase their literacy as it pertains to advertising. Salomon (1983) suggests that “literacy varies according to the mode in which information is presented . . . that special skills are required for the comprehension of television and that these skills can be developed and cultivated by the medium . . .” (p. 67). Compatible with Salomon’s idea is the notion

that advertising literacy requires a set of skills specific to advertising media. Based on findings from this study, the development of strategies to promote advertising literacy should consider several factors.

The first factor relates to the imagery present in a print ad. Visual images in advertisements have direct bearing on cognitive and affective responses. In fact, the imagery in advertising stimuli has a major impact on the specific details recalled about an ad, the number of inferences, and the intensity of emotional response. Expressed in standard deviation units, the effect size of type of advertising stimulus on recall is 1.81. On inferences, the effect size of type of ad is 1.54 standard deviations and on emotional response, 1.86 standard deviations. These findings are consistent with the premises of the dual coding model and support research on advertising that has found that ads containing more visual information relative to verbal information are better remembered by adults (Percy & Rossiter, 1983). Other findings about the effect of visual imagery in advertisements on affective responses, recall, and inferences also are substantiated (Friestad & Thorson, 1986; Gaeth & Heath, 1987; Kisielius & Sternthal, 1982; Stuart, Shimp, & Engle, 1987).

Processing objective was a factor only on the memory measure. Students in the high-elaboration processing condition recalled more specific details about the ads than students in the low-elaboration condition across all advertisements (effect size of .22 standard deviations). These findings support research which suggests that an individual's processing objective influences the information subsequently remembered (Anderson & Reder, 1979; Craik & Lockhart, 1972; Friestad & Thorson, 1986; Liechtenstein & Srull, 1985; Loken & Hoverstad, 1985). Unlike other research on elaborative processing, no significant effect for level of elaboration was found on the inference measure and emotional response. One explanation for this discrepancy is that the operationalization of the processing objective condition was implemented by verbally written instructions. Thus, level of response to elaboration instructions may have been contingent on the students' reading ability, attention level, and motivation. Another explanation is that the ads themselves may have affected the levels of inferencing and emotional response. Because ad stimuli are designed to promote inferencing, even students in the low-elaboration condition may have elaborated. Finally, although students were instructed to base their answers to the inference questions only on the advertisement they had just seen, it cannot be determined if inferencing occurred at the time the ad was viewed or at the time of testing.

As predicted by the selectivity hypothesis (Meyers-Levy, 1989), gender influenced adolescents' processing of the advertisements. Females were more comprehensive processors, remembering more specific facts than males, making more inferences than males, and detecting the explicit claim of advertisements more frequently than males. Although the effects of gender are significant, they are not large, with effect sizes of .25 standard deviations

on the memory measure, .24 standard deviations on the inference measure, and only .12 standard deviations on the measure of emotional response. As suggested by previous research, these gender differences were sensitive to contextual factors (Meyers-Levy & Maheswaran, 1991). Type of advertising stimulus influenced the size of the gender difference on the memory and inference measures, with visual advertising stimuli eliciting greater differences than the verbal advertising stimuli between the males and the females. Processing objective also affected the gender difference on the memory measure. In the high-elaboration condition, the difference between the males and females was smaller than the difference between males and females in the low-elaboration condition. It is possible that the instructions in the high-elaboration condition may have motivated the males to engage in more comprehensive processing, although only enough to influence performance on the memory measure.

Many adolescents were unable to detect the explicit claim of an advertisement yet maintained that the ad "made sense," which suggests that peripheral visual information *becomes* the central message. Apparently, some teenagers lack appropriate strategies for discerning the explicit claim of an ad and find it difficult to distinguish between visual imagery used to gain attention and imagery that conveys relevant product information. This is consistent with text processing research on seductive details which has found that unimportant text segments which include sensational material are memorable and may actually interfere with learning main ideas and other important information (Wade, 1992; Wade, Schraw, Buxton, & Hayes, 1993). In this study, visual information appears to be seductive in that it interferes with students' ability to detect the explicit claim, particularly male students, as a significant difference of frequency of detection of explicit claims existed between males and females. When considered in light of Salomon's (1983) view about the existence of different literacies, these findings suggest that advertising literacy requires the development of a set of skills specific to advertising media that relate to the processing of visual information and explicit claims.

Several methodological issues limit the ecological validity of this study and the generalizability of the findings. External validity may have been sacrificed to maintain internal validity. For example, slides of ads were projected on a screen to control extraneous variables such as viewing time and surrounding magazine content (other ads or articles). Further research should better approximate adolescents' processing of advertisements in real-world settings and include a less constraining open-ended inference task. In addition, given Dubow's (1995) finding that teens remember advertising better than young adults and older adults, research involving a comparison group of adults would demonstrate the extent to which adolescents are particularly vulnerable to advertising messages.

EDUCATIONAL IMPLICATIONS

The relationship between cognitive and affective responses and consumer purchasing behavior is complex and beyond the scope of this study. Although a number of education groups are attempting to control or curb advertising in schools, (e.g., Association for Supervision and Curriculum Development, the National Parent Teacher Association, and the National Education Association), ads targeting youth outside of the classroom will continue to increase since advertisers are bound by few restrictions (Karpatkin & Holmes, 1995). Consumer education and media literacy programs that emphasize techniques used by advertisers that send overt and covert messages thus are needed to make adolescents better processors of advertisements. Some resources for media literacy are available. For example, *Zillions* magazine and a classroom program developed by Consumers Union "helps kids see past product hype" (Karpatkin & Holmes, 1995, p. 75). Even Channel One, one of many sources of advertising, provides educators with an excellent opportunity to educate youth in consumer education skills (Greenberg & Brand, 1994). Several Web sites offer consumer education tips specifically for teens (e.g., avoiding scam artists and saving money) and specific information about consumer education resources (see National Institute for Consumer Education). Using these resources and developing others based on findings about how adolescents process ads should assist youth in becoming knowledgeable consumers of advertisements.

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