INTERMEDIATE ADVERTISING EFFECTS:
THE MAC MODEL

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Abstract

Advertising was once believed to operate wholly as information transference. For the last 100 years, advertising has also been seen as persuasive with cognition continuing to dominate advertising research. The role of affect in advertising has a stream of research not fully integrated with the Cartesian (cognitive) stream. Neuroscience may provide the linkage. This paper suggests that consumer behavior is driven primarily by memory (M), which includes habits and conditioning, and secondarily by feelings (affect - A). The utility maximising role of reason (cognition - C) typically plays a minor, albeit important, role. The $M \supset A \supset C$, or MAC, model of the intermediate effects of advertising (“$\supset$”, includes, is used in the sense of “setting the context for”) may be part of a paradigm shift in marketing research toward more emphasis on affect. Brand equity is presented as $\Sigma M$, i.e. the combined brand memory of the relevant population. The paper concludes with managerial implications and proposals for testing the MAC model.
Intermediate Advertising Effects:

The MAC Model

Advertising may change consumer behavior through the provision of information and/or persuasion and/or by preventing the erosion of loyalty. Advertising may reassure consumers whose decisions are already made and it may permit a brand to maintain a higher price. This paper is concerned with the mind of the consumer, with the intermediate effects that take place between the consumer’s perception of the advertising and any such behavioral changes\(^1\). We know that, with the possible exception of direct response and point of sale advertising, these intermediate effects must exist if only because of the interval of time between the advertising and the next behavioral change opportunity, e.g. shopping.

Marketers have been seeking to model these intermediate effects since AIDA (Attention ⇔ Interest ⇔ Desire ⇔ Action) first appeared 100 years ago (Strong 1925, p.76). Before that, advertising was seen simply as providing information. The information might be true or false, and often exaggerated (Turner 1952), but intermediate effects were not considered.
This paper sets out to reconcile what we know from the marketing literature about intermediate effects with what we know from the neuroscience literature about mental processes. Three factors are mostly concerned: cognition, affect and memory which will, following Holbrook (1986) be abbreviated as C, A and M. “Experience” is related to memory in the marketing literature but ambiguously as it may also refer to actual behavior (B) as distinct from antecedent and consequential mental conditions. “Memory” is not new to the marketing literature, e.g. Srull (1990), Alba et al. (1991), though it is generally used in the context of brand and advertising recognition and recall, i.e. conscious memory. Memory will later be defined to include all forms of mental storage such as facts, procedures, habits and other nonconscious conditioning which result from experience in the sense of behavior.

From these streams of literature, a model of how advertising works is formed. The model may perhaps be extended to all marketing decision-making to position cognition within the context of memory and then affect. The perception of cognition as the dominant mental process may be traced to “cogito ergo sum”, if not the ancient Greeks, though cognition (knowing) is not strictly equivalent to thinking (cogitation). Since “cognition” is commonly (e.g. Holbrook et al. 1990) associated with all rational aspects of the mind, it is so used here. “Affect” includes emotions and feelings, such as desire, instinct and volition (conation). Cognition and affect are, for the purposes of this paper, interactive but mutually exclusive.

1 To save redundancy, “change” hereafter includes “maintain” if, without the advertising.
Cartesianism, i.e. utility maximizing rationality and the exclusive focus on cognitive processes, has been “a basic assumption in marketing” (O’Shaughnessy 1992, p.90). The interest now being taken in affective responses, relationship marketing, post-modernism and other non-cognitive explanations of decision-making may be part of a paradigm shift to “Post-Cartesianism”. Hunt (1992) is only one researcher who has drawn attention to the divisions between the rationalists and the relativists. I explore the extent to which neuroscience, which meets his requirements for objective science but also deals with affective and social issues which concern the relativists, may link the two schools. Managerial implications and proposals for testing the MAC model are provided, before drawing conclusions.

Marketing literature

This section briefly follows the development of consumer behavior research from Cartesian assumptions to non-cognitive approaches. Research into the intermediate effects of advertising is then summarised before concluding with the suggestion that cognitive bias permeates the research process.
Consumer behavior

The Cartesian perspective has been termed “man as computer” (Holbrook 1986; Hirschman 1993) or the “information processing model” (Bettman 1979) and assumes consumers to be rational utility maximizers (e.g. Howard and Sheth 1969; Engel, Blackwell and Kollat 1978) who follow a series of logical steps (e.g. problem recognition, situation assessment, short-listing of alternatives, establishment of choice criteria, evaluation and selection). More recently, products have been seen as bundles of attributes which the consumer instinctively assesses, e.g. conjoint analysis (Green and Wind 1975; Green and Srinivasan 1990). Such models assume that the consumer has a short list (evoked set - Howard 1977; Nedungadi 1990) of alternative choices (products/services) each of which can be analyzed into discrete but comparable attributes.

As it became clear that consumers do not fully engage cognition in trivial and repetitive decisions (e.g. choice of brand of soup), the approach was modified to accommodate routinization (Chaffee and McLeod 1973; Robertson 1976). Loyalty may reflect the convenience inherent in repetitive behavior, rather than commitment to the brand purchased or active decision making. Krugman (1965, 1967) introduced involvement to distinguish those situations, where minds are active, from those where only the auto-pilot is engaged. Krugman noted that learning can take place without involvement. Petty and Cacioppo (1981) distinguished central (extensive cognitive processing) from peripheral (limited) processing of advertising information.
Anderson (1983) proposed “a common cognitive system for higher level processing” (p.1), i.e. a universal architecture which included both central and peripheral formats, and rejected the notion of the mind having separate organs for separate functions (p.4). The mind, in his view, was a unitary production centre though memory had three functions: short-term working, factual (declarative) and rules (procedural) storage. Anderson’s ACT* computer-like model has no role for affect.

The dominance of cognition has been implicitly and explicitly challenged from various directions (e.g. Batra 1986; Holbrook 1986). Zajonc (1980) showed that “affective reactions can take place without extensive perceptual and cognitive encoding”. Group decisions can be more reliable than individual ones because of affective reactions (p.171). The interplay between individual feelings, social behavior and decision-making is one of Zajonc’s key findings; cognition had little, if any, role.

No consumer cognitive brand selection process may exist at all, even originally to add a brand to the evoked set from which consumers pick (Kassarjian 1978; Olshavsky and Granbois 1979). People do not consider options; they think only when they have to (Kagan 1989; Csikszentmihalyi 1993).
Pham (1996) showed that affect is a source of information in certain buying decisions, e.g. buying a dress, because the customer anticipates the pleasure of the purchased item and this prompts the shopping expedition. He distinguishes this process from a rational evaluation of options: “affect recruitment” involves the immediate experience of the anticipated feelings.

Feminist writers (e.g. Hirschman 1993) challenge the dominant cognitive approach as androcentric. The suggestion is that, if more women had been involved, consumer research would have been more sensitive to affect, with less acceptance of the machine metaphor (cognition). The rejection of logic is a dangerous road for an academic but there is, as we will see, substance to Hirschman’s claim that consumer research is cognitively biased. Stern (1993, p.562) argued that “incorporating feminist ideas into the research stream” would enhance the roles of moods and feelings: “executional cues in ads are likely to evoke different moods depending on the consumer’s gender”.

Holbrook, O’Shaughnessy and Bell (1990, pp.134-5) list no less than sixteen different non-Cartesian research streams and ten methodologies. Collectively, “the experiential perspective” is dominated by emotions and social interactions.

*Advertising*

Research into how advertising works, i.e. intermediate effects, is dominated by “persuasive hierarchy” or “hierarchy of effects” models (Holbrook 1986; for reviews, see O’Shaughnessy
In these, advertising information is mentally processed sequentially in a series of stages, typically C ⇔ A ⇔ B (cognition ⇔ affect ⇔ behavior). More recent variants (e.g. Bloom, Edell and Staelin 1994) have more complex hierarchies, but they all presume sequential stages with cognitive processing. Neither experience nor memory is usually involved.

Ehrenberg’s ATR model of advertising (1974) proposed that brand Awareness and Trial were largely random at the individual level, with advertising serving to Reinforce behavior. In this model, cognition plays little, if any, part. Others, e.g. Ray et al. 1973, Deighton 1984, Hoch and Ha 1986, and Maloney 1990, have similarly concluded that product experience dominated any persuasive effects of advertising. These conclusions, otherwise known as the “weak theory” (Jones 1990) of advertising (persuasive hierarchy is the “strong”), begins with awareness (C) but sees experience (E) as forming attitudes (A) rather than the advertising itself. The role of advertising is the maintenance of awareness and attitudes, rather than necessarily increasing them.

Holbrook, O’Shaughnessy and Bell (1990) synthesized reasons and emotions in consumer behavior. More integrative than the linear (C-A-B) hierarchy of effects model, “the consumption experience [is] a gestalt-like network of simultaneous interdependencies” as proposed by Gazzaniga (1985). Importantly, Holbrook et al. argue that the hierarchy of effects, and any other sequential model of how advertising works, must be wrong because the
cognitive and emotional components of decision-making should be balanced, in parallel, avoiding either polarity. They reject causality as being the product of cognitive bias (see below).

Maloney (1990) reviewed consumer psychology’s contribution to understanding advertising and also dismissed the persuasive hierarchy (p.347). He suggested we should look to neuroscience for answers but, meanwhile, suggested two integrative models of how advertising works (figures 19.1 and 19.2). The former links impressions of advertising with impressions of brand determined on both sides by the levels of (advertising/brand) involvement. The latter has three stages of intermediate effects, all labelled “memories”, before moving to behavioral effects (sales).

Vakratsas and Ambler (1996) collected the different theories of advertising into a single taxonomy based on their structure: C (informative only), A (affective only), CA (persuasive hierarchy), CEA (weak theory), CAEA (more complex hierarchies) and hierarchy free models, of which there were few examples. They drew two main conclusions:

1. Models should incorporate C, E and A since the exclusion of one is likely to cause the over-estimation of the others; and

2. The concept of a hierarchy of intermediate effects is not supported. It has just been assumed.
The persuasive hierarchy (CA) groups of models which has dominated the literature, appears to fail on both counts.

In some models of how advertising works, the cognitive component is minimized, e.g. the peripheral varieties of ELM (Elaboration Likelihood Model - Petty and Cacioppo 1981). Other models separate advertising into primarily cognitive or affective types, e.g. the FCB Grid which has four cells: (high/low involvement) x (think/feel) (Vaughn 1980). The ELM recognises that processing may be largely affective which could be interpreted as being similar to classical conditioning (Pavlov 1927) in which the unconditioned stimulus is the pleasure derived from purchase/usage (unconditioned response) of the brand. The ad becomes associated with the pleasure so that the conditioned stimulus (the brand) leads to the conditioned response (buy the brand). Practitioners have recognised the stimulus/response nature of advertising (e.g. Bullmore 1991) in which advertising should be understood, not in terms of the information being conveyed, but of the consumer response it is trying to achieve. Thus an advertiser may disparage its own product but do so in a way that causes the consumer to like the product more.

Similarly, the ATR model (Ehrenberg 1974) could be regarded as a form of operant, or instrumental, conditioning (Skinner 1938) where the person’s buying behavior, and product usage, becomes rewarded by a subsequent reinforcing event, i.e. advertising which provides pleasure and also reassurance that the buyer behaved well. For example, seeing Kelloggs Corn
Flakes’ (KCF) advertising at the same time as eating the cereal (post-purchase) will, if both experiences are enjoyable, reinforce the KCF buying habit. Belk (1985) in seeking to explain the poor predictive power of buyers’ intentions suggested (p.9) “it seems likely that these [low involvement] items are also repetitively purchased without express intentions to do so”.

As a reminder that people react differently to the same ad, Moore et al. (1995) showed that more emotional people react more strongly to emotional appeals but equally to non-emotional appeals. Gould (1991) distinguished “vital energy”, a consumer attribute presumably akin to “animal spirits”, Descartes’ expression for lower order, non-cognitive, drivers of behavior which was adopted by Keynes (1936) to explain the success of non-rational investment decisions. Holbrook and Batra (1987) analyzed the emotional content of ads and concluded that the three key dimensions, pleasure, arousal and domination, mediated the effects of ad content on attitude towards the ad and thence, partially, attitude toward the brand.

Krugman (1985) recalled a 30 year earlier Advertising Research Foundation study into advertising recognition and recall research. It was shown then, and by neuroscience since (Squire 1995), that these are different forms of memory and should not be seen as two strengths of the same function. Advertising research should use both measures, not just one. Singh et al. (1988) showed that recognition was the more sensitive and discriminating.
Childers and Houston (1984) demonstrated that imagery (pictures) is an effective memory aid in advertising measured as delayed recall. Rothschild and Hyun (1990) used EEG (electroencephalograph) technology to show that TV ad recognition was increased when right brain was employed initially but left hemisphere dominated during the following seconds. This built on their previous (Rothschild et al. 1988) EEG study of hemispheric processing of commercials. Bilateral processing was greatest for rational commercials and least for emotional, with mixed appeal commercials between those extremes.

The concepts that emerge from this analysis are the importance of memory and affect, the absence of a hierarchy of intermediate affects, the significance of the behavior feedback loop into memory (experience) and the importance of context such as competitive activities and whether the category is high or low involvement. Intermediate effects are seen as important partly because advertising practitioners seek to measure them to predict consumer behavior. There is some way to go. Lodish et al. (1995) concluded “4. It is unlikely that there is a strong relationship between standard measures of T.V. commercial recall and persuasion for established brands and the sales impact of the copy.”

Intermediate effects and neuroscience

In reviewing the marketing (and some psychology) literature on the intermediate effects of advertising, I have sought to highlight the different perceptions of the relative importance of cognition, affect and product experience (memory). We can now compare those streams with
the evidence from neuroscience and then use both to construct a fresh model of how advertising works. Before that, I draw attention to the impact of cognitive bias on advertising research and argue that it partially explains why cognition has received relatively more attention than affect or memory.

Cognitive Bias

Practitioners have long (Allport 1935) recognized the importance of attitudes but have been frustrated by poor \(0 \leftrightarrow 0.3\) attitude behavior correlations (ABCs - Wicker 1969; Fazio and Zanna 1979). Kraus’ (1995) meta-analysis of 88 non-advertising studies, however, found a mean ABC of 0.38 which increases to more than 0.50 “if they are measured at corresponding levels of specificity” (p.70).

Poor ABCs may be partially explained by Wilson et al. (1989) whose research indicates that cognitive analysis of attitudes disrupt their reliability. For example, attitudes towards makes of strawberry jam (perceived qualities) closely matched objective quality measures (Consumer Reports) until the respondents were asked to explain their reasons. The cognitive disruption of consumers’ reported feelings, however, did not change subsequent behavior. The phenomenon is less true where the respondent is an expert in the field. Presumably, an expert has spent many years questioning his/her own attitudes and synchronized the two. Thus no disruption is involved in doing it again. Where the application of cognition to affect is a relative novelty, however, disruption will be more pronounced.
Marketers and academics alike, in trying to understand the consumer’s mental process, are themselves using processes that create cognitive bias. Market research survey methodology, for example, typically invites respondents to think about, and perhaps explain their decision processes, in ways that they would not ordinarily use.

When someone with a clipboard asks an opinion of Tide laundry detergent, one feels impelled to provide a sensible answer, a reason, even if Tide had not previously received a nanosecond’s thought. The responses are then cognitively processed by the researcher and passed along to an audience of practitioners, or academics, who apply their own cognitive faculties. A report which is irrational or a-rational will be discounted, even though it may represent reality. At each stage from consumer to research data collector, to research analyzer, to marketer, cognitive faculties are used in order to make sense of, communicate, and thereby filter out, non-cognitive elements.

Cognitive bias can arise in different ways: disruption of attitudes (Wilson et al. 1989), research process (above) and the selection of research objects which are compatible with that process. Computer reasoning is inevitably more suited to the analysis of items that can be expressed in computer language just as a telescope is a poor listener.
One consequence of cognitive bias will be to underestimate the relative importance of other mental factors. For an alternative perspective of cognition, affect and memory/experience, we turn to the neuroscience literature.

**Neuroscience**

“The central tenet of modern neural science is that all behavior is a reflection of brain function” (Kandel 1991a, p.5). Customer and marketer behavior may be reviewed in the context of what neural science can tell us of what goes on in their “minds”. Some emotions, e.g. visceral, and memories, e.g. hormonal conditioning, take place outside the physical brain but the distinction need not concern us here.

Within the mind, we are concerned with three functions: memory, affect and cognition. The brain has other functions which deal with receiving and transmitting information, bodily control and genetic factors which will not be considered further even though Tesser (1993) argues that some attitudes are moderated by heritability. In other words, our genes collectively predispose us to like certain things, and thus perhaps brands, more than others. After reviewing the implications of memory, I shall consider the interactions that are now known between feelings, thinking and decision-making.
In essence, if we understand how our minds work, we may better understand the intermediate effects of advertising both as inputs, as memory storage of advertising and experience and determinants of behavior.

**Memory**

Memory can be categorized into four types (Kupfermann 1991a, p. 1002), see Figure 1:

![Figure 1 here](image)

“Procedural”, or “reflexive” or “implicit”, memory is not dependent on awareness, association, consciousness or cognitive processes (Anderson 1983; Rose 1993). It records *how* to do something. “Declarative”, or explicit, memory holds information about specific personal experience, facts and events (Anderson 1983; Dudai 1989; Squire 1995). The word “memory” here is therefore being used more broadly than its everyday use. Declarative memory in turn dichotomises to “semantic” (meanings and associations, e.g. a red light means “stop”) and “episodic” (what one did or said or what happened). Thus experience, through habits and conditioning, “alters behavior nonconsciously without providing access to any memory content” (Squires 1995, p.67). This may also be true for advertising.

Kupfermann (1991a, p.1003) summarizes the neural basis of memory with “just four generalizations:
1. memory has stages and is continually changing, 
2. long-term memory may be represented by physical (or plastic) changes in the brain, 
3. the physical changes coding memory are localized in multiple regions throughout the nervous system, and 
4. reflexive and declarative memories may involve different neuronal circuits.”

We should elaborate each of these in turn.

*Stages*

The key separation, at least for declarative memory, is between short- and long-term. Short-term storage may last “only for minutes at most” (Kupfermann 1991a, p.1003) or up to about six hours (Rose 1993) before the memory is either transferred to long-term or lost. The explanation of the different timings probably lies in some intermediate stages before memory becomes permanent.

One implication for marketers is that a truly new concept requires considerable impact and/or reinforcement to move through the stages to become a permanent memory. Frequent repetition may be needed within the time limits of short-term memory. Existing memories, however, may require very little refreshment. This is consistent with the advertising research finding associated with Jones (1995) that one or two exposures per inter-purchase period may be “enough”.

16
Memories are physical

This paper spends some time on the physical characteristics of memory in order to understand how advertising effects, and experience, are stored. In the Anderson (1983, p.19) computer-like model, for example, outside events are encoded (input) and performance generated (output) to/from working memory which in turn feeds/is sourced by declarative memory (facts) and procedural memory (programming rules). This is a useful model in some respects but, as I shall show, differs significantly from current neuroscience. In particular, memory can be moderated by affect with emotionally arousing films being better recalled than neutral subjects (Cahill et al. 1996).

Memory holds everything that we have been taught or become accustomed to doing and all we know about our needs, wants, attitudes and experiences. Unless changed by some fresh inputs, it determines future behavior. Thus brand memory and brand equity are at least related concepts. I will suggest that they are identical.

When two nerve cells (neurons) are connected, the point of contact is a synapse (Sherrington 1906; Ramón y Cajal 1911) - see Figure 2. Hebb (1949) deduced, since experimentally confirmed, that the strengthening of the synapse, i.e. memory formation, required the near simultaneous arrival of multiple stimuli. Figure 2 abbreviates the relative length of an axon which is the fine thread which transmits information between parts of the brain (body). The
The human brain has about $10^{11}$ neurons each of which has about 1,000 synapses, i.e. we have about $10^{14}$ synaptic connections (Kandel 1991b, p.121). “A piece of the brain the size of a rice grain contains, in addition to a million neurons, about twenty miles of axons.” (Stevens 1995, p.37). And also ten billion synapses. Memory corresponds with the growth of new synapses. One new synapse was thought to represent one unit of memory (Goelet et al. 1986) though this is now thought to be an over-simplification (Rose 1996). Information is exchanged between neurons by both chemical and electrical transmission, via axons, through these synapses. Kandel (1991c, p.1014) suggests that “the long-term storage process appears to be a graded extension of the short-term process” though this too is under review (Rose 1996).

In this and many other respects, the biological brain is logically, as well as physically, very different from the electronic computer misleadingly used as a metaphor (Churchland and Sejnowski 1992; Lyons 1995). Humans remember meanings and routines, not data. Each time we review a memory, we return it changed in some respect. A computer returns to store, unless programmed otherwise, what it withdrew. Computers are not, yet anyway, affected by concepts such as moods, feelings, and values.

Emotions moderate short-term memory for amnesic as well as healthy controls patients (Hamann et al. 1997) although elderly individuals obtain less benefit from this phenomenon.
(Nielson and Jensen 1994). As noted above, emotion also enhances long-term recall (Cahill et al. 1996). Curiously perhaps, muscle tension also heightens retention (Nielson et al. 1996).

**Multiple regions**

Location is important to the marketer to the extent that if two functions, e.g. feelings and decision-making, are identically located they may be closely connected whereas if they are distant, they must be different.

Short- and long-term memories may be physically separate, and declarative memories may involve separate circuits (Kupfermann 1991a, p.1005), but we should not conclude that particular memory types necessarily belong in particular areas. This is not yet established. Squire (1995, p.73) concludes “memory is localized in the sense that different parts of the brain store different aspects of information, but memory is distributed in the sense that multiple areas of neocortex participate in representing even simple pieces of information.” The brain uses parallel processing of information by association. Cueing one part of the memory can reassemble the whole from its various locations. If some locations are blocked, or cut off surgically, other locations may be employed (Kupfermann 1991a, p. 1005). This may be limited to procedural memory as damage to certain parts of the brain can prevent new long-term declarative memories being formed without hindering the recovery of existing memories.
Kupferman’s caution above that procedural and declarative memory “may” involve separate circuits is not shared by Kandel and Hawkins (1995) who indicate (p.51) that they definitely do. Procedural memory is slow to build.

Brain damage reports do not necessarily infer memory functions. The removal of a radio component may cause the radio to squeal but that does not imply that the component’s function is squeal suppression (Gregory 1961). Care with localization applies to all brain functions, not just memory: “assigning functions to specific regions presents a problem, since no part of the nervous system functions in the same way alone as it does in concert with other parts” and “multiple areas of cortex are typically activated by even simple tasks” (Kupfermann 1991b). The brain is complexly integrated.

Procedural and declarative memories may involve different neuronal circuits

Figure 2 above shows the different forms of memory some of which seem to work independently: “Some of the most compelling evidence for the newer [multiple] view has come from findings that amnesiac patients, who are severely impaired on conventional memory tests that assess recall and recognition of previously encountered material, are nevertheless fully intact at many kinds of learning and memory” (Squire 1995, p.67). In other words, their declarative memory had failed but their procedural had not. When patients were primed with pictures of simple objects, amnesiac patients could also name them some days later faster than they had originally. Squire’s conclusion echoes the EEG research noted above (Rothschild and
Hyun (1990) that an initial right brain, presemantic, visualisation is important for memory. That
the amnesiac patients had impaired declarative memory was confirmed from their inability to
identify which pictures they had seen before.

Memory implications

We have been considering memory because it holds any intermediate effects of advertising. In
particular:

- it holds everything that we have been trained, habituated, or conditioned, to do;
- it contains all we know about our needs, wants, and how well the choices we made in the
  past then satisfied those needs and wants;
- unless changed by some fresh inputs, it determines future behavior;
- creating new memories make require different (amounts of) inputs from refreshing existing
  ones in order to shift memory from short- to long-term;
- recall and recognition are separate phenomena, not different strengths of the same one; and
- separate memory systems, and especially declarative and procedural, appear to work in
  parallel.

The physical basis of human memory, with its multiple circuits, forms of storage and
dependency on affect, throws light on brand equity, a much debated term. Srivastava and
Shocker’s (1991) definition will serve here: “a set of associations and behaviors on the part of a
brand’s customers, channel members and parent corporation that permits the brand to earn
greater volume or greater margins than it could without the brand name and that gives a strong,
sustainable and differential advantage”. “Associations” implies conscious (declarative) memory
but “behaviors” imply that action has been taken, i.e. the sale has been made. A closer look at
the brand equity concept would regard it as a form of storage of marketing effects not yet
converted into performance. We have established (Kandel 1991a) brain function, memory, as a
predictor of behavior. The analysis above would indicate that “behaviors” should be replaced,
in a definition of brand equity, by those aspects of procedural memory which give rise to those
behaviors. Thus, brand equity should comprise intermediate stored effects, rather than realised,
and therefore transitory, effects.

Srivastava and Shocker consider customers (end users), channel members and employees
which could be generalized to the “relevant population”, i.e. those whose behaviors affect
brand performance. If we accept that brand equity is properly stored effects, rather than
results, and include both declarative and procedural memory, we can envision brand equity as
\[ \Sigma \ M \] where M represents the brand memory of the relevant population.

In other words, the brand has an identity which accumulates *meanings* (awareness, associations
and attitudes) and *habits* (usage experience) which are stored in human memory. Given the
time lag between many marketing activities, such as advertising, and changed consumer
behavior, such as purchasing, brand equity can be seen as what is held on deposit, pending
market effects being realised. Thus brand equity exists as physical, albeit microscopic, parts of
the brain which we could in principle see, albeit not distinguish from other memories. One day perhaps, marketers will be able to satisfy their accounting colleagues by directly measuring this work in progress.

This discussion sets up the first leg of the model developed in this paper. M(emory) determines our behavior in the absence of fresh A(ffect) or C(ognition), and also creates the context for the fresh A or C, i.e. $M \supset \{A,C\}$. Inputs, such as advertising, are mediated by memory not least because of the time lag between the perception of the advertising and the purchasing or consumption behavior which it might affect. Direct response and point of sale advertising aside, marketing activities can only affect behavior indirectly.

**Affect and Cognition**

As mentioned above, we are concerned with the physical location of brain functions because of the inference of connectedness. In particular, the parts of the brain that deal with decision-making and feelings coincide. Cognition may interact but it is more distant. It appears that decision-making is more affective than cognitive ($A \supset C$). This may be compounded by the proximity of feelings with social skills.

Cognitive functions are associated with the pre-frontal lobe (Figure 3).

Figure 3 about here
The hippocampus (so called because it looks like a sea-horse) seems to be involved in spatial learning and, crucially, the conversion of short- to long-term memory (Rose 1993). LeDoux (1992) distinguishes emotional memory from memory of emotion. The former is mediated by the amygdala whereas the latter is mediated by the hippocampus. Primary emotions exist in the primitive (central) brain (connected with the amygdala) whereas the more subtle feelings arising from emotions and other (dis)pleasing effects of the environment and bodily states are located (but see caution above) in the lower part of the neo-cortex (the ventro-medial section of the frontal lobe - VMFL) (Damasio 1994).

Damasio (1994, p.145) distinguishes emotions (body state) from feelings which are the experiences of that emotion “in juxtaposition to the mental images that initiated the cycle.” He then (p.150) refers to three levels of feelings as being “Feelings of Basic Universal Emotions, Feelings of Subtle Universal Emotions and Background Feelings” respectively. The distinctions between emotions and feelings are not universally shared. For the purposes of this paper, I shall maintain the same three levels described now as primary, or primitive or primal, emotions, feelings and mood. Primary emotions (love, fear, hate etc.) may be in the brain or elsewhere in the body but feelings in the sense used here are located in the VMFL, albeit linked, since the brain is massively inter-connected. The third (weakest) level, mood, is likewise only indirectly connected with the VMFL. “Feelings” here include concepts such as liking, warmth,
well-being, contentment and possibly humor. They certainly include group sensitivities such as belonging and aptness.

In 1848, Phineas P. Gage suffered an iron rod through his brain (Damasio 1994) and not only survived, but appeared to recover all his faculties. Soon after the accident, he was able to converse normally. The damage was to the VMFL. In time, Gage was seen to have reduced social skills and an inability to make decisions. He could no longer hold down a supervisory job.

Damasio’s main research source, code-named "Elliot", provided more immediate evidence that damage to the VMFL did not impair reasoning, memory and communication skills but, like Gage, Elliott had drastically reduced social skills, could not make decisions, nor maintain employment. He was intellectually aware of the feelings he should have had, but did not.

Damasio’s conclusion was that decision-making is primarily associated with the part of the brain that deals with feelings and social skills, not with the parts that deal with cognition. The inference is that not only are advertisers likely to achieve better recall through use of affect but also feelings are closer to the choice mechanism of the brain. We should, it appears, concur with feminist writers (e.g. Hirschman 1993) and give affect precedence over cognition in understanding decision-making.
The co-location of social skills and feelings in the VMFL with decision-making, has important implications for advertising research. Many buying decisions have social aspects with friends, office co-workers and families. The evolution of feelings in conjunction with these social sensitivities, may be no accident. Over millions of years, our brains have evolved primarily to ensure survival. Primitive emotions help us with immediate dangers, fear in the face of an oncoming vehicle for instance, but the wider environment is immensely complex. The later development of the brain, which includes the VMFL, helped us survive by being part of one or more social groups. Mithen (1996, pp.110-111) suggests that the rapid increase of brain size two million years ago was linked with the size of social groups. Language and social intelligence developed from the need to replace physical grooming, which is limited to one individual at a time, “and functioned to spread feelings of mutual content and well-being”. Thus the feelings and sensitivities in the VMFL help us to integrate within our social groups.

This review of brain physiology leads to the conclusion that, for decision-making purposes, \( A \supset C \), and, joining that with the earlier memory implications, \( M \supset A \supset C \), where \( M \) stands for memory, \( A \) for affect or feelings, \( C \) for cognition and the \( \supset \) sign means “includes”, not in the formal mathematical sense of set theory, but “sets the context for”. Memory, as we have seen, includes both conscious memories and nonconscious habits and conditioning. More specifically, advertising acts to enhance consumer decision-making in favour of the brand. Its intermediate effects are stored as memories which tend, in turn, to be strengthened more by affect than by cognition.
We must be wary of over-generalization here. Not all ads work the same way and different people, e.g. the elderly, seem to be differentially impacted by A relative to C. The purpose of the review thus far has not been to provide a blueprint for advertisers but to suggest that memory and affect deserve prior consideration to cognition in marketing.

A Model of the Intermediate Effects of Advertising

Holbrook, O’Shaughnessy and Bell (1990, p137) integrated competing schools of thought into “An Integrative Overview of the Consumption Experience” with three types of component: reasons (thoughts, intention), emotions (wants, appreciation) and memory (habit, reinforcement, experience). Usage reinforced the emotional components which, in turn, acted on the rational and habit components which drove acquisition. At the same time, thoughts and wants, looped with emotions, also moderated reasons.

This paper proposes a simplification of that analysis to a \( M \supset A \supset C \) (or “MAC”) model as described above, i.e. memory, in the broad sense used here, is the primary driver of, or sets the context for, decision making. None of us operates with total amnesia. Within memory, the area of the brain concerned with (social) feelings is involved, but thinking (cognition) is not essential. Clearly Damasio did not mean to suggest that VMFL lesion patients could make NO decisions, or they would not even have been able to cross the road. He was dealing with those
where the brain is actively involved, specifically in changing a strategy. The thesis here is that Damasio’s conclusions can be applied to the intermediate effects of advertising but we really need to understand how advertising is processed when it is received, how the effects are stored and how behavior is impacted.

Jones (1990) asks us to choose between the strong and weak (CA and CEA) models but it seems more likely that advertising conditions us, depending on the circumstances, in both classical and operant ways. New products will tend more to the former, persuasive, and frequently purchased, low value, low involvement packaged goods more to the former. Clearly one cannot reinforce a habit that does not yet exist but casting advertising in the role of building and then refreshing brand synapses may help reconcile the two perspectives.

Marketers recognize, in their use of focus groups which usefully combine feelings with social group dynamics, the importance of VMFL mental processing. Such research is not quantitative (C) but those practitioners behind the one-way mirrors can empathize with the discussion group (A).

Figure 4 sets out a conceptual model of how consumer brand display advertising is hypothesized to work:

Figure 4 about here
At the input stage, the model recognizes that ads fight for attention with other stimuli and competitive ads. Filters ensure that most potential perceptions do not engage our mental faculties, but those that penetrate at all trigger memory. Within that, affect may be involved and possibly cognition. The nesting shown in figure 4 implies significance, not sequence. Attitudes and beliefs (memory) influence all stages of inbound processing; and information supporting beliefs is more readily accepted and remembered (for overviews of the attitudes literature see, inter alios, Johnson 1991, Eagly and Chaiken (1993), and Olson and Zanna 1993).

Thus long-term brand memory of usage, previous communications and associated material (brand equity) is drawn down into short-term memory for affective and cognitive parallel and interactive processing. Behavior is not directly involved except where the advertising and brand-related behavior are simultaneous, e.g. direct response or point of sale advertising.

On the other hand, both before and after the advertising stimulus, behavior moderates perceptual filters (buying a car makes one more likely to notice an ad for that car). Behavior is also processed in short-term memory and thereby modifies brand equity.
Thus the MAC model incorporates both the strong and weak theories of how advertising works by allowing for both persuasion and behavior reinforcement. It separates short- and long-term memory effects and allows for competition and brand equity.

The MAC model adds affect and nonconscious memory to Anderson’s (1983) ACT* model which also separates working from long-term declarative and procedural memories. It also has similarities with Maloney’s (1990) “Hierarchy of Responses to Advertising” (Figure 19.2) but eliminates the concept of hierarchy (as Maloney himself suggests). It seems much more likely that intermediate effects are simultaneous. The model recognizes the following factors which many extant models (Vakratsas and Ambler 1996) ignore:

- Brand advertising exists in the context both of direct and indirect competition for attention;
- Most of the messages do not penetrate our perceptual filters;
- Messages that do penetrate, operate, if they have any continuing effect at all, by changing long-term memories, whether or not they have stimulated A and/or C;
- There is a time interval between advertising and subsequent decision making. Advertising effects are stored as increased (relative to what would otherwise have been the case) brand equity; and
- Behavior is a reflection of memory, affect and cognition which then loops back as feedback to change/maintain awareness, associations, attitudes and conditioning.
Implications for managers

The MAC model supports the attention now given to brand equity, e.g. Aaker (1991, 1996); Keller (1987). Direct response and point of sale advertising apart, advertising can only indirectly affect sales. The brand equity asset at any point in time resides in human memory: If advertising has any effect at all, it changes memory. In other words,

\[ \text{AdFX} = \Delta M = \Delta \text{Brand equity} \]

where AdFX is advertising effects and the changes are relative to what would otherwise (no advertising) have been the case. Managers should recognize that memory is not a single entity but has separate components, the main distinction being between declarative and procedural. Their relative importance is likely to vary between brands, individuals and situations. We have, however, established enough to suggest that managers be thoughtful in their use of market research which

- measures declarative, not procedural, memory;
- disrupts affect and tends toward cognitive bias.

Whether the intermediate effects translate into behavioral changes depends on context as well as advertising. Marketers seeking to measure the performance of their advertising, and/or their agencies, may track both cognitive and affective brand memories and those of competing
brands, as best they can, with these caveats in mind. Advertising recall and recognition indicate the penetration of perceptual filters, though not necessarily any change to brand memory.

The MAC model (figure 4) provides a benchmark to compare with the marketers’ own model of how their advertising works. Target indicators should be determined in the context of the likely level of involvement set by the product category, the competition, the balance of the marketing mix, the stage of product life cycle (new versus refreshment of memory) and target market. Both briefing agencies and then conducting pre- and post-measurement using this consistent model should at least clarify communications.

Unfortunately, pre- and post-measurement does not identify change in the sense above (relative to what otherwise would have happened). Split channels or other parallel testing may be possible. The practical difficulties of quantifying intermediate effects are likely to maintain the emphasis on behavioral measures for the time being.

The principal implication is the focus it brings to the measurement of brand equity. Inputs, such as share of voice, and outputs, such as market share or relative price, can only be indirect measures. Their value relative to direct measures, e.g. awareness, associations and attitudes, is an empirical question each firm can determine for itself from analysis of available data. Kraus (1995) advises that, as a general rule, ABCs (attitude behavior correlations) will tend to be higher when measured at corresponding rates of specificity. For example, intention to purchase next week is likely to be more predictive than broad brand liking.
Future research

Neuroscientific techniques to measure brand memory (brand equity) precisely are still beyond both today's science and marketing analysis. Directionally this may be the way to go, but in the short-term the MAC model can be tested at each stage:

- The organization of perceptual filters. Figure 4, for example, shows feedback control from behavior but from neither short-term processing nor long-term memory. Introspection would indicate that we do not consciously control these filters. Some may consider it more probable that the filters are determined by procedural memory and that behavior is mediated thereby;

- Intermediate effects. It would be interesting to compare measures of declarative and procedural memory after advertising but before purchase/consumption with those after purchase/consumption but before the next flight of advertising;

- As noted above, the existing research comparing ads based on cognitive and affective appeals is undeveloped (e.g. Rothschild et al. 1988). This area could be integrated with single source data tracking the behavioral responses to split channel broadcasts of the two types of commercial. The contextual factors noted above would also need to be recorded. Such a holistic approach would be difficult to achieve for academics and firms who may have already conducted such research, might not wish to release results due to their commercial sensitivity;
• Consumer decisions could be categorized and tested within the MAC framework. Purely routinized (nonconscious/barely conscious) choices are hypothesized to be driven by M without “involvement” (Krugman 1965, 1967) which has both affective and cognitive components. Following Petty and Cacioppo (1981), they could be separated into elaboration (cognition) and arousal (affect) before replicating prior involvement studies, e.g. Vaughn (1980), using this additional distinction. The objective would be to determine the relative importance of M, A and C and the extent to which it is invariant across brands in a category, across consumers and across usage situations. For example, the choice of ice-cream may be peripherally elaborated when it is a routine family purchase but centrally when it is for a dinner party;

• Decision making research may be extended from this paper in two directions: from advertising to other forms of decisions and from the individual to small groups, e.g. families where decision making is informal and empathetic bonds are strong. The size of the decision making unit may not be as critical as the two latter conditions. It may even apply to a single decision made by millions of people. In the 1996 US Presidential campaign, advertising seemed to owe more to a MAC framework than anything Cartesian. The research issue, therefore, is the extent to which MAC model applies not just to individuals but to social groups.
Conclusions

The marketing literature has been developing in parallel streams. Pure cognitivists have had little truck with relativism which is regarded as soft (e.g. Hunt 1992). Conversely, humanists are impatient with what they consider mechanical models (e.g. Hirschman 1993). Neither are wrong and perhaps neuroscience, which places hard measures on soft concepts, such as memory and affect, may provide the bridge to bring these two streams together.

The two literatures together support the unlikelihood of any hierarchy of intermediate advertising effects; they act simultaneously and interactively. Similarly, they support the idea that advertising models should involve M, A and C; the elimination of any one is likely to exaggerate the importance of the others. Advertising models should also include the context, namely the likely level of involvement set by the product category, competitive advertising effects, the balance of the marketing mix, the stage of product life cycle and target market.

Different forms of memory are affected differently by the combination of advertising and experience. One should be cautious of choosing between persuasive and habituation models since it seems more likely that both operate in parallel with their relative importance being determined by circumstance. This is an argument for a holistic, non-reductionist, view of advertising effects whilst recognizing the practical research difficulties involved.
The recognition that advertising directly affects brand equity and that brand equity resides in the memories of the relevant population has implications for the briefing of agencies and the tracking of performance. Both need to take place within the context noted above but also the specific goals of the advertising. Advertising is only as good as the shift in brand equity, the collective brand memory of the relevant population, it creates.

The growing interest in affective research may indicate shift from a Cartesian (purely cognitive) to a Post-Cartesian understanding of marketing decision-making. In decision-making terms, I have suggested that memory sets the context for affect which sets the context for, even dominates, cognition (M ⊃ A ⊃ C). This is not to say rationality is unimportant. Where M and A are neutral or conflicting, C is likely to be the deciding factor if involvement is high enough to bring it into play. Otherwise choice is likely to be random.

Post-Cartesianism thus sees humans not as value-neutral, transactional, individual utility maximizers but as sentient, experiential beings finding satisfaction in social groups. We need to humanize our perception of decision making.
References


38


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43


--------”--------- (1996), informal discussion with the author.


Figure 1

A Taxonomy of Memory

Memory

Reflexive/procedural/implicit
Nonassociative learning
Classical conditioning

Declarative/explicit
Priming
Skills and habits

Events
Facts

Adapted from: Squire & Zola-Morgan 1991
Figure 2 - Synaptic Connections

Source: Kandel 1991a, p.19
Figure 3

The Brain

Frontal lobe

Cognition (thinking)

Feelings 
social skills 
decision-making?

Source: Calvin and Ojeman, 1994, p147
MAc: A Conceptual Model of How Advertising Works

Figure 4

Ads
Perceptual filters
Competitors for attention
Memory
Affect
Cognition
Long-term memory: brand equity
Behavior