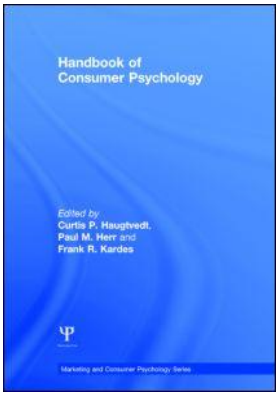

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Consumer Memory, Fluency, and Familiarity

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Consumer Memory, Fluency, and Familiarity

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The systematic study of consumer behavior is heavily influenced by theories and paradigms from memory research, as the behavior of the consumer is largely influenced by prior experiences. The distinction is often drawn between memory-based, stimulus-based (all relevant information is physically present at the time of judgment or choice), and mixed (a combination of memory-based and stimulus-based) decisions (Lynch & Srull, 1982). However, purely stimulus-based decisions are relatively rare; most consumer decisions are necessarily dependent on memory and thereby range from the purely memory-based to mixed (Alba, Hutchinson, & Lynch, 1991).

Given the importance of memory in consumer research, it behooves us periodically to take stock of the contemporary theories of memory and consider their assumptions and implications. To that end, we aim in this chapter to provide a review of the dominant accounts of memory and the way they have shaped our understanding of consumer behavior in the past two decades. We discuss the advances that have been made as well as some areas of potential concern. Specifically, we frame the review and discussion vis-à-vis an alternative account of memory, the SCAPE framework, developed by Bruce Whittlesea and his colleagues (e.g., Whittlesea, 1997). In addition, we offer some suggestions and future directions for research on consumer memory.

MEMORY

Memory is the record of our personal past. As such, it is useful for remembering. But memory is also much more than that: it also involves the capacity to learn, to be influenced by prior experience, and to behave differently in the future as a consequence of an experience. Memory is the controller of all acquired human behavior, including speech, conceptual knowledge, skilled activities, social interactions, and consumer preferences. To achieve a true understanding of any aspect of human behavior, it is therefore essential to have an effective theory of memory.

During the 1970s, the notion of associative memory was introduced (Anderson & Bower, 1973). Following the assumption that elaboration is related to the creation of associative pathways in memory; the notion that elaboration could impact attitudes became an important research question. Elaborative processing became a heavily studied determinant of information accessibility (e.g., Kardes, 1994) and attitude formation (Kisielius & Sternthal, 1986; McGill & Anand, 1989). Such effects have been explained by a multiple-pathway explanation (cf. Anderson, 1983), although more recently explanations have favored the reconstruction hypothesis (e.g., Walker, 1986).

Despite the popularity of thinking about memory in terms of "construction" (e.g., Loftus & Palmer, 1974; Loftus, 1979), during the 1980s, "separate systems" approaches to memory became popular, and continue to be popular today. We will focus on these approaches: first outlining them in detail, and then contrasting them with the SCAPE framework.

SEPARATE SYSTEMS THEORIES

Three major dichotomies were proposed as the basic organization of memory, each pointing to some clear contrast in behavior. Each dichotomy is based on observations of various dissociations in performance on some tasks. For example, recognition performance has been found to be affected by varying levels of processing (Jacoby & Dallas, 1981) or delay of test (Tulving, Schacter, & Stark, 1982) while leaving identification performance unaffected. Amnesic patients demonstrate implicit learning (Knowlton & Squire, 1994) and respond to repetition priming (Warrington & Weiskrantz, 1970), despite poor recognition performance. These dissociations are taken as evidence of Nature's seams, the lines along which mind can be split and compartmentalized into convenient and independent sub-units, each of which can be studied without consideration of the other.

The *episodic/semantic* dichotomy of memory is arguably the most dominant of the three dichotomies. It distinguishes the preservation of detail and context of prior experiences from the preservation of context-free, abstract, summary properties of those experiences (e.g., Tulving, 1983, 1985). The former supports tasks such as recall and recognition; the latter supports tasks requiring perception, identification, and conceptual and categorical knowledge.

Also common is the *procedural/declarative* dichotomy which is based on the distinction between a declarative system, supporting tasks requiring conscious deliberation about the content and source of current knowledge, and a procedural system, supporting tasks requiring specific skills, or motoric ability (Cohen & Squire, 1980). The distinction is between intentional acquisition, storage, and retrieval of information versus non-reflective acquisition and application of prior experience, as evidenced by perceptual, cognitive, and sensorimotor performance on tasks demonstrating skill or involving repetition priming. *Skill* is considered to be a product of multiple prior experiences; *priming* is considered to be a product of a single prior experience. Evidence of either is measured by the observed savings or facilitation in performance, in the absence of conscious awareness, control, or volition.

The third dichotomy entails an *implicit/explicit* distinction that emphasizes the differential role of consciousness in performance, contrasting tasks such as recall and recognition, in which awareness of prior experience is important, versus tasks which measure repetition priming (Graf & Schacter, 1985). An implicit form of memory exists to account for effects of prior experience on current behavior in the absence of conscious awareness (e.g., effects observed in a priming task); an explicit form of memory exists to account for behavior accompanied by conscious awareness (e.g., effects observed in a remembering task).

These separate systems theories of memory are based on the assumption that the fundamental functions of mind are obvious: they consist of the capacity to perform each of the various activi-

ties that humans are faced with in the social world, such as recognition, knowing, and responding appropriately but unconsciously in skilled activities such as speech and dance. The important research question is thus not what the functions of mind are, but how they are performed. It has further been assumed that different functions of mind are served by separate dedicated mechanisms, and that the dissociated patterns of performance observed in performing various tasks is a consequence of the different principles by which the separate mechanisms work. Finally, because of this correspondence of mechanism with function, it has been assumed that each mechanism serves each function directly. Thus, for example, because recognition of a particular face or event requires differentiation among many others, that function is served by a specific retrieval mechanism; whereas classification of an object such as a dog in the street could benefit from experience of many similar beasts, and so instead relies on abstraction of knowledge across events and activation of a general concept node.

Applied to consumer memory, the separate systems distinctions have been useful for compartmentalizing consumer knowledge. For example, a "retrieval set" is distinguished from a "knowledge set" (e.g., Alba & Chattopadhyay, 1985), or a "consideration set" is distinguished from an "awareness set" (see Shapiro, MacInnis, & Heckler, 1997). In each example, the former is episodic in nature, the latter semantic. As such, the assumptions of the distinction are often used for hypothesis testing, and taken for granted. For example, many consumer researchers assume that activation of nodes in semantic memory is a necessary by-product of cueing to a brand category or feature (e.g., Cowley & Mitchell, 2003; Nedungadi, 1990; Shapiro, 1999), and often discuss "activation" as a causal mechanism, rather than a proposed theoretical construct.

This chapter argues that current major theories of memory are problematic, and instead favors an account of memory called SCAPE, which is an acronym for "Selective Construction And Preservation of Experiences" (Whittlesea, 1997). This account is a synthesis of ideas from the attribution theory of remembering (e.g., Jacoby & Dallas, 1981; Jacoby, Kelley, & Dywan, 1989; Whittlesea, 1993), the episodic-processing account of concept acquisition (e.g., Whittlesea & Dorken, 1993), instance theory (e.g., Brooks, 1978; Medin & Schaffer, 1978; Jacoby & Brooks, 1984), skill transfer (e.g., Kolers & Smythe, 1984), and transfer-appropriate processing (TAP; e.g., Morris, Bransford, & Franks, 1977; Roediger & Challis, 1992; Masson & MacLeod, 1992). In accordance with the SCAPE framework, we suggest that the functions of mind identified by separate systems (and most contemporary) theories are misleading: they are categories of mental performance that make sense from the point of view of the user of memory (one's conscious self), but do not correspond in any direct way with the fundamental principles of memory. We further argue that the real underlying mechanisms of memory are unitary and serve all of these user-defined functions; and moreover that they do so indirectly, such that the mechanism responsible for a certain behavior in no way resembles the behavior. Among other claims, we deny that remembering consists of retrieval; that spreading activation and inhibition are valid mental operations; that conscious and unconscious performance have different causal agents; and that controlled and automatic behavior differ in any meaningful way.

A FUNCTIONAL ANALYSIS

However obvious the contrasts between explicit and implicit performance, or between remembering and knowing, it will be argued in this chapter that none of those are fundamental functions of mind. Instead, they are emergent categories of behavior, useful in describing differences in a person's behavior from the outside, and perhaps in describing their current intentions, but not diagnostic of the underlying principles by which mind is organized. The problem, we assert, stems from

a levels-of-analysis problem, confusing what a system achieves in operating on the world with the means by which that operation is attained. To take a simple example of the problem, in attempting a functional analysis of an automobile, one might perform an examination of the variety of things that cars are used for. Following such an examination, one might be tempted to say that a car's chief functions are transportation, ego projection, sport, and courtship. Certainly these are valid and separate categories of interaction with the world that cars enable us to achieve. However, they do not reveal anything about the underlying affordances that support these achievements (capacities such as steering, propulsion, shock absorption, and containment), and even less about the mechanisms that support these affordances (rack and pinion steering, disk brakes, Otto-cycle engine, and so on). That is, the functions of a system that are evident to and of value to the user of the system may not in any way resemble the basic principles by which the system operates. In consequence, arguing basic mechanism from dissociations among classes of activity that are important to the user is fraught with danger.

More important, we believe that Nature, in her subtlety, often arranges for behaviors that are of advantage to her offspring to come about in ways that are startlingly indirect. As an example, consider a well-known phenomenon: that of a sunflower's tendency to follow the path of the sun over the course of a day, known as *heliotropism*. A direct mechanism to bring about this correspondence would require, in addition to some mechanical means of twisting, (a) that the plant knows, at a given moment, where the sun is, (b) that it also knows the direction in which it is currently pointed, and (c) that it has some means of calculating the difference. Clearly, such a direct mechanism is wrong. In fact, the mechanism is indirect, having the *effect* of bringing about alignment with the sun without any computation of that alignment. The actual, more subtle, explanation of this behavior is that red and blue wavelengths of light respectively increase and reduce photosynthesis and the resulting uptake of water into the stem's cells. The gradient of blue light across the plant stem in full sunlight causes cells on the shady side of the stem to increase photosynthesis and water uptake, expanding their size, whereas photosynthesis in cells on the sunny side is reduced, leading these cells to shrink. This combination of effects causes the head of the plant to twist, bending toward the sun. That the plant faces the sun accurately is in some sense an accident, resulting from the ratio of swelling in cells on opposite sides of the stem; the real cause of that effect is that ancestral sunflowers that had better ratios of swelling, so that they followed the sun more precisely, out-competed those that did so less effectively. Thus, the success in sun-following, although vital to the plant, is better thought of as an incidental benefit or by-product of its fundamental architecture, rather than as an inherent function of that architecture.

These two examples illustrate the difficulty of functional analysis aimed at understanding the fundamental principles of a system that control that system's interactions with the world. We will propose a different dichotomy of functions of mind, of production versus evaluation, that is fundamental to the SCAPE framework of memory (Whittlesea, 1997). This dichotomy is much more abstract than any of those recounted earlier, and much less easily tied to any specific behavior that a person performs. However, we will argue that it provides a more thorough explanation of the variety of human performance than do any of the other so far mentioned accounts.

THE SCAPE FRAMEWORK

According to the SCAPE account, there is only one memory system, which contains only representations of the experience of processing the stimuli in various tasks and contexts. In any processing event, this memory system interacts with the environment; the environment constrains some activities and affords others (e.g., you can use a pencil as a weapon or to stir coffee, but cannot fly on

it). The central function of memory is *construction*: memory never simply registers or records the environment, but instead imposes selection, organization, and meaning on it. It is this experience of construction that will be encoded in memory, and that will control performance on subsequent interactions involving stimuli, tasks, and contexts that are similar on relevant dimensions.

The construction function has two aspects: (1) the *production* of psychological events, controlled by the interaction of the stimulus, task, and context, with representations of previous processing experiences in memory; and (2) the *evaluation* of the significance of that production, given the stimulus, task, and context. The former leads to performance: the occurrence of all manner of perceptual, cognitive, and motoric events. The latter results in phenomenology: the subjective reaction to current processing that causes people to adopt the attitude that they are remembering, understanding, or identifying an object, either correctly or committing an error.

The production function begins by selecting some aspect of the current situation as a stimulus, or focus of attention, the rest as context. This selection depends on a variety of factors, including the prior history of memory with various aspects of the environment, each aspect's salience or apparent significance (threat, novelty, interest), and the preparedness of the system to perform some activity given how and what it has just been processing. This process continues on to construct a mental model of the event: of a percept of the stimulus, of its identity, class or covert properties, or of the detail of a past or future event involving that stimulus, depending on the task at hand and the affordances and cue properties of the stimulus and context.

Many accounts of memory involve (at least in part) assumptions that sound similar to those just stated. However, the SCAPE account makes two radical claims. The first is that current cognitive processing is always the product of a constructive act. One implication is that, although a prior episode can, in part, control the shape and ease of constructing a mental model of a current stimulus, that prior episode is not itself retrieved. That has major implications for understanding the nature of remembering, as documented below. A second departure is the account's insistence that the production function is always accompanied by the operation of the evaluation function, although that is often difficult to detect (see Kronlund & Whittlesea, 2005, for a demonstration of this point).

The evaluation function consists of chronic monitoring of the integrity and coherence of ongoing performance; it also makes inferences about unexpected successes or apparent failures of coherence. In the words of Marcel (1983), it consists of an attempt to "make sense of as much data as possible at the most functionally useful level" (p. 238). It is this act of inference which gives rise to the phenomenology accompanying performance. In attempting to make sense of apparent disparities between two aspects of a current stimulus, or between what is expected and what occurs, the evaluation function makes an attribution to some plausible source of influence. The apparent disparity may be resolved by an attribution to the stimulus, the situation, the person, or the past; these unconscious attributions give rise to conscious feelings such as desirability, impending danger, unusual mood, or familiarity.

THE CONSTRUCTIVE NATURE OF AWARENESS

According to separate systems accounts, explicit and declarative knowledge is thought to be accessed by retrieval. In contrast, the SCAPE account assumes that information is never retrieved, but constructed. This idea was originally proposed by Bartlett (1932), and with some exceptions (e.g., Janiszewski, Noel, & Sawyer, 2003; Braun-LaTour, LaTour, Pickrell, & Loftus, 2004),[1] it is hardly considered in the consumer literature. As an example, imagine that a recognition study begins with a study phase consisting of paired associates, such as onion-carrot, milk-cheese, bread-cake, etc. At test, when asked "Did you see MILK in the earlier list?", one subject may reply

"MILK…..oh yeah, CHEESE. Yes, I do remember seeing MILK." That performance seems to demonstrate that the person has used MILK as a cue to retrieve the episodic representation of the earlier experience, and that, in doing so, they have become aware of a prior experience. That description of the process is too simple, however. Another subject might respond "MILK, um, CHEESE, um, no, that's just a common associate. I don't remember MILK." That subject's initial performance duplicates that of the first subject's. However, although the content of the earlier experience comes to mind, this person has not become aware of the prior experience. Another subject might say, "MILK — oh right, DAIRY. Yes, I do remember seeing MILK." This person's performance is influenced by a source other than the specific prior experience, yet this person is experiencing awareness of encountering that item.

These examples demonstrate that becoming aware of a prior experience is caused by two interlinked processes: the production of a response, and an evaluation of the significance of that production. The coming-to-mind of an item in a remembering task is thus not one and the same as awareness of the prior event. Awareness of the source of the production comes about by an evaluation of the significance of that production, which results in an attribution to a source that seems most likely.

As another illustration of the difference between these two aspects of construction, Leboe and Whittlesea (2002) presented subjects with pairs of items: one-third contained two strong associates (e.g., LION-TIGER), one-third contained two unrelated words (e.g., ROAD-NAVY), and one-third contained one word and four Xs (e.g., TABLE-XXXX). Each associate in the former two cases occurred only once in the study phase, whereas XXXX occurred on many study trials. At test, subjects were provided with a word stem (e.g., LION-?) and were required to recall the item with which it was paired earlier, and provide a confidence rating about their performance. Subjects performed accurate recall on 48% of the trials involving strong associates, on only 13% of the trials involving unrelated words, and on 41% of the trials involving XXXXs. In contrast, subjects' confidence ratings for those trials were 78% for recall of the strong associates, 91% for recall of the unrelated words, and only 45% for recall of XXXXs.

Leboe and Whittlesea concluded that the differential rates of recall accuracy and confidence reflect the interaction of two operations: the coming-to-mind of a response (i.e., a strong associate, an unrelated word, or XXXX), and the subject's resulting evaluation of the significance of each of those types of responses coming to mind. For example, subjects were unimpressed with the coming-to-mind of XXXX, because they were aware that they could easily generate it because of their knowledge that one-third of studied items were paired with XXXX. Thus, they often produced XXXX correctly, but even when accurate, they were not convinced that they were actually recalling. In contrast, recall of an unrelated word was difficult, in part because the association formed during study would often be of low quality (e.g., the association between ROAD and NAVY). Consequently, accurate recall was low in this condition. However, when an unrelated word did come to mind, subjects were very impressed because they could think of no other reason why that word would come to mind other than that it had been presented in study. Such productions were thus experienced as accurate recall, and were associated with high confidence ratings.

Therefore, the conclusion that one is now aware of an aspect of the past is always a decision: an adoption of an attitude toward current processing. Awareness of the contents of previous experiences does not comprise direct access to a representation of the past. It is the product of a heuristic decision. People are chronically having to infer the nature of their past from the quality and content of their current processing. There are always multiple possible reasons why a particular mental event occurs: because it actually occurred in one's past, because one experienced a similar event

with a different stimulus, because that event occurred in the life of someone else who has told you about it, or because one has experienced many similar events, which in parallel contribute to the ease of processing the current mental event.

This inferential relationship between awareness and experience is not limited to remembering. It is also true of knowledge in general. In the next section, we will demonstrate analogous performance in remembering and classification judgments, but that people claim awareness of the basis of their performance in the first but not the second. The difference appears to be only due to the adoption of an appropriate attitude and theory to understand their performance in the first case and a lack of doing so in the latter.[2]

SEPARATE SYSTEMS APPROACHES TO MEMORY

S*eparate-systems accounts* of memory, including the episodic/semantic (Tulving, 1983, 1985), declarative/procedural (Cohen & Squire, 1980), and explicit/implicit (Graf & Schacter, 1985) dichotomies, are based on the notion that memory performance is sustained by distinct modules of memory. The modules support different functions of memory, each of which is based on specific types of knowledge, and thus have specific principles for acquiring and applying each type of knowledge. Each type of knowledge is also selectively cued by different types of tasks, and preserved in distinct stores. Evidence for such dichotomies in memory has come from dissociations that have been observed in both intact and amnesic subjects. We provide an in-depth description of the episodic/semantic and implicit/explicit dichotomies, as they have dominated how consumer researchers conceptualize memory.[3] We provide empirical evidence for each distinction, and examples of consumer behavior studies which have embraced or relied on each. We focus primarily on studies on consumer memory published since the review by Alba et al. (1991).

THE EPISODIC/SEMANTIC DICHOTOMY

According to this account, memory can be subdivided into an episodic system which preserves details of particular experiences and supports remembering tasks (i.e., recall and recognition), and a semantic system, which preserves conceptual and categorical knowledge and supports non-remembering activities (i.e., perception and identification). The semantic system thus preserves the abstract, context-free, summary properties of all prior experiences (Tulving, 1983, 1985). The fundamental distinction is between *remembering*, which depends on event-specific information, and *knowing*, which depends on the abstracted summary of prior experiences. Event-specific information can take on the form of tokens (Kanwisher, 1987); abstractions can take on the form of types (Anderson, 1980, 1983; Kanwisher, 1987), prototypes (Rosch, 1978), rules (Reber, 1989, 1993), or logogens (Paap & Noel, 1991). The process of acquiring knowledge occurs by automatic abstraction or implicit learning; the process of accessing knowledge is thought to be mediated by the principles of activation and inhibition.

Although not always made explicit, numerous consumer researchers appear to assume an episodic/semantic distinction of memory. A set of studies have examined how brand or product category schemas are formed and organized. For example, Meyvis and Janiszewski (2004) investigated how breadth of brand categories affects brand associations and perceptions of brand extensions (see also Gurhan-Canli, 2003); Wood and Lynch (2002) examined the effects of expertise or prior knowledge about products on learning of new information and subsequent memory; and Roedder-John and Sujan (1990) studied product information organization and categorization in young children.

The strength and extensiveness of information held in memory and how it affects consumers' judgments and decisions are almost always considered to be a direct or indirect function of person-related (e.g., motivation, ability), stimulus-related (e.g., distinctiveness, visual vs. verbal), and situational factors (e.g., time delay, usage situation). For example, Park and Hastak (1994) have examined how involvement affects product memory, and how the product memory affects judgments. Peracchio and Tybout (1996) have also investigated how product category schema affects product evaluations. In particular, they examined the effects of schema incongruity on product evaluations. Thus these consumer studies share commonalities with some aspects of the SCAPE framework. For instance, the production part of construction processes posited by the SCAPE assumes an interaction of stimulus, task, and context that is in line with the approach taken by consumer researchers. However, there is no accompanying acknowledgement in the studies that the significance of the production is, in turn, evaluated.

Other studies have also investigated the manner in which organization of brand information or prior knowledge affects how and what information is processed and remembered by consumers. The way that prior knowledge influences judgments or choice has been of interest to a number of consumer researchers (e.g., Crowley & Mitchell, 2003; Hutchinson, Raman, & Mantrala, 1994; Nedungadi, 1990). These studies, however, largely assume that "retrieval" occurs as the result of a spreading activation process. A threshold level of activation of a particular concept, such as a brand, is assumed to be facilitated through the use of cues such as attribute information. This in turn results in retrieval of the target brand. Spreading activation models have also been applied to models of brand equity (e.g., Aaker, 1991; Keller, 1993, 1998).

In the following sections we describe assumptions made by the episodic/semantic approach that separate principles are involved in remembering and knowing, that acquisition of knowledge occurs by automatic abstraction, and that access to knowledge structures is mediated by activation and inhibition. We consider further examples of consumer behavior studies which have embraced each assumption. We also provide predictions made by SCAPE for each observation discussed.

ACQUIRING KNOWLEDGE STRUCTURES

One observation that suggests the use of abstracted information is *implicit learning* (Dienes & Berry, 1997; Knowlton & Squire, 1994; Reber & Allen, 1978; Reber, 1989, 1993). As an example of what takes place during an implicit learning study, brand logos (e.g., the Hello Kitty picture) are shown to subjects in their regular and opposite orientations (e.g., Hello Kitty with a bow in her hair above her right ear instead of her left ear). Subjects are above chance at choosing the correct orientation, suggesting automatic, incidental learning of regularity in such stimuli (Kelly, Burton, Kato, & Akamatsu, 2001). Such results have also been found in controlled laboratory settings, where attention is directed to stimuli that follow a rule. At test, subjects are above chance at discriminating between legal and illegal items (i.e., they demonstrate sensitivity to the abstract structure of the domain) without having awareness of the rule (e.g., McGeorge & Burton, 1990).

Such performance is taken as evidence that the subjects must have abstracted information about the rule during the exposure phase. Because they are unaware of doing so, that abstraction must be automatic. The phenomenon of implicit learning is thus argued to demonstrate the existence in memory of an autonomous abstraction mechanism that proceeds independent of conscious intention or awareness, and supports performance in tasks such as classification and identification.

The suggestion of automatic abstraction has been criticized on the grounds that test items that are legal are highly similar to each previously encountered legal (studied) exemplar of the given class, therefore, if a subject simply memorizes one or more of the study items, and uses the per-

ceived similarity of test items to those memorized instances as a basis for their decision, they will perform above chance (Brooks, 1978, 1987; Dulany, Carlson, & Dewey, 1984; Neal & Hesketh, 1997; Perruchet & Pacteau, 1991; Shanks & St. John, 1994; Vokey & Brooks, 1992). This provides a situation whereby the same processes that are involved in showing sensitivity to prior individual experiences (episodic) are also involved in showing sensitivity to general, abstract properties of classes (semantic). The SCAPE account is in agreement, but adds that memory preserves processing experiences, and the type of processing experience that occurred on a prior encounter with a stimulus will influence later processing of the same (or a similar) stimulus to the extent that later processing matches the earlier processing experience (i.e., transfer appropriate processing: henceforth TAP; Morris et al., 1977). The SCAPE account suggests that TAP will apply to both remembering and non-remembering tasks (Whittlesea & Dorken, 1993, 1997).

To demonstrate that TAP applies to non-remembering activities such as classification, Wright and Whittlesea (1998) developed a set of four-digit stimuli, each which followed the rule odd-even-odd-even (e.g., 3412, 8954, etc). They presented these items to subjects in a study phase, and encouraged them to read them as bigrams (e.g., "thirty-four, twelve," etc). At test, no studied items were shown, however, half corresponded to the odd-even-odd-even rule, half violated the rule (e.g., 4613, 8723, etc). Subjects were asked to discriminate legal from illegal items, and they accurately did so 68% of the time, although they were unable to state the rule. This type of finding is usually interpreted as providing evidence for automatic abstraction and subsequent use of a rule in semantic memory. In another study, the same study phase was used. At test, studied (e.g., 3412) and new (e.g., 1374) items were presented; subjects were asked to discriminate studied from unstudied items (i.e., they performed recognition); they accurately did so 71% of the time. This type of finding is usually interpreted as acquisition and use of episodic memory. In a subsequent study, half the subjects were given the identical study and instructions as outlined above (i.e., to read digits as bigrams), the other half were encouraged to read stimuli as individual digits (e.g., "three-four-one-two"). The bigram group classified legal from illegal test items with 70% accuracy, however the digit group had only 58% accuracy. This result demonstrates that representations of particular experiences are determined by the type of task used, and are preserved and demonstrate transfer to both recognition and classification tasks.

In their fourth experiment, they showed subjects digits in a study phase, and encouraged them to read them as bigrams. At test, subjects were able to discriminate legal (odd-even-odd-even) from illegal items at 65% accuracy, but could not state the rule, again suggesting automatic abstraction of the rule. In this study however, the study items all consisted of combinations of odd-odd or even-even bigrams with odd-even bigrams (e.g., 3714, 8432, 6897, etc). Thus, if subjects were abstracting a rule of some sort, it would be "either odd-odd or even-even as one of the two bigrams."

In this case, Wright and Whittlesea attempted to demonstrate that subjects could *appear* to show sensitivity to a rule (i.e., to a non-existent odd-even-odd-even rule). To achieve this end, they constructed the test items such that both bigrams in the "legal" test items (e.g., 1432) had occurred in several study items (e.g., in 3714, 8432, 7514, etc), whereas the bigrams of the "illegal" items (e.g., 3154) never occurred in any of the study items. Thus subjects could successfully classify the items if and only if they had encoded the instances from study rather than if they had automatically abstracted a rule. The ability of subjects to show above-chance performance at classifying according to the non-existent odd-even-odd-even rule demonstrates that subjects used the similarity of the test items to study instances to classify them.

The important lesson to be learned from these studies is about the nature of awareness. In the initial recognition study, when subjects were told about their above-chance scores, they were unimpressed: when asked for an explanation of their success, they said something like, "Well, I just

remembered them, you know?" In contrast, subjects in the remaining studies were quite mystified when told about their above-chance success. Having not been told any rules, and having not consciously worked out any rules, they could think of no basis for above-chance success, and agreed that they must have learned the rules unconsciously. In fact, the set of experiments taken together suggest that the subjects performed on exactly the same basis in classification as they did in recognition. Why, then, should they not be aware of the basis of their success? We suggest that they adopted an inappropriate theory (as did the original investigators of this effect): that success in classifying according to a rule can occur only if one has the rule. This adoption of an inappropriate theory prevented the subjects from achieving awareness of the basis of their performance. In turn however, that conclusion changes the nature of what is meant by awareness. Rather than being aware or unaware of what we are doing, the question is whether we are aware or unaware of the effect of what we are doing now with respect to some unanticipated decision in the future. Viewed in that way, "awareness" is an attribution, based on an inference, about the significance of our current processing. Thought of in this way, "accessibility" and "diagnosticity" (Feldman & Lynch, 1988) are very complicated processes, which, according to the assumptions of SCAPE, may be based on a person's intuitive theories of cause and effect, the salient aspects of the current situation, and the current task, which selectively cues prior experiences, both individually and in parallel.

ACTIVATION

In the episodic/semantic view of memory, types, and prototypes are assumed to be stored as nodes in a network organization in memory (e.g., Anderson & Bower, 1973). The knowledge structures are assumed to be hierarchical (thus imposing cognitive economy and inheritance; e.g., Collins & Quillian, 1969; see also Nedungadi, 1990) or non-hierarchical (e.g., Collins & Loftus, 1975). Any prior exposure to an exemplar, associate, or conceptual feature of that node is thought to "activate" that node, adjacent nodes, and closely linked nodes within the network (e.g., Anderson, 1983; Collins & Loftus, 1975).[4]

The associative network model of memory is a common way that consumer researchers have conceptualized the organization of brands and brand-related information in memory. According to this perspective, consumer memory is represented in the form of episodic and semantic traces of the incoming information (e.g., source and content) that comprise schemas or knowledge structures. The fundamental assumption is that consumers hold knowledge structures or schemas that are related to specific consumer domains (e.g., Nedungadi, 1990). When a particular knowledge structure is accessed or "primed,"[5] the central node and related nodes are activated, and facilitation in processing is observed, either through a direct or indirect test. Basic reaction time measures are often used as the critical dependent measure demonstrating effects of prior experience (e.g., Jewell & Unnava, 2003), and are assumed to be advantageous over other measures (see Fitzsimons et al., 2002).

Instead of facilitation through activation, the SCAPE account argues for overlapping operations (e.g., Hughes & Whittlesea, 2003). No one can become aware of the entire content of their memory. However, it is often possible to be influenced by semantic relationships acquired in the past and to be aware of that influence in current experience. One example of this is the semantic priming effect. Originally explored by Meyer and Schvaneveldt (1971), the effect consists of the facilitation of performing a task, such as naming or lexical decision, when the test stimulus or probe (e.g., DOCTOR) is preceded by a meaningfully or associatively related stimulus, usually referred to as a "prime" (e.g., NURSE). One of the boundary conditions of the effect which has been regularly observed, and has been influential in theories about underlying mechanism, is that it is short-lived, both in terms of absolute time (stimulus onset asynchrony; SOA) and lag (number of unrelated

items inserted between the prime and probe). The effect can disappear when the SOA is as little as 500 ms (Ratcliff & McKoon, 1988); facilitation of the probe is not observed if the presentation of the probe is delayed by more than two seconds (e.g., Neely, 1977, 1991). Further, any amount of lag eliminates the effect (e.g., Masson, 1995), although some investigators have observed priming occurring at a lag of one (e.g., Joordens & Besner, 1992; McNamara, 1992).

The finding of the initial boundary conditions led investigators (e.g., Anderson, 1976, 1983; Collins & Loftus, 1975) to propose spreading activation accounts of the effect. The proposed mechanism at the time was that presentation of the prime activates its node in a semantic network; that activation spreads along the linkages of the network to nodes of all related concepts. As a consequence, the nodes of all related concepts become partially activated, such that they can be stimulated above threshold more quickly than if not primed. By this account, the effect is short-lived because activation dies away quickly in the semantic network.

Whittlesea and Jacoby (1990) presented an alternative account of semantic priming, in which such a time course is not a central issue. This account was based on Kolers' (1973, 1976) idea of "remembering operations", by which any transfer is to be understood as resulting from recapitulating the specific processing operations a person learned to perform on a stimulus within a particular context on a previous occasion: to the extent that the later test involves the same operations as the earlier one, processing will be facilitated.

By Whittlesea and Jacoby's account, the direction of causation underlying semantic priming is from the probe back to the prime, the opposite of that assumed by activation theories. It assumes that processing the prime is a learning experience, like any other stimulus encounter. That experience establishes a resource for performing other, similar activities on other stimuli that are related on relevant dimensions. That explanation has been applied to long-term priming effects, including repetition priming (Scarborough, Cortese & Scarborough, 1977), form-based priming (Ruekl, 1990) and morphological priming (Bentin & Feldman, 1990). Whittlesea and Jacoby (1990) argued that it can also be applied to semantic priming.

In accord with Whittlesea and Jacoby's (1990) ideas, Becker, Moscovitch, Behrmann, and Joordens (1997) suggested that semantic priming is not observed outside the boundary conditions because the usual test tasks (naming or lexical decision) do not require extensive semantic processing (cf. Borowsky & Besner, 1993; Chumbley & Balota, 1984). By increasing the demands of the task (i.e., they used an animacy decision as the task), they were able to observe reliable semantic priming effects at up to 8 lags.

Hughes and Whittlesea (2003) modified these procedures by making the test task more challenging, but also different on every trial. For example, on prime trials, the subject would be asked to judge whether APPLE is a kind of FRUIT or MACHINE, or whether COBRA is a kind of BIRD or SNAKE. On probe trials, they could be given a primed target, such as ORANGE (a semantic associate of APPLE) and asked if it is a kind of FRUIT or JEWEL; or could be given an unprimed target such as CROW and asked if it is a kind of FRUIT or BIRD. Under these circumstances, they observed semantic priming effects of about 60–100 ms, enduring over a lag of 90 intervening questions and about a one-half hour interval. These long-term transfer effects demonstrate that semantic priming is not an inherently short-lived effect, but is so usually because of the extreme ease and non-distinctiveness of the prime and probe tasks (naming, lexical decision). Contrary to the idea of semantic priming illustrating a transient perturbation in an essentially stable system, these new observations suggest that it is a learning effect, occurring in much the same way that learning and recall or recognition occur in remembering tasks. Consistent with the data presented so far, these observations deny any strong distinction between processes conducted in "semantic" and "episodic" tasks.

Control studies revealed that these large and enduring semantic transfer effects depended both on performing a somewhat elaborate verification task on both the prime and probe trials, and that the decision for the prime and probe be the same (e.g., that the answers to both LION and TIGER both be ANIMAL). Further control studies revealed that the same size of priming effects occur not just with category verification, but also for the selection of categorical associates (e.g., PEAR – APPLE – CROW in the prime phase, and PEAR – ORANGE – COBRA in the probe phase) or of features (e.g., PEEL – APPLE – FEATHER in the prime phase, and PEEL – ORANGE – HISS in the probe phase). That is, semantic transfer was observed at three levels of abstractness: categorical membership of exemplars, association with other category exemplars, and features of particular exemplars. That might suggest to some readers that the semantic transfer observed was mediated by activation of knowledge about the category as a whole, perhaps through activation of some prototype representation of the category, giving primed access to all knowledge of the category at all levels of abstraction.

The authors tested this idea through cross-level priming, for example FRUIT – APPLE – BIRD in the prime phase and PEEL – ORANGE – HISS in the test, or alternatively PEEL – ORANGE – HISS in the prime phase and FRUIT – APPLE – BIRD in the test phase. In contradiction of the "categorical activation" hypothesis, no priming was seen in these cases. The authors concluded that, although the phenomenon occurs broadly across levels of abstraction, it occurs only when the same relationships are presented for both the prime and the probe. They thus further concluded that the phenomenon does not involve spreading activation in a semantic network, but instead reveals the importance of "overlapping operations," an idea introduced by Paul Kolers (1973, 1976). By this principle, any transfer is to be understood as resulting from recapitulating the specific processing operations a person learned to perform on a stimulus within a particular context on a previous occasion: to the extent that the later test involves the same operations as the earlier one, processing will be facilitated.

This concept of overlapping operations is central to the "production" function of the SCAPE framework. It explains all manner of transfer effects, when critical aspects of an earlier and later experience are specifically similar and distinctive, whether those aspects are of the nominal stimulus, the context, or the task. As illustrated in the "implicit learning" section provided above, it is not even necessary for the subject to be aware of the overlapping components to gain advantage from them.

Perhaps a more subtle point that is made in the Hughes and Whittlesea study is the importance of using a number of trials; each treated as a separate instance. Thus effects are less likely to be stimulus specific. While some consumer researchers examine effects of variables of interest on a significant number of brands (e.g., Morrin & Ratneshwar, 2003), other examine effects on only a limited number of brands (e.g., Jewell & Unnava, 2003; Krishnan & Shapiro, 1996; Nedungadi, 1990). Of special interest is the article by Nedungadi (1990). He argued that (a) indirectly cueing to a brand category will produce selective effect on "retrieval" and inclusion into the consideration set, in the absence of an effect on evaluation, and (b) that indirect "priming" (i.e., prior exposure to a related brand) selectively affects only the major brand in a minor subcategory of brands. That is, repeating Subway (minor brand in minor subcategory of fast-food places) three times increases "retrieval" of Joe's Deli (major brand in minor subcategory), however, repeating Wendy's (minor brand in major subcategory) three times *does not* increase "retrieval" of McDonald's (major brand in major subcategory)

A major limitation of Nedungadi's study is that he used only a select number of brand categories. Wagner and Kronlund (2005) performed a near-replication of Nedungadi's study, however they used 28 brand categories, and operationalized "priming" by having subjects read four brand names

(e.g., Honda, GMC) and 14 associates (e.g., tire, gas, brakes) for each brand category. Critically, they never showed any major brands (e.g., Toyota). Unlike Nedungadi, they found consistently, subjects *falsely recognized* the major brand more often than any of the minor brands (or associates). That is, when subjects read "can, drink, soda…Pepsi, Sprite, Mountain Dew," they reported having seen Coke, but not Dr. Pepper.

In a subsequent study, they asked for subjects to report preference ratings for target brands after they had made their recognition decision. Subjects' preference ratings of the major brands were reliably higher than preference ratings for minor brands regardless of whether they were cued by their respective lists or not. Thus, preference ratings corresponded to remembering. Taken together, these results suggest that brand primes can indirectly shape brand remembering, but *only* for major brands. Further, influences on brand choice may not be independent of brand evaluation, as suggested by Nedungadi (1990). These findings provide us with the basis for using our stimulus set to assess the relationships between consideration set inclusion, brand evaluation, and choice. We have research currently underway that explores this possibility.

INHIBITION

Repeated practice in recalling some members of a category (e.g., apple, orange, pear; apple, orange, pear, etc.), impairs later recall of other members of that class (e.g., banana, strawberry, kiwi), but not members of other classes (e.g., dog, rabbit, giraffe). This observation is termed *retrieval induced forgetting* (RIF; Anderson, Bjork, & Bjork, 1994).[6] The notion is that repeated practice of some members of a class requires *inhibition* or suppression of unpracticed members of that category. Inhibition persists and prevents later recall of the unpracticed members. The result is that subjects are *less likely* to recall unpracticed items from practiced categories than items from non-practiced categories. Importantly, other categories are unaffected.

This idea once again assumes a network organization of memory that operates under principles of activation and inhibition. Such an inhibition account is dominant in other studies showing a decrement in performance, including studies on directed forgetting (Bjork, 1989; Bjork, Bjork, & Anderson, 1998), negative priming (e.g., Neill, 1977; Tipper, 1985; Tipper, Meegan, & Howard, 2002), and repetition blindness (Kanwisher, 1987, 1991; Kanwisher & Potter, 1990; Park & Kanwisher, 1994).

Such an inhibitory mechanism has been assumed by many investigators of consumer memory (e.g., Keller, 1991), although some use the terms "inhibition" or "suppression" and "interference" interchangeably (e.g., Burke & Srull, 1988; Jewell & Unnava, 2003; Kumar & Krishnan, 2004; Law, 2002; Unnava & Sirdeshmukh, 1994). The interference hypothesis however does not require the assumptions of a network organization. Rather, according to the interference hypothesis, performance in recalling category members will be facilitated to the extent that appropriate cues are available for accessing the traces, and will be impeded to the extent that the demands of the task are difficult. That is, while an inhibition account would predict that recall of unpracticed members are inaccessible; an interference account would predict that recall of unpracticed members are accessible, so long as the appropriate cues are provided during the test.

To demonstrate this point, Kronlund and Hughes (2005a) replicated the basic finding of RIF using eight categories.[7] After studying all eight category lists, half of the members from four of the categories were practiced; the other four categories were not practiced. We found that subjects were less likely to recall unpracticed items from the practiced categories than from the non-practiced categories.

The stimuli however, were chosen such that they could be subcategorized by a distinctive feature (e.g., red fruits vs. non-red fruits). In a subsequent study, the practiced members from the practiced

categories were specifically grouped according to a feature (e.g., all non-red fruits were practiced). At test, we cued subjects with the feature (e.g., "Fruits that are red?") and were able to eliminate the effect: subjects were able to report unpracticed items from practiced categories. This finding suggests that the RIF effect is due to within-category interference.

To provide further evidence that the effect is not due to inhibition, in a subsequent study (Kronlund & Hughes, 2005b), we randomly assigned subjects to groups: one group was tested using the standard RIF procedures (i.e., all eight categories: four practiced, four unpracticed), a second group performed the procedure for six categories (three practiced categories, three unpracticed), and a third group performed the procedure for only four categories (two practiced categories, two unpracticed). Assignment of categories into conditions was randomly-determined, and was re-randomized for each subject. According to inhibition accounts, repeated practice of some members of a class requires inhibition of unpracticed members of that category, but not other categories. An inhibition account would predict that the amount of RIF found should not change as a function of the number of categories used. We found that the amount of RIF *decreased* as the number of categories tested decreased, suggesting between-category interference.

The results of Kronlund and Hughes (2005a, 2005b) demonstrate that a change in the way that stimuli are construed or characterized within the task can eliminate or enhance observed transfer. This point will be further demonstrated by the "mere exposure" studies described in the subsequent section. Kronlund and Hughes' results also highlight one final point: in contradiction of the neo-associationistic assumptions of accounts like the semantic/episodic distinction: the world does not consist of stable combinations of features that are available to be mapped into the mind of the prepared individual. Instead, consistent with the fundamental assumption of the SCAPE framework, the world consists of affordances and constraints; but is fundamentally ambiguous until the person supplies some particular organization of those features, based on past experience with similar stimuli, or the demands of the task, or the implications of the context.

THE IMPLICIT/EXPLICIT DICHOTOMY

Graf and Schacter (1985) proposed a distinction between implicit and explicit forms of memory as the fundamental dichotomy. The notion is that differential levels of consciousness are involved in performance, and that an implicit form of memory exists to account for effects of prior experience on current behavior in the absence of conscious awareness (e.g., effects observed in a priming task), whereas an explicit form of memory exists to account for behavior accompanied by conscious awareness (e.g., effects observed in a remembering task).

This dichotomy has been increasingly used as a theoretical framework by investigators of consumer memory (e.g., Krishnan & Shapiro, 1996; Lee, 2002). Lee (2002) introduced the implicit/explicit dichotomy as a means to evaluate exposure to brand names. She presented subjects with a list of brand names either in the context of a sentence (e.g., "He threw the case of Heineken in the truck of his car and drove off") or in isolation. After completing a distractor task, half of the subjects made a memory-based choice (i.e., subjects were presented with "beer" and asked which brand they would prefer be sold in a new store opening on campus) or a stimulus-based choice (i.e., they were asked to choose among two exemplars which brand of beer to stock). When presented in a sentence, the probability of brand choice for that brand was higher for the memory-based task than for the stimulus-based task, and the reverse occurred when the brand was presented in isolation. Lee concluded that such results demonstrate that "the effects of presentation context on conceptual and perceptual priming provide clear support that the two types of implicit memory are distinct constructs of memory" (p. 447), thus further subdividing implicit memory. She suggested that implicit memory tasks are superior to explicit tasks for measuring advertising effectiveness.

Another example of the use of the implicit-explicit dichotomy is in the *mere exposure effect* (Zajonc, 1968). The mere exposure effect is the observation that when pictures of the same category (e.g., chairs) are presented in rapid serial visual presentation (RSVP) format, recognition for items shown is at chance, but pleasantness ratings for items presented previously is above chance. This difference in awareness is thought to be due to different memory systems. The indirect test of preference is thought to be mediated by implicit memory; the direct test of recognition is thought to be mediated by explicit memory (Bornstein & D'Agostino, 1994; Schacter, 1990; Seamon, et al., 1995). The same applies to preference of brand names. "Mere exposure" to an ad or brand is thought to have an effect on fluency of processing of brands, such that brand choice and consideration-set membership can be affected (Nedungadi, 1990; Shapiro, 1999), and this is thought to be mediated by some form of automatic, spreading activation between hypothetical nodes in the brain, such that prior exposure of a brand or related brand facilitates processing of the target brand during brand choice or consideration-set.

FLUENCY AND THE MERE EXPOSURE EFFECT

In the case of the mere exposure effect, fluency of processing is thought to mediate increased ratings of liking, even in the absence of conscious recollection of the target stimulus (e.g., Bonnano & Stillings, 1986). The failure of reaching above chance levels in recognition is thought to be due to ineffective encoding of the stimuli caused by the rapid presentation of the items during the study phase (e.g., Bornstein & D'Agostino, 1994). However, a puzzle arises because fluency of processing also allows one to infer from the fluency of current performance to an earlier, perhaps in some cases hypothetical, experience of the stimulus and thus to make an effective remembering decision (Jacoby, Kelley, & Dywan, 1989). In fact, recognition memory results from either of two bases, *familiarity*, governed by fluent processing (e.g., Jacoby & Dallas, 1981), which is usually associated with the earlier global encoding of the stimulus, or *recollection*, governed by a remembering of details of a stimulus, which is associated with earlier, effective encoding of detailed elements of a stimulus (e.g., Mandler, 1991; see also Joordens & Hockley, 2000). Thus a paradox emerges: why is it that subjects are capable of using fluency as a basis for preference but not for recognition?

Whittlesea and Price (2001) attempted to disambiguate why the feeling of familiarity was not powerful enough to cause recognition ratings to be above chance in any previously examined mere exposure experiment. In their study, they first replicated the basic mere exposure effect. When subjects were asked to choose which of two items they preferred, they performed above chance in a preference judgment for items shown earlier, but were at chance on recognition for those items. They then performed two more experiments, one in which subjects were asked to choose which of two items globally resembled an item shown earlier, and one in which subjects were asked to choose which of two items they preferred and to justify their decision. In the former, subjects performed above chance at recognition, probably due to the non-analytical processing that they were required to do, which allowed them to experience and use fluency in their response. In the latter, subjects were at chance at preferring the old item, likely due to the now analytical processing that they were using, which prevented them from experiencing the fluency.

This demonstration shows the importance of thinking of memory not in terms of explicit and implicit systems, each only measurable by direct and indirect tests of performance, but rather as a unitary system, that uses different strategies which depend on the stimulus, task, and context. Memory uses the same set of knowledge and skill to perform a variety of tasks, including both remembering (recognition) and non-remembering (preference) tasks, using a variety of dimensions (e.g., analytic/non-analytic, specific/general, etc.). Whittlesea and Price's focus on types of

processing used also explains mere exposure effects reported in the consumer literature (e.g., Nordhielm, 2002).

According to the separate systems account, awareness of the source of one's performance depends on the type of task one is performing, and the type of memory system (explicit or implicit) that that task accesses. In contrast, according to the SCAPE account, awareness of the source of performance is constructed through a process of generation, inference and attribution, in the same way that the performance itself is constructed. Explicit versus implicit is a description of the outcome of this process, not a description of the knowledge on which it is based or the process that controls performance and creates awareness. As illustrated in the next section, one consequence of this constructive process is that one can become aware of sources of performance that do not exist.

In the case of Lee (2002), the same applies. She highlighted the principles of elaboration and specificity. Her data reveal that the principle of TAP fully explains her data: the degree to which resources used for the given test match the resources used earlier (e.g., a memory-based task would rely on skills needed for generation, elaboration, and deeper processing—the same skills used when processing a brand in the context of a meaningful sentence as opposed to in isolation). There are yet other examples of dissociations that can be explained with the same principle (e.g., Janiszewski, 1993; Krishnan, 1999; Krishnan & Shapiro, 1996). Thus Lee's (2002) demonstration showed two dissociated *strategies*, not evidence for separate constructs of memory. This is often the case with research thought to provide test contexts which are believed to selectively tap into explicit and implicit memory systems. Those test contexts simply foster subjects in adopting different strategies which either facilitate or preclude them from experiencing priming. We submit that this is an important consideration for consumer researchers, who may simply be creating contexts which facilitate different processing strategies.

FLUENCY AND RECOGNITION

When subjects are able to experience fluency of processing, another problem arises when trying to interpret the meaning of the observation. Is it the absolute fluency of processing that is responsible for observable changes in performance? Or is it that subjects are responding to some type of perceived relative fluency? Said another way, are subjects able to form and use expectations about how fluent something ought to be? And then only if this expectation is met or exceeded respond a certain way?

The idea of fluency as a basis for recognition decisions was originally investigated by Jacoby and Dallas (1981). They performed a recognition experiment using low frequency (e.g., JANITOR) and high frequency (e.g., TABLE) words. At test, before making their recognition decision, subjects were required to make a tachistoscopic identification of each word; identification was used as an index of fluency of processing. Jacoby and Dallas observed that high-frequency words were processed more fluently than were low-frequency words. More importantly, prior experience enhanced the fluency of processing for the low-frequency words *more than* that of the high-frequency words. Further, they found that low-frequency words that were studied were more likely to be claimed "old" than high-frequency words which had been studied. Jacoby and Dallas suggested that subjects appeared to be impressed not by the absolute fluency of processing of a target item, but rather by the *relative* fluency of processing: subjects were impressed by the deviation between actual and expected fluency. Thus, relative fluency led to a feeling of familiarity.

Since Jacoby and Dallas' (1981) influential study, many investigators have observed similar effects of changes in fluency on recognition claims (e.g., Dewhurst & Hitch, 1997; Drummey & Newcombe, 1995; Higham & Vokey, 2000; Johnston, Hawley, & Elliott, 1991; Lindsay & Kelley,

1996; Luo, 1993; Masson & Macleod, 1996; Mayes & Gooding, 1997; Mulligan & Hirshman, 1995; Polson, Grabavac, & Parsons, 1997; Rajaram, 1993; Seamon, Luo, & Schwartz, 2002; Snodgrass, Hirshman, & Fan, 1996; Stark & McClelland, 2000; Ste-Marie, 1996; Verfaellie & Treadwell, 1993; Wippich & Mecklenbraeuker, 1994; Whittlesea & Leboe, 2000). The fluency-attribution idea has also been applied to understanding consumer behavior (e.g., Janiszewski, 1993; Janiszewski & Meyvis, 2001; Lee, 2002; Lee & Labroo, 2004).

There are two major problems with the above-mentioned studies as well as numerous other studies investigating fluency. First, unlike the procedure used by Jacoby and Dallas, the fluency manipulation in these studies was experimental: fluency was enhanced by some type of manipulation. The major disadvantage is that this minor procedural difference creates a confound: both absolute and relative fluency are enhanced, simultaneously, thus it is unclear which type of fluency is operating, and many investigators claim that it is the absolute type. Second, it seems illogical that the feeling of familiarity is created from absolute speed of processing. One's child, partner, friend, or even dog, although very fluently processed, never cause a feeling of "have I seen you before?" (Whittlesea & Williams, 1998).

This notion was investigated by Whittlesea and Williams (1998). They presented subjects with well-known words (e.g., TABLE), difficult to pronounce nonwords (e.g., LICTPUB) and easy to pronounce nonwords which were created from real words by changing one or more letters to create a nonword (e.g., HENSION). Each type of stimulus was studied for a memory test. During the test phase, subjects first named each word (to get an index of processing fluency) and then made a recognition decision on old and new stimuli of each category. The words (e.g., TABLE) were processed the most fluently (827ms), but were *not* associated with the most claims of "old." The HENSION items on the other hand, although processed less fluently than the words (988ms), produced the most false alarms (37% vs. 16% for the words).

Whittlesea and Williams (1998) reasoned that when reading the easy to pronounce nonwords surprise resulted from an unknown source that was wrongly attributed to the past. For example, when reading HENSION, subjects expected a meaningful word, but it was a nonword. It was the surprise associated with the mismatch between expectation and outcome which led to the feeling of familiarity. Said another way, the HENSION items were processed more fluently than could be expected for a nonword. This created the perception of discrepancy, leading to a feeling of familiarity. This study was replicated by Menon and Raghubir (2003) using the accessibility/ease of retrieval framework (see also Huber, 2004).

In this case, absolute fluency and relative fluency were not confounded, and though the regular words were processed more fluently than either of the nonwords, expected and actual fluency were matched. Whittlesea and Williams (2001a) proposed the *discrepancy-attribution hypothesis* which states that when there is a mismatch between expected and actual performance on a given stimulus in a given context (in this case, the test context), the perceived discrepancy is consciously experienced as the feeling of familiarity, and unconsciously attributed to a prior experience of that stimulus.

Whittlesea and Williams (2001a, 2001b) attempted to create and examine the perception of discrepancy using a different paradigm which consisted of probe items following a predictive sentence stem and a pause (e.g., "The stormy seas tossed the…BOAT"). Using this procedure during a test phase (targets in isolation during the study phase), subjects were more likely to claim "old" for probes following a predictive stem and pause as opposed to a predictive stem and no pause. In this case, the predictive stem was thought to create an expectation, the pause uncertainty, and the terminal word a surprising validation, similar to what occurs when waiting for the other shoe to drop.

When the subjects tried to identify the source of the surprise, their decision was based on the salient aspects of the stimulus (the semantic relationship of the stem and target), given the task and context. While subjects were focusing on the salient aspect of the task, they experienced the perception of discrepancy upon seeing the terminal probe. Knowing that they were in a recognition experiment, subjects unconsciously attributed the surprise to a prior experience of the target word, consciously experiencing the feeling of familiarity.

The perception of discrepancy occurs when outcomes either violate or validate expectations in a surprising way. Note that in the case of HENSION, a surprising violation occurred. Often this surprise occurs because the expectation is a constrained, indefinite one, so that the relationship between expectation and outcome is ambiguous (Whittlesea, 2002b). In support of this, Whittlesea and Williams (2001b) did not find increased false alarms for probes following a predictive stem and pause when subjects had to make recognition decisions on (a) probes that the subject generated as a completion to the stem, (b) probes following completely predictable stems (e.g., row, row, row, your GOAT), or (c) probes following completely predictable stems that are violated (e.g., row, row, row, your SHEEP).

This is not to say that absolute fluency, when unconfounded with relative fluency, is not associated with claims of familiarity. There are some cases in which people have been found to use absolute fluency to make judgments about self-alertness (Shimizu, Renaud & Whittlesea, 2006), aesthetic merit (Winkielman, Schwarz, Reber, & Fazendeiro, 2003), and nonwords (Whittlesea & Leboe, 2003).

Taken together, the evidence seems to suggest that people will only use the absolute fluency of performance to make remembering decisions when that is the only possible source of information, that is, when they cannot easily create and use expectations about the normative fluency for the target item. The evidence also seems to suggest that people invariably use the perception of discrepancy rather than absolute fluency for most decisions related to the feeling of familiarity.

A case in the consumer behavior literature whereby it is not clear whether subjects are responding to absolute or relative fluency was the study by Lee and Labroo (2004). They used Whittlesea's (1993) sentence stem paradigm to create conceptually fluent processing of words. They presented words in the context of predictive (e.g., the woman soaked the white sweater in some cold *water*) or non-predictive (e.g., the woman looked out of the window and saw the *water*) sentence stems. Another manipulation they used was presenting the target word as the same (water), related (drink), or unrelated word (house) immediately following the sentence. It was expected that the productiveness of the stem and the similarity of the target to the last word in the sentence that would both effect conceptual fluency, and that the repetition status would effect perceptual fluency. Results revealed that pleasantness ratings were higher for words in the predictive versus the non-predictive context and the related versus unrelated target words. This finding was the basis for later examining, and replicating, these effects with consumer products. It may be the relative fluency that is the basis of changes in attitudes or changes in pleasantness ratings in Lee and Labroo's (2004) study.

REMEMBERING

The above-chance pleasantness and recognition judgments observed in the "mere exposure" experiments reported earlier likely occurred because prior exposure caused the old member of test pairs to be processed with greater fluency than the novel member (i.e., repetition priming), at least when subjects performed nonanalytically. That is, these subjects appear to have used a simple decision heuristic such as "if fluent then old/pleasant" (cf., Jacoby & Whitehouse, 1989). However, the evaluation process that leads to a subjective reaction can be considerably more complex than that. Whittlesea and his colleagues (e.g., Kronlund & Whittlesea, 2005; Kronlund & Whittlesea, 2006;

Whittlesea, 2002b, 2004; Whittlesea & Leboe, 2003; Whittlesea & Williams, 2001a, 2001b) investigated the source of the feeling of familiarity. They concluded that people chronically examine their cognitive and perceptual processing at a variety of levels, attempting to integrate various aspects of that processing with other aspects (the "evaluation" function of mind described earlier). In doing so, they come to one of four primitive conclusions, or perceptions, about their current processing: *coherence* (well-formedness), *incongruity* (wrongness), *discrepancy* (strangeness), or *integrality* (predictability or unity). These primitive perceptions are not usually experienced consciously. Instead, they are further interpreted under some intuitive theory of cause and effect, and within the implications of salient aspects of the task, stimulus and context; this extended interpretation gives rise to some specific subjective reaction, such as a feeling of pleasantness, interest, or familiarity.

The perception of coherence occurs when all aspects of the current experience seem to fit well with others; the chief reaction to that perception is to accept the current processing event and move on. The perception of incongruity occurs when some aspect of current processing is clearly inconsistent with others, for example when a speech error is made or when stimulus elements conflict semantically or at some other level (e.g., on reading "The hunter sat quietly on the dog"). The chief reaction to the perception of incongruity is to stop processing the inflow of environmental stimuli and to focus on the source of the incongruity, resulting in error correction.

In contrast, the latter two perceptions can sponsor strong feelings of familiarity or remembering. The perception of discrepancy appears to occur when an indefinite expectation is surprisingly validated (Whittlesea & Williams, 2001b) The perception of discrepancy does not always cause illusory feelings of remembering, however; the errors committed by subjects experiencing this perception simply reveal the common mechanism whereby such feelings are aroused (i.e., the feelings contribute as much to hits as to false alarms); perception is probably primarily responsible for weak or powerful feelings of familiarity that occur without actually recalling the target event (i.e., without becoming aware of the distinctive context of the earlier event). Finally, the perception of integrality sponsors more extensive and specific claims of remembering. That perception, however, appears to occur when a *definite expectation* is validated by a consistent outcome (Kronlund & Whittlesea, 2006; Whittlesea, 2002a).

The conclusions that remembering occurs indirectly, through adopting an attitude to a production rather than directly through retrieval, and that the feelings of remembering that produce this attitude occur through a heuristic process of evaluation and inference, may seem extreme given the limited evidence presented here. However, both patterns of effects have been replicated repeatedly and subjected to all manner of convergent tests (cf. Kronlund, 2006; Kronlund & Whittlesea, 2006; Whittlesea & Williams, 1998, 2000; Leboe & Whittlesea, 2002; Whittlesea, 2002b, 2004). They suggest two quite different routes to a feeling of remembering, one based on surprise caused by the validation of an indefinite expectation aroused on the fly, the other based on the validation of a definite expectation laid down by prior specific experience. However, they share the same basic principles: in chronically evaluating their productions, people attempt to make what sense they can of the significance of apparent fit or lack of fit of the components of the current experience. They make inferences about the causes of the primitive perceptions aroused by different experiences, and make attributions to plausible sources.

CONCLUSIONS AND FUTURE DIRECTIONS

We have presented a small part of the data on which the SCAPE framework is based. However, the variety of evidence presented demonstrates that that account can make predictions about performance in both "episodic" and "semantic" tasks, through a single set of underlying principles: construction, with its corollary sub-functions of production and evaluation. This evidence is at

least challenging for proponents of separate-systems accounts: it requires them to provide functional explanations at a deeper level than "there are two kinds of knowledge, and therefore two memory systems specialized to deal with them."

In re-evaluating their functional analysis, we would hope that researchers will listen to the wisdom of the user of memory. Such sensible statements as "I used to *know* his name, but I can't *remember* it now" reveal clearly some of the functional significance of such categories to the user: "know" means easy and fluent use of the past, with emphasis on *use* of the knowledge for some other purpose, rather than its accessibility; whereas "remember" means reflective use of the past, with focus on the act of making contact with the past. We submit that such functional analysis is essential, and cannot be replaced by neuropsychological investigations of correspondences between gross tasks and areas of brain activation. For example, Elliot and Dolan (1998) conducted a standard "mere exposure" study, and obtained the usual behavioral results (preference judgments biased toward old items, but recognition at chance). They also recorded brain activity via fMRI. They observed that the preference task was associated with right lateral prefrontal activity, whereas recognition was associated with left frontopolar and parietal activity. They concluded that that observation gave physiological support to the explicit/implicit memory dichotomy, indicating the anatomical distinctness of the subsystems responsible for the two behaviors. However, given the evidence above that the usual results of such studies come about through encouraging analytic versus non-analytic processing rather than two separate memory systems, the meaning of the fMRI data becomes much more difficult to interpret.

Our major point is thus simply this: one cannot *assume* that one knows the functions of memory; and no amount of physiological correlations will corroborate those assumptions. Instead, a more thorough task analysis is required, using convergent operations and broad examinations of dissociations and correspondences across widely different kinds of task.

Concepts of memory are continually molded and shaped by empirical findings and researchers' interpretations of those findings. Although the fundamental concepts of memory tend to change very slowly, conceptual changes do nonetheless occur. Almost no attention has been paid, however, to ensuring that we understand the similarities and differences among the terms, concepts, and assumptions related to memory. One frequent source of confusion lies in the use of one and the same term (e.g., priming) to refer to different concepts. Another common source of confusion is the use of different terms to refer to the same construct (e.g., fluency, accessibility, ease of retrieval[8]). It is our position that the lack of an effort by researchers to consider and weigh the conceptual similarities and differences among memory theories and studies has hampered our understanding of consumer memory. In this chapter, we elucidate some of the problems with the contemporary memory theories and the studies that implicitly or explicitly build on those theories. By doing so, we seek to encourage consumer researchers to place greater emphasis on conceptual clarity that will lead to meaningful advances in our understanding about consumer memory.

NOTES

1. A notable exception is the constructive view of consumer decision making posited by Bettman, Luce, and Payne (1998).
2. Note similarities between assumptions of SCAPE and Schwarz (2004), although see Huber (2004).
3. Readers interested in a critique of the procedural/declarative dichotomy may wish to examine Whittlesea (2002a).
4. Although distinct, the concept of activation is often used interchangeably with conceptual fluency (e.g., Lee, 2002; Lee & Labroo, 2004; Shapiro, 1999; see section on Fluency and Recognition below).
5. The term *priming* was originally used by Meyer & Schvaneveldt (1971) to describe facilitation in lexical decision of a word when that word is preceded by a meaningfully related word. The proposed mechanism for the effect at the time was "forward acting" spreading activation. We find that today, 35 years

later, people confuse mechanism with observation: facilitation in processing, however observed, can result from backward-acting TAP, through the use of matched resources, etc. (see the discussion of Whittlesea & Jacoby, 1990, and Hughes & Whittlesea, 2003, below).

6. Although this effect, and the notion of inhibition, has spurred further investigation by many psychologists since 1994, the effect itself, as well as the mechanism of inhibition, was actually discussed in 1985, by Alba and Chattopadhyay. They argued that both the retrieval practice, and the act of recall, cause inhibition. Their paper was not cited in 1994 by Anderson et al., or by any investigators who have cited Anderson's work. Interestingly, those who have cited Alba and Chattopadhyay's (1985) article since 1994 appear to not have cited the work of Anderson et al. (1994).
7. For the studies described here, Kronlund and Hughes (2005) used categories such as animals, fish, etc., however in other studies, they replicated their basic findings with brand name categories such as soda and shampoo.
8. A notable exception is Schwarz (2004) who distinguishes between fluency and accessibility and provides many consumer psychological examples. He also distinguishes between accessible content and accessibility experiences. Consistent with the implications of the SCAPE model, Schwarz (2004) emphasizes the importance of implicit theories for linking experiences and inferences.

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