Consumer Learning by Analogy: A Model of Internal Knowledge Transfer

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Although knowledge transfer has been found to be an important learning mechanism in several consumer behavior domains, our understanding of the nature and scope of the transfer process is still in its infancy. In this article, we develop a conceptual model to explain how previously acquired knowledge is transferred in the process of consumer learning. Augmenting analogical learning theory with research on expertise effects and conceptual development, our model details the underlying stages in the process of knowledge transfer and identifies key factors influencing the nature and outcome of each stage. Applying our model to several consumer behavior contexts, we demonstrate its utility both as a tool for enhancing our understanding of knowledge transfer and as a productive guide to future research on consumer learning.

Understanding how consumers learn has been a topic of enduring interest in the marketing literature. A great deal of the research effort in this area has been directed toward examining consumer learning from advertising, word-of-mouth communication, and product experience itself. Implicit in these efforts is the assumption that most consumer learning occurs through exposure to *external* information sources such as advertising and product experience. Though it is likely that much consumer learning occurs in this fashion, it is also likely that consumers learn through a process of *internal* knowledge transfer from familiar to novel domains. For instance, consumers might learn about a new product through advertising, but they might also learn about it by transferring knowledge of a similar type of product to the new product.

Knowledge transfer has emerged as an important issue in several consumer behavior domains. For example, in the brand extension literature, it has been assumed that the success of a brand extension depends on the degree to which positive beliefs and attitudes associated with the parent brand *transfer* to the extension product (see, e.g., Aaker and Keller 1990; Boush and Loken 1991; Broniarczyk and Alba 1994a). Similarly, in the literature on country-of-origin effects, it has been assumed that a consumer's response to a product can be influenced, in part, by the transfer of information from the consumer's cognitive representation for the country to the product (see, e.g., Shimp, Samiee, and Madden 1993; Hong and Wyer 1990). As an additional example, research on comparative advertising has shown that consumers often spontaneously transfer the attributes they have come to associate with the comparison product to the advertised product (see, e.g., Pechmann and Ratneshwar 1991; Sujan and Dekleva 1987).

Much of the existing work on consumer knowledge transfer has been guided by the categorization literature from social and cognitive psychology. Although categorization theory has provided an appealing conceptual basis for many of these studies, its ability to serve as a comprehensive theoretical framework is limited in certain ways. Specifically, categorization research adheres to the assumption that categories serve primarily as tools for organizing knowledge rather than as tools for using or applying knowledge (Fiske and Neuberg 1990). Consequently, research guided by the categorization paradigm has focused exclusively on transfer occurring as a by-product of the organization of novel stimuli, such as the transfer of beliefs that might occur after a new type of camera is categorized with existing types of cameras. Overlooked by this paradigm are situations where a category other than the one serving as the primary means of organizing a novel stimulus serves as a valuable source of information about it. Though it is true that a great deal can be learned about a new camera via the transfer of knowledge from the "camera" category to the new camera, learning can also occur, for instance, via the transfer of knowledge about the human eye to the new camera (e.g., the camera needs light for a good picture just like

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the human eye needs light to see clearly). Reliance upon the categorization perspective has thus led to an overly narrow view of the knowledge-transfer issue, one that greatly underestimates the extent to which prior knowledge can be harnessed to facilitate current learning across a wide variety of consumer contexts.

A more promising approach for developing a comprehensive and detailed account of consumer knowledge transfer is offered by analogical learning theory. The focus of this theory is on the transfer of knowledge from one domain (the base) to another (the target) as a function of the correspondence between the two (Gentner 1989). A fundamental assumption of the theory is that existing knowledge structures serve to facilitate the achievement of specific learning objectives. As such, the analogical learning paradigm provides a detailed understanding of knowledge transfer as it occurs not only between a novel stimulus and the knowledge structure used to *organize it in memory,* but also between a novel stimulus and a knowledge structure used to *learn about it.* Thus, relative to categorization theory, analogical learning theory takes a broader perspective on the knowledge-transfer issue, one that does not view transfer solely as a by-product of the way in which knowledge is organized.

In this article, we incorporate these basic notions of analogical learning theory into a model of consumer knowledge transfer. Our Consumer Learning by Analogy (CLA) model merges literature on analogical learning, expertise, and conceptual development to provide a better understanding of how and when knowledge transfer occurs. Additionally, we outline the contributions of the CLA model by identifying how it expands the scope of transfer issues and processes in the consumer behavior arena, how it differs from other conceptual frameworks such as categorization theory, and how it improves upon previous conceptual treatments in the analogical learning area.

THE ANALOGICAL TRANSFER PARADIGM

When faced with something unfamiliar, we often attempt to understand it by relating it to something familiar. When we do this, we are learning by analogy. More formally, analogical learning is concerned with the use of a familiar domain (the base) to understand a novel domain (the target). Learning proceeds via a process that transfers knowledge from the well-known base to the lesser-known target. The driving force behind learning via analogy is the idea that domains related in some respects are likely to be related in other respects as well.

The following is an example of an instance of learning via analogy. Suppose you are interested in the new software programs called off-line Web readers, which download Web pages to the computer's disk drive. One way you could learn more about the unfamiliar domain of off-line Web readers (target) is by relating it to something you understand better, such as the domain of VCRs (base). Using your knowledge of VCRs as the base, you may notice that off-line Web readers are related to VCRs in that both allow the consumer to retrieve and store media content. Given that the domains are related in this respect, you may logically expect them to be related in other respects as well. For example, you may know that a VCR records TV programs onto a videocassette, thus allowing the program to be viewed at any time, on any TV. Transferring that knowledge to the off-line Web reader suggests that this new product will copy Web pages onto a disk, thus allowing you to view (access) specific information at any time, on any computer. You may also know that VCRs are difficult to program. From that, you may surmise that the off-line Web reader will also be difficult to program. Learning has occurred in this context in that your knowledge of VCRs has furthered your understanding of off-line Web readers.

Stages of Base-Target Transfer. Though not immediately apparent from the preceding example, the analogical learning process is actually composed of numerous stages, each with its own set of issues and influences (Anderson and Thompson 1989; Gentner 1989; Holyoak and Thagard 1989; Reeves and Weisberg 1994; Winston 1980). These stages include (*a*) accessing the base domain, (*b*) mapping the elements of the target onto the base, (*c*) transferring knowledge from the base to the target, and (*d*) inducing a schema.

The *access* stage of the analogical learning process is concerned with the ability of a target to retrieve the learner's mental representation of a base domain. The goal of the access phase is to activate the learner's mental representation of a base domain so that it can be considered as a potential source of information about the target domain. For example, the access aspect of analogical learning would be concerned with determining why people would retrieve their knowledge of VCRs (base) when they encounter an off-line Web reader (target).

Whether or not the knowledge activated in the noticing phase transfers from the familiar to the novel situation is the central issue of the *mapping* stage of the analogical learning process. The goal of mapping is to align the base and target domains such that knowledge associated with the base can transfer to the target. This is accomplished through a process that constructs one-to-one correspondences between the elements of the learner's representations of the base and target domains (Gentner 1983, 1989; Holyoak 1984; Holyoak and Thagard 1989). These correspondences represent paths between the base and target across which knowledge can be transported. Continuing with our example, a mapping is constructed between the VCR and off-line Web reader domains on the basis of the observation that both items allow for the retrieval and storage of media content.

Having noticed the potential relevance of a previously acquired base of knowledge to a novel situation (access), and having performed a mapping of the elements of the two domains (mapping), the next stage in analogical learning is the actual *transfer* of information. It is in this stage that learning occurs, with knowledge from the base

domain moving to the target. Underlying the knowledge-transfer decision is the belief that domains known to be similar in certain respects (as established in the mapping phase) are likely to be similar in other respects as well. In the example above, knowing that VCRs and off-line Web readers both allow the retrieval and storage of media content may lead to the belief that off-line Web readers possess other characteristics previously associated with VCRs. For instance, it might be inferred that, like a VCR, the off-line Web reader will be difficult to program.

Finally, in many cases, a more abstract knowledge structure, such as a *schema,* may be created as a by-product of the analogical learning process (see Forbus and Gentner [1986] for a detailed consideration of how this might come about). As much research has shown (e.g., Catrambone and Holyoak 1989; Gick and Holyoak 1980, 1983; Spencer and Weisberg 1986), this abstract knowledge structure may be used as a base in future analogical learning. For example, having noticed and benefited from the comparison drawn between the VCR and off-line Web readers, the consumer in our example may combine his or her knowledge of the two domains, creating a more abstract representation of information relevant to the purchase of these products. The resulting schema, which is likely to contain general information about such things as programming procedures and quality of the recorded material, may be retrieved when related purchases are encountered in the future (i.e., for products defined in terms of their retrieval and storage capabilities).

Structure of the Base and Target Domains. The central focus in analogical learning is on the comparison of one domain to another and, more specifically, on what can be learned as the result of this comparison. As proposed by Gentner and her colleagues (Gentner 1989; Gentner and Toupin 1986; Goldstone, Medin, and Gentner 1991; Medin, Goldstone, and Gentner 1993), the key to understanding this comparison process is to view the structure of a domain as consisting of systems of objects, attributes, and relations. The term *attribute* refers to an independent property or component of an object, with the definition including both concrete and abstract properties. Returning to the preceding example, attributes of a VCR include such things as "clock" (a concrete attribute) and "reliability" (an abstract attribute). The term *relation* refers to an interconnected system of properties or components. The distinguishing feature of a relation is the link (or links) that defines the relationship between attributes. A VCR is characterized by a relation between two of its components, remote control and clock, with the link being that the remote control is used to set the clock.

Characterizing the Nature of the Base-Target Relationship. As the example above illustrates, the attribute-relation distinction is particularly important to the mapping phase of the analogical learning process. In particular, the nature and outcome of the analogical learning process is a function of whether mapping is based on attributes or relations (Clement and Gentner 1991; Holyoak and Koh 1987; Spellman and Holyoak 1992). In order to organize our predictions regarding the differential effects of attribute versus relational mappings, it is useful to define several types of domain comparison (Gentner 1989; Gentner and Toupin 1986). First, when a base and target domain are mapped in terms of both attributes and relations, this is called a *literal similarity* comparison. Like the mapping itself, both attributes and relations may be appropriately transferred as the result of such a comparison. For example, a generic drug manufacturer would argue that a literal similarity relationship exists between generic drugs and their branded counterparts. According to this argument, one could logically assume that a generic drug will have the same effect on a patient's symptoms as a branded drug (transfer of relation), and that it will come in the same shape as a branded drug (transfer of attribute).

Second, when a base and target are mapped primarily in terms of relations, this is called a *relational* comparison.[1] The central concern of such comparisons is the transfer of relations from the base to the target. This type of comparison is most likely to arise in the context of learning about new products, particularly those arising from new technologies.[2] For example, the explanation of a recent technological development combining computer, voice-recognition, and telephone technologies centered on a comparison of the product to a secretary. In making that comparison, the intent clearly was not to imply that the product possesses the same physical attributes as a human secretary. Instead, it was to imply that the product is related to the computer user in the same way that a secretary is related to a boss. Thus, while it would not be reasonable to assume that the product will have arms and legs, it would be reasonable to assume that it will answer incoming calls, take messages, and so forth, just as a human secretary would.

Third, when a base and target are mapped primarily in terms of attributes, this is called a *mere appearance* comparison. This domain comparison primarily involves the transfer of attributes from the base to the target. In some cases, me-too products fit the description of this type of comparison. Though sharing many of the attributes of the product they are meant to imitate, me-too products sometimes lack critical relational commonalties that would earn them the literal similarity designation. For example, similarities in color, shape, and lettering may make a brand of laundry detergent appear comparable to Tide, but dissimilarities in the configuration of chemicals

[1]Reflecting the idea that "true" analogies are those that are drawn from disparate domains, Gentner and her colleagues call this type of domain comparison "analogy" (see, e.g., Gentner 1989; Gentner, Ratterman, and Forbus 1993; Gentner and Toupin 1986). This terminology effectively excludes literal similarity and mere appearance comparisons from the realm of true analogies. However, given that knowledge transfer has been found to occur in situations where the domain comparison can best be described as a literal similarity or mere comparison match (see, e.g., Novick 1988), we adopt a terminology that does not exclude them from being considered analogies.

[2]We thank the editor for pointing out the relationship between analogical learning and the emergence of new technologies.

making up the product may make the transfer of anything other than attribute information inappropriate. Thus, it would be reasonable to assume that the me-too product will come in powder and liquid forms (attributes of the product), but it may not be reasonable to assume that the me-too product will prolong the life of clothes (relation of the product to clothes).

This discussion highlights a notable characteristic of analogical learning—namely, that errors in transfer can occur (Novick 1988). Although it is true that domains related in some respects are likely to be related in others, there is clearly a limit to the commonalties between domains. As such, only a subset of the information associated with a particular base will ever be appropriate for, or compatible with, any given target (Ortony 1975). As pointed out above, imitative marketing strategies, which rely on mere appearance comparisons, exist to take advantage of consumers' tendency to exceed those limits, encouraging transfer based on physical similarity alone (Ward et al. 1986). Indeed, transfer errors are a particularly worrisome problem for mere appearance comparisons because such comparisons are based entirely on attribute overlap. With attributes as the sole basis of the comparison, the subset of knowledge associated with the base that can be appropriately transferred to the target is relatively small (Ortony 1975). This suggests that the potential for exceeding the limits of the comparison (i.e., for transferring information beyond the appropriate subset) is higher for mere appearance comparisons than for either relational or literal similarity comparisons. However, it is clearly the case that transfer errors may occur anywhere along the continuum defining the domain comparison types (e.g., the off-line Web reader may *not* be difficult to program). The potential for incorrect transfer, however, does not diminish the importance of analogical learning as a mechanism of consumer knowledge transfer (Holyoak and Thagard 1995; Reeves and Weisberg 1994).

OUR MODEL OF CONSUMER LEARNING BY ANALOGY

Our CLA model incorporates many of the key aspects of the analogical transfer paradigm just described (see Fig. 1). Going beyond that paradigm, however, our model specifies the nature of the transfer process and the important moderating role that expertise plays in the process of consumer learning by analogy. In this section, we describe our model by focusing on the factors that influence the nature and outcome of the processes underlying consumer learning by analogy. Because each stage of the process is characterized by a unique set of issues and influences, the discussion is organized around the individual stages (see Exhibit 1 for a summary).

What Determines Access?

Access Is a Function of Attributes. Recall that the access phase of the analogical learning process is concerned with the ability of a novel situation (the target) to retrieve the learner's mental representation of a previously encountered situation (the base) that is in some way comparable to the novel one. Consequently, the main result of the access phase is that knowledge potentially relevant to the novel situation becomes active in memory. But what allows a novel target situation, sometimes far removed from the base domain, to access the learner's mental representation of the base? We turn now to that question.

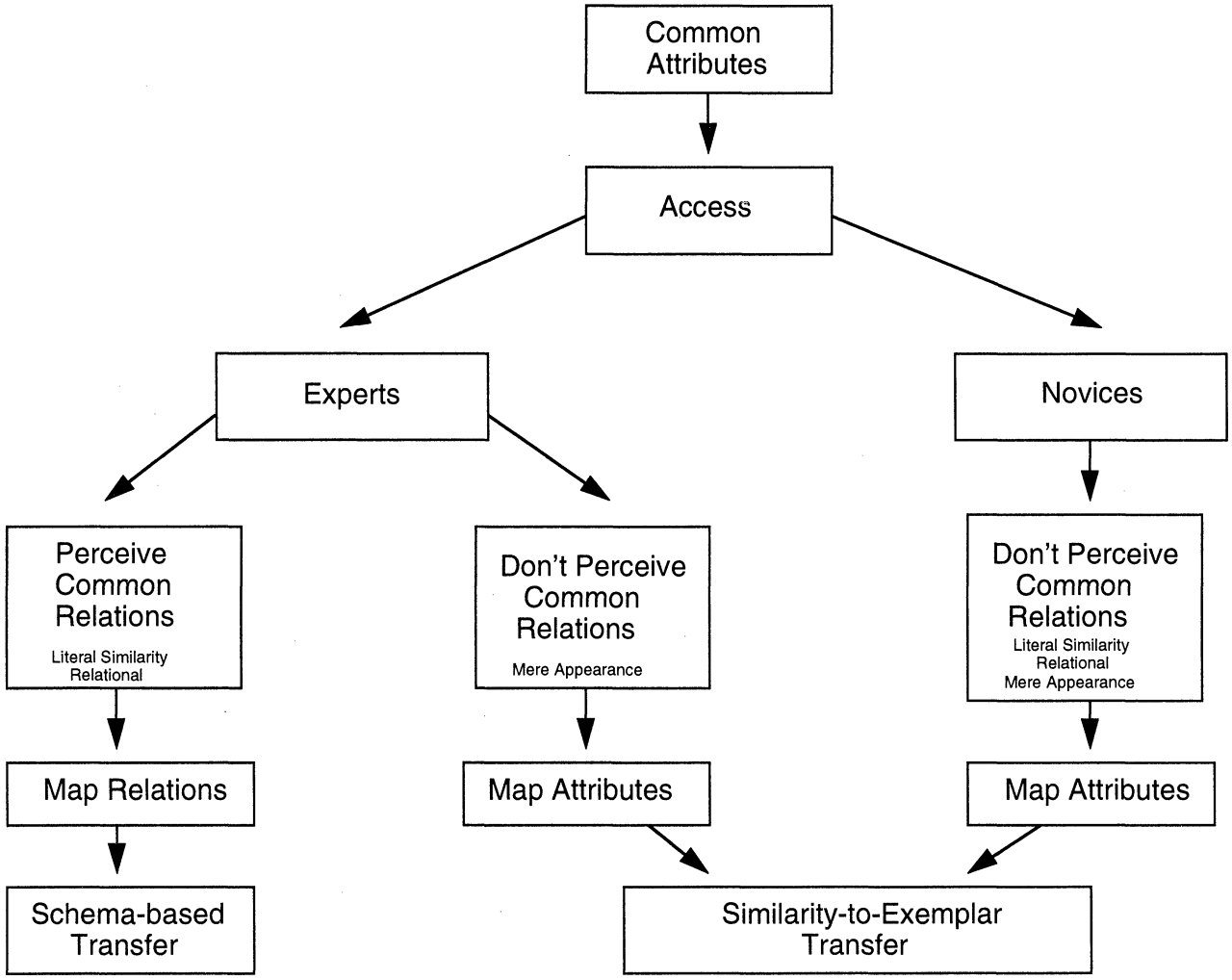
The difficulty of this stage of analogical learning is nicely illustrated by studies attempting to demonstrate "spontaneous" transfer of knowledge via analogy, where spontaneous refers to the automatic activation of relevant knowledge at the appropriate time. Taken together, findings from these studies indicate that individuals often fail to notice the potentially valuable relationship existing between a novel domain and a previously encountered one (see, e.g., Gick and Holyoak 1980; Reed, Ernst, and Banerji 1974; Weisberg, DiCamillo, and Phillips 1978).

In response to this general finding, a great deal of research has been directed toward uncovering conditions likely to lead to success in accessing the base domain. Although several factors have emerged as facilitators of the access process (e.g., receiving a hint about the relevance of the base), one factor in particular has consistently emerged as a critical determinant of base domain access: the nature of the correspondence between the base and target domains. In particular, as illustrated in the top half of our model, it has been found that access is largely determined by the degree to which the base and target domains share common *attributes* (Nisbett and Ross 1980). For instance, systematically varying the degree to which sets of stories contained common attributes (e.g., characters), Gentner et al. (1993) found that increasing attribute overlap increased the probability that a target story would retrieve a base story. Similarly, comparing a condition in which word problem pairs (i.e., one base and one target word problem) had similar story lines to one in which word problem pairs had dissimilar story lines, Ross (1987) found that subjects in the similar story line condition were more likely to retrieve the base word problem, as evidenced by a greater proportion of correctly solved target word problems in the similar story line condition. Finally, analyzing verbal protocols gathered as subjects attempted to solve target problems, Ross (1984) found that, among the subjects reminded of an earlier encountered problem, most were reminded of an example that matched the content, rather than the principle, of the target problem.

Although attributes clearly play a central role in accessing the base domain, it is important to point out that relations may, in some cases, play a supporting role. In a study examining solution transfer in a problem-solving context, Holyoak and Koh (1987) found that transfer was impaired if either the surface similarity of the components in the problem or the structural constraint similarity declined. This is not an isolated finding. Ross (1987, experiment 2B) was able to eliminate the transfer advantage

FIGURE 1

A MODEL OF CONSUMER LEARNING BY ANALOGY



for word problems containing similar (vs. dissimilar) story lines (reported above) by making the principle underlying the solution to the problem more distinctive, and thus a more salient retrieval cue (see also Wharton et al. 1994).

What Determines Mapping?

Whether or not the knowledge activated in the access phase transfers from the familiar to the novel situation is the central issue of the mapping phase of the analogical learning process. As described earlier, the objective of mapping is to align the base and target domains such that knowledge associated with the base can transfer to the target. This is accomplished through a process that constructs one-to-one correspondences between elements of the representations of the base and target. These correspondences serve as paths between the base and target domains across which additional elements (i.e., attributes and/or relations) can be transferred.

Relational Mappings Are Preferred. The alignment process that defines the mapping phase actually begins in the access phase as the base and target's most salient corresponding attributes (and, in some cases, relations) are recognized. In contrast to access, however, mapping is characterized by a preference for relation-based, rather than attribute-based, matches. One of the best tests of this proposition comes from a study by Clement and Gentner (1991, experiment 1). After reading a base story, they had subjects read a target story that shared two key facts with the base. The critical manipulation was that, while one key fact was part of a relation that was shared by the base and target (shared fact), the other key fact was part of a relation that was not shared by the base and target (different fact). When subjects were asked to rate how well each key fact contributed to the analogy, the shared

EXHIBIT 1

BASIC PROPOSITIONS OF THE CLA MODEL

Overall	P1: The transfer of consumer knowledge from one domain (the base) to another (the target) occurs via three distinct stages: access, mapping, and transfer.
Access	P2: Access is largely determined by the degree to which the base and target share common attributes.
Mapping	P3: The target and base can be mapped in terms of attributes (a mere appearance comparison), relations (a relational comparison), or attributes and relations (a literal similarity comparison). P4: When constructing a mapping between a base and target, people prefer relational mappings over attribute mappings. P5: Comparisons based on relational mappings produce more goal-relevant inferences than comparisons based on attribute mappings. P6: Level of expertise in the base domain is related to the ability to construct relational mappings. In particular, base domain experts construct more relational mappings than base domain novices.
Transfer	P7: The transfer of consumer knowledge from one domain to another occurs via two distinct processes: similarity-to-exemplar processing and schema-based processing. P8: Relational mappings trigger schema-based processing whereas attribute mappings trigger similarity-to-exemplar processing. P9: Among base domain novices, there is a greater incidence of similarity-to-exemplar processing than schema-based processing. P10: When a base and target have common relations to map, base domain experts engage in schema-based processing moreso than similarity-to-exemplar processing. When a base and target have primarily common attributes, base domain experts engage in similarity-to-exemplar processing moreso than schema-based processing.

fact received significantly higher ratings than the different fact, suggesting a preference for relational mappings in analogy.

Employing an alternate measure, Gentner et al. (1993) uncovered additional support for the relational preference hypothesis. Systematically varying the degree to which sets of stories contained common attributes and relations, they found that adding common relations increased the perceived soundness of a match. Notably, they found that the addition of attribute commonalities had no effect on the perceived soundness of a match. Providing evidence from a different context, Spellman and Holyoak (1992) found that, when constructing an analogy between the Persian Gulf War and World War II, subjects tended to produce mappings that preserved the relation between a country and its leader, rather than mappings that separated the two components.

Relational Mappings Generate Goal-Relevant Inferences. The research reviewed above indicates that, when constructing a mapping between a base and target, people prefer relational matches over attribute matches. But an important question remains: Why do people prefer to construct mappings based on relations rather than attributes? The answer centers on the ability of relational mappings to generate goal-relevant inferences. In many instances, comparisons based on relational mappings have greater explanatory power than comparisons based on attribute mappings. For example, when attempting to determine whether a store-brand laundry detergent will clean clothes as well as Tide, common relations, rather than common attributes, are central to reaching an accurate assessment. That is, in order to determine the probable cleaning performance of the store brand, it is necessary to assess whether Tide (base) and the store brand (target) share similar chemical configurations (common relation). Whether or not both brands come in orange boxes (common attribute) is largely irrelevant to the goal of determining the cleaning performance of the store brand.

Evidence from other experimental contexts converges on the idea that people perceive relational matches to be more informative than attribute matches. Examining the extent to which individuals rely on analogical comparisons between people to determine the likely occurrence of particular behaviors, Read (1984, experiment 1) found that predictions regarding the occurrence of the behavior were determined, in part, by whether or not the target and base individuals matched on a relation. Specifically, his results revealed that subjects were more likely to predict that the target individual would perform the behavior of interest when the target and base individuals shared a feature that was obviously related to the behavior of interest than when they shared a feature that was not so obviously related to the behavior of interest.

Read's (1984) findings point to the perceived advantage of having relational overlap, in addition to attribute overlap. Although subjects were willing to base their behavioral inferences on attribute overlap alone, their responses reflect the perception that relational matches possess greater explanatory power. Providing additional evidence, Clement and Gentner (1991, experiment 2) found that the transfer of facts between target and base stories was determined by whether or not the facts were part of a shared relational structure. Similarly, in the context of solution transfer between word problems, Holyoak and Koh (1987, experiment 2) found that once subjects were given a hint to use a particular base problem to solve a novel target problem (i.e., once successful access was assured), increasing the relational dissimilarities between the base and target problems significantly impaired solution transfer. Interestingly, increasing the surface dissimilarities had no effect on total transfer.

The Ability to Construct Relational Mappings Is a Function of Expertise. Because of the important differences between attribute and relational matches noted above, in our model a critical distinction is made between relation-based and attribute-based domain comparisons. To this point, however, we have been equating the *existence* of shared relations with the *perception* of shared

relations. Yet one of the biggest challenges facing the analogical learner is separating the "attributional chaff" from the "relational grain" (Goldstone et al. 1991).

It appears likely that expertise in the base domain is intimately related to that critical ability. Results from numerous domains suggest that although novices represent problems primarily in terms of surface attributes, experts represent problems in terms of relational features. For example, examining the knowledge structures of expert and novice computer programmers, McKeithen et al. (1981) found that experts organized programming concepts according to their function in a particular programming language, whereas novices organized them according to idiosyncratic common language associations (e.g., alphabetical order). Similarly, Schoenfeld and Herrmann (1982) administered a problem-sorting task to groups of novices distinguished only by whether they had received intensive instruction in problem-solving techniques. They found that the problem sortings of those who received instruction were based largely on common deep structures (e.g., particular mathematical laws), whereas the sortings of those who did not receive instruction reflected common surface features (e.g., 11-pound weight vs. 7-quart jugs), even when those problems represented different deep structures.

On the basis of evidence like this, analogical learning researchers generally agree that expertise is critically linked to the analogical learning process (see, e.g., Brown 1989; Gentner et al. 1993; Holyoak 1984; Rumelhart and Norman 1981; Vosniadou 1989). Representing one of the few empirical tests of this proposal, Novick (1988, experiment 1) exposed both experts and novices to word problem pairs possessing common relations (i.e., corresponding solution procedures), but lacking common attributes (i.e., dissimilar story contexts). Suggesting that the ability to perceive relational matches is linked to base domain expertise, the results revealed that experts were more likely than novices to transfer the procedure from the base to the target word problem. Investigating the effect of expertise on the perception of analogical comparisons further, Novick (1988, experiment 3) exposed her experts and novices to word problem pairs possessing common attributes, but lacking common relations. Notably, when faced with this type of domain comparison, novices were more likely to transfer the solution procedure than experts. Taken together, the results of Novick's experiments highlight an important contrast between experts and novices. That is, they suggest that, when it comes to transferring knowledge, experts are primarily relation-driven while novices are primarily attribute-driven.

Although these experiments provide strong support for the contention that base domain expertise influences the mapping and transfer of information via analogy, other analogy research on the issue has been less conclusive. Defining expertise in terms of subjects' ability to estimate the answers to a set of word problems, Reed (1987) exposed subjects to pairs of word problems varying in the extent to which they possessed common story contexts or common solution procedures. The subjects' task was to judge how useful the solution to the first problem in the pair would be if it were applied to the second problem in the pair. The expectation was that experts would be more likely than novices to recognize the superiority of the word problem pairs possessing a relational match, and that their usefulness ratings would reflect that recognition. However, across the different types of word problem pairs, the usefulness ratings of the experts and novices did not differ. In fact, from the ratings it appeared that all the subjects were responding as novices (i.e., they were all influenced by story context rather than solution procedure). Although a second experiment, in which the differences between solution procedures was made more obvious, was successful in getting subjects to focus more on the mathematical structure of the word problems, the anticipated expert/novice differences again failed to surface. Other research suggests, however, that Reed's null results for expertise may simply reflect a failure to isolate the appropriate domain of expertise required for the particular task used in his study (Marchant et al. 1991, 1993; Novick and Holyoak 1991). Clearly, more research is needed on this critical issue.

In summary, when relational commonalities exist, people seem to prefer to build their mappings upon them. It also appears that the driving force behind this relational preference is the greater explanatory power often offered by relational matches. These conclusions are moderated, however, by the differential advantage base domain experts may have over novices when it comes to perceiving and benefiting from relational mappings. These differences are captured in our model by proposing that experts, but not novices, will perceive common relations when faced with domain comparisons characterized by the existence of common relations.

The Nature and Determinants of the Transfer Process

As stated earlier, an important by-product of the mapping and transfer processes involved in learning via analogy is the creation of a more abstract knowledge structure. Once compiled, this abstract knowledge structure, or schema, is thought to support further analogical learning by functioning as a source of inferences about the target (see, e.g., Carbonell 1983, 1986). Thus, it is implied that the analogical learning mechanism relies largely on a *schema-based transfer process* as a means of transporting knowledge from the base to the target. Supporting this contention, Gick and Holyoak (1983) found that subjects rated as having "good schemas" were much more likely to transfer a problem solution to a new problem than subjects rated as having "intermediate" or "poor schemas." Using the same stories and procedures, Spencer and Weisberg (1986) found that the effect of schema quality on transfer held even when story analysis and problem solving occurred in different contexts (see also Catrambone and Holyoak 1989). Suggesting that the effect is not due to the particular stories/problems used, Novick and

Holyoak (1991) reported similar results using math word problems. Reflecting this consensus of evidence, our model includes a schema-based transfer process as one possible means by which consumers transfer their knowledge via analogy.

Research suggests, however, that schema-based transfer is largely beyond the ability of those with lower levels of base domain knowledge (Alba and Hutchinson 1987; Carey 1985; Smith and Zarate 1992). Instead, it has been suggested that, because of the impoverished nature of their schemas, novices engage a *similarity-to-exemplar process* in which knowledge transfer depends entirely on the similarity of the target to an exemplar of the base (Alba and Hutchinson 1987; Beattie 1982; Carey 1985; Klein et al. 1992; Rumelhart 1989). The more similar the base exemplar and target appear to be (i.e., the more attributes they share), the more willing the novice learner is to transfer what they know about the exemplar to the target (cf. Broniarczyk and Alba 1994b). Supporting these ideas, in a study of analogy use in a social context, Read (1987) found that increased attribute overlap between base and target individuals led to increased transfer of behavioral information from the base to the target individual. Notably, this finding was confined to situations in which subjects had no other information on which to base their behavioral predictions (Read 1983, 1987).

On the basis of this evidence, our model proposes that similarity-to-exemplar processing acts as a backup strategy that is only engaged when a relevant schema is either unavailable or insufficient to guide processing. However, this is not meant to imply that experts engage a schema-based process and novices engage a similarity-to-exemplar process. In terms of our model, we suspect that both experts and novices will rely on a similarity-to-exemplar transfer process when the base and target domains are perceived to have a mere appearance relationship (i.e., they primarily share attributes, not relations). As pointed out above, novices rely on similarity-to-exemplar processing for all domain comparisons because their schema is dominated by attributes, not relations, and as such, cannot support schema-based processing (Brown 1989; Carey 1985). Clearly, this is not the case for experts, whose well-developed knowledge structures are characterized by a rich system of attributes and relations quite capable of supporting sophisticated processing (Reimann and Chi 1989). Why, then, would experts not engage in schema-based processing when faced with a mere appearance match? Quite simply, it is because the situation does not warrant schema-based processing, and experts are capable of recognizing and reacting to that fact (cf. Fiske, Kinder, and Larter 1983; Glaser and Chi 1988; Scardamalia and Bereiter 1991). Specifically, experts initially engage schema-based processing in response to a mere appearance comparison but abandon it in favor of similarity-to-exemplar processing when the lack of relations is recognized (Sanbonmatsu, Kardes, and Herr 1992). With this recognition comes the understanding that attributes, not relations, may be appropriately transferred in this context. With attribute transfer as his or her goal, the expert retrieves the exemplar most closely matching the target (i.e., the one offering the greatest potential in terms of transfer) and transfers attributes from the exemplar to the target.

Consider the following example of this sequence of events. Because WebTV set-top boxes and video-game devices are similar in appearance (i.e., they share attributes), experts may access their "video-game" schema when they first encounter a WebTV device. Looking beyond the attribute overlap, however, experts are likely to recognize that WebTV and video games possess a critical relational dissimilarity. Whereas video-game devices deliver content to the TV via an *internal* source (i.e., game cartridge), WebTV devices deliver content to the TV via an *external* source (i.e., phone lines). Put another way, experts will be aware that WebTV and video games are not the same kind of thing. Recognizing that the WebTV–video game comparison resides primarily at the level of attributes, experts are expected to restrict their transfer to that level. In particular, experts are predicted to retrieve an exemplar of the video-game schema and, on the basis of the perceived similarity of the exemplar to the WebTV device, transfer attributes from the exemplar to the evolving representation for WebTV. For instance, because of its recent popularity, Nintendo 64 may be a salient exemplar of the video-game schema and thus may be retrieved as part of the transfer process. Having retrieved Nintendo 64, experts select the subset of available information appropriate to transfer from Nintendo 64 to the WebTV device (e.g., color, shape, and size), leaving behind that which is deemed inappropriate (e.g., how to hook it up). A slightly different course of events is expected for novices. Like experts, novices are expected to access their knowledge of video games when they first encounter a WebTV device. However, because their impoverished schema provides little, if any, transfer potential, novices turn to a more promising source of information, a familiar exemplar of the video-game schema. If an assessment of the exemplar's similarity to the WebTV device reveals the two to be comparable (i.e., there are attributes to map), novices transfer what they know about the exemplar to the WebTV device. Having recently seen a Nintendo 64 at Toys Я Us, for instance, the novice might access that particular product as an exemplar and, on the basis of a similarity assessment (e.g., both are dark-colored boxes), engage in unrestricted transfer of information from Nintendo 64 to the WebTV device (e.g., WebTV will be available in a toy store).

In sum, according to our CLA model, both a schema-based process and a similarity-to-exemplar process underlie knowledge transfer, with the expertise of the consumer determining which process is more likely to guide analogical learning. In particular, our model proposes that relational mappings, which are perceived by experts, trigger a schema-based transfer process, whereas attribute mappings, which are perceived by novices and, under certain circumstances, experts, trigger a similarity-to-exemplar transfer process.

TABLE 1

AN OVERVIEW OF KNOWLEDGE-TRANSFER RESEARCH IN CONSUMER BEHAVIOR

Type of comparison/relevant context or issue	Examples of existing research
Literal similarity:	
Brand extensions	Aaker and Keller 1990; Boush and Loken 1991; Broniarczyk and Alba 1994; Loken and John 1993; Muthukrishnan and Weitz 1991; Park, Milberg, and Lawson 1991
Comparative advertising	Dröge and Darmon 1987; Pechmann and Ratneshwar 1991; Rose et al. 1993; Sujan and Dekleva 1987
Country-of-origin effects	Halfhill 1980; Han 1989; Hastak and Hong 1991; Hong and Wyer 1989, 1990; LeClerc, Schmitt, and Dube 1994
Positioning strategies	Sujan and Bettman 1989; Pechmann and Ratneshwar 1991
Product evaluation strategies	Sujan 1985
Transfer of procedural knowledge	None
Relational:	
Really new products Positioning strategies Product evaluation strategies Brand extensions Comparative advertising Country-of-origin effects Transfer of procedural knowledge	None
Mere appearance:	
Reminder advertising	None
Copycat products	Kapferer 1995; Ward et al. 1986

RESEARCH IMPLICATIONS

Knowledge transfer has emerged as an important issue in several areas of consumer behavior research, including research on brand extensions, country-of-origin effects, and comparative advertising (see Table 1 for a summary). For example, the current research on consumer response to brand extensions clearly points to knowledge transfer as the central basis of brand-extension judgments. As a case in point, a recent study by Broniarczyk and Alba (1994a) found that subjects responded favorably to the idea of Close Up breath mints because of the relevance of Close Up's breath-freshening association in the breath mint category. Many subjects in the study "went even further to infer that the breath mints would have the same red and white color and cinnamon flavor as Close Up toothpaste" (p. 227). Turning to a different context, transfer is also an issue in comparative advertising studies. To illustrate, Pechmann and Ratneshwar (1991) found that ads directly comparing the fictitious Star powdered cleanser to Ajax on an attribute typical of the product category not only resulted in Star being judged more likely to possess the featured attribute, but also resulted in Star being judged more likely to possess an attribute previously associated with Ajax that was not mentioned in the ad.

Though prior research has clearly heightened our awareness of knowledge transfer as an important issue and provided interesting findings across several areas, adopting an analogical learning perspective allows us to greatly expand the nature and scope of our investigations. Central to our CLA model is a call to move beyond the study of knowledge transfer as a by-product of categorization, and to consider the role that knowledge transfer plays, or could play, in an expanded set of consumer learning situations. Viewing the knowledge-transfer issue through the wider lens of the analogical transfer perspective suggests that we broaden our study of knowledge transfer to encompass comparisons between both closely related knowledge structures and distantly related knowledge structures.

Moving beyond Literal Similarity

A close examination of prior literature on consumer knowledge transfer reveals a rather limited focus on transfer occurring in the context of literal similarity comparisons. Across contexts, we have concentrated our efforts on knowledge transfer between bases and targets that share both attributes and relations. Research on comparative ads, for example, involves comparisons between products within the same product class. Research on brand extensions often introduces discrepancies between the target (brand extension) and base (parent brand), but despite discrepancies of this nature, the target continues to share attributes and relations with the base. Research on country-of-origin effects features comparisons that might be considered more relational in nature, yet country-of-origin information is typically presented with one or two other attributes, again ensuring that the base (country of origin) and target (product) possess an attribute match.

As our model points out, knowledge transfer need not be limited to such a narrow set of circumstances. Transfer can occur between seemingly disparate knowledge structures that share only relations in common. Relational

comparisons are a viable mechanism of consumer knowledge transfer, as illustrated below.

Really New Products. Our model's discovery of the relational comparison as a viable mechanism of consumer knowledge transfer presents an intriguing possibility. It suggests that prior knowledge can be used to facilitate current learning even when the target entity defies classification in terms of existing product concepts. That being the case, our model's discovery of relational comparisons comes at an opportune time. Rapid technological changes are creating truly novel product offerings, or "really new products," at an increasing rate. These radical innovations, by definition, represent entirely new product concepts and thus impose significant learning requirements upon the consumer (Lehmann 1994). Indeed, the challenge of comprehending a truly new innovation is often cited as a key factor underlying their slow adoption rates (Gatignon and Robertson 1985; Hirschman 1980; Wilton and Pessemier 1981).

Unlike the less radical new product developments examined in previous knowledge-transfer research (e.g., brand extensions, a product with a new attribute), a central characteristic of really new products is that they require the induction of entirely new knowledge structures, not just the modification or extension of existing ones. A compelling case can be built for the assertion that relational comparisons represent a superior mechanism for facilitating consumer learning under these demanding conditions (Cummins 1992; Simons 1984). First, many really new products result from changes in technology that are somewhat abstract in nature. By drawing a relational comparison between the new technology (e.g., a fiber-optic network) and something both more familiar and concrete (e.g., railroad tracks), the notion of what the new technology is, and what it can provide to the consumer, can be more clearly conveyed. For example, a recent ad capitalized on the relational comparison between a fiber-optic network and railroad tracks to demonstrate what happens when a long-distance line goes down. The ad pictured railroad tracks with debris obscuring a section of track. A train rushed down the tracks toward the debris but at the last minute was routed around the obstruction and back onto the original track. Clearly, the point of the comparison was that when a line goes down, calls traveling the damaged "route" can still go through because, like the train, a call can be "rerouted" around the trouble spot and continue on to its "destination." Drawing a comparison between two disparate domains allows this ad to effectively and efficiently communicate its intended message.

Second, many really new products create entirely new product categories (e.g., personal computer). Relational comparisons to distantly related, but familiar, categories and concepts can provide the formal structure needed to begin building the knowledge structure required by the novel product concept (Simons 1984). As such, learning about really new products via a relational comparison may serve to facilitate the comprehension of the new product by easing the task of accommodating the information received about it.

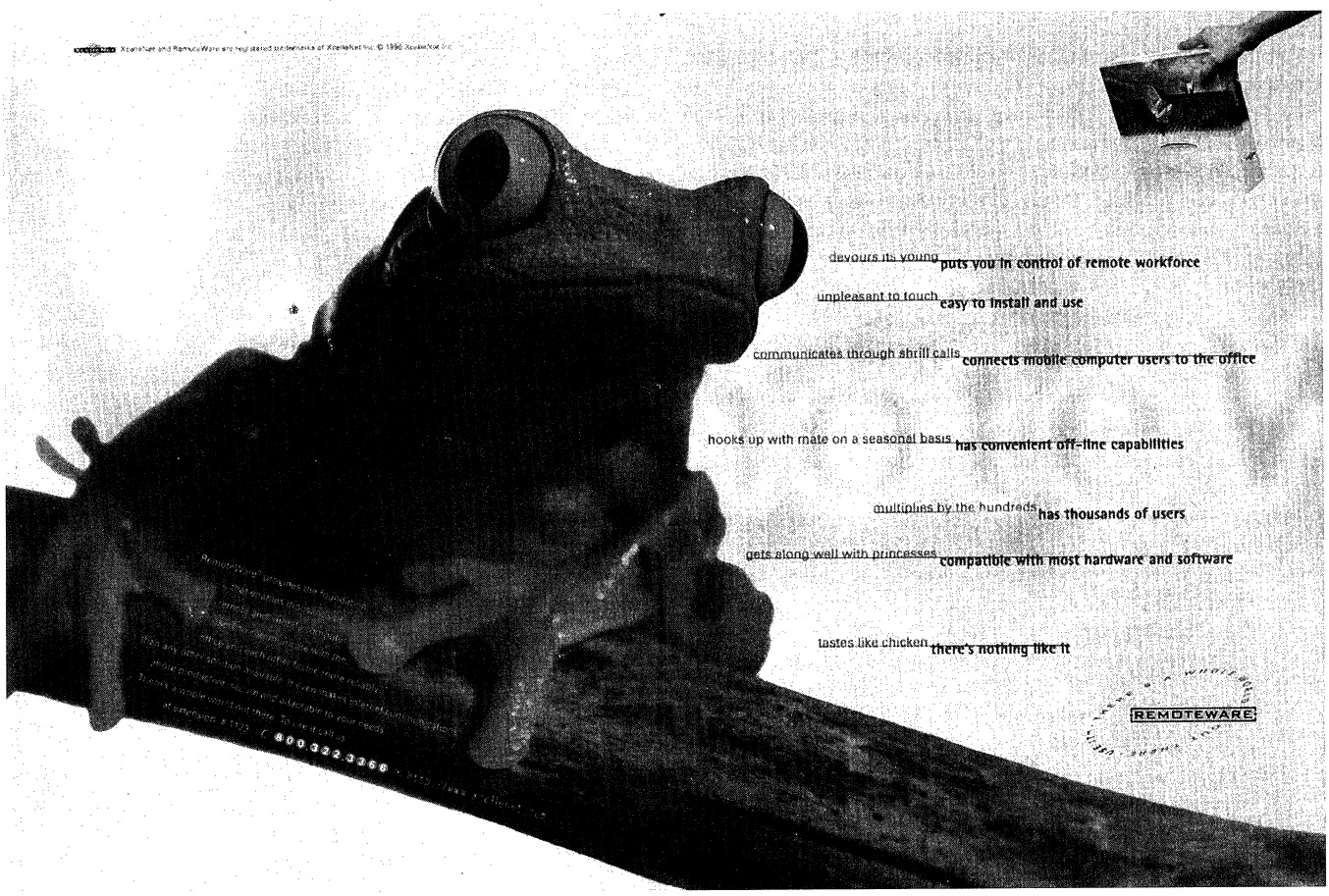
As an example of this approach to the challenge of educating consumers about really new products, consider the ad for RemoteWare (see Fig. 2). This ad takes the typical bullet-point approach to presenting product attributes but adds to that a comparison between the product and a frog. Clearly, this comparison is relational in nature, as it would be difficult to compile a list of attributes common to this product (which can best be described with existing terminology as a "network information-management system") and a frog. However, as the copy contained in the ad illustrates, this type of frog and the RemoteWare product do have a number of relational similarities and dissimilarities that can be used to help convey the benefits of this extremely abstract product. The relational comparison mapped out in the ad makes the abstract benefits of this product more concrete and imaginable.

Brand Positioning Strategies. Sujan and Bettman (1989) identified two strategies for positioning a brand within the market. The first strategy, product differentiation, involves positioning the brand within an existing product class. The second strategy, subtyping, involves positioning the brand near, but not within, an existing product class (i.e., creating a submarket or niche). Reflecting the influence of social categorization theory, these approaches focus exclusively on comparisons between a product and the knowledge structure used to organize it in memory. This is reflected in the fact that the options available for positioning a brand rely on comparisons that place the new brand either within an existing product category (differentiation) or close to it (subtyping). Within the confines of this perspective, the subtyping strategy is argued to be uniquely suited for creating the perception "that the brand is in a class or category by itself" (Sujan and Bettman 1989, p. 454).

When compared to the differentiation strategy, the subtyping strategy certainly comes out on top in terms of creating a perception of uniqueness. Yet neither strategy is likely to be as successful in creating a perception of uniqueness as a positioning strategy based on a relational comparison. To see this, consider the situation in which a product is truly novel in some respect, but the novelty becomes hidden or overlooked when the product is positioned within, or close to, the category used to organize it in memory. This situation is most likely to arise when there is a great deal of attribute overlap between the new product and an existing one. For example, consider the case of cellular phones. It has been argued that initial acceptance of cellular phones was hampered by the comparison that consumers drew between cellular phones and traditional phones (Fusco 1994). The knowledge transfer prompted by this comparison presumably made it more difficult for consumers to perceive the distinctive benefits of the cellular phone. The use of a relational positioning strategy (i.e., a strategy involving one or more relational comparisons) may have facilitated the diffusion of cellular phones by activating a more appropriate, or at least

FIGURE 2

RELATIONAL COMPARISON USED TO FACILITATE LEARNING ABOUT A REALLY NEW PRODUCT



less misleading, knowledge structure(s). For example, to highlight the ''freedom'' and ''mobility'' benefits that set the cellular phone apart from traditional phones, a relational comparison could have been drawn between a cellular phone and a Walkman. Just as the introduction of the Walkman allowed consumers to enjoy the benefits of a stereo almost anywhere, the introduction of cellular phones allows consumers to enjoy the benefits of a phone almost anywhere. The failure to consider relational comparisons as a potential basis for a positioning strategy provides a potential explanation for the view, held by some researchers, that prior knowledge is a deterrent, rather than an aid, to the successful introduction of new products (Fusco 1994; Reidenbach and Grimes 1984). Our model suggests that, given the appropriate type of comparison, prior knowledge can facilitate the new product introduction process.

Comparative Advertising. Reflecting the bias of categorization theory toward grouping and transfer between entities that ''naturally hang together'' (Medin 1989; Murphy and Medin 1985), comparative ads entail a comparison between brands within the same product category (i.e., a direct comparative ad), or between one brand and the product category as a whole (i.e., an indirect comparative ad). However, this is not the only type of comparison that can be used in an advertising context. To see this, consider the following example. In designing a comparative ad to convey the message that the pain reliever Aleve provides continuous pain relief over several hours, one could create an ad that directly compares Aleve to its closest competitor, stating that Aleve is superior to that brand because it provides continuous pain relief. Another option, however, would be to look beyond the pain-reliever category to a more distantly related category that could be used to convey the intended message. As an example, one could instead compare Aleve to an IV, with the point of the comparison being that, like the dripping of an IV, Aleve delivers pain relief continuously over the course of many hours. Notice that the first type of ad, which has typically been studied from the categorization perspective (see, e.g., Sujan and Dekleva 1987; Pechmann and Ratneshwar 1991), is based on the idea that consumers first organize their knowledge (e.g., Aleve is a new type of pain reliever) and then make judgments based on the way knowledge is organized (e.g., compared

to other pain relievers, Aleve provides more continuous pain relief). The categorization perspective precludes the recognition of the second type of ad, which, unlike the first, places the goal of *learning* about the novel stimulus above the goal of incorporating the novel stimulus into existing knowledge structures. Upon encountering Aleve for the first time, a consumer would not typically classify the new pain reliever as an instance of the IV category. Yet, as this example shows, the IV category can still function as a source of information about Aleve. More generally, this example further illustrates that a category not serving as the primary means of organizing a novel stimulus can still serve as a valuable source of information about it.

Moving beyond Product Evaluations

Our previous summary of prior research on consumer knowledge transfer reveals a rather limited focus on the type of knowledge being transferred. Across contexts, efforts have been concentrated on the transfer of beliefs and attitudes from a base to a target. Research on brand extensions, for instance, examines how beliefs and affect associated with the parent brand (base) transfer to consumer evaluations of a new extension (target), and vice versa. Research on country-of-origin effects attempts to understand how beliefs and affect associated with a country (base) transfer to consumer evaluations of a product (target) manufactured in that country.

Clearly, it is important to understand the way that affect and beliefs are used in the service of evaluating and judging products. Yet, transfer need not be limited to declarative knowledge of this form. Transfer can also occur for *procedural knowledge* related to how one buys a product or decides which product to buy.[3] Though this would appear to be a rather straightforward observation, there is virtually no research addressing the transfer of procedural knowledge. This is probably due to the fact that categorization frameworks, which have proven so useful for examining issues regarding product evaluations and judgments, are poorly suited for researching the transfer and use of procedural knowledge. Given that consumer decision-making procedures or heuristics do not lend themselves to categorization in the same way as products, a different approach, such as our CLA model, is required.

Our CLA model provides an opportunity to examine how consumers transfer procedural knowledge, in the form of strategies, heuristics, or scripts, from one problem situation to another. Consider, for example, a consumer who wishes to purchase an exercise treadmill for his or her home gym (Graonic 1995). After a brief information search, several attributes appear important in making the final purchase, such as price, warranty, horsepower of the motor, and monitoring and programming capabilities. In deciding how to make trade-offs between these features, the consumer might draw upon the heuristic they used the last time they bought a piece of exercise equipment (a ski-exercise machine). Or, they might draw upon their experience in buying machines where the motor is the most important component, such as a snowblower or food processor. Or, they might draw upon their most recent experiences in buying consumer products in general, noting that, for example, "you get what you pay for."

Though all of these options seem quite plausible, our CLA model can provide the structure necessary to predict and explain the transfer process. First, the treadmill decision (target) would need to activate knowledge that is potentially relevant to the decision (base). As we described earlier, access is largely a function of attribute overlap between the base and the target. In our example, heuristics related to the purchase of exercise equipment or big machines with motors seems most likely to be accessed. Second, the knowledge related to the heuristics associated with these purchases (base) would be mapped onto the treadmill decision (target). As described earlier, relational mappings are preferred to attribute matches. In our example, mapping the "treadmill decision" onto the scenario associated with "buying big machines with motors" is likely to occur given that the functional component of a treadmill is a large motor, with performance and reliability issues not unlike those associated with a snowblower. Though a treadmill is an exercise machine, and is used for cardiovascular conditioning as is a ski-exercise machine, the two pieces of equipment are very different in mechanical makeup (e.g., ski machines have no motor).

Our example can be illuminated even further if we incorporate ideas about expertise and the nature of the transfer process. Heuristics about machines with large motors are likely to be accessed and used by consumers with some degree of expertise. As proposed earlier, experts are more likely to see relational similarity between the treadmill and machines with motors, and more likely to use a schema-based transfer process as a means of transporting what they know from one decision setting to another. For example, the consumer with some expertise may realize that the extra horsepower is worth the price if the machine (treadmill) is going to be subjected to hard or constant use. Novices are more likely to follow a different path. Here, given our previous conjecture, a novice consumer is more likely to utilize a similarity-to-exemplar process, probably accessing and using heuristics they might have developed when buying their recent ski-exercise machine. For example, they might use a heuristic of buying a "moderately priced" exercise machine, given their knowledge that ski-exercise machines exhibit little variance in quality above moderate or average price levels.

THEORETICAL IMPLICATIONS

Comparison to Previous Models of the Product-Evaluation Process

Examining previous research aimed at uncovering the product-evaluation process, we find a great deal of support

[3]We thank a reviewer for bringing the idea of transferring procedural knowledge to our attention.

for the idea that consumers transfer knowledge either by a category-based or a piecemeal process (see, e.g., Boush and Loken 1991; Goodstein 1993; Stayman, Alden, and Smith 1992; Sujan 1985). Specifically, when a consumer is able to categorize a novel product as an instance of an existing category, a category-based evaluation process is triggered. In this process, the attitude associated with an existing category (e.g., a brand) transfers to a new instance of the category (e.g., a brand extension). Conversely, when the consumer cannot find a suitable match between a novel product and an existing category, a piecemeal process underlies the formation of product evaluations. In this process, the attitude is computed through a careful consideration of the product's individual attributes.

The concept of category-based processing that appears in previous research is obviously very similar to our model's concept of schema-based processing, but the alternate process proposed by our CLA model (i.e., similarity-to-exemplar processing) differs in one very critical way from its counterpart in the category-based/piecemeal dichotomy. Although the similarity-to-exemplar and piecemeal processes are both attribute-based processes, notice that similarity-to-exemplar processing is concerned with the transfer of *existing* knowledge. In contrast, piecemeal processing is concerned with an examination of the individual attributes of the target object itself, *disconnected from the consumer's existing knowledge.* This represents a key distinction between piecemeal and similarity-to-exemplar processing and yet points to an important relationship between the three processes. Whereas piecemeal processing represents a mechanism of external knowledge acquisition (i.e., getting information from the environment), schema (category)-based and similarity-to-exemplar processing represent mechanisms of *internal knowledge transfer* (i.e., getting information from existing knowledge structures). Our CLA model suggests that the category-based/piecemeal distinction may, in a more general sense, represent a distinction between transfer and acquisition processes. Rather than being associated with only one processing mode, as categorization theory would suggest, our model proposes that internal knowledge transfer may occur by either a schema-based or a similarity-to-exemplar process.

Consistent with our CLA model, research investigating the incidence of category-based versus piecemeal processing has found that the nature of processing is determined by an interaction of consumer expertise and degree of match or mismatch to existing category knowledge (Sujan 1985). Just as our model predicts that novices will engage in the same process of knowledge transfer regardless of the nature of the domain comparison, this research suggests that novices engage in the same evaluative process regardless of the degree of consistency between product information and category knowledge. It is surprising, however, that the results also suggest that novices use category-based processing more than piecemeal processing. On the surface, this finding appears contradictory to our model. Our model suggests that category (schema)-based processing cannot be supported by the novice's impoverished knowledge structure. As pointed out above, however, rather than distinguish between schema-based and similarity-to-exemplar processing, the categorization perspective combines the two under the label "category-based processing." Thus, according to our model, a closer examination of this issue should reveal that similarity-to-exemplar processing is, in fact, the preferred processing mode for novices (Gregan-Paxton 1997).

Extending this discussion to the results obtained for experts in Sujan's (1985) study provides further insights into the dynamic interplay between the internal and external processes. Just as our model proposes that experts switch processing modes when relations are unavailable to map, Sujan's results suggest that experts switch processing modes when they encounter a mismatch to existing category knowledge. Interestingly, it was found that they switch from category-based processing to piecemeal processing in response to category discrepant information. This implies a switch from an internal to an external process and suggests a possible competition between the two when experts encounter discrepancies in a comparison. This notion of competition between internal and external processes is further supported by protocol data from the study indicating that not all experts switched to a piecemeal process when they encountered mismatches. Indeed, some switched to a lower-level category-based process that, like our similarity-to-exemplar process, involved a comparison between the novel product and a specific category member.

As this example illustrates, thinking of the product-evaluation process as a trichotomy consisting of two internal transfer processes (i.e., similarity-to-exemplar and schema/category-based) and one external acquisition process (piecemeal) brings to light several interesting issues. First, it raises questions about the nature of the representation novices rely on when evaluating products. Although past research suggests that novices rely primarily on a category- or schema-based process when forming product evaluations, our CLA model suggests that the process novices adopt more closely approximates a similarity-to-exemplar process. This is not a trivial distinction, as the following example illustrates. Upon encountering a new product from Texas Instruments (TI), will novice consumers rely on their rudimentary TI schema, which is likely to contain beliefs and affect associated with TI calculators and educational toys, or rely on information associated with the most salient product exemplar associated with Texas Instruments, which would most likely be a calculator? If product evaluations are driven by a similarity-to-exemplar process, only those products perceived to be similar to a calculator should receive favorable evaluations. On the other hand, if product evaluations are driven by a schema-based process, it may be the case that a wider range of products will receive favorable judgments. In addition, a schema-based process implies the activation of a greater proportion of the novice's TI knowledge, suggesting that a larger number of existing

beliefs will be available to serve as an input to the evaluation process when a schema- rather than an exemplar-based process predominates.

Second, if there is indeed competition between internal transfer processes and an external acquisition process when an expert consumer encounters an inconsistency between a new product and an existing category, an important question arises regarding the factors responsible for determining which type of process is most likely to drive product evaluations in particular situations. It seems plausible to suggest that the nature of the expert consumers' transfer process will be influenced by factors such as involvement, motivation, time pressure, and the expert's confidence in his or her existing knowledge. Determining whether and to what extent these and other factors moderate experts' transfer processes remains an important issue for future empirical research in the area to address.

Finally, the idea that experts may still engage in internal knowledge transfer, even when the novel product is not easily categorized as an instance of an existing knowledge structure, represents a noteworthy implication of our model's unique perspective on the product-evaluation process. The dual processing framework by itself implies that knowledge transfer plays no part in the product-evaluation process when a mismatch occurs (see, e.g., Fiske and Neuberg 1990). Suggesting a greater role for existing knowledge in the evaluation process, our CLA model argues that failing to organize a novel stimulus in terms of a closely related knowledge structure may still result in internal knowledge transfer if the individual retrieves, or is supplied with, a distantly related category to use as a source of inferences.

Comparison to Previous Models of Analogical Learning

Our CLA model represents an integration of the central concepts of existing models of analogical learning (e.g., Gentner 1983, 1989; Holyoak 1984; Holyoak and Thagard 1989; Ross 1984; Winston 1980) with key findings and propositions gleaned from research on expert/novice differences and concept development. The analogical model that emerges from this effort stands out from its predecessors in two key respects: (1) it incorporates both relation- and attribute-based transfer within a single model, and (2) it makes specific predictions regarding the effects of base domain expertise on the analogical learning process. In this section, we compare our model to previous models of analogical learning on these key points. We also discuss how these refinements result in a model that is particularly well suited to the study of learning in a consumer context.

Attribute-Based versus Relation-Based Transfer. Most analogical models focus on the role of relations, and downplay the role of attributes, in the transfer process (Burstein 1986; Carbonell 1986; Holyoak and Thagard 1989). For example, a central assumption in Gentner's structure mapping theory (Gentner 1983, 1989) is the principle of systematicity, which states that people prefer to map connected systems of relations rather than isolated attributes. This focus on relations is understandable when one considers that a great deal of analogical learning research has been conducted in a problem-solving context. For example, a common experimental context involves having subjects solve a math word problem by analogy to another math word problem(s) (see, e.g., Reed 1987). When attempting to solve a word problem by analogy, the formula defines the relationship between the problem attributes, and its transfer paves the way for solving the problem. The fact that none of the attributes from the target word problem map onto the base word problem is of little consequence. That is, it does not matter if one word problem is about peanuts and the other is about boric acid (attributes), as long as the formula (relation) leading to the correct solution is the same for both problems.

In sharp contrast to analogical problem-solving research, consider the type of materials used in research on analogy in a social context (from Read 1983, p. 325):

> Base:
> Dory is a short, stocky young woman. She is somewhat shy, but highly artistic. She spends most of her time making pottery for use by the community. She is presently unmarried. It is fall. Soon the crops must be harvested. Tomorrow, Dory will be leaving to visit a nearby village. After the evening meal, Dory took a knife and cut her finger. With her blood, she then drew several symbols on a piece of bark.
> Rule:
> Tribe members perform the finger cutting ritual when they are leaving the village the next day.

In this kind of study, a description of another individual (with or without the relation) serves as the target. The subject's job is to determine whether or not the individual is likely to perform the behavior of interest (e.g., the ritual). Unlike a math word problem, there is no normatively correct "solution" to this "problem." The task here is to determine the *likelihood* that something will occur. Such judgments may be based on a common relation (if one exists and is perceived), but they may also be based on the presence of significant attribute overlap. That is, in determining whether the target individual is likely to perform the same behavior as the base individual, the subject may simply base his or her judgment on the assumption that individuals similar in some respects are likely to be similar in others as well (cf. Rumelhart 1989). Thus, if the base and target individuals match on a number of attributes (e.g., being short and stocky), it may be concluded that they are likely to perform many of the same behaviors.

Consumers may encounter either type of learning situation. That is, consumers face both problem-solving situations (e.g., What should I use to unclog my drain?), in which relations are likely to dominate, and "social" situations (e.g., Does this soft drink contain Nutrasweet?), in which attributes are likely to play a greater role. Indeed, in a consumer context, it is easy to defend

a transfer process that retains, rather than discards, attributes. First, attributes are often highly correlated with the other attributes and benefits that consumers seek in purchasing a product, such as when the size of a car is associated with the safety it affords (cf. Medin and Ortony 1989). As mentioned earlier, imitative marketing strategies, such as the use of me-too branding, exist to take advantage of consumers' tendency to generalize affect and beliefs on the basis of these assumed correlations (Ward et al. 1986). Further, attributes are likely to be important to transfer in a marketing context simply because advertising and other forms of promotions are largely concerned with educating the consumer about attributes. As a result, attributes, rather than relations, are likely to dominate the mental representations of many consumers.

Expertise Effects. Another unique aspect of our CLA model is its explicit incorporation of expertise effects into the process of learning by analogy. In previous models, the relationship between expertise and analogy has generally been one in which analogy use leads to expertise in a domain through some type of schema-induction process (Anderson and Thompson 1989; Carbonell 1983; Forbus and Gentner 1986). Other models discuss the likely influence of base domain expertise on the process of analogical learning but stop short of incorporating such effects explicitly into their conceptualizations. For example, in the context of her structure mapping theory, Gentner (1989) allows for the possibility that experts and novices differ in their ability to set up accurate relational mappings. This issue has not received much attention from analogical learning theorists because they have been concerned largely with *process* issues, and expertise is a *representation* issue. However, as the research reviewed in this section reveals, expertise is likely to have a tremendous impact on the process of transfer and, therefore, should not be ignored in models of analogical learning (Vosniadou 1989).

In contrast to the lack of empirical work on expertise effects in the analogy literature, the expertise issue has received considerable attention from consumer researchers (e.g., Herr 1989; King and Balasubramanian 1994; Maheswaran and Sternthal 1990; Monroe 1976; Park and Lessig 1981; Rao and Sieben 1992; Sujan 1985). This research tradition has established the importance of expertise as a variable in consumer behavior studies. Consistent with that tradition, and the findings from other domains, expertise is explicitly incorporated into our CLA model.

CONCLUDING COMMENTS

Ultimately, the end product of any process that compares a target to a base, or an instance to a category, is the transfer of new information from the base (category) to the target (instance). People employ comparisons primarily because they communicate the critical information needed to facilitate comprehension (Davidson 1976). On these two important points, the categorization and analogical learning literatures agree. Beyond that, however, research in the two areas has developed along quite different lines.

Although recognizing that categories derive their importance from the role they play in the transfer of existing knowledge, the cognitive psychology literature on categorization has focused not on how and when particular mental representations serve as sources of information about novel stimuli, but on the more narrow topic of how and why people form the object groupings that they do. Consequently, insights gleaned from this body of literature have led to important advances in our understanding of the structure and content of consumer categories and the determinants of product category membership, but offer little theoretical guidance on the knowledge-transfer issue. Picking up where the cognitive categorization literature leaves off, the social categorization literature has generated an extensive collection of empirical and theoretical work pertaining to the role that categories play in the process of judging and evaluating novel stimuli (see, e.g., Fiske et al. 1987; Gurwitz and Dodge 1977; Krueger and Clement 1994; Moskowitz and Roman 1992; Zarate and Smith 1990). Drawing on this body of literature, consumer researchers have been able to shed light on the cognitive, affective, and behavioral consequences of category membership.

Despite the significant contributions made by both the social and cognitive categorization literatures to our understanding of these issues, our heavy reliance on the categorization paradigm has, in some ways, become a liability. It has led to the view that categories serve primarily as tools for organizing knowledge and, more importantly, to the idea that knowledge transfer is simply the by-product of the process of categorization (i.e., organization). Adopting this view, consumer researchers have focused exclusively on transfer as it occurs between a novel stimulus (e.g., product, brand) and the consumption-related category normally used to organize it in memory. Providing a theoretical basis for questioning the established view of transfer, our CLA model offers a broader and thus more complete perspective on the process of consumer knowledge transfer. Fundamental to our model is the argument that knowledge structures are first and foremost tools for achieving specific learning objectives. Although recognizing that a significant amount of learning does occur as a result of the organizing function of categories (as in literal similarity comparisons), our model suggests that the transfer occurring under such conditions represents only a fraction of the learning that can be supported via a knowledge-transfer process.

Demonstrating the limitations of the prevailing view of consumer knowledge transfer, our CLA model brings to light issues that have not surfaced in previous research. For instance, providing greater detail to predictions arising from the widely accepted dual processing paradigm (Fiske and Neuberg 1990; Pavelchak 1989), our model identifies an additional process underlying the evaluation of new products. Pointing out that the distinction between category-based and piecemeal processing centers on the

fact that the former creates evaluations via an internal transfer process and the latter creates evaluations via an external acquisition process, our CLA model suggests that internal transfer may occur by either a category-based or a similarity-to-exemplar process. Further, our model suggests that internal transfer, via either of the two proposed processes, may play a larger role in the product-evaluation process than previously thought. The dual processing paradigm holds that items not fitting an existing (closely related) category trigger a piecemeal evaluation process. Questioning this prediction, our model implies that a failure to organize the novel instance in terms of an existing, closely related category may still result in internal knowledge transfer if the individual is able to access a more distantly related knowledge structure and map the novel stimuli onto it.

Under the influence of the categorization perspective of knowledge transfer, previous research has focused exclusively on brand-positioning strategies defined in terms of the categories consumers normally use to organize brands and products. Expanding on that, our CLA model points to an additional positioning option. Emphasizing comparisons between a brand and a distantly related knowledge structure (e.g., positioning a car as "fast" by comparing it to a cheetah) rather than comparisons between a brand and a closely related knowledge structure (e.g., positioning a car as fast by comparing its acceleration rate to that of another car in its class), this new positioning option promises to go even further toward creating a perception of uniqueness for a brand. A positioning strategy based on a distantly related knowledge structure does not activate the category from which the marketer wishes to distance the brand and therefore does not encourage the transfer of information capable of undermining perceptions of uniqueness.

The emerging body of research on really new products serves as an additional illustration of the advantages of adopting our CLA model's view of the knowledge-transfer issue. Because really new products, by definition, defy categorization in terms of existing, closely related knowledge structures, categorization theory is unlikely to be of much help to researchers in this area. In contrast, focusing on the broader question of how existing knowledge structures, whether they be closely or distantly related to the novel product, can be used to facilitate the process of consumer learning, our CLA model represents an ideal theoretical guide to researchers in this nascent stream of research. In general, our model suggests that the burden of learning about really new products will be reduced in situations where a comparison to something more familiar allows the consumer to transfer both the formal structure needed to begin constructing the mental representation for the new product and the initial information to be incorporated into that representation.

In a similar vein, because procedural knowledge, such as that involved in scripts for common consumer activities ("how to make a warranty claim," "how to return a product"), does not lend itself to categorization in the same way as products do, categorization theory is of limited value to researchers interested in pursuing this line of research. In sharp contrast, because analogical learning theory developed largely out of the desire to explain how and under what conditions individuals transfer solution procedures between comparable problems, our CLA model is an obvious choice for researchers wishing to address this previously untouched area of knowledge-transfer research.

Consumer researchers have made considerable progress in understanding how consumers learn, but continued progress requires that we adopt a broader theoretical perspective on the knowledge-transfer issue, one that recognizes all the ways in which prior knowledge contributes to current learning. Capturing a fuller spectrum of knowledge-transfer possibilities, our CLA model promises to take future research in the area in new and productive directions.

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REFERENCES

Aaker, David and Kevin Lane Keller (1990), "Consumer Evaluations of Brand Extensions," *Journal of Marketing,* 54 (January), 27–41.

Alba, Joseph and Wesley Hutchinson (1987), "Dimensions of Consumer Expertise," *Journal of Consumer Research,* 13 (March), 411–454.

Anderson, John and Ross Thompson (1989), "Use of an Analogy in a Production System Architecture," in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 267–297.

Beattie, Ann (1982), "Effects of Product Knowledge on Comparison, Memory, Evaluation and Choice: A Model of Expertise in Consumer Decision Making," in *Advances in Consumer Research,* Vol. 9, ed. Andrew Mitchell, Ann Arbor, MI: Association for Consumer Research, 581–584.

Boush, David and Barbara Loken (1991), "A Process Tracing Study of Brand Extension Evaluation," *Journal of Marketing Research,* 28 (February), 16–28.

Broniarczyk, Susan and Joseph Alba (1994a), "The Importance of the Brand in Brand Extension," *Journal of Marketing Research,* 31 (May), 214–228.

——— and Joseph Alba (1994b), "The Role of Consumers' Intuitions in Inference Making," *Journal of Consumer Research,* 21 (December), 393–407.

Brown, Ann (1989), "Analogical Learning and Transfer: What Develops?" in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 369–412.

Burstein, Mark (1986), "Concept Formation by Incremental Analogical Reasoning and Debugging," in *Machine Learning: An Artificial Intelligence Approach,* Vol. 2, ed. Ryzsard Michalski et al., Los Angeles: Morgan Kaufman, 351–369.

Carbonell, Jaime (1983), "Learning by Analogy: Formulating and Generalizing Plans from Past Experience," in *Machine Learning: An Artificial Intelligence Approach,* Vol. 1, ed. Ryzsard Michalski et al., Palo Alto, CA: Tioga, 137–161.

——— (1986), "Derivational Analogy: A Theory of Recon-

structive Problem Solving and Expertise Acquisition,'' in *Machine Learning: An Artificial Intelligence Approach,* Vol. 2, ed. Ryzsard Michalski et al., Los Angeles: Morgan Kaufman, 371–392.

Carey, Susan (1985), *Conceptual Change in Childhood,* Cambridge, MA: MIT Press.

Catrambone, Richard and Keith Holyoak (1989), ''Overcoming Contextual Limitations on Problem Solving Transfer,'' *Journal of Experimental Psychology: Learning, Memory and Cognition,* 15 (6), 1147–1156.

Clement, Catherine and Dedre Gentner (1991), ''Systematicity as a Selection Constraint in Analogical Mapping,'' *Cognitive Science,* 15, 89–132.

Cummins, Denise Dellarosa (1992), ''Role of Analogical Reasoning in the Induction of Problem Categories,'' *Journal of Experimental Psychology: Learning, Memory and Cognition,* 18 (5), 1103–1124.

Davidson, Robert (1976), ''The Role of Metaphor and Analogy in Learning,'' in *Cognitive Learning in Children: Theories and Strategies,* ed. Joel Levin and Vernon Allen, New York: Academic Press, 135–162.

Dröge, Cornelia and Rene Darmon (1987), ''Associative Positioning Strategies through Comparative Advertising: Attribute versus Overall Similarity Approaches,'' *Journal of Marketing Research,* 24 (November), 377–388.

Fiske, Susan, Donald Kinder and W. Michael Larter (1983), ''The Novice and the Expert: Knowledge-Based Strategies in Political Cognition,'' *Journal of Experimental Social Psychology,* 19, 381–400.

——— and Steven Neuberg (1990), ''A Continuum of Impression Formation, from Category-Based to Individuating Processes: Influences of Information and Motivation on Attention and Interpretation,'' in *Advances in Experimental Social Psychology,* Vol. 23, ed. M. P. Zanna, Orlando, FL: Academic Press, 1–74.

———, Steven Neuberg, Ann Beattie, and Sandra Milberg (1987), ''Category-Based and Attribute-Based Reactions to Others: Some Informational Conditions of Stereotyping and Individuating Processes,'' *Journal of Experimental Social Psychology,* 23, 399–427.

Forbus, Kenneth and Dedre Gentner (1986), ''Learning Physical Domains: Toward a Theoretical Framework,'' in *Machine Learning: An Artificial Intelligence Approach,* Vol. 2, ed. Ryzsard Michalski et al., Los Angeles: Morgan Kaufman, 311–348.

Fusco, Carl (1994), ''New Product Introduction: Challenges in Researching Customer Acceptance,'' paper presented at the Marketing Science Institute Conference, Boston.

Gatignon, Hubert and Thomas Robertson (1985), ''A Propositional Inventory for New Diffusion Research,'' *Journal of Consumer Research,* 11 (March), 849–867.

Gentner, Dedre (1983), ''Structure Mapping: A Theoretical Framework for Analogy,'' *Cognitive Science,* 7, 155–170.

——— (1989), ''The Mechanisms of Analogical Transfer,'' in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 199–124.

———, Mary Jo Ratterman, and Kenneth Forbus (1993), ''The Roles of Similarity in Transfer: Separating Retrievability from Inferential Soundness,'' *Cognitive Psychology,* 25, 524–575.

——— and Cecile Toupin (1986), ''Systematicity and Surface Similarity in the Development of Analogy,'' *Cognitive Science,* 10, 277–300.

Gick, Mary and Keith Holyoak (1980), ''Analogical Problem Solving,'' *Cognitive Psychology,* 12, 306–355.

——— and Keith Holyoak (1983), ''Schema Induction and Analogical Transfer,'' *Cognitive Psychology,* 15, 1–38.

Glaser, Robert and Michelene T. H. Chi (1988), ''Overview,'' in *The Nature of Expertise,* ed. Michelene T. H. Chi et al., Hillsdale, NJ: Erlbaum, xv–xxviii.

Goldstone, Robert, Douglas Medin, and Dedre Gentner (1991), ''Relational Similarity and Nonindependence of Features in Similarity Judgments,'' *Cognitive Psychology,* 23, 222–262.

Goodstein, Ronald (1993), ''Category-Based Applications and Extensions in Advertising: Motivating More Extensive Ad Processing,'' *Journal of Consumer Research,* 20 (June), 87–99.

Graonic, Milos D. (1995), ''The Effects of Context and Consumer Knowledge on Transferability of Preferences,'' unpublished doctoral dissertation, Carlson School of Management, University of Minnesota, Minneapolis, MN 55455.

Gregan-Paxton, Jennifer (1997), ''Consumer Learning by Analogy: A Process Model of Consumer Response to Brand Extensions,'' working paper, Marketing Department, Washington State University, Vancouver, WA 98686.

Gurwitz, Sharon and Kenneth Dodge (1977), ''Effects of Confirmations and Disconfirmations on Stereotype-Based Attributions,'' *Journal of Personality and Social Psychology,* 35 (7), 495–500.

Halfhill, D. S. (1980), ''Multinational Marketing Strategy: Implications of Attitudes toward Country of Origin,'' *Management International Review,* 20 (4), 26–30.

Han, C. Min (1989), ''Country Image: Halo or Summary Construct,'' *Journal of Marketing Research,* 26 (May), 222–229.

Hastak, Manoj and Sung-Tai Hong (1991), ''Country-of-Origin Effects on Product Quality Judgements: An Information Integration Perspective,'' *Psychology and Marketing,* 8 (Summer), 127–143.

Herr, Paul (1989), ''Priming Price: Prior Knowledge and Context Effects,'' *Journal of Consumer Research,* 16 (June) 67–78.

Hirschman, Elizabeth (1980), ''Innovativeness, Novelty Seeking and Consumer Creativity,'' *Journal of Consumer Research,* 7 (December), 283–295.

Holyoak, Keith (1984), ''Analogical Thinking and Human Intelligence,'' in *Advances in the Psychology of Human Intelligence,* Vol. 2, ed. Robert Sternberg, Hillsdale, NJ: Erlbaum, 199–230.

——— and Kyunghee Koh (1987), ''Surface and Structural Similarity in Analogical Transfer,'' *Memory and Cognition,* 15 (4), 332–340.

——— and Paul Thagard (1989), ''A Computational Model of Analogical Learning,'' in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 242–266.

——— and Paul Thagard (1995), *Mental Leaps: Analogy in Creative Thought,* Cambridge, MA: MIT Press.

Hong, Sung-Tai and Robert Wyer, Jr. (1989), ''Effects of Country-of-Origin and Product Attribute Information on Product Evaluation: An Information Processing Perspective,'' *Journal of Consumer Research,* 16 (September), 175–187.

——— and Robert Wyer, Jr. (1990), ''Determinants of Product Evaluation: Effects of the Time Interval between Knowl-

edge of a Product's Country of Origin and Information about Its Specific Attributes," *Journal of Consumer Research,* 17 (December), 277–288.

Kapferer, Jean-Nicole (1995), "Brand Confusion: Empirical Study of a Legal Concept," *Psychology and Marketing,* 12 (6), 551–568.

King, Maryon and Siva Balasubramanian (1994), "The Effects of Expertise, End Goal, and the Product Type on Adoption of Preference Formation Strategy," *Journal of the Academy of Marketing Science,* 22 (2), 146–159.

Klein, Stanley, Judith Loftus, J. Gregory Trafton, and Robert Fuhrman (1992), "Use of Exemplars and Abstractions in Train Judgments: A Model of Trait Knowledge about the Self and Others," *Journal of Personality and Social Psychology,* 63 (5), 739–753.

Krueger, Joachim and Russell Clement (1994), "Memory-Based Judgments about Multiple Categories: A Revision and Extension of Tajfel's Accentuation Theory," *Journal of Personality and Social Psychology,* 67 (1), 35–47.

LeClerc, France, Bernd Schmitt, and Laurette Dube (1994), "Foreign Branding and Its Effect on Product Perceptions and Attitudes," *Journal of Marketing Research,* 31 (May), 263–270.

Lehmann, Donald (1994), "Characteristics of 'Really' New Products," paper presented at the Marketing Science Institute Conference, Boston.

Loken, Barbara and Deborah Roedder John (1993), "Diluting Beliefs about Family Brands: When Extensions Have a Negative Impact," *Journal of Marketing,* 57 (July), 71–84.

Maheswaran, Durairaj and Brian Sternthal (1990), "The Effects of Knowledge, Motivation, and Type of Message on Ad Processing and Product Judgments," *Journal of Consumer Research,* 17 (June), 66–73.

Marchant, Garry, John Robinson, Urton Anderson, and Michael Schadewalder (1991), "Analogical Transfer and Expertise in Legal Reasoning," *Organizational Behavior and Human Decision Processes,* 48, 272–290.

———, John Robinson, Urton Anderson, and Michael Schadewald (1993), "The Use of Analogy in Legal Argument: Problem Similarity, Precedent and Expertise," *Organizational Behavior and Human Decision Processes,* 55, 95–119.

McKeithen, Katherine, Judith Reitman, Henry Rueter, and Stephen Hirtle (1981), "Knowledge Organization and Skill Differences in Computer Programmers," *Cognitive Psychology,* 13, 307–325.

Medin, Douglas (1989), "Concepts and Conceptual Structure," *American Psychologist,* 44 (12), 1469–1481.

——— and Andrew Ortony (1989), "Psychological Essentialism," in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 179–195.

———, Robert Goldstone, and Dedre Gentner (1993), "Respects for Similarity," *Psychological Review,* 100 (2), 254–278.

Monroe, Kent (1976), "The Influence of Price Differences and Brand Familiarity on Brand Preferences," *Journal of Consumer Research,* 3 (June), 42–49.

Moskowitz, Gordon and Robert Roman (1992), "Spontaneous Trait Inferences as Self-Generated Primes: Implications for Conscious Social Judgment," *Journal of Personality and Social Psychology,* 62 (5), 728–738.

Murphy, George and Douglas Medin (1985), "The Role of Theories in Conceptual Coherence," *Psychological Review,* 92, 289–316.

Muthukrishnan, A. V. and Barton Weitz (1991), "Role of Product Knowledge in Evaluation of Brand Extensions," in *Advances in Consumer Research,* Vol. 18, ed. Rebecca Holman and Michael Solomon, Provo, UT: Association for Consumer Research, 407–413.

Nisbett, Richard and Lee Ross (1980), *Human Inference: Strategies and Shortcomings of Social Judgment,* Englewood Cliffs, NJ: Prentice-Hall.

Novick, Laura (1988), "Analogical Transfer, Problem Similarity and Expertise," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 14 (3), 510–520.

——— and Keith Holyoak (1991), "Mathematical Problem Solving by Analogy," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 17 (3), 398–415.

Ortony, Andrew (1975), "Why Metaphors Are Necessary and Not Just Nice," *Educational Theory,* 25, 43–53.

Park, C. Whan and V. Parker Lessig (1981), "Familiarity and Its Impact on Consumer Decision Biases and Heuristics," *Journal of Consumer Research,* 8 (September), 223–230.

———, Sandra Milberg, and Robert Lawson (1991), "Evaluation of Brand Extensions: The Role of Product Feature Similarity and Brand Concept Consistency," *Journal of Consumer Research,* 18 (September), 185–193.

Pavelchak, Mark (1989), "Piecemeal and Category-Based Evaluation: An Idiographic Analysis," *Journal of Personality and Social Psychology,* 56 (3), 354–363.

Pechmann, Cornelia and S. Ratneshwar (1991), "The Use of Comparative Advertising for Brand Positioning: Association versus Differentiation," *Journal of Consumer Research,* 18 (September), 145–160.

Rao, Akshay and Wanda Sieben (1992), "The Effect of Prior Knowledge on Price Acceptability and the Type of Information Examined," *Journal of Consumer Research,* 19 (September), 256–270.

Read, Stephen (1983), "Once Is Enough: Causal Reasoning from a Single Instance," *Journal of Personality and Social Psychology,* 45 (2), 323–334.

——— (1984), "Analogical Reasoning in Social Judgment," *Journal of Personality and Social Psychology,* 46 (1), 14–25.

——— (1987), "Similarity and Causality in the Use of Social Analogies," *Journal of Experimental Social Psychology,* 23, 189–207.

Reed, Stephen (1987), "A Structure-Mapping Model for Word Problems," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 13 (1), 124–139.

———, George Ernst, and Rana Banerji (1974), "The Role of Analogy in Transfer between Similar Problem States," *Cognitive Psychology,* 6, 436–450.

Reeves, Lauretta and Robert Weisberg (1994), "The Role of Content and Abstract Information in Analogical Transfer," *Psychological Bulletin,* 115 (3), 381–400.

Reidenbach, Eric and Sharon Grimes (1984), "How Concept Knowledge Affects Concept Evaluation," *Journal of Product Innovation Management,* 4, 255–266.

Reimann, P. and Michelene T. H. Chi (1989), "Human Expertise," in *Human and Machine Problem Solving,* ed. K. J. Gilhooly, New York: Plenum, 161–191.

Rose, Randall, Paul Miniard, Michael Barone, Kenneth Manning, and Brian Till (1993), "When Persuasion Goes Undetected: The Case of Comparative Advertising," *Journal of Marketing Research,* 30 (August), 315–330.

Ross, Brian (1984), "Remindings and Their Effects in Learning a Cognitive Skill," *Cognitive Psychology,* 16, 371–416.

——— (1987), "This Is Like That: The Use of Earlier Problems and the Separation of the Similarity Effects," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 13 (4), 629–639.

Rumelhart, David (1989), "Toward a Microstructural Account of Human Reasoning," in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 298–312.

——— and Donald Norman (1981), "Analogical Processes in Learning," in *Cognitive Skills and Their Acquisition,* ed. John Anderson, Hillsdale, NJ: Erlbaum, 335–359.

Sanbonmatsu, David, Frank Kardes, and Paul Herr (1992), "The Role of Prior Knowledge and Missing Information in Multiattribute Evaluation," *Organizational Behavior and Human Decision Processes,* 51, 76–91.

Scardamalia, Marlene and Carl Bereiter (1991), "Literate Expertise," in *Toward a General Theory of Expertise: Prospects and Limits,* ed. K. Anders Ericsson and Jacqui Smith, Cambridge: Cambridge University Press, 172–194.

Schoenfeld, Alan and Douglas Herrmann (1982), "Problem Perception and Knowledge Structures in Expert and Novice Mathematical Problem Solvers," *Journal of Experimental Psychology: Learning, Memory and Cognition,* 8 (5), 484–494.

Shimp, Terence, Saeed Samiee, and Thomas Madden (1993), "Countries and Their Products: A Cognitive Structure Perspective," *Journal of the Academy of Marketing Science,* 21 (4), 323–330.

Simons, P. R. J. (1984), "Instructing with Analogies," *Journal of Educational Psychology,* 76 (3), 513–527.

Smith, Eliot and Michael Zarate (1992), "Exemplar-Based Model of Social Judgment," *Psychological Review,* 99 (1), 3–21.

Spellman, Barbara and Keith Holyoak (1992), "If Saddam Is Hitler Then Who Is George Bush? Analogical Mapping between Systems of Social Roles," *Journal of Personality and Social Psychology,* 62 (6), 913–933.

Spencer, R. Mason and Robert Weisberg (1986), "Context Dependent Effects on Analogical Transfer," *Memory and Cognition,* 14 (5), 442–449.

Stayman, Douglas, Dana Alden, and Karen Smith (1992), "Some Effects of Schematic Processing on Consumer Expectations and Disconfirmation Judgments," *Journal of Consumer Research,* 19 (September), 240–255.

Sujan, Mita (1985), "Consumer Knowledge: Effects on Evaluation Strategies Mediating Consumer Judgments," *Journal of Consumer Research,* 12 (June), 31–46.

——— and James Bettman (1989), "The Effects of Brand Positioning Strategies on Consumers' Brand and Category Perceptions: Some Insights from Schema Research," *Journal of Marketing Research,* 26 (November), 454–467.

——— and Christine Dekleva (1987), "Product Categorization and Inference Making: Some Implications for Comparative Advertising," *Journal of Consumer Research,* 14 (December), 372–378.

Vosniadou, Stella (1989), "Analogical Reasoning as a Mechanism in Knowledge Acquisition: A Developmental Perspective," in *Similarity and Analogical Reasoning,* ed. Stella Vosniadou and Andrew Ortony, Cambridge: Cambridge University Press, 413–437.

Ward, James, Barbara Loken, Ivan Ross, and Tedi Hasapopoulos (1986), "The Influence of Physical Similarity on Generalization of Affect and Attribute Perceptions from National Brands to Private Label Brands," in *Proceedings of the American Marketing Association Summer Educators' Conference,* ed. Terence Shimp et al., Chicago: American Marketing Association, 51–56.

Weisberg, Robert, Marie DiCamillo, and Dennis Phillips (1978), "Transferring Old Associations to New Situations: A Nonautomatic Process," *Journal of Verbal Learning and Verbal Behavior,* 17, 219–228.

Wharton, Charles, Keith Holyoak, Paul Downing, Trent Lange, Thomas Wickens, and Eric Melz (1994), "Below the Surface: Analogical Similarity and Retrieval Competition in Reminding," *Cognitive Psychology,* 26, 64–101.

Wilton, Peter and Edgar Pessemier (1981), "Forecasting the Ultimate Acceptance of an Innovation: The Effects of Information," *Journal of Consumer Research,* 8 (September), 162–171.

Winston, Patrick (1980), "Learning and Reasoning by Analogy," *Communications of the ACM,* 23 (12), 689–703.

Zarate, Michael and Eliot Smith (1990), "Person Categorization and Stereotyping," *Social Cognition,* 8 (2), 161–185.