

A Process Analysis of the Effects of Humorous Advertising Executions on Brand Claims Memory

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We report 2 studies that examined how the strength of humorous advertising executions and their relevance to the brand claims in the advertisement influence consumer memory for the claims. We infer the underlying memory processes by testing claims memory using recall, recognition, and indirect tests following incidental exposure to advertisements manipulating humor strength and claims relevance. Memory for the humor component was checked as corroborating evidence. We also validated these inferences by contrasting these effects on claims and humor memory with those under instructed elaboration. Study 1 shows that for humor of low claims relevance, brand claims memory is an inverted U-shaped function of humor strength. Compared to both nonhumor and high-strength humor, moderate humor facilitates both encoding and retrieval of the claims. The patterns of humor memory and instructed elaboration effects suggest that low-relevance humor is not spontaneously linked to the claims even when processing resources are available. Study 2 shows that when strong humor is made more relevant, brand claims memory improves even during incidental exposure. Corresponding humor memory and instructed elaboration effects imply that relevance encourages the formation of humor-claims links that facilitate encoding and retrieval of the claims. The results show that although strong humor inhibits the processing received by the brand claims, enhancing its claims relevance can compensate for such inhibition.

Depending on the medium, anywhere from 10% to 30% of all advertisements use humor (Weinberger, Spotts, Campbell, & Parsons, 1995), implying that many advertisers believe that humor improves advertisement effectiveness. Some academic researchers have shown that advertisements using humor draw more attention and induce greater liking than advertisements that do not (Speck, 1991), whereas others speculate that humor may lower message comprehension (Sternthal & Craig, 1973). A review of 17 humor studies (Weinberger & Gulas, 1992) reported that “six indicate humor may enhance comprehension, five produce neutral or mixed findings, and six indicate that humor may harm comprehension” (p. 38). Clearly, the literature needs definitive

answers on whether humor always “hooks in” viewers to generate processing that creates a strong memory for the brand name and/or claims.

Given the mixed findings, contemporary advertising research papers (Spotts, Weinberger, & Parsons, 1997) and texts (Shimp, 2000) caution against using humor with many product categories and media. However, the studies reviewed often do not distinguish among the conditions under which humor effects may vary. The humor tested is of different types (puns, cartoons, etc.) and is often compared only to advertisements that contain no humor. Most studies ignore variations in humor strength and claims relevance, and some do not address whether viewers focused on processing the message, the humor, or the program context. Also, advertisement memory tests are limited to recall and recognition measures that do not tap the varieties of memory resulting from advertisement exposure (Krishnan & Chakravarti, 1993, 1999). Research is needed to address these gaps in the literature.

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Consumer memory processes influence advertisement effects whether the advertisement focuses on creating claims memory or generating affect that drives purchase intentions. Even for advertisements that focus on inducing affect, the evoked feelings still must be linked in memory with the target brand. Thus, although consumers liked the Energizer® bunny advertisements, the execution initially became associated with the competing Duracell® brand—an expensive source misattribution. Often, however, memory for the brand name and/or claims is itself the critical criterion. Thus, the Budweiser® “Lizards” advertisements aimed to associate the humor with the Budweiser name and advertisements such as Miller Lite®’s “Tastes Great, Less Filling” focused on relevant claims.

Memory encoding and retrieval processes underlie many of the effects of humorous advertisements. Relative to nonhumor, a humorous execution may facilitate encoding of brand claims if it attracts more processing resources that then spill over to the claims. However, if the humor itself absorbs the resources, it may interfere with processing and inhibit encoding of the claims (Burke & Srull, 1988; Keller, 1991). Also, with previously seen advertisements, humor can facilitate retrieval if it is associated in memory with the claims. Yet, humor that cues competing associations may interfere and inhibit retrieval of the target claims. Thus, the Energizer bunny initially cued durability associations that were mistakenly attributed to Duracell. The correct association to Energizer was made only when the bunny was consistently featured on the product package.

These intended and unintended memory effects observed with humorous advertisements may also occur with other executions such as celebrities or music (MacInnis, Moorman, & Jaworski, 1991). The mixed findings on the memory effects of humorous advertisements may stem not only from facilitation and/or interference between a target advertisement and other advertisements but also among components within the same advertisement. We argue that the strength and claims relevance of advertisement humor influence how the claims are processed and remembered. We develop hypotheses regarding these effects and outline how performance patterns on a set of memory tests can be used to infer the underlying processing. We report two experimental studies. In Study 1, we examined how humor strength (of low claims relevance) influences brand claims memory. In Study 2, we examined these effects when the humor is made more relevant to the claims. We compare memory test results following advertisement exposure with and without instructed elaboration to infer the nature of processing and the locus of memory effects.

DIMENSIONS OF HUMOROUS ADVERTISING EXECUTIONS

Strong humor may attract processing resources by breaking through advertising clutter. Humor that is *relevant* (i.e.,

meaningfully linked) to the brand claims may enhance claims comprehension and memory. This recipe for effective humorous executions appears straightforward and advertisers often embed the brand claims in relevant humor, hoping that the humor will attract processing resources and benefit claims comprehension and memory. In practice, however, these goals may be at odds with each other. Strong humor that attracts processing resources to the advertisement may also absorb most of these resources and reduce processing of the claims. Yet, a focus on relevance alone may compromise the advertisement’s overall ability to attract processing. The mixed findings on humor effects (Spotts et al., 1997, Weinberger & Gulas, 1992) suggest that not all advertisements attain the right balance between strength and relevance.

Humor Strength

During incidental exposure in cluttered media, an advertisement usually receives limited attention. In a brief exposure, only some surface features (e.g., a headline catchword) may register in memory without semantic activation. If more processing resources become available, the advertisement may receive further analysis. Because humorous executions often use incongruent structures (Alden, Hoyer, & Lee, 1993; Spotts et al., 1997), the initial response may be a cognitively based discrepancy reaction (“Huh!”). More elaboration may resolve the meaning of the humor (“Aha!”) and generate a response (“Ha Ha!”). However, incongruity effects are not always monotone (greater incongruity does not always imply stronger humor), and humor strength also has other antecedents (Speck, 1991). Hence, with possible individual differences and brand/product context effects in humor processing and responses (Sternthal & Craig, 1973), we avoid focusing on particular antecedents or contexts. Rather, we define the strength of a humorous execution as its potential for eliciting a humorous response independent of its brand or product context. Similar strength concepts based on assessed response are used for fear appeals (Block & Keller, 1995; Strong & Dubas, 1993). In Study 1, we examined humor strength effects (using low relevance humor) to assess if strength can compensate for deficiencies in claims relevance by attracting more processing resources to the claims (not just to the advertisement).

Humor Relevance

Memory researchers have found that information is remembered better when it is organized in some way (Alba, Hutchinson, & Lynch, 1991; Lockhart, 2000). The advertising literature also shows that message memory improves when spokespersons and products are meaningfully associated (Friedman & Friedman, 1979) or if a pictorial frame is linked to the message (Edell & Staelin, 1983). These findings suggest that humorous executions that are meaningfully related

(relevant) to the other advertisement components (e.g., brand claims) should improve memory for all associated components (Speck, 1991; Sternthal & Craig, 1973). Although intuitive, the memory effects of claims relevant humor are untested (Shimp, 2000; Spotts et al., 1997; Weinberger & Gulas, 1992). In Study 2, we examined how the degree of relevance of the humor to the brand claims influences processing and affects claims memory. We focused on strong humor to assess if enhancing its relevance to the claims mitigates possible interference with claims processing.

TRACKING THE EFFECTS OF HUMOROUS ADVERTISING EXECUTIONS

Memory Tests

Tests differ in their ability to detect the various types of memory representations that may form when participants are exposed to advertising stimuli. Tests such as aided and unaided recall and Starch recognition scores are common in advertising (Shimp, 2000). Recall and recognition are often labeled direct tests because participants are instructed to think back to the encoding episode (i.e., advertisement exposure) to remember the target information. Recall tests refer explicitly to the encoding context as a cue and sometimes also provide other cues. Recognition tests not only refer to the encoding context but also provide the target stimulus for identification along with “distracters” that were not seen before (see Richardson-Klavehn & Bjork, 1988).

Consumer researchers (Krishnan & Chakravarti, 1999; Krishnan & Shapiro, 1996; Shapiro, 1999) have also used indirect tests that rest on implicit memory concepts (Richardson-Klavehn & Bjork, 1988; Schacter, 1987, 1996). An example of an indirect memory test (e.g., for the brand name MONARCH) is a word-completion task (e.g., MON____) in which participants complete several word stems (including distracters) with the first word that comes to mind. In another example of an indirect test of claims (humor) memory, participants provide top-of-mind attribute (slogan) preferences from a set containing degraded or disguised versions of the target attributes (slogans) as well as distracters. Indirect test instructions do not refer to the exposure episode, and test awareness checks (Bowers & Schacter, 1990; Krishnan & Shapiro, 1996) ensure that the response is not consciously primed by prior stimulus exposure. Some indirect tests may reveal long-term advertisement exposure effects (Tulving, Schacter, & Stark, 1982) and exposure-induced affective or behavioral predispositions (e.g., Zajonc, 1980) that are inaccessible to direct tests (see also Toth, 2000).

Response on each of the three memory tests requires processing that sufficiently registers the brand claims in memory. However, each test appears to tap a different set of retrieval processes based on test task demands. Recall is usually explained using a two-process model (e.g., Gillund &

Shiffrin, 1984) in which an initial memory search (using the encoding context as a retrieval cue) produces a set of potential targets. Discrimination among these then identifies the actual target. In recognition, the search component is not needed because the test task provides the target. Prior exposure makes the target more familiar, enabling discrimination from distracters. Indirect tests rely on nonconscious priming. Retrieval is not tied to the exposure episode or to conscious rehearsal or associations formed by semantic elaboration of the stimulus (Lockhart, 2000).

Test performance patterns signal how the advertisement was processed at exposure. First, processing is sometimes nonconscious, and some surface features of the advertisement may register in memory. The traces lack semantic content but can be detected with indirect probes that prime memory without awareness (Shapiro, 1999; Toth, 2000). The traces do not affect recall or recognition. Second, specific aspects (e.g., humor or claims) of an advertisement may receive conscious and separate rehearsal at exposure. This raises the target’s familiarity and aids discrimination from distracters in recognition tests (and in discrimination for recall). Indirect tests are unaffected. Finally, processing may create conscious associations between the humor and claims. These cue each other in later recall tests (recognition and indirect tests are unaffected).¹ Like recall-recognition comparisons that distinguish availability and accessibility (Tulving & Pearlstone, 1966), we compared recall, recognition, and indirect test data to infer processing induced by our manipulations.

Incidental Exposure Versus Instructed Elaboration

Consumers generally view advertisements incidental to watching a program or reading a magazine (MacInnis et al., 1991; MacKenzie & Lutz, 1989). Subsequent memory tests may be used to infer the processing that occurs naturally for the focal manipulation (e.g., humor strength). Although instructed elaboration during advertisement exposure is unusual, it may serve as a contrast condition to support process inferences. In particular, instructed semantic elaboration effects should differ by type of memory test. Recall tests should benefit most because associative processing facilitates the memory search needed to generate the target, and separate processing helps discrimination. Recognition does not require generating the target (it is provided at test).

¹These ideas resemble the contrast between item-specific and relational processing (Einstein & Hunt, 1980; Meyers-Levy, 1991). Note though that *item-specific processing* refers to elaboration focusing on unique or distinct stimulus properties, whereas we focus simply on separate rehearsal of a stimulus element (e.g., humor or claims). *Relational processing* elaborates the similarities or shared themes among disparate stimulus aspects, whereas we focus on processing that simply associates two or more stimulus elements.

Hence, associative processing should not facilitate performance. However, if instructed elaboration also produces separate processing of the target, it may become more familiar and easier to discriminate from distracters. This improves recognition (Gillund & Shiffrin, 1984). Indirect tests do not rely on semantic traces or conscious retrieval of previously seen items. Hence, instructed elaboration should not affect indirect tests (Krishnan & Chakravarti, 1999; Richardson-Klavehn & Bjork, 1988; Toth, 2000).

Comparing memory test patterns following instructed elaboration and incidental exposure can validate inferences about the process effects of a focal manipulation. Consumer researchers have compared direct test performance under different elaboration instructions to distinguish encoding and retrieval deficits in the elderly (Cole & Houston, 1987). Indirect test comparisons have been used to detect perceptual and conceptual fluency effects following incidental exposure (Shapiro, 1999). We use a similar test comparison framework. Participants are exposed to advertisements manipulating humor strength (Study 1) or relevance (Study 2). Exposure is either incidental or under instructed semantic elaboration. After exposure, participants complete one of three (recall, recognition, or indirect) tests of claims and humor memory. Performance patterns on tests of claims memory following incidental exposure suggest the type of processing induced naturally by the manipulations. Memory for the humor component is checked as corroborating evidence. We validate the process inferences by examining instructed elaboration effects on claims and humor memory.

STUDY 1: HUMOR STRENGTH EFFECTS

Research Hypotheses

In Study 1, we examined how humor strength (given low claims relevance) influences claims memory. We used a pre-tested advertisement with a nonhumor headline as a baseline and manipulated humor strength at two levels (moderate and high) via the advertisement headlines. We then developed the processing scenarios under incidental exposure for each strength condition and predict performance on recall, recognition, and indirect tests of claims and humor memory. Test patterns validating the process analysis are also outlined for instructed elaboration.

Humor strength effects during incidental exposure.

Relative to the humor headlines, the nonhumorous headline should attract fewer processing resources to the advertisement. Because this headline also has low claims relevance, the association level is too low for high recall. Even so, the limited processing resources attracted to the advertisement should be distributed more evenly such that the claims (and the headline) receive sufficient separate processing for discrimination from respective distracter sets in recognition

tests. Finally, even this nonhumorous advertisement should attract sufficient attention for the headline and the claims to register on indirect tests (exceed performance of unexposed participants). Pretests confirmed these baselines of low recall and moderate recognition and indirect test performance for the claims and the no-humor headline.

In contrast, moderate strength humor should attract more processing resources. Relative to the no-humor condition, the surface features of both the humor and the claims are more likely to register in memory, raising indirect test performance for each component. Some additional resources should be used for conscious and separate rehearsal of the humor and the claims, improving recognition of each (perhaps also helping discrimination in recall). Finally, additional processing resources may create new associations among the advertisement components. Claims recall may benefit from these associations whether through idiosyncratic links to the humor (despite low claims relevance) or to other advertisement components. If more humor-claims links are created, humor recall should show a symmetric improvement. In summary, this analysis suggests that with moderate humor (vs. no humor), performance on each memory test (recall, recognition, and indirect tests) should improve for both claims and humor (Alba et al., 1991; MacInnis et al., 1991).

High-strength humor should attract the most attentional resources to the advertisement. Relative to moderate humor, the headline's surface features are more likely to be encoded, raising indirect test performance. The headline should also receive conscious and separate rehearsal that improves recognition. However, the strong humor headline could inhibit encoding of the claims if it absorbs the processing resources (Rossiter & Percy, 1987) with little spillover for processing the claims. This should attenuate both recognition and recall of the claims and may even lower indirect test performance. Thus, high-strength humor (of low claims relevance) should attenuate performance (relative to moderate humor) on all three tests of claims memory. However, humor memory should improve on all tests. With humor-claims associations inhibited in this condition, improved humor recall may stem from either increased rehearsal (which helps discrimination in recall) or from linkages between the humor and advertisement components other than the claims.

These processing accounts imply that with incidental exposure, humor strength effects on brand claims memory should be nonmonotone (an inverted U), first increasing from no humor to moderate strength humor but then decreasing for high-strength humor. The relative effects would depend on the calibration of the humor strength metric. The nonmonotone effects on claims memory may reconcile prior findings that humor has both positive and negative effects on advertisement memory (Duncan & Nelson, 1985; Lammers, Leibowitz, Seymour, & Hennessey, 1983; Stewart & Furse, 1985). At the same time, monotone improvements in humor memory are consistent with findings

that stronger humor attracts more attention to the advertisement.

- H1A: With incidental exposure, brand claims memory performance on recall, recognition, and indirect tests will be lower in the no humor condition than in the moderate humor strength condition.
- H1B: With incidental exposure, brand claims memory performance on recall, recognition, and indirect tests will be lower in the high humor strength condition than in the moderate humor strength condition.

Instructed elaboration effects. Semantic elaboration instructions should mainly induce viewer-generated processing that forms additional humor-claims associations (Lockhart, 2000; Tulving, 1962). This should enhance recall of both humor and claims relative to incidental exposure. With humor of low claims relevance, both components may also receive some additional separate rehearsal supporting recognition improvements. No effects are expected on indirect tests. Because processing during incidental exposure should differ by humor strength, we expected corresponding contrasts in how instructed elaboration affects recall and recognition in the various humor strength conditions. Three such contrasts were used to validate our inferences regarding how humor strength influences processing during incidental exposure.

First, in the no-humor condition, the associative processing needed to cue recall is unlikely to occur with incidental exposure (given a low relevance headline). With instructed elaboration, participants should forge new (idiosyncratic) links between the headline and the claims, enhancing recall of each. Recognition should not improve, as incidental exposure should have allowed sufficient separate rehearsal of the headline and the claims. Thus, in the no-humor condition, instructed elaboration should enhance both headline and claim recall but not recognition. This pattern confirms retrieval inhibition (Tulving & Pearlstone, 1966) following incidental exposure. The memory traces formed with incidental exposure are sufficiently strong for discrimination of the targets (recognition) but not sufficiently rich to be cued in memory search (for recall).

Second, even with incidental exposure, moderate strength humor attracts more processing resources to the advertisement relative to the no-humor condition. This facilitates separate rehearsal of the humor and the claims and may also drive spontaneous associations among the advertisement components. Hence, even with incidental exposure, recognition should be higher (vs. the no-humor condition) for both claims and humor. Recall of both components should also be higher, particularly if they are associated at encoding. Instructed elaboration is then unlikely to improve either recognition or recall of the claims or the humor. This pattern would confirm that even during incidental exposure, moder-

ate-strength humor does not inhibit encoding (or retrieval) of claims or of humor.

Finally, high-strength humor should attract the most attention to the advertisement during incidental exposure. Humor recognition should be high because it receives significant rehearsal. However, if the humor absorbs most of the processing resources, little is left to rehearse the claims or to associate them with the humor. This inhibits both encoding and retrieval of the claims, lowering recognition and recall. Instructed elaboration should then stimulate more (idiosyncratic) humor-claims links, improving recall of both components. Claims recognition may improve if they also receive more separate processing. However, because the humor is already well rehearsed, humor recognition should remain high and unchanged.

We validated our process rationale using planned comparisons to test the following hypotheses on instructed elaboration effects on direct tests of claims memory. No effects were expected on indirect tests.

- H2A: In the no-humor condition, recall (but not recognition) of brand claims will be higher with instructed elaboration, relative to incidental exposure.
- H2B: In the moderate-strength humor condition, neither recall nor recognition of brand claims will change with instructed elaboration, relative to incidental exposure.
- H2C: In the high-strength humor condition, both recall and recognition of brand claims will be higher with instructed elaboration, relative to incidental exposure.

Method

In Study 1, we used a 3 (humor strength: no humor, moderate, and high) \times 2 (exposure conditions: incidental exposure and instructed elaboration) between-subject factorial design. The three types of memory tests (recognition, recall, and indirect) were also administered between-subject to avoid carryover effects from earlier to later tests. The humor conditions were replicated across two product classes. Each participant was exposed to advertisements for two products, always in the same humor strength condition. The Study 1 data are from 303 introductory business students at a Midwestern university who participated for course credit. Data were collected in groups of 7 to 8 participants, with participants assigned to the various study conditions in each session. Participants were seated sufficiently far apart to avoid exchange of information.

Humor strength manipulation. Following prior research that has used mock print advertisement stimuli (Edell & Staelin, 1983; Keller, 1991), we used print advertisements in color for our manipulations. Stimulus features were selected based on extensive pretests. Each advertisement included a headline, a product picture, a brand name, a transition sentence, and two brand claims. The headline embeds

TABLE 1
Pretest Humor Strength Scores for Headline Puns

Brand	Humor Strength Condition	Headline Pun Used	Strength Score ^a	
			M	SE
ANGLER	No humor	A person who catches fish with the help of a rod, line, and hook	1.64	.57
	Moderate	A person who sits still for a long time without catching any fish	3.37	.81
	High	A person who catches fish sometimes by patience or luck but mostly by the tale	5.12	.83
ACROBAT	No humor	A performer of skillful acts of body control	1.80	.60
	Moderate	A performer who talks about himself behind his back	3.53	.81
	High	A performer who can flip successful flops	5.20	.90

^aMean strength scores based on four humor strength items (entertaining, humorous, funny, witty) rated on 7-point scales ranging from 1 (*low*) to 7 (*high*).

the humor strength manipulation. All other advertisement elements were held constant across conditions.

Pretests showed that the products (pain relievers and laundry detergents) are relevant to students of both genders and often feature humorous print advertisements (e.g., Nyquil® and Surf®). New brand names were used to control for prior knowledge. The names were chosen from a word list (Paivio, Yuille, & Madigan, 1968) based on their imagery, meaningfulness, and concreteness scores. The target names (ANGLER and ACROBAT) had similar (moderate) scores, were not differentially memorable, and had no prior links with the product or the claims (Chattopadhyay & Basu, 1990). Brand claims were chosen from a pretested list of important product attributes. Some claims served as targets, and others were used as distracters in the recognition and indirect tests. The product picture made the advertisement more realistic but did not cue either the humor or the claims.

For each of the two brand names, *puns* were created for the advertisement headlines. A form of comic wit that uses incongruity, puns are common in advertising (Speck, 1991). We had several reasons for using puns in a print medium to manipulate humor strength. First, humorous cartoons may confound the effect of humor with that of pictures. Second, we wished to avoid using humor that was based on sex, ethnicity, or age. Finally, several existing TV advertisements that we pretested varied significantly on humor strength, but the differences were confounded with humor type, story line, and number of brand mentions.

Puns similar to those in the ABSOLUT® vodka campaign (Wells, Burnett, & Moriarty, 1992, p. 267) were drawn from various humor compendia. The format allows control for potential confounds such as structure, length, complexity, evoked emotions, and claims relevance (Lammers et al., 1983). Participants rated the puns on four 7-point semantic differential scales (entertaining, humorous, funny, witty) selected from a larger set of humor strength items (Schlinger, 1979). These items are reliable (Cronbach's $\alpha = .85$), and the puns chosen were those that showed the sharpest overall distinctions on this scale. Table 1 shows these headlines and their strength scores for each humor strength condition. The no-humor headlines are dictionary definitions of the two brand names. Pretests show that the ANGLER laundry deter-

gent and ACROBAT pain reliever advertisements provide good manipulations of humor strength while minimizing other confounds.² Equal variances in strength scores for the moderate and high-strength headlines suggest similar levels of consensus in humor perception (Sternthal & Craig, 1973). Appendix A shows a sample advertisement (high-strength condition). For each humor strength condition, two target advertisements (one per product replicate) were embedded in counterbalanced order in a "Consumer News" magazine (fictitious name) containing two similarly formatted filler advertisements and five unrelated one-page articles.

Incidental exposure and instructed elaboration. Each participant was given a version of the magazine and asked to follow instructions while rating its contents. Some participants were told to focus on the magazine articles and to rate each on whether it was interesting and the extent to which they agreed with its views. These participants' advertisement exposure is incidental to the primary task. Other participants were specifically instructed to elaborate on the meaning of each advertisement. They were asked to rate how well the headline related to the brand claims and then create a transition sentence associating the headline and the claims.

Memory tests. After 10 min (pretested as sufficient processing time), participants were asked to place the magazine and the instructions on the floor. All participants then completed a series of unrelated filler tasks that took about 15 min. Each participant's memory for the claims and humor (in that order) was tested using one of a set of recall, recognition, and indirect tests (i.e., tests were between-subjects). Each test was representative of its class of memory tests (see Appendixes B and C for detailed task descriptions). For the recognition and recall tests, participants were asked to think

²We tested for differences among the humor strength conditions in the perceived ease of linking the humor with the brand claims. The three advertisements were shown to 36 participants who were asked to create transition sentences relating the headline and the claims. They then rated how easy or difficult it was to create the transition sentences on a scale ranging from 1 (*very difficult*) to 7 (*very easy*). The mean ratings provided by the three groups (3.60, 3.75, and 3.83 for the no-humor, moderate-humor and high-humor conditions, respectively) were not significantly different ($p > .20$).

back to the magazine advertisements when answering the questions. The recognition task required participants to identify the target from a set of distracters (pretested for sufficient discrimination difficulty). For recall, the product category for brand claims and a sentence stem for the headline were used as the respective cues.

The indirect tests assessed priming with an attribute importance selection task (claims) and a slogan selection task (headlines). The test instructions did not refer to the advertisements or the magazine that participants saw before. Several procedural aspects reduced the possibility of test awareness (Bowers & Schacter, 1990; Krishnan & Shapiro, 1996). First, participants were initially told that they would work on a set of unrelated studies. After the magazine and advertisement evaluation task, they were thanked for participating in the "first study" and asked to wait for the "next study." Second, placing the magazines and questionnaires on the floor prevented visual cuing. Third, the new 15-min filler tasks were introduced as an unrelated study. These cleared short-term memory and lowered the salience of the prior magazine and advertisement evaluation task. Finally, the filler tasks resembled the indirect tests so that the actual tests were indistinguishable.

Despite these precautions, participants may still remember the earlier magazine/advertisement evaluation context during the indirect tests. This makes them "test-aware." A self-report questionnaire on test awareness checked this possibility. Three open-ended questions asked the participants if they had noted any connection between the (indirect) test tasks and the advertisements seen earlier. Although direct, the questions lower demand bias because the participants do not know what response the experimenter wanted. An independent coder classified the responses as test-aware or "test-unaware" based on whether the participant realized the link between the indirect tests and magazine/advertisement exposure. Finally, other measures checked the humor strength and elaboration manipulations and task reactions. Participants were later debriefed.

Analyses

Because an initial analysis showed no differences between the two product replicates, the results are pooled across products. We discuss the manipulation checks and memory measures before presenting the results on the humor strength and instructed elaboration hypotheses.

Manipulation checks. We checked the humor strength manipulation by analyzing participants' humor strength ratings as a function of the strength manipulation (none, moderate, and high) exposure condition (incidental exposure and instructed elaboration) and memory test type (recall, recognition, and indirect). The humor strength effect was significant, $F(2, 290) = 6.94, p < .001$. Perceived strength was higher for moderate versus no humor ($M_s = 3.77$ vs. 2.53), $t(290) = 4.20, p < .01$, and higher for high versus moderate

humor ($M_s = 5.06$ vs. 3.77), $t(290) = 4.40, p < .01$. The elaboration and memory test factors had no main effects or interactions, $F_s < 1$. Thus, the humor strength manipulation was successful. The strength ratings in the incidental exposure and instructed elaboration conditions did not differ, allaying concerns that the puns in the humor strength conditions differ in complexity.

Also, as expected, participants in the instructed elaboration (vs. incidental exposure) condition said that they focused more on evaluating the quality of linkages, $F(1, 292) = 7.71, p < .01$, and on developing better ones, $F(1, 292) = 15.43, p < .001$. The humor strength and memory test factors had no significant main effects or interactions on these measures. Thus, the elaboration instructions worked as intended. The test-awareness procedure disqualified 8 indirect test participants whose data were dropped. We analyze and report data only from participants who qualified as test-unaware.

Memory measures. Performance data for the three memory tests (for both brand claims and humor) are expressed as proportions ranging from 0.0 (*no memory*) to 1.0 (*perfect memory*). The pattern of results is similar with raw scores. For recall, an independent judge coded each response on whether it indicates memory for one of the advertisement components. A score of 0 or 1 was assigned for each brand claim depending on whether or not the participant recalled the claim. Thus, the recall measure for each participant is the proportion of targets correctly retrieved. For recognition, we count a hit (false alarm) if the participant checked a brand claim that had (had not) appeared in the advertisement. The recognition measure (Taschian, White, & Pak, 1988) is the proportion of correct identifications (hit rate minus false alarm rate). Finally, the indirect test measure is the proportion of targets correctly identified on each task (claims attribute importance, slogan selection). A group of 23 participants (who had not seen the advertisements) also took the indirect tests. Their mean attribute importance (0.52) and the slogan selection (0.21) scores were the respective baselines for assessing claims and humor priming. Contrasts against these baselines showed significant priming of claims ($p_s < .05$) in all but the two no-humor conditions and for humor ($p_s < .05$) in all study conditions.

Results

We note three general points about our analyses. First, the hypotheses addressed brand claims memory, and the humor memory patterns were used to corroborate our process inferences. Performance levels on claims and humor memory were not directly comparable. Second, because the three memory tests have different metrics, direct comparisons of performance levels were always within the same test type. Although some process inferences were based on comparisons of the study conditions across test types, these only examined whether specific effects were present or absent at

conventional significance levels. Finally, because some predictions involved null effects, we drew process inferences only if theoretically meaningful and significant effects on other tests accompanied these null effects.

Humor strength effects (H1). Analyses of variance (ANOVAs) of the respective memory measures as functions of the humor strength, exposure condition, and the two-way interaction showed that humor strength had significant main effects on recall, $F(2, 93) = 7.01, p < .01$; recognition, $F(2, 103) = 5.60, p < .01$; and indirect tests of claims memory, $F(2, 89) = 7.18, p < .01$. We tested the humor strength hypotheses via planned contrasts of relevant cell means using the full design error from the respective ANOVA models (Keppel, 1991; Rosnow & Rosenthal, 1989). One-tailed t tests were used for the directional predictions.

Table 2 shows the cell means by study condition. With incidental exposure, claims memory was higher in the moderate-strength condition relative to the no-humor condition. Specifically, recall improved (.18 to .43), $t(93) = 2.59, p < .01$, as did recognition (.53 to .84), $t(103) = 2.37, p < .025$, and the indirect test score (.41 to .79), $t(89) = 3.60, p < .001$. These results are consistent with H1A. Moderate-strength humor appeared to facilitate both encoding and retrieval of the claims (relative to no humor). However, tracking the humor memory patterns following incidental exposure suggests a different process than anticipated. The recall (0.26 and 0.25) and indirect test (0.33 and 0.36) scores in the no-humor and moderate-humor conditions did not differ ($ps > .50$). However, recognition of the moderate-humor headline was higher than that of the no-humor headline (0.93 vs. 0.85), $t(103) = 1.87, p < .025$. This suggests that moderate humor attracted more separate rehearsal than the nonhumor. However, without a corresponding increase in humor recall, higher claims recall cannot be attributed to new humor-claims links as originally hypothesized.

Relative to moderate humor, brand claims recall was lower with high-strength humor (.43 vs. .19), $t(93) = 2.46, p < .01$, and recognition dropped as well (.84 vs. .61), $t(103) = 1.98, p < .05$. The drop in indirect test scores (.79 to .67) was marginally significant, $t(89) = 1.59, p < .10$. These data are consistent with H1B. Relative to moderate humor, high-strength humor attenuated both recall and recognition showing that it inhibited both claims rehearsal (needed in recognition) and the formation of humor-claims links (needed in recall). Encoding was inhibited enough to register a (marginally significant) drop in indirect test performance.

The corresponding humor memory data show an interesting pattern. Unexpectedly, high-strength humor and moderate humor had identical scores on indirect (0.36) and recognition (0.93) tests. The high recognition level implies significant separate rehearsal of the humor. Yet, high-strength humor was recalled significantly better (0.32 vs. 0.25), $t(93) = 1.72, p < .05$, suggesting that it received additional processing resources than moderate-strength humor. However, these resources apparently did not create more humor-claims links (because claims recall dropped from moderate- to high-strength humor). Hence, the recall improvement may stem simply from improved discrimination due to separate rehearsal or from associations with other advertisement components.

In summary, these incidental exposure data are generally consistent with the hypothesis that strong (but low relevance) humor tends to absorb the increased processing resources it draws to the advertisement. The resulting resource deficit inhibited both claims rehearsal (needed for recognition) and associative processing (needed in recall). On the other hand, moderate humor attracted processing resources to the advertisement, and these were distributed more evenly to other advertisement components including the claims. This facilitated claims encoding and subsequent retrieval. The asymmetric changes in claims and humor recall suggest that low relevance humor was not spontaneously associated with the claims even

TABLE 2
Study 1 Cell Means^a

Test	Humor Strength	Claims ^b				Difference	Humor ^c				Difference
		Incidental Exposure		Instructed Elaboration			Incidental Exposure		Instructed Elaboration		
		M	Cell Size	M	Cell Size		M	Cell Size	M	Cell Size	
Cued Recall	No humor	0.18	15	0.35	17	0.17	0.26	15	0.27	17	0.01
	Moderate	0.43	16	0.58	17	0.15	0.25	16	0.37	17	0.12
	High	0.19	17	0.38	17	0.19	0.32	17	0.44	17	0.12
Recognition	No Humor	0.53	19	0.65	17	0.12	0.85	19	0.90	17	0.05
	Moderate	0.84	20	0.96	18	0.12	0.93	20	0.94	18	0.01
	High	0.61	19	0.92	16	0.31	0.93	19	0.95	16	0.02
Indirect	No Humor	0.41	16	0.55	15	0.14	0.33	16	0.31	15	-0.02
	Moderate	0.79	16	0.75	17	-0.04	0.36	16	0.34	17	-0.02
	High	0.67	15	0.75	16	0.08	0.36	15	0.36	16	0.00

^aCell means are presented as proportions in which 0 = no memory, and 1.0 = perfect memory. ^bNo exposure baseline for claims = 0.52. ^cNo exposure baseline for humor = 0.21.

when additional processing resources became available. Also, the indirect test data show that moderate strength humor improved implicit memory for the claims (vs. no humor) and high-strength humor inhibited it (vs. moderate humor).

Instructed elaboration effects (H2). ANOVAs of the indirect test data showed no significant instructed elaboration effects on claims memory ($F < 1$) or humor memory ($F < 1.2$). These results replicate the finding that semantic elaboration does not affect indirect tests (Krishnan & Chakravarti, 1999, Richardson-Klavehn & Bjork, 1988). Instructed elaboration should, however, affect both recall and recognition of brand claims (and correspondingly of the humor). The pertinent ANOVA models showed significant main effects of instructed elaboration on claims recall and recognition, $F(1, 93) = 8.68, p < .01$, and $F(1, 103) = 6.05, p < .05$, respectively, and humor recall, $F(1, 93) = 5.31, p < .05$. Humor recognition was not affected. Omnibus tests for the interaction of exposure condition and humor strength were also not significant ($F_s < 1$). However, because only 3 planned contrasts (out of 15 possible comparisons among the six cell means) in each of the interactions for claims and humor memory are of theoretical interest, we examined these with one-tailed t tests using the full ANOVA design error.

We focused next on validating the process inferences made from the claims memory data. For the nonhumor condition, H2A predicted that claims recall (but not recognition) will increase from incidental exposure to instructed elaboration. Consistent with this prediction, there was a significant increase in claims recall (.18 to .35), $t(93) = 1.69, p < .05$ but not in claims recognition (.53 to .65), $t(103) = .99, p > .15$. The improvement in claims recall suggests that instructed semantic elaboration produced some additional associative processing of the claims. However, the absence of a symmetric improvement in headline recall (0.26 to 0.27) suggests that the links made were not with the headline but perhaps with some other advertisement components.

The relatively high recognition scores for both claims (.53) and humor (.85) and the absence of recognition improvements suggest that both components were rehearsed and distinctively encoded even with incidental exposure. Instructed elaboration did not produce much additional rehearsal. Together, the recall and recognition results show that although the claims were encoded, recall was inhibited at retrieval. Thus, the claims were available but not accessible in memory following incidental exposure (Tulving & Pearlstone, 1966). The nonhumor headline was encoded, but showed no recall improvement, suggesting that the dictionary definition is hard to associate with the claims, even with instructed elaboration.

H2B predicted that both recall and recognition of claims should not differ between incidental exposure and instructed elaboration. As expected, the high level of claims recognition following incidental exposure did not improve with instructed elaboration (.84 vs. .96), $t(103) = .89, p > .15$. How-

ever, instructed elaboration generated an unexpected but marginally significant improvement in claims recall (.43 to .58), $t(93) = 1.52, p < .10$. The findings are inconsistent with H2B and suggest that although the claims were encoded with moderate strength humor, retrieval inhibition was not entirely eliminated. The humor memory data support this interpretation. Recognition of the moderate strength humor was also high with incidental exposure (.93) and remained unchanged (.94) with instructed elaboration. However, humor recall paralleled claims recall and improved with instructed elaboration (.25 to .37), $t(93) = 1.96, p < .05$, suggesting the formation of additional humor-claims links. Thus, although the claims recall improvement was unexpected, it was accompanied by a consistent improvement in humor recall.

H2C predicted that with high-strength humor, claims recall, and recognition would improve with instructed elaboration relative to incidental exposure. As expected, both recall (.19 vs. .38), $t(93) = 1.88, p < .05$, and recognition (.61 vs. .92), $t(103) = 2.42, p < .01$ improved significantly. The data suggest that with incidental exposure, high-strength humor (of low claims relevance) inhibited both separate rehearsal of the claims and the formation of claims-humor associations. Instructed elaboration then generated additional separate rehearsal of the claims and associative processing of the claims and humor. For high-strength humor, instructed elaboration did not change the humor recognition score (.93 to .95), possibly due to ceiling effects. However, the humor recall improvement (.32 to .44), $t(93) = 1.91, p < .05$ was significant and paralleled the claims recall improvement, consistent with the creation of additional humor-claims links.

An interesting aspect of the data is that even with instructed elaboration, claims recall in the high-strength condition (.38) remained lower than in the moderate-strength condition (.58). One explanation is that the high and moderate strength humor advertisements were differentially relevant to the claims. However, this is unlikely because the mean relevance scores for the nonhumor, moderate humor, and high-strength humor headlines were not different ($ps > .20$) in either the pretest (2.9, 3.1, and 3.0, respectively) or the main study (3.5, 3.5, and 3.3, respectively). Rather, the data suggest that with high-strength humor, instructed elaboration drove additional processing of the advertisement. These processing resources were then allocated to greater claims rehearsal (improving recognition) and developing more humor-claims links (improving recall of both components).

Discussion

Study 1 shows that even low relevance humor can facilitate brand claims memory by attracting more processing resources to the advertisement. Compared to nonhumor, moderate humor improves recall, recognition, and indirect test performance (H1A), implying facilitation of claims encoding and retrieval. However, high-strength humor attenuates performance on each test (H1B), showing that it absorbs the

resources it attracts, inhibiting claims encoding and retrieval. Although the results are as hypothesized, juxtaposing the data on claims and humor recall reveals unexpected asymmetries. Low relevance humor is not spontaneously linked to the claims in incidental exposure, and improved recall cannot always be attributed to new humor-claims associations. The components are rehearsed separately even if additional resources are available. Improved recall must then be attributed either to easier discrimination or to links with other advertisement components.

Instructed elaboration affects claims recall and recognition but not the indirect tests. It also influences humor recall (but not recognition and indirect tests), showing that humor memory responds to associative processing. Thus, in conscious choice processes, elaboration that creates humor-claims links can aid retrieval. However, in nonconscious choices that engage implicit memory, elaboration is not needed for retrieval. The preplanned contrasts (H2) show that instructed elaboration effects on direct tests vary by humor strength. With nonhumor, claims recall (but not recognition) improves with instructed elaboration (H2A), suggesting retrieval inhibition following incidental exposure. The claims are rehearsed sufficiently for encoding, but lower recall implies an associative processing deficit that inhibits retrieval. Improved claims recall under instructed elaboration is not accompanied by improved humor recall, suggesting that the low-relevance, nonhumorous headline is difficult to associate with the claims even under instruction.

With moderate humor, instructed elaboration produces parallel improvements in claims and humor recall, but not in recognition. Although unexpected (H2B), the parallel improvements suggest that instructed elaboration creates new humor-claims links that cue each other in the recall test. With high-strength humor, instructed elaboration improves both claims recall and recognition (H2C), apparently providing resources both for additional rehearsal of the claims and creating additional humor-claims associations. Parallel improvements in humor recall are consistent with this inference.

STUDY 2: HUMOR RELEVANCE EFFECTS

Research Hypotheses

Study 1 results show that with humor of low claims relevance, claims memory is at its highest level when the humor is of moderate strength but is attenuated with humor of higher strength. Thus, advertisers hoping to attract attention to an advertisement with high-strength humor run a risk of drawing processing resources away from the claims. As an alternative, advertisers could reduce dependence on consumer-controlled processing and try to facilitate associations by embedding easily discernible humor-claim links in the advertisement. However, will such embedded relevance compensate for the interference of strong humor with claims memory? In Study 2, we examined how humor relevance in-

fluences memory for brand claims, focusing on the case in which strong humor is made more relevant to the claims. As in Study 1, we compared the effects under incidental exposure and instructed semantic elaboration to assess the nature and the locus of these underlying processes.

Humor relevance effects during incidental exposure.

Relevant humor in an advertisement facilitates organized encoding of the advertisement elements because processing can build naturally on the embedded links. The humor and the claims can then cross-cue each other and help search processes in recall. Thus, increasing humor relevance should improve both humor and claims recall. Also, because relevance facilitates associative processing, more resources should be available for rehearsing the humor and the claims. This should enhance feelings of familiarity and help discrimination of the humor and the claims from distracters in recognition tests (Alba & Hutchinson, 1987; Alba et al., 1991). However, because indirect tests do not rely on the activation of semantic meaning (Schacter & Graf, 1986), relevance should not influence indirect tests.

H3: With incidental exposure, humor that is more (vs. less) relevant to the brand claims will enhance claims recall and recognition but will have no effect on indirect tests.

Instructed elaboration effects. Recall that in Study 1, we used strong humor that was low in claims relevance. We found that humor itself absorbs significant processing resources during incidental exposure, attenuating claims processing. With instructed semantic elaboration encouraging viewer-generated associations, recall improves for both claims and humor. The claims are also recognized better, suggesting that they receive more focused rehearsal. Humor recognition is unaffected by instructed elaboration, suggesting that strong humor is rehearsed sufficiently even during incidental exposure (ceiling effects). No effects were found on indirect tests of claims memory.

In contrast, in Study 2, we manipulated humor relevance. We argue that with more relevant humor, specific humor-claims links will be readily forged even during incidental exposure. Both claims and humor should also receive sufficient rehearsal. Instructed elaboration then has little room to generate the additional humor-claims links to improve both claims and humor recall. With sufficient rehearsal even in incidental exposure, instructed elaboration is also unlikely to augment either claims or humor recognition. We validated this process rationale for humor relevance effects by testing the following two hypotheses using planned contrasts of the relevant means. No effects were expected on indirect tests.

H4A: When humor relevance is low, both brand claims recall and recognition will increase from incidental exposure to instructed semantic elaboration.

TABLE 3
Study 2 Cell Means^a

Test	Humor Relevance	Claims ^b				Difference	Humor ^c				Difference
		Incidental Exposure		Instructed Elaboration			Incidental Exposure		Instructed Elaboration		
		M	Cell Size	M	Cell Size		M	Cell Size	M	Cell Size	
Cued Recall	Low	0.23	16	0.39	18	0.16	0.27	16	0.38	18	0.11
	High	0.57	17	0.59	16	0.02	0.54	17	0.45	16	-0.09
Recognition	Low	0.26	15	0.33	15	0.07	0.85	15	0.92	15	0.07
	High	0.57	20	0.60	18	0.03	0.92	20	0.95	18	0.03
Indirect	Low	0.62	15	0.67	15	0.05	0.31	15	0.32	15	0.01
	High	0.64	16	0.64	14	0.00	0.35	16	0.32	14	-0.03

^aCell means are presented as proportions in which 0 = no memory, and 1.0 = perfect memory. ^bNo exposure baseline = 0.52. ^cNo exposure baseline = 0.21.

H4B: When humor relevance is high, both brand claims recall and recognition will be unchanged from incidental exposure to instructed semantic elaboration.

Method

In Study 2, we used a 2 (humor relevance: low and high) × 2 (exposure conditions: incidental exposure and instructed elaboration) between-subjects design. The three memory tests were administered between-subjects as before. The data are from 187 participants recruited from the same pool of business undergraduates at a Midwestern university (none participated in Study 1). The procedures were similar to those for Study 1.

Humor relevance manipulation. Advertisements from the high humor strength stimulus set (pretested for Study 1) were modified to create low- and high-relevance versions of the same advertisement. The basic advertisement components (brand name, product category, humor headline, picture, and claims) were identical. Relevance was manipulated by embedding transition statements that did (did not) specifically link the same high-strength humor headline to the brand claims at the bottom of the advertisement. This manipulation was pretested using a four-item, 7-point semantic differential measure of relevance (corresponds, relates, fits, consistent) based on prior research (Bryant, Hezel, & Zillman, 1979). The scales ranged from 1 (*low*) to 7 (*high*). The items were adapted to check the relevance of the humor execution to the claims and proved reliable (Cronbach's $\alpha = .92$).

For the ANGLER advertisements, we used "The powerful laundry detergent that catches tough stains," and "The laundry detergent popular with involved consumers" as the respective transition statements for the high- and low-relevance conditions. The corresponding transition statements for the ACROBAT advertisements were, "The extra-strength pain reliever that performs fast," and "The pain reliever of choice for concerned consumers." The transition statements for the low-relevance condition were intentionally mundane, as we wished to avoid facilitating humor-claims links. In contrast, the high relevance transition statements explicitly linked the

humor headline to the brand claims.³ The format used was similar to that shown in Appendix A. The advertisements were embedded in a newsmagazine (with order counterbalanced) and the elaboration manipulation and memory tests were administered as in Study 1.

Analyses

The hypotheses were tested using preplanned contrasts of the cell means (Table 3) based on a set of ANOVAs. Because the replicates did not differ, the analyses are pooled across the two products.

Manipulation checks. An ANOVA examining the participants' relevance ratings as a function of the humor relevance, exposure condition, and memory test factors showed a significant main effect for relevance, $F(1, 188) = 91.71, p < .001$ but no other main effects or interactions. Relevance scores were higher (4.13 vs. 2.25) in the high- versus the low-relevance condition. Thus, the humor relevance manipulation appeared successful and had effects distinct from the other manipulated factors. Two other manipulation checks showed that the elaboration instructions were effective. Participants reported focusing more on evaluating the quality of linkages, $F(1, 191) = 6.37, p < .01$, and on developing better linkages, $F(1, 191) = 9.98, p < .01$ with instructed semantic elaboration (vs. during incidental exposure). No other effects were significant. Data from 14 test-aware participants (assessed as in Study 1) were excluded from the analysis.

³Relevance may also be manipulated by direct humor-claims links as is common in real advertisements. However, we wanted to avoid confounding strength and relevance. We tested the concern that repeating the brand claims in the high relevance transition sentence produced the effects attributed to relevance. We created an advertisement that only repeated the claims but did not include the high relevance manipulation. Twenty-six participants were divided into two groups and exposed to either the original or the new advertisement, along with a filler advertisement. After a short delay, the participants wrote down what they remembered from the advertisements. Claims recall was similar for the two groups (.25 vs. .28, $p > .20$), showing that the relevance manipulation was unaffected by repeating the claims in the transition sentence.

Memory measures. As in Study 1, performance on each memory test is stated as a proportion ranging from 0.0 (*no memory*) to 1.0 (*perfect memory*). The recall measure is the proportion of targets retrieved correctly. The recognition measure is the proportion of correct identifications (hit rate minus false-alarm rate). The indirect test measure is the proportion of targets correctly identified (attribute importance for claims, slogan selection for headlines). The indirect tests showed significant priming of both claims and humor relative to the respective baselines in all conditions ($ps < .05$).

Results

We start by testing the claims memory hypotheses for incidental exposure (with the humor memory data as corroboration) and then examine the instructed elaboration effects. Performance level comparisons are always within the same test type. Process inferences drew on comparisons of the study conditions only on the presence or absence of effects across tests.

Humor relevance effects (H3). ANOVAs of the respective memory measures as functions of the humor relevance and exposure conditions and the 2-way interaction showed that relevance had significant main effects on claims recall, $F(1, 60) = 34.45, p < .001$, and recognition, $F(1, 55) = 27.71, p < .001$. As expected, relevance had no effect on indirect test performance, $F(1, 56) < 1$. As before, we tested our humor relevance hypotheses via planned contrasts of the pertinent cell means based on one-tailed t tests using the full design error from the respective ANOVAs.

Incidental exposure generated improvements in both claims recall (.23 to .57), $t(60) = 5.26, p < .001$, and recognition (.26 to .57), $t(55) = 3.96, p < .001$, as the humor became more claims relevant. These results are consistent with H3. There were corresponding improvements in both humor recall (.27 to .54), $t(63) = 4.61, p < .001$, and recognition (.85 to .92), $t(56) = 1.73, p < .05$ from low- to high-relevance humor. The parallel improvements in recall and recognition of both claims and humor suggest that more relevant humor stimulates additional separate rehearsal as well as humor-claims links, facilitating encoding and retrieval.

Instructed elaboration effects (H4). The ANOVA model also showed that instructed elaboration had a marginally significant main effect on claims recall, $F(1, 60) = 3.43, p = .07$ but not on recognition and indirect tests ($Fs < 1$). The interaction of relevance and exposure condition was also marginally significant for claims recall, $F(1, 60) = 3.38, p = .07$ but not for the recognition and indirect tests ($Fs < 1$). However, a more complete understanding comes from the planned comparisons in H4, which implied that instructed elaboration effects on recall and recognition would differ by humor relevance. As before, we contrasted relevant means using the full ANOVA design errors and one-tailed t tests.

With humor of low relevance, claims recall improved from incidental exposure to instructed elaboration (.23 to .39), $t(60)$

$= 2.36, p < .05$, but recognition does not (.26 to .33), $t(55) = .92, p > .15$. For humor, instructed elaboration improved both recall (.27 to .38), $t(63) = 1.71, p < .05$, and recognition (.85 to .92), $t(56) = 1.73, p < .05$. The parallel improvements in humor and claims recall corresponded to those in Study 1 and suggest that instructed elaboration created more humor-claims links that aided recall of both elements. Improved humor recognition suggests that it received more rehearsal. However, the lack of improvement in claims recognition is surprising, particularly given the low baseline. Contrary to H4A, these data locate the claims memory improvement at retrieval (vs. at encoding).

With relevant humor, neither claims recall (.57 and .59) nor claims recognition (.57 and .60) improved with instructed elaboration ($ps > .25$). These results are consistent with H4B. Unexpectedly, there was a marginally significant drop (.54 to .45), $t(63) = 1.41, p < .10$ in humor recall, but humor recognition was unchanged as expected (.92 to .95), $t(56) = .65, p > .25$. The results imply that even in incidental exposure, relevant humor facilitated humor-claims links. The indirect tests showed evidence of priming due to stimulus exposure (vs. the baseline condition). Yet, consistent with the literature, relevance and instructed elaboration had no significant main or interactive effect on the indirect tests ($ps > .20$).

Discussion

In Study 2, we examined whether claims memory is enhanced by a relevance manipulation that embeds readily discernible humor-claims links. Relevance affects recognition of both claims and humor, showing that each receives separate rehearsal. More importantly, the embedded associations drive improvements in both claims and humor recall. The instructed elaboration effects confirm this inference. When relevance is low, claims (and humor) recall improve with instructed elaboration (vs. incidental exposure), but claims recognition does not. This pattern suggests that instructed elaboration builds additional humor-claims links that facilitate search processes in recall (vs. discrimination processes in recognition). Thus, the facilitation is located at retrieval rather than at encoding, as originally hypothesized.

With relevant humor, claims recall and recognition are unchanged by instructed elaboration, implying that participants perceive the embedded humor-claims links and develop associations even during incidental exposure. The unexpected decline in the humor recall score with instructed elaboration is an anomaly, perhaps reflecting interfering associations generated due to an overabundance of processing resources in this condition (high strength, high relevance, and instructed elaboration). Finally, the lack of significant effects on the indirect tests suggests that relevance (like instructed elaboration) works by aiding the association of the humor and the claims.

GENERAL DISCUSSION

Our findings suggest some answers to long-standing substantive questions about humor effects. First, does humor facili-

tate (or interfere with) memory for brand claims? The answer seems to depend on humor strength. We find that relative to nonhumor, moderate humor (even if low in claims relevance) may facilitate encoding by attracting more processing resources to the advertisement. Memory for brand claims (and perhaps other advertisement components) may benefit from these resources. However, high-strength humor (especially if low in relevance) may draw resources away from brand claims, lowering recall. Together, these results for low-relevance humor suggest that humor strength has an inverted U-shaped effect on claims memory.

Can we tell if these effects occur at encoding or at retrieval? Based on our rationale for interpreting memory test data, the answer seems to be yes. With moderate humor, even incidental exposure draws sufficient processing resources to encode claims for successful recall and recognition. However, high-strength humor inhibits both encoding and retrieval. Impoverished semantic encoding of the claims may impair their retrieval on direct tests, even if indirect tests show implicit memory for the claims. Diagnostics on the locus of memory effects may help advertising researchers systematically improve the memory impact of advertisements.

Claims memory also depends on whether the humor is claims relevant. Humor relevance (like instructed elaboration) improves claims recall (and humor recall) but does not affect recognition or indirect tests. These effects appear to stem from conscious processing of embedded humor-claims links that facilitate claims encoding. However, humor strength affects both direct and indirect tests. The latter results imply nonconscious processes at encoding (e.g., Janiszewski, 1988). This evidence of retrieval without awareness of the encoding episode shows that brand memories may develop without conscious recollection of exposure (Krishnan & Chakravarti, 1999; Krishnan & Shapiro, 1996; Shapiro, 1999).

Must there be ample elaboration opportunity for humor to influence brand claims memory? Our data suggest that this is not necessarily so. If the humor is relevant, humor-claim associations may be encoded naturally even during incidental exposure. Further elaboration then has limited additional effects on recall or recognition. In contrast, with low-relevance humor, instructed elaboration improves claims recall (but not always recognition). This suggests retrieval inhibition (and sometimes deficient encoding) during incidental exposure. Embedding discernible humor-claims links in the advertisement may compensate for situations in which participants lack opportunity to link and relate the advertisement elements.

Is there a strength–relevance trade-off in the use of humor in advertising? When relevance is low, moderate-strength humor produces higher claims memory than high-strength humor. However, does this pattern hold if the humor is made relevant to the claims? We cannot answer this question directly because we did not fully cross strength and relevance in Study 2. However, the data suggest that strong humor is effective for attracting processing resources to the advertisement but may block distribution of these resources to other advertisement components. Therefore, the optimal combina-

tion of strength and relevance may depend on the relative difficulty of attracting viewer attention (e.g., due to media clutter and low audience involvement) versus creating an organized encoding of the advertisement (e.g., due to the complexity of the claims or brand concept).

Future Research

We discuss future research issues within the broad categories of stimulus design, memory tests, and individual differences (Jenkins, 1979). First, humorous advertisement executions may also be implemented in other ways (e.g., with claims directly embedded in the humor). Although processing may differ in such situations, similar memory principles should govern the facilitation and interference effects of humor. Strong and irrelevant humor may distract consumers from the embedded claim, whereas a moderate or subtle incongruity may facilitate the “Huh/Aha/Ha-ha!” sequence. Second, other humor formats (besides puns in print advertisements) are also candidates for further study. Third, research may examine if other advertisement executions operate like humor, especially under low involvement (MacInnis et al., 1991). Thus, even though they attract attention to the advertisement, celebrities with strong images may draw processing resources away from message claims (e.g., Bob Dole in Viagra® and Pepsi® advertising).

Fourth, relevance is defined in this study only in terms of binary links between the humor and the claims. More work is needed on memory processes when the desired associations involve simpler concepts (e.g., brand names) that are easily rehearsed and linked to other advertisement components or when several complex concepts with shared and unique aspects must be comprehended and remembered. Facilitation and interference when the advertisements (e.g., the Michelin® tires baby advertisements) trigger emotion, imagery, and affect-based associations are also important areas for research. Finally, memory inhibition may be severe in consumer segments with processing deficits. Researchers have used direct tests to compare the processing capabilities of younger and older adults (Cole & Houston, 1987). However, nonconscious influences that humor and other advertising executions may have in these segments deserve more study. Indirect tests may add public policy insights in these contexts.

More generally, affect, preferences, and behavioral predispositions following incidental advertisement exposure may be underestimated in recall and recognition tests. Recent papers suggest that indirect tests may tap memories created by exposure to marketing stimuli that are inaccessible to conscious processes. In particular, the distinctions between remembering and knowing (Gardiner & Richardson-Klavehn, 2000; Monroe & Lee, 1999) as well as task versus process dissociation must be considered in the development and use of indirect tests in advertising and consumer research (Jacoby, 1991; Krishnan & Chakravarti, 1999; Shapiro, 1999). It is fair to say that the study of implicit memory phenomena in consumer contexts is at an early stage and the field would benefit from more research in the area.

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APPENDIX A
Angler Advertisement for High
Humor Strength Condition

ANGLER: A PERSON WHO CATCHES FISH SOMETIMES BY PATIENCE OR LUCK, BUT MOSTLY BY THE TALE.



ANGLER™: *The laundry detergent popular with involved consumers.*

POWERFUL CLEANER
 ANGLER is the most powerful detergent you can get for your money.

REMOVES TOUGH STAINS
 It contains a formula which is effective in removing stains from all fabrics.

APPENDIX B
Direct and Indirect Tests for Brand Claims

Recall Test Instructions

Consider the following list of products. Some were featured in the ads in the example magazine. Think back to the ads that you saw in the magazine, and try to remember all the prod-

ucts that you saw in these ads. For each product that you remember seeing, write down all the claims that were made about the product in the ad.

1. Beer _____
2. Pain relievers _____
3. Mouthwash _____
4. Laundry detergent _____
5. Toothpaste _____

Recognition Test Instructions

See Table B1.

Indirect Test Instructions

Marketers are often interested in finding out what specific product features are important to consumers. For each product category below, four features are listed which consumer research shows are the most common features for brands in this category. Circle the two features for each product category that you think are most important to you as a consumer. (List identical to that in Table B1.)

Notes

1. The cues for the recognition task (B) and the indirect task (C) are identical, with only the instructions changed to think back to the advertisements (recognition) or focus on the task (indirect).
2. Because the recall test does not provide the target claims, participants must think back to the advertisements and retrieve them. The recognition test provides the target claims along with distracters; hence, participants must match these cues to what they saw before and discriminate among the cues as either seen or not seen before. The indirect test is an attribute importance task with the target claims provided and instructions focused on the task (not the exposure episode). Hence, participants do not think back to the advertisements and use the test cues to respond to the task. This response is unconsciously primed by the prior advertisement exposure (i.e., participants are unaware of the basis for their task response).

APPENDIX C
Direct and Indirect Tests for Humor

Recall Test Instructions

Consider the following list of sentence-beginnings. Some of these may be completed with headlines that you saw in the ads in the example magazine. Think back to *the ads that you saw in the magazine* and using the sentence beginnings, try to remember *all the headlines that you saw in the ads*. For in-

TABLE B1
Recognition Instructions

Consider the following list of products and brand claims. Some of these were featured in the ads in the example magazine. Think back to the ads you saw in the magazine and try to remember all the products and brand claims that you saw in the ads. For each product you remember seeing, circle the two claims that were made about the product in the ad.

1. Beer	a. Smooth taste	b. Imported	c. Less alcohol	d. All natural
2. Pain relievers	a. Safe to use	b. Works fast	c. Extra strength	d. Advanced medicine
3. Mouthwash	a. Kills germs	b. Pleasing taste	c. Low cost	d. Fights tartar
4. Laundry detergent	a. Powerful cleaner	b. All temperature	c. Pleasant scent	d. Removes tough stains
5. Toothpaste	a. Tastes good	b. Fights cavities	c. ADA Approved	d. Whitens teeth

Note. ADA = American Dental Association.

stance, if “CHARTER: The wine that ...” were one of the sentence beginnings you could complete it by writing down “CHARTER: The wine that lightens your spirits but not your purse,” if you remembered seeing this headline earlier. Using these sentence-beginnings, please try to write down all the headlines that you saw in the advertisements.

1. Classic: A work that _____
2. Angler: A person who _____
3. Bagpipe: A Scottish instrument _____
4. Acrobat: A performer _____
5. Model: A lass _____

Recognition Test Instructions

Consider the following list of headlines. Some of these are headlines that you saw in the ads in the example magazine. Think back to *the ads that you saw in the magazine* and try to remember *all the headlines that you saw in the ads*. If you remember seeing a particular headline, circle the corresponding number. For instance, if you remember seeing the headline “A work that is considered outstanding in its field,” circle Number 1. Please circle all the headlines that you saw in the ads.

1. A work that is considered outstanding in its field.
2. A person who performs gymnastic feats of the body.
3. A person who catches fish with the help of a rod, line and hook. (target)

4. A Scottish instrument that is always out of tune.
5. A lass with a classy chassis.
6. A performer of skillful acts of body control.
7. A sportsman who catches fish using a fishing rod.

Indirect Test Instructions

See Table C1.

TABLE C1
Indirect Test Instructions

In today’s cluttered marketplace, marketers are often interested in finding unique ways of attracting attention to their product. One way of doing this is to use slogans that will appeal to consumers (e.g., Just do it). In this page several slogans are listed that may potentially be used by marketing managers. Circle the two slogans that you find most appealing.

- | | |
|------------------------------|-----------------------------|
| 1. Outstanding in its field. | 2. A top-notch performer. |
| 3. Stretch the boundaries. | 4. A classic choice. |
| 5. Catch the excitement. | 6. The best value. |
| 7. Always in tune. | 8. The hottest new product. |

Notes

1. The cues for the recall and indirect tasks are identical, with only the instructions changed to think back to the advertisements (recall) or focus on the task (indirect).
2. See Note 2 (Table 1) for an outline of the hypothesized retrieval mechanism for each test.

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