Moderators of Language Effects in Advertising to Bilinguals: A Psycholinguistic Approach

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This article examines a psycholinguistic model of bilingual concept organization and extends it to the processing of advertisements by bilingual consumers. The model suggests that second-language (L2) messages result in inferior memory as compared with first-language (L1) stimuli. These language asymmetries in memory are thought to occur because processing an L2 message at a conceptual level is less likely than processing an L1 message conceptually. Applying this notion to advertisements, this research examines picture-text congruity as a potential moderator of language effects in memory. The results suggest that a high level of congruity between picture and text facilitates conceptual processing of L2 messages, increasing memory for second-language ads and thereby reducing the impact of language asymmetries on memory.

This article explores how bilingual individuals process advertising messages. Consumer researchers have devoted relatively little attention to bilingual information processing and have instead focused on investigating how monolingual individuals process information (Usunier 1996). However, given that many, if not most, of the world's consumers speak more than one language (Grossjean 1982; Hoffman 1991), understanding how bilingual individuals process information in their first as compared with their second language is of crucial importance to consumer research.

Several studies have begun to examine the role of language in advertising. Koslow, Shamdasani, and Touchstone (1994) applied a sociolinguistic approach to study how bilingual Hispanics perceive marketers' sensitivity to their culture. Studies by Schmitt, Pan, and Tavassoli (1994) and Schmitt and Zhang (1998) used a psycholinguistics approach to examine how differences between two specific languages, Chinese and English, affect the manner in which monolingual speakers of each language process information. These studies shed light on the link between language and consumers' cognitive structures and represent a significant step forward in the application of linguistic theory to advertising.

However, to this date, there is a dearth of research examining how bilingual consumers process advertisements.

We examine bilingual consumers' processing of marketing messages by extending a psycholinguistic model, the Revised Hierarchical Model, or RHM, to advertising (Dufour and Kroll 1995; Kroll and de Groot 1997). The RHM describes how bilingual individuals process words corresponding to two languages. This model suggests that conceptual or semantic processing is less likely to occur when a word is encountered in an individual's second language than when it is presented in his first language. Thus, the RHM implies that memory for second-language messages will be inferior to memory for first-language messages. The model applies to bilingual speakers of any two languages, so it is of importance to researchers interested in different subcultures.

Our research investigates the RHM's predictions of asymmetries in memory for first- and second-language stimuli and explores several factors that may moderate those asymmetries, perhaps offsetting the language effects described by the RHM. In the first study, we examine the impact of varying levels of congruity between the ad's picture and its copy on memory for first- and second-language ads. This first study also examines the relevance of the RHM, which has been tested only with single-word stimuli, to the relatively more complex environment of advertising. In the second study, we explore the impact of processing motivation on the asymmetries in memory for first- and second-language ads. Together, these studies begin to provide a framework for understanding how bilingual individuals process ads in their first and second languages. They suggest that conceptual processing of and enhanced memory for second-

language messages can be encouraged by designing ads in which the picture and text are highly congruent. To begin, we briefly review some research from psycholinguistics and marketing that is relevant to how bilingual consumers process advertising messages.

PSYCHOLINGUISTICS, PICTURES, AND ADVERTISING TO BILINGUALS

The Revised Hierarchical Model

The topic of conceptual representation in a bilingual individual's memory has been discussed extensively in the psycholinguistics literature. A recent and widely accepted model of bilingual concept representation is the Revised Hierarchical Model, or RHM (Dufour and Kroll 1995; Kroll and de Groot 1997). This model builds on previous findings (Durgunoglu and Roediger 1987; Snodgrass 1984) that suggest that there exist two levels of representation in the bilingual's mind: the lexical (word) level and the conceptual (meaning) level. At the lexical level, each language is stored separately. However, at the conceptual level, there is a unitary system in which words in each language access a common semantic representation or meaning. Thus, according to Dufour and Kroll (1995, p. 166), bilingual individuals possess a "hierarchical arrangement of words and concepts, with a separation at the lexical level but with connections to a semantic system that is shared across languages."

The connections between words in different languages made at the lexical level are referred to as word associations or lexical links, while the connections in memory between lexical representations in either language and the meanings they represent are referred to as conceptual links. The model specifies a stronger lexical link from the individual's second language (L2) to his first language (L1) than from the individual's L1 to his L2. This is a residual effect from the second-language-acquisition process, in which individuals begin learning words in their L2 by relating them to words in their L1. Hence, words in the bilingual individual's L2 are closely associated with words in his or her L1.

The same residual effect accounts for the stronger conceptual links between the lexical representations in an individual's L1 and the semantic representations in memory (concepts). Conceptual links to the individual's L2 are weaker than L1 links because it is only after individuals have achieved a high level of proficiency in their L2 that they rely less on their L1 to gain access to meaning. Thus, the strength of both lexical and conceptual links is a function of the L2 proficiency of the individual in question. However, even after the individual has become fluent in both languages, there is a residual asymmetry in both lexical and conceptual links (Dufour and Kroll 1995; Kroll and de Groot 1997).

The model also specifies that the second-language lexical store is smaller than the first-language store, which indicates a pervasive superiority of the first language over the second language. Although it may seem intuitive that bilinguals who are proficient in two languages have perfectly balanced lex-

ical representations for first- and second-language words, research indicates that, even for proficient bilinguals, there is an imbalance in their first- and second-language lexical storage (Dufour and Kroll 1995; Kroll and de Groot 1997). In summary, the RHM suggests that processing an L2 message at the conceptual level is less likely than processing an L1 message conceptually.

It is worth noting that, in this research, language proficiency or fluency, not the chronological order in which each language was learned, is the construct used to conceptualize L1 and L2. This is because it is possible that a person could have learned Spanish (English) first and yet be more proficient in the other language at the time of the research (Dufour and Kroll 1995). In such a case, the RHM would predict that the language learned chronologically first would suffer from weaker conceptual links and a smaller lexicon and would be best described as L2, while the language learned chronologically second would be the dominant language and would be best described as L1. Thus, in the rest of this article, L1 will denote the language in which a bilingual is most fluent, and L2 will denote the language in which a bilingual is less fluent. Some prior work testing the RHM in psycholinguistics has confounded language proficiency with the chronological order in which the languages were learned. Therefore, the current study offers an improvement over previous research in that it explores language proficiency as the driver of the asymmetries described by the RHM.

Empirical testing of the RHM supports the proposition that semantic processing of L2 stimuli is less likely than processing equivalent L1 stimuli (e.g., Sholl, Sankaranarayanan, and Kroll 1995). At the same time, research in psycholinguistics testing the RHM has found that the accessibility to concepts of an L2 text may be facilitated by manipulating other elements of the stimulus, such as whether it is accompanied by a congruent picture. Thus, the congruence of pictures and text may potentially moderate the L1 and L2 conceptual links.

La Heij et al. (1996), for example, exposed bilingual individuals to words that had to be translated into a different language. Respondents were native speakers of Dutch (their dominant language) and were relatively proficient in English. In an experiment, words were accompanied by either congruent or incongruent pictures, for example, the word "shark" in combination with a picture of a shark or a picture of a bottle. La Heij et al. found that translation of the written stimuli from L2 to L1 was facilitated in the form of shorter latencies by congruent pictures, while incongruent pictures resulted in higher latencies. Thus, pictures seem to aid or hamper second-language processing, depending on their level of relatedness to the textual stimulus. Consistent with the RHM, La Heij et al. (1996) concluded that respondents are able to access concepts from L2 but that they do so with more effort than from L1. More important, La Heij et al.'s findings imply that congruent pictures may moderate the predictions of the RHM. That is, the weaker L2 conceptual links may be strengthened by a pictorial cue that facilitates

activation of the concept represented by the L2 word. This proposition will be explored further in the current article. We will now review consumer research that is related to this reasoning.

Picture Effects in Advertising to Bilinguals

The findings of several advertising research studies also seem to suggest that congruent pictures may assist conceptual processing of second-language information. These studies have found that pictures that are congruent with ad copy can enhance consumers' memory. For example, Schmitt, Tavassoli, and Millard (1993) built on previous studies (Edell and Staelin 1983; Lutz and Lutz 1977; Miniard et al. 1991) to explain picture-congruity effects on ad processing by monolingual consumers. Relying on the Spreading Activation Paradigm (Anderson 1983), they suggest that the ad picture activates a conceptual node, which then may become closely associated with the concept(s) described by the subsequent ad copy if there is a certain level of picture-text congruity. The strong linkages between these sets of nodes then facilitate further processing, which, in turn, makes the links stronger.

Picture-text congruity, therefore, seems to enhance memory. Further support for this reasoning is provided by dual code theory. Because pictures are more easily accessed in memory than verbal information (Paivio 1986), the probability of a concept being retrieved is higher if it is closely associated with a picture (Unnava and Burnkrant 1991). Thus, we can conclude that when ad copy elements—for example, the product attribute featured in the ad claims or the product's brand name—express the same (or similar) concepts as the ad picture, strong linkages will be formed in memory that will facilitate processing of the textual ad elements. Given these findings in consumer research and La Heij et al.'s (1996) findings with bilinguals, it would seem that congruity between the ad's picture and the textual ad elements may make conceptual processing of L2 information more likely and, thereby, enhance recall.

In study 1, we examine the RHM's predictions of asymmetries in memory for first- and second-language ads. We consider picture-text congruity as a potential moderator of the language-asymmetry effects. The study attempts to offer insight into how bilingual consumers process advertisements by addressing the questions, "When is memory for L1 ads superior to L2 ads?" and "Are there conditions under which L2 ads can be as memorable as L1 ads?" In examining these questions, we attempt to find conditions under which L2 ads are as memorable as L1 ads by varying the congruity between the ad picture and the ad's textual elements, namely, the product attribute featured in the ad claims and the product's brand name.

STUDY 1

In study 1 we investigate the RHM's predictions of language asymmetries in memory for advertising. As discussed in the previous section, it is possible that pictorial cues that are congruent with the ad's copy facilitate L2 conceptual processing. Hence, the congruity of ad pictures and text may moderate the asymmetries in language processing predicted by the RHM. We conceptualize the degree of picture-text congruity and its effect on ad memory by adapting Houston, Childers, and Heckler's (1987) operationalization. Two ad execution factors are manipulated to produce various levels of picture-text congruity: interactivity of the product brand name (whether the brand name is congruent with the ad picture) and consistency of the copy (whether the product attribute described in the ad claims is congruent with the ad picture). We should note that our definition of interactivity refers to Houston et al.'s (1987) operationalization. It does not correspond with Lutz and Lutz's (1977) operationalization in that the brand name is not physically integrated with or embedded within the picture.

The level of picture-text congruity may determine the degree to which the picture helps process the ad's message semantically. Higher congruity levels may result in stronger linkages being created in memory between pictorial and verbal concepts, thus facilitating processing and increasing the likelihood that the ad claims will be remembered (Lippman and Shanahan 1973). This effect not only applies to memory for the specific element congruent with the picture but also extends to the rest of the textual elements of the ad, including the nonmanipulated elements. This result occurs because ads are processed as interactive units, so each element enhances another's meaning (Glenberg and Langston 1992; Houston et al. 1987).

Three levels of ad congruity result from our manipulation of brand-name and product-attribute congruity with the ad picture: (1) a low-congruity ad condition, in which neither the brand name nor the product attribute are congruent with the picture; (2) two moderate- or mixed-congruity ad conditions, in which either the brand name or the product attribute is congruent with the ad picture, while the other element, brand name or product attribute, is not congruent with the picture; and (3) a high-congruity ad condition, in which the picture, brand name, and product attribute are all congruent.

For ads in the low-congruity condition (brand name and product attribute expressed in the ad claims are not congruent with the ad picture), pictures do not facilitate processing and subsequent memory of the ad claims. Second-language ads should, therefore, not benefit from the pictorial information in the ad. Strong linkages between the concepts represented by the picture and text are not formed, impeding processing of the ad. Hence, as suggested by the RHM, we should expect a memory superiority of L1 ads over L2 ads. The L1 ads, because they are more easily processed, will be better remembered in the absence of facilitatory cues.

However, it is possible that memory for first-language ads could also be hampered, since consumers may be misled or thrown off course by the low picture-text congruity (Glenberg and Langston 1992). Instead, individuals exposed to low-congruity L1 ads may remember incorrect information. This may be because subjects initially remember elements

of the picture and interpret them independently of the ad copy (Glenberg and Langston 1992; Paivio 1986). Therefore, when prompted to remember these low-congruity L1 ads, subjects will produce incorrect or unrelated statements. Thus, low-congruity ads may indeed hinder correct memory of the ad in both L1 and L2. Our first hypotheses will examine these possible outcomes.

H1: Noninteractive/inconsistent ads will result in higher memory if they are presented in the subjects' first language than if they are presented in their second language.

As the congruity of the ads is increased in the moderate-congruity conditions (the brand name is congruent with the ad picture and the product attribute expressed in the ad claims is not congruent with the ad picture, or the brand name is not congruent with the ad picture and the product attribute expressed in the ad claims is congruent with the ad picture), memory for the L1 ad content may increase. Subjects in the L1 condition will be able to more easily establish a connection between the picture and at least one element of the ad. Relational processing between the picture and the L1 ad copy may thus be enhanced, facilitating further processing of additional information in the ad, including the nonmanipulated copy elements (Glenberg and Langston 1992; Houston et al. 1987).

As described by the RHM, conceptual processing of L2 ads is less likely than processing L1 ads because of the weaker L2 conceptual links. It is possible, then, that a greater degree of picture-text congruity may be necessary to facilitate L2 processing than is necessary for L1 processing. In other words, picture-text congruity may have a higher facilitative threshold for L2 ads than for L1 ads. In the moderate-congruity condition, only one of the two manipulated copy elements is congruent with the picture. Therefore, relational processing between the different elements in moderate-congruity L2 ads may not take place. As La Heij et al. (1996) found in their research, in the absence of total congruity, consumers exposed to an L2 message may be less likely to process and elaborate on the message. As a result, consistent with the RHM, memory for L2-ad content may also be lower than memory for L1 content in the moderate-congruity condition.

H2: Noninteractive/consistent ads will result in higher memory if they are presented in the subjects' first language than if they are presented in their second language.

H3: Interactive/inconsistent ads will result in higher memory if they are presented in the subjects' first language than if they are presented in their second language.

Finally, ads in the high-congruity condition represent complete overlap between the pictorial and textual information. In this condition, both the brand name and the product attribute expressed in the ad claims are congruent with the picture, so the entire text of the ad reinforces the concept expressed by the picture, thus facilitating processing of the ad. This condition parallels the congruent condition in La Heij et al.'s (1996) study. Second-language ads in this condition may, therefore, experience a facilitative effect of pictures on elaboration and memory. At the same time, consistent with Mick (1992), the increased elaboration promoted by total congruity may not offer any incremental benefit to L1 ads. Hence, memory for L2 ad content may experience a significant improvement over the low- and moderate-congruity conditions and reduce the memory superiority of L1 ads.

H4: Interactive/consistent ads will result in similar high memory in both the L1 and L2 conditions.

Two main memory measures will be examined: ad content recall and ad claim recognition. Consistent with previous research, we expect that recognition will follow a pattern similar to that of recall, because relational processing facilitates both recognition and recall (Craik 1977; Gillund and Shiffrin 1984; Krishnan and Chakravarti 1999).

In addition, subjects' unrelated statements generated in response to the recall protocol will be analyzed. These statements are comments made by the subjects that are not directly related to the information presented in the ads. An example of such a comment is "the ad talked about buying health insurance for your pets" (when the ad did not mention this attribute). Unrelated statements may follow a pattern opposite the ad content recall. When subjects are able to remember the ad well, they will be less likely to record unrelated comments in their recall protocols. On the other hand, when correct recall is low, for example, in the low-congruity condition, subjects may be misled or thrown off course by the low picture-text congruity. They may assign a meaning to the ad that does not reflect the ad copy. Consequently, they may generate statements unrelated to the ad. This measure will offer insight into the kind of information that individuals in the L1 low-congruity condition are processing. Specifically, if the number of unrelated statements is high, it may mean that those subjects are led astray by low congruity. A similar conclusion can be drawn in the L2 moderate-congruity conditions, where we predict low L2 memory and significant language effects on memory.

Finally, the experimental treatments may also have an effect on product evaluations. Recent studies have found that attitudinal measures have an inverted-U relationship with the level of ad congruity (Peracchio and Meyers-Levy 1997). A similar pattern of effects may occur in this study such that, for L1, moderate-congruity ads are preferred to both low- and high- congruity ads. However, for L2, if enhanced memory occurs in the high-congruity condition, indicating that conceptual processing is more likely, evaluations may not decrease from the moderate- to the high-congruity conditions. This is because, even in the high-congruity condition, L2 ads are still not as easily processed as L1 ads. As the RHM suggests, L2 ads are intrinsically more challenging to process than are L1 ads, so it is unlikely

that they will be perceived as too easy or that they will lead to excessive processing, as L1 ads might. In fact, high-congruity L2 ads may result in enhanced product evaluations because persuasion is often heightened when respondents successfully engage in adequate, but not excessive, processing (Anand and Sternthal 1990; Peracchio and Meyers-Levy 1997). Thus, the language of the ad may moderate product evaluations. The next section describes the empirical study designed to investigate the impact of congruity on the language asymmetries predicted by the RHM.

Method

An experiment was conducted in which three factors were manipulated between subjects: language, consistency of the product attribute described in the ad claims with the ad picture, and interactivity of the product's brand name with the ad picture. The ads were presented in either English or Spanish. The ad's language was coded as L1 or L2, depending on the language in which the subjects were most fluent. Thus, if the language in which subjects were most proficient (e.g., Spanish) was the same as the language in which the ad was presented (e.g., Spanish), they were in the L1 condition; otherwise, they were in the L2 condition.

Stimuli. The study materials consisted of three print ads: a grocery store ad, an insurance company ad, and a guided tours ad. All of the ads included a picture and text, with the text located below the picture. The length of the text ranged from 37 to 55 words. The brand name of the product appeared only once and was located in the main body of text, near the beginning of the copy. The rest of the ad copy focused on the attribute of the product and also included some additional information, such as a toll-free number or an offer to contact the company for a free estimate. For example, the picture of the insurance ad contained a car surrounded by guard dogs. The brand names in that ad were Watchdog (interactive) or Star (noninteractive). The product attributes were security (consistent) or economy rates (inconsistent).

Two studies were conducted to ensure that neither the brand names nor the product attributes employed in any of these ads differed in terms of memorability (recall scores) or likeability (1 = dislike a lot; 7 = like a lot). Twenty bilingual Spanish-English individuals participated in each study. The first study revealed that brand names in the interactive condition did not differ from the noninteractive condition in memorability or likeability (F's < 1). Similarly, the second study found that the product attributes in the consistent condition did not differ from the inconsistent condition in memorability or likeability (F's < 1).

The test materials consisted of (1) a personal inventory questionnaire that combined questions about the language proficiency of subjects with other demographic, cultural, and personality questions; and (2) a questionnaire that included a recall protocol and a recognition test. Product evaluation scales were administered separately. Following procedures used in bilingual research, the questionnaires were available in Spanish and English, and subjects were given the choice of completing them in either language. All materials (ads and questionnaires) were originally written in English and translated using the method of back-translation (Hui and Triandis 1985).

Pretests. Pretests were conducted to ensure the validity of the consistency and interactivity manipulations. For the consistency manipulation, bilingual Spanish-English pretest subjects ($n = 40$) were asked to rate each ad on the meaning similarity of the ad picture and claims (1 = totally different meaning; 7 = exactly the same meaning). Pretest subjects were only exposed to one version of each ad (either consistent or inconsistent). Half of the subjects rated the consistent version of each ad, and the other half rated the inconsistent version. The pretest booklets were mixed, so each subject saw some consistent and some inconsistent ads. In addition, subjects viewed the ads in either Spanish or English. The means across all ads were 5.41 for consistent ads and 2.15 for inconsistent ads ($F(1, 39) = 225.26, p < .001$), indicating that consistent ads were considered more congruent than inconsistent ads. There were no differences between the Spanish and English language versions of the ads ($F < 1$).

For the interactivity manipulation, a different sample of bilingual Spanish-English pretest subjects ($n = 40$) were asked to rate each picture-brand pair on meaning similarity (1 = totally different meaning; 7 = exactly the same meaning). As with the consistency manipulation, pretest subjects were only exposed to one of the versions of each ad (interactive or noninteractive) in either Spanish or English. The means across all pairs were 6.30 for interactive ads and 1.70 for noninteractive ads ($F(1, 39) = 407.47, p < .001$), indicating that interactive ads were thought to be more congruent. No differences were evident between Spanish and English language ads ($F < 1$).

Subjects. Eighty-three subjects participated in the main study. They were all fluent Spanish-English bilinguals. Their mean age was 39 years, and 96 percent of them had at least a high school diploma. There were 38 males and 45 females. Subjects held diverse jobs in the community, from secretaries to middle managers, and agreed to participate in the study when contacted in their offices. They were of diverse national origins (e.g., Puerto Rican, Mexican, Cuban). Language proficiency was measured by a self-administered questionnaire that included 12 items that asked subjects to rate from 1 to 5 their own proficiency in Spanish and English in different situations (e.g., understand newspaper headlines) or in general (e.g., reading proficiency). Scale items were adapted from previous studies (Clark 1981; Liu, Bates, and Li 1992; MacIntyre, Noels, and Clément 1997). Both the Spanish ($\alpha = .94$) and English ($\alpha = .94$) scales loaded highly on one factor (eigenvalues = 8.00 and 7.63, respectively), so the scores of all the items were averaged to form a single Spanish and English proficiency measure for each subject.

For those subjects whose first language was Spanish, their L1 average rating on the five-point language scale was 4.85,

TABLE 1

STUDY 1: TREATMENT MEANS AND STANDARD DEVIATIONS FOR ALL MEASURES

	Noninteractive				Interactive			
	Inconsistent		Consistent		Inconsistent		Consistent	
	L1	L2	L1	L2	L1	L2	L1	L2
Ad content recall	2.70	2.10	4.60	2.27	4.50	2.40	5.17	5.70
	(3.04)	(1.50)	(3.57)	(2.32)	(2.68)	(1.90)	(1.95)	(1.52)
Recognition	.48	.45	.98	.73	.60	.37	.89	.93
	(.22)	(.14)	(.21)	(.33)	(.05)	(.33)	(.34)	(.16)
% of unrelated statements	.18	.22	.03	.21	.07	.24	.15	.06
	(.15)	(.08)	(.06)	(.32)	(.05)	(.47)	(.11)	(.23)
Product evaluations	3.03	2.75	3.54	3.28	3.68	3.74	3.31	3.48
	(.51)	(.64)	(.62)	(.70)	(.39)	(.72)	(.65)	(.78)

NOTE.—Standard deviations are in parentheses.

and their L2 average rating was 4.08. For subjects whose first language was English, their L1 average rating was 4.87, and their L2 average rating was 4.09. Subjects were all relatively proficient in both languages, all scoring 2.50 or higher in both L1 and L2 on the five-point language scale. However, they were all more proficient in their first language than in their second language, as shown by a paired t-test ($t(82) = 10.21, p < .001$).

Procedure. Subjects received a booklet including the three experimental ads and four filler ads. The order of the ads was varied. All the experimental ads were in the same condition, and all ads in the booklet were in the same language (Spanish or English). Subjects were randomly assigned to each experimental cell. Subjects were instructed to examine the ads. Then, they were given 20 seconds to read each of the ads. This length of time had proven sufficient to read all the ads fully during pretests. Subjects were informed that after they saw the ads they would answer some questions on how they felt about the product, but no mention was made about the memory test. After exposure to each of the ads, subjects evaluated the featured product. Evaluations were obtained on five-point, four-item scales labeled poor value/excellent value, poor quality/high quality, boring/exciting, and common/unique. Higher ratings were more favorable. Because these four items loaded on a single factor, they were averaged to form one evaluation index ($\alpha = .85$).

After the subjects read all the ads and completed their corresponding product evaluation scales, the ad booklets were collected, and the subjects were given a second booklet that included a 10–15 minute unrelated task intended to clear their short-term memory. Following completion of this task, subjects were handed a third booklet, which included several tasks. First, subjects were prompted by the product category of the products featured in the ads and asked to recall all the information they remembered from the text and the picture of each of the ads. Next, subjects completed a recognition test in which they were asked to choose the correct product attribute for each of the ads out of five possible choices. Subjects filled out the personal inventory ques-

tionnaire, which included the language scale, either before or after exposure to the recall tasks. Subjects were randomly assigned to the before or after conditions. No effect of order for completing these measures was found (F's < 1).

Results

Initial analysis revealed no treatment effects for the order in which the ads were administered or for whether Spanish or English was the subjects' first language (F's < 1). Therefore, the results were analyzed as a 2 (L1, L2) × 2 (interactive brand name, noninteractive brand name) × 2 (consistent product attribute, inconsistent product attribute) between-subjects factorial design. Degrees of freedom are 1 and 75 for all analyses unless otherwise noted. Means for all the measures appear in Table 1.

Manipulation Check. We examined the total number of statements generated in response to the recall protocol. The RHM predicts that conceptual processing is less likely to occur in L2 conditions than in L1 conditions. Therefore, in general, less elaborative processing should be evident for L2 ads than for L1 ads. This should result in a lower number of total statements generated in response to L2 ads than to L1 ads. Our analysis confirmed this expectation. An examination of total statements revealed only a significant main effect of language ($F(1, 83) = 8.32, p < .01$), indicating that L1 ads elicited more total statements than L2 ads ($M = 11.14$ vs. $M = 8.78$).

Ad Content Recall. The recall measure included the number of correct statements subjects recorded in their protocols regarding the ad content. Two bilingual judges who were blind to the hypotheses coded the recall protocols reliably with 87 percent of interjudge agreement (Rust and Cooil 1994). Analysis of subjects' ad content recall showed a significant three-way interaction of language by interactivity by consistency ($F = 4.18, p < .05$). Figure 1 presents these results.

Examination of the interaction revealed differences between the L1 and L2 conditions only after exposure to the

FIGURE 1

THREE-WAY INTERACTION ON AD CONTENT RECALL
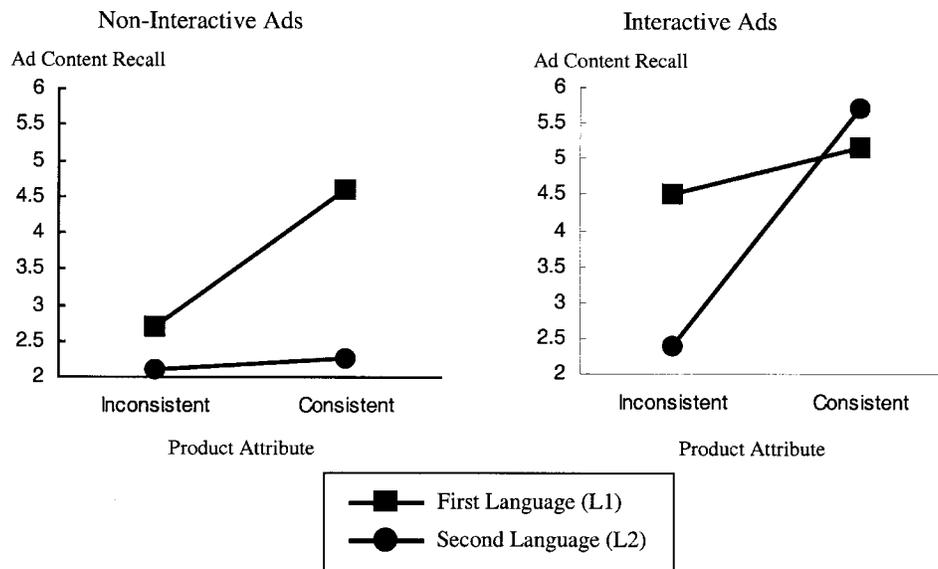
moderate-congruity conditions. In the noninteractive/inconsistent condition (low-congruity ads), there was no significant difference between the L1 ($M = 2.70$) and the L2 ($M = 2.10$) conditions ($F < 1$), failing to support Hypothesis 1. This result supports the alternative reasoning that even L1 subjects are led off track by incongruent ads. Also, as can be seen in Figure 1, memory for both L1 and L2 ads is relatively low. Hypotheses 2 and 3 were supported: L1 messages were recalled better than L2 messages in the noninteractive/consistent condition (Hypothesis 2: $M = 4.60$ vs. $M = 2.27$; $F = 4.83, p < .03$) and in the interactive/inconsistent condition (Hypothesis 3: $M = 4.50$ vs. $M = 2.40$; $F = 3.8, p < .05$). Finally, support for Hypothesis 4 was also found. In the interactive/consistent condition, L2 ads were recalled as well as L1 ads yielding similar high memory in both the L1 and L2 conditions ($M = 5.17$ vs. $M = 5.70$; $F < 1$).

Ad Claim Recognition. Recognition memory scores were computed by calculating the proportion of correct decisions in a recognition test in which each item presented five options, including the target attribute and four foils that were similar kinds of attributes to the target (Cradit, Tashchian, and Hofacker 1994; Tashchian, White, and Pak 1988). Recognition results follow the same pattern as the recall measure. The three-way interaction between language, interactivity, and consistency was statistically significant ($F = 5.48, p < .03$).

In the noninteractive/inconsistent condition, failing to support Hypothesis 1, there was no significant difference between L1 and L2 memory ($M = .48$ vs. $M = .45$; $F < 1$). As predicted by Hypotheses 2 and 3, L1 ads resulted in more ac-

curate memory than L2 ads in both the noninteractive/consistent condition (Hypothesis 2: $M = .98$ vs. $M = .73$; $F = 5.81, p < .02$) and the interactive/inconsistent condition (Hypothesis 3: $M = .60$ vs. $M = .37$; $F = 4.61, p < .04$). Finally, Hypothesis 4 was supported as there was no difference between L1 and L2 memory in the interactive/consistent condition ($M = .89$ vs. $M = .93$; $F < 1$).

Unrelated Statements. The proportion of unrelated statements generated by subjects during the recall protocol was also examined. This proportion was subject to an arcsine transformation for purposes of analysis. The results of this measure followed a pattern opposite the ad content recall findings. When recall was high (low), the proportion of unrelated statements was low (high). The three-way interaction of language by interactivity by consistency was significant ($F = 6.12, p < .05$). The L1 and L2 ads elicited approximately the same proportion of unrelated statements in the noninteractive/inconsistent condition (Hypothesis 1: $M = .18$ vs. $M = .22$; $F < 1$). On the other hand, a greater proportion of unrelated statements was elicited after exposure to L2 ads than L1 ads in the noninteractive/consistent condition (Hypothesis 2: $M = .21$ vs. $M = .03$; $F = 4.97, p < .03$) and in the interactive/inconsistent condition (Hypothesis 3: $M = .24$ vs. $M = .07$; $F = 4.10, p < .05$). Finally, a similar proportion of unrelated statements was elicited after exposure to L1 and L2 ads in the interactive/consistent conditions (Hypothesis 4: $M = .15$ vs. $M = .06$; $F < 1$).

These findings provide some insight into the processes underlying the memory results. They seem to confirm that the low-congruity condition and, additionally, the moderate-

congruity conditions for L2 ads, hamper semantic processing and the subsequent correct recall of the ad claims. Instead, subjects focus on producing unrelated statements when they fail to recall the correct information. Of special importance is the difference between the L1 noninteractive/inconsistent (low-congruity) and the L1 noninteractive/consistent (moderate-congruity) conditions. In the low-congruity condition, L1 subjects produced a high proportion of unrelated statements relative to the moderate-congruity condition. This difference was marginally significant ($F = 3.31, p < .07$) and may help to explain the null effects of language on memory obtained in the low-congruity condition: the L1 subjects seem to have been thrown off track by the low picture-text congruity, resulting in their elaborating on concepts not related to the ad copy. Therefore, low picture-text congruity inhibited conceptual processing of the copy, even in L1. These findings shed light on why there was no recall superiority of L1 over L2 in the low-congruity condition and why L1 individuals exhibited low recall in this condition. The L1 recall superiority predicted by the RHM was offset by the low level of ad congruity.

Product Evaluations. Previous research (Keller and Block 1997; Peracchio and Meyers-Levy 1997) has examined the relationship between incongruity and evaluations based on three levels of congruence: low, moderate, and high. Therefore, we analyzed the evaluation data to draw a parallel between the current study and previous research. To accomplish this, we reparameterized the independent variables to obtain three levels of picture-text congruity. Thus, the two moderate-congruity conditions were collapsed into one single condition (i.e., interactive/inconsistent and noninteractive/consistent ads were grouped together). The resulting design consisted of a two-way ANOVA, or a 3 (Congruity: Low, Moderate, High) × 2 (Language: L1, L2) design.

Consistent with previous research in monolingual populations, in the L1 condition, moderate-congruity ads were preferred relative to low- and high-congruity ads. Product evaluations increase significantly from low to moderate congruity ($M = 3.03$ vs. $M = 3.61$; $F = 4.20, p < .05$). As picture-text congruity increases further, however, product evaluations decrease ($M = 3.61$ vs. $M = 3.14$; $F = 5.74, p < .02$). Thus, for L1, the optimal point with respect to evaluations is the moderate-congruity condition.

On the other hand, L2 ads do not result in decreased evaluations in the high-congruity condition. For L2 ads, similar to L1 ads, evaluations increase significantly when the low- and moderate-congruity conditions are compared ($M = 2.75$ vs. $M = 3.50$; $F = 9.87, p < .01$). However, L2 product evaluations are maintained at a high level in the high-congruity condition, with no differences in evaluation between moderate and high congruity ($M = 3.50$ vs. $M = 3.48$; $F < 1$). Thus, it seems that L2 ads are less likely to exhibit a decrease in evaluations under high-congruity conditions, perhaps because of the increased, but not excessive, conceptual processing in the high-congruity condition.

Discussion

Study 1 examined the effect of picture-text congruity on memory for L1 and L2 ads. The results indicate that, for both L1 and L2 ads, recall of the ad content is hampered by low congruity between the ad picture and the ad copy. When moderate picture-copy congruity is present, L1 ads display a memory superiority over L2 ads. If a high degree of picture-copy congruity is achieved, recall of L2 messages can be as great as recall of L1 messages without compromising product evaluations. Thus, we can conclude that L2 ads require a higher level of picture-copy congruity than L1 ads to benefit from the facilitative effect of pictures on conceptual processing.

These results qualify the findings of previous empirical studies with bilingual consumers, which found that messages in the subjects' first language were generally recalled better than second-language messages (Roslow and Nicholls 1996). Our findings indicate that picture-text congruity is a moderator of the language-asymmetry effect predicted by the RHM. Thus, L2 ads can be as memorable as L1 ads when there is a high degree of picture-text congruity.

Although the findings of study 1 support the proposed theorizing, a second study was conducted both to replicate and better understand the results of the initial study. In study 2, we further explore the conditions under which language effects were found in study 1: ads with moderate picture-text congruity. The results of study 1 suggest that the moderate-congruity conditions do not surpass the threshold necessary to facilitate conceptual processing of L2 messages. In other words, L2 moderate-congruity conditions do not provide the necessary opportunity for individuals to process the ad copy. If this opportunity is not present, conceptual processing will be unlikely, and motivation will not have a positive impact on processing or subsequent ad claim memory (MacInnis and Jaworski 1989; Petty and Cacioppo 1986). Thus, further evidence that moderate-congruity L2 ads do not meet a facilitative threshold necessary to encourage conceptual processing may be obtained if higher levels of motivation fail to induce higher L2 memory in these conditions. Study 2 will, therefore, examine the impact of motivation on the processing of moderate-congruity ads.

STUDY 2

Previous research with monolingual populations has found that motivation improves memory (Unnava and Burnkrant 1991). Motivation has been defined as the desire to process brand information in an ad. Such desire can increase the intensity of processing and dictate the focus of individuals' attention (MacInnis and Jaworski 1989). However, according to models of information processing, opportunity to process brand information can moderate the beneficial effect of motivation (MacInnis and Jaworski 1989; Petty and Cacioppo 1986). Hence, if individuals do not have an adequate opportunity to process the ad claims, they will not experience the benefits of higher motivation levels. In study 1, we suggested that moderate-congruity L1 ads of-

fered an adequate processing opportunity and that moderate-congruity L2 ads did not. This reasoning and the results of previous research would suggest that higher levels of motivation should increase L1 memory while lower levels of motivation would result in decreased L1 memory. However, consistent with the results of study 1, we expect that motivation will not improve memory for moderate-congruity L2 ads, because these ads are unlikely to be processed conceptually. Therefore, under higher-motivation conditions, L1 memory will be superior to L2 memory. Under lower-motivation conditions, conceptual processing will be inhibited for both L1 and L2 individuals, eliminating language effects on ad memory.

H5: Under lower-processing motivation, both L1 and L2 language ads with moderate-congruity picture-text will result in similar low memory.

H6: With increased processing motivation, L1 ads with moderate-congruity picture-text will result in higher memory than similar L2 ads.

This anticipated pattern of results would be consistent with our theorizing that L2 conceptual processing is less likely and requires a higher level of facilitative cues than L1 processing.

Method

Study participants consisted of 85 fluent Spanish-English bilinguals, none of whom had participated in study 1. Language proficiency was measured using the same scale as in study 1. The participants in this study were similar to those in the previous one. The mean age was 36 years, and 93 percent of subjects had at least a high school diploma. There were 28 males and 57 females. As in study 1, subjects held diverse jobs in the community and were of diverse national origins. For those subjects whose first language was Spanish, their L1 average rating was 4.77 and their L2 average rating was 4.08. For subjects whose first language was English, their L1 average rating was 4.82 and their L2 average rating was 4.09. Subjects were relatively proficient in both languages, all scoring 2.50 or higher in both L1 and L2 on the five-point language scale. However, they were all more proficient in their first language than in their second language, as shown by a paired t-test ($t(84) = 9.27, p < .001$).

The procedure and materials employed in this study were similar to those of study 1. Subjects were exposed to the ad booklet and then completed a questionnaire containing the dependent measures. The experimental ads included the same manipulations of brand-name and product-attribute congruity with the ads' pictures for the same three products. Study 2 differed from study 1 in two ways: (1) only ads in the moderate-congruity conditions were employed, and (2) subjects' processing motivation was manipulated following a procedure used in previous research (Peracchio and Meyers-Levy 1997). Individuals in the low-processing-motivation condition were told that they were part of a large group

of people in the country participating in the study and that their opinion about the ads might be used after aggregating it with that of other individuals. On the other hand, individuals in the higher-processing-motivation condition were told that they were part of a small group of people in the city participating in the study and that because their opinion was very valuable to the companies represented in the ads, they would be offered special discounts on any advertised product or service that they wished to purchase.

Results and Discussion

The effectiveness of the motivation manipulation was assessed by asking subjects whether they thought the ads were not at all interesting/extremely interesting and involving/not involving on a five-point scale. Answers to both items were averaged ($r = .74$), and the results revealed a main effect of processing motivation ($F = 4.89, p < .05$). Overall, subjects found the ads more interesting and involving when processing motivation was higher ($M = 3.10$) rather than lower ($M = 2.66$).

Preliminary analyses indicated that the three-way interactions of Ad Type (interactive/inconsistent, noninteractive/consistent) × Motivation (Low, Increased) × Language (L1, L2) were not significant (F's < 1) for any of the measures. Thus, the analyses for all measures were performed as a Motivation (Low, Increased) × Language (L1, L2) between-subjects design. Degrees of freedom are 1 and 84 for all analyses unless otherwise noted.

Two bilingual judges who were blind to the experimental manipulations coded the recall protocols reliably with 89 percent interjudge agreement (Rust and Cooil 1994). The recall results revealed a significant two-way interaction of processing motivation and ad language ($F = 5.03, p < .05$). Examination of this interaction revealed the anticipated outcomes supporting the hypotheses. In the low-motivation condition, L1 and L2 messages resulted in similar low recall of the ad content (Hypothesis 5: $p > .19$). In the increased-processing-motivation condition there was a memory superiority of L1 messages over L2 messages (Hypothesis 6: $M = 4.55$ vs. $M = 1.77$; $F = 19.93, p < .01$), replicating the results of study 1. It seems that L1 ads benefited from processing motivation ($F = 7.35, p < .01$),while L2 ads did not ($F < 1$).

Similar to study 1, ad claim recognition data were also examined. Recognition results mirrored the ad content recall findings. The difference between L1 and L2 was not significant under low-processing motivation (Hypothesis 5: F's < 1). However, L1 ads offered superior ad claim recognition relative to L2 ads in the increased-motivation condition (Hypothesis 6: $M = .79$ vs. $M = .58$; $F = 3.74, p < .05$).

The findings of study 2 seem to provide further support for the RHM's claim that L2 stimuli are less likely to evoke conceptual processing than are L1 stimuli. Processing motivation, a factor that generally prompts high levels of elaboration and memory (Unnava and Burnkrant 1991), did not improve L2 memory. We theorize that this is because motivation cannot facilitate processing when adequate pro-

cessing opportunity is not provided. In this study, L2 ads did not provide such opportunity, because bilingual individuals are less likely to process L2 messages conceptually unless they contain high levels of picture-text congruity or similarly facilitative cues.

GENERAL DISCUSSION

In this research we introduce a psycholinguistic framework of bilingual memory to consumer research. Several contributions emerge from our findings. First, our research addresses the assumption that ads in the consumers' first language always offer better results than ads in their second language. This assumption is shared by psycholinguistic theories like the RHM, which specifies that the conceptual processing of L2 stimuli is less likely than the processing of L1 stimuli. The results of study 1 suggest that L2 ads can have similar levels of memory to L1 ads when the ads' picture and text are congruent. We conclude that the level of congruity between the picture and the text of an ad may enhance the effectiveness of ads targeting bilingual consumers, even if the ads are written in their second language. For example, in study 1, when the picture and the text of the ads were highly congruent, both expressing a similar message, memory for L2 ads was raised to a level similar to memory for L1 ads, while also maintaining product evaluations at a relatively high level.

Study 2 offers further insight to both psycholinguistics and advertising by suggesting that individual-level factors like processing motivation can also moderate the language effects hypothesized by the RHM and consequently influence the effectiveness of ads targeting bilingual consumers. This study shows that, under conditions of moderate picture-text congruity, motivation increases memory for L1 ads but not memory for L2 ads. Because motivation requires a certain level of conceptual processing to enhance memory, this finding confirms that, in order to facilitate conceptual processing of L2 messages, a higher level of picture-text congruity is required than for L1 messages. Moderate picture-text congruity does not surpass that threshold level for L2 ads.

These results suggest that two types of variables influence the effectiveness of advertising to bilingual consumers. Ad-related factors like the congruity between the ad's picture and its copy facilitate the conceptual processing of both L1 and L2 ads, increasing the likelihood of subjects' processing the ad semantically. Also, individual-level variables such as processing motivation influence ad effectiveness by enhancing ad recall in the L1 condition. However, when the likelihood of processing an ad conceptually is lower, such as with L2 processing, higher motivation does not seem to enhance ad memory. Methodology developed by Sharma, Durand, and Gur-Arie (1981) would suggest that these two types of variables are moderators of language effects on memory. Picture-text congruity can be considered a quasi moderator (it has a direct relationship with recall in addition to its significant interaction with language; $F = 8.21, p <$

.001), and motivation is a pure moderator (it has no direct relationship to recall; $F = 1.68, p = .20$).

Our findings offer additional contributions to the psycholinguistics literature. Previous studies seeking to test the RHM had only considered single-word stimuli and either translation or priming tasks. This research applied the RHM to more complex stimuli: advertising messages. We also tested the implications of the RHM for dependent measures that had not been previously examined, recall and recognition, and we found that the model predictions can be extended to these tasks.

Another contribution of this work involves the attribution of language effects to language comprehension and not language-production processes (Carroll 1994; Poulisse 1997). The results of the empirical studies presented in this article suggest that the impact of language on the effectiveness of ads targeting bilingual consumers are particularly important during the comprehension process. It would seem that the asymmetry in conceptual links described by the RHM results in significant comprehension constraints for L2 messages. Individuals are unable to form the necessary links in their long-term memory to facilitate retrieval of the information presented in the ad during language production. We can infer that language effects are important during comprehension because subjects were allowed to respond in any language they chose, either English or Spanish, thus minimizing effects on language production.

The product evaluation findings also seem noteworthy. In study 1, the results for L1 processing are consistent with previous work on the impact of congruity and processing effort on affective measures (Peracchio and Meyers-Levy 1997). In a subject's first language, ad copy that has low congruity with the picture results in lower product evaluations. Evaluations seem to peak at a moderate processing difficulty, and there seems to be a trend toward lower evaluations as ad congruity increases further. Second-language ads, however, do not reach a point, in this research, at which evaluations begin to decrease as congruity increases. Second-language ads, perhaps because they are intrinsically less likely to result in conceptual processing than are L1 ads, seem to be less vulnerable to excessive processing (Anand and Sternthal 1990). By combining both evaluation and memory results, we may infer that, for L1 ads, the optimal level of congruity seems to be the moderate-congruity level, while for ads in L2 , the optimal level seems to be the high-congruity level. It should be noted that the disassociation of memory and evaluation results in some conditions (e.g., moderate-congruity L2) is typical of studies examining both measures (Hastie and Park 1986). While our research focused on memory processes, our preliminary attitudinal results suggest that future research must further investigate the evaluative processes of bilingual consumers.

Our research has several limitations that need to be addressed by future researchers. First, regarding the methodology of study 2, it is possible that our particular motivation manipulation was not strong enough to induce higher L2 memory. A replication of our experiment with other ma-

nipulations of processing motivation may offer stronger support for the hypotheses. Also, our respondents were all Spanish/English bilinguals. Future research should investigate whether our experimental results apply to bilingual speakers of other languages.

In addition, the experiments described in this article focused on relatively simple print advertisements. Previous research, however, suggests that ethnic consumers, and Hispanics in particular, are heavy consumers of television and radio (O'Guinn and Meyer 1983). Future research should examine whether messages presented in these media are subject to the same processes found in our research. It may also be of interest to examine more complex print ads to determine how greater complexity effects the likelihood of L2 individuals engaging in conceptual processing.

All of the respondents in this research were fluent bilinguals. Consequently, another area open to investigation could involve examining the processing differences between these fluent bilinguals and individuals with some competence, but not fluency, in a second language. Further research could also focus on examining additional cognitive or memory measures, such as comprehension or memory, for specific ad elements. These measures would help to characterize the specific nature of bilingual processing. They may also pinpoint whether language effects on ad processing occur at encoding, retrieval, or both.

Future research studies must also examine whether learning context (e.g., classroom or immersion learning), situation (e.g., home or work), or subject matter (e.g., home life issues or shopping) moderate the findings of this research. For example, it is possible that for some bilingual Hispanics, L2 (e.g., English) conceptual links are stronger when the topic of conversation revolves around buying high-technology products. Conversely, the same individuals' L1 (e.g., Spanish) conceptual links could be stronger when the subject matter is home-life issues. Peñaloza's (1994) research seems to imply that Mexican immigrants in the United States may experience this phenomenon because they frequently learn certain concepts in English (their second language) for which there are no Spanish equivalents. Future work must examine language proficiency in specific settings to determine how context-specific effects of language influence processing of marketing stimuli.

REFERENCES

Anand, Punam and Brian Sternthal (1990), "Ease of Message Processing as a Moderator of Repetition Effects in Advertising," *Journal of Marketing Research,* 27 (August), 345–353.

Anderson, John R. (1983), "A Spreading Activation Theory of Memory," *Journal of Verbal Learning and Verbal Behavior,* 22 (June), 261–295.

Carroll, David W. (1994), *Psychology of Language,* Pacific Grove, CA: Brooks/Cole.

Clark, John (1981), "Language," in *College Students' Knowledge and Beliefs, A Survey of Global Understanding: The Final Report of the Global Understanding Project,* ed. Thomas Barrows, New Rochelle, NY: Change Magazine Press.

Cradit, J. Dennis, Armen Tashchian, and Charles Hofacker (1994), "Signal Detection Theory and Single Observation Designs: Methods and Indices for Advertising Recognition Testing," *Journal of Marketing Research,* 31 (February), 117-127.

Craik, Fergus I. M. (1977), "Depth of Processing in Recall and Recognition," in *Attention and Performance*, ed. Stanislav Dornic, London: Wiley.

Dufour, Robert and Judith Kroll (1995), "Matching Words to Concepts in Two Languages: A Test of the Concept Mediation Model of Bilingual Representation," *Memory and Cognition,* 23 (March), 166–180.

Durgunoglu, Aydin and Henry L. Roediger (1987), "Test Differences in Accessing Bilingual Memory," *Journal of Memory and Language,* 26 (August), 377–391.

Edell, Julie A. and Richard Staelin (1983), "The Information Processing of Pictures in Print Advertisements," *Journal of Consumer Research,* 10 (June), 145–161.

Gillund, Gary and Richard M. Shiffrin (1984), "A Retrieval Model for Both Recognition and Recall," *Psychological Review,* 91 (January), 1–67.

Glenberg, Arthur M. and William E. Langston (1992), "Comprehension of Illustrated Text: Pictures Help Build Mental Models," *Journal of Memory and Language,* 31 (April), 129–151.

Grossjean, Francois (1982), *Life with Two Languages: An Introduction to Bilingualism,* Cambridge, MA: Harvard University Press.

Hastie, Reid and Bernadette Park (1986), "The Relationship between Memory and Judgment Depends on Whether the Judgment Task Is Memory-Based or On-Line," *Psychological Review,* 93 (July), 258–268.

Hoffman, Charlotte (1991), *An Introduction to Bilingualism,* New York: Longman.

Houston, Michael J., Terry L. Childers, and Susan E. Heckler (1987), "Picture-Word Consistency and the Elaborative Processing of Advertisements," *Journal of Marketing Research,* 24 (November), 359–369.

Hui, C. Harry and Harry C. Triandis (1985), "Measurement in Cross-Cultural Psychology: A Review and Comparison of Strategies," *Journal of Cross-Cultural Psychology,* 16 (June), 131–152.

Keller, Punam Anand and Lauren Block (1997), "Vividness Effects: A Resource Matching Perspective," *Journal of Consumer Research,* 24 (December), 295–304.

Koslow, Scott, Prem N. Shamdasani, and Ellen E. Touchstone (1994), "Exploring Language Effects in Ethnic Advertising: A Sociolinguistic Perspective," *Journal of Consumer Research,* 20 (March), 575–585.

Krishnan, H. Shanker and Dipankar Chakravarti (1999), "Memory Measures for Pretesting Advertisements: An Integrative Conceptual Framework and a Diagnostic Template," *Journal of Consumer Psychology,* 8 (1), 1–37.

Kroll, Judith F. and Annette de Groot (1997), "Lexical and Conceptual Memory in the Bilingual: Mapping Form to Meaning in Two Languages," in *Tutorials in Bilingualism: Psycholinguistic Perspectives,* ed. Annette de Groot and Judith F. Kroll, Mahwah, NJ: Erlbaum, 169–199.

La Heij, Wido, Andre Hooglander, Robert Kerling, and Esther Van Der Velden (1996), "Nonverbal Context Effects in Forward and Backward Word Translation: Evidence for Concept Me-

diation," *Journal of Memory and Language,* 35 (October), 648–665.

Lippman, Marcia Z. and Morris W. Shanahan (1973), "Pictorial Facilitation of Paired-Associate Learning: Implications for Vocabulary Training," *Journal of Educational Psychology,* 64 (2), 216–222.

Liu, Hua, Elizabeth Bates, and Ping Li (1992), "Sentence Interpretation in English-Chinese Bilinguals," *Applied Psycholinguistics,* 13 (December), 451–484.

Lutz, Kathy A. and Richard J. Lutz (1977), "Effects of Interactive Imagery on Learning: Application to Advertising," *Journal of Applied Psychology,* 62 (August), 493–498.

MacInnis, Deborah and Bernard Jaworski (1989), "Information Processing from Advertisements: Toward an Integrative Framework," *Journal of Marketing,* 53 (October), 1–23.

MacIntyre, Peter D., Kimberly A. Noels, and Richard Clément (1997), "Biases in Self-Ratings of Second Language Proficiency: The Role of Language Anxiety," *Language Learning,* 47 (June), 265–287.

Mick, David Glen (1992), "Levels of Subjective Comprehension in Advertising Processing and Their Relations to Ad Perceptions, Attitudes, and Memory," *Journal of Consumer Research,* 18 (March), 411–424.

Miniard, Paul W., Sunil Bhatla, Kenneth R. Lord, Peter Dickson, and H. Rao Unnava (1991), "Picture-Based Persuasion Processes and the Moderating Role of Involvement," *Journal of Consumer Research,* 18 (June), 92–107.

O'Guinn, Thomas C. and Timothy P. Meyer (1983), "Segmenting the Hispanic Market: The Use of Spanish-Language Radio," *Journal of Advertising Research,* 23 (December), 9–16.

Paivio, Allan (1986), *Mental Representations: A Dual Coding Approach,* New York: Oxford University Press.

Peñaloza, Lisa (1994), "Atravesando Fronteras/Border Crossings: A Critical Ethnographic Exploration of the Consumer Acculturation of Mexican Immigrants," *Journal of Consumer Research,* 21 (June), 32–54.

Peracchio, Laura A. and Joan Meyers-Levy (1997), "Evaluating Persuasion-Enhancing Techniques from a Resource-Matching Perspective," *Journal of Consumer Research,* 24 (September), 178–191.

Petty, Richard E. and John T. Cacioppo (1986), "The Elaboration Likelihood Model of Persuasion," in *Advances in Experimental Social Psychology,* Vol. 19, ed. Leonard Berkowitz, Orlando, FL: Academic Press, 123–205.

Poulisse, Nanda (1997), "Language Production in Bilinguals," in *Tutorials in Bilingualism: Psycholinguistic Perspectives,* ed. Annette de Groot and Judith F. Kroll, Mahwah, NJ: Erlbaum, 201–224.

Roslow, Sydney and J. A. F. Nichols (1996), "Targeting the Hispanic Market: Comparative Persuasion of TV Commercials," *Journal of Advertising Research,* 36 (May/June), 67–77.

Rust, Roland T. and Bruce Cooil (1994), "Reliability Measures for Qualitative Data: Theory and Implications," *Journal of Marketing Research,* 31 (February), 1–14.

Schmitt, Bernd H., Yigang Pan, and Nader T. Tavassoli (1994), "Language and Consumer Memory: The Impact of Linguistic Differences between Chinese and English," *Journal of Consumer Research,* 21 (December), 419–431.

———, Nader T. Tavassoli, and Robert T. Millard (1993), "Memory for Print Ads: Understanding Relations among Brand Name, Copy, and Picture," *Journal of Consumer Psychology,* 2 (1), 55–81.

——— and Shi Zhang (1998), "Language, Structure and Categorization: A Study of Classifiers in Consumer Cognition, Judgment, and Choice," *Journal of Consumer Research,* 25 (September), 108–122.

Sharma, Subhash, Richard Durand, and Oded Gur-Arie (1981), "Identification and Analysis of Moderator Variables," *Journal of Marketing Research,* 18 (August), 291–300.

Sholl, Alexandra, A. Sankaranarayanan, and Judith F. Kroll (1995), "Transfer between Picture Naming and Translation: Test of Asymmetries in Bilingual Memory," *Psychological Science,* 6 (January), 45–49.

Snodgrass, Joan Gay (1984), "Concepts and Their Surface Representations," *Journal of Verbal Learning and Verbal Behavior,* 23 (February), 3–22.

Tashchian, Armen, J. Dennis White, and Sukgoo Pak (1988), "Signal Detection Analysis and Advertising Recognition: An Introduction to Measurement and Interpretation Issues," *Journal of Marketing Research,* 25 (November), 397–404.

Unnava, H. Rao and Robert E. Burnkrant (1991), "An Imagery-Processing View of the Role of Pictures in Print Advertisements," *Journal of Marketing Research,* 28 (May), 226–231.

Usunier, Jean Claude (1996), *Marketing Across Cultures,* New York: Prentice-Hall.