

# ENHANCING STIMULUS INTEGRATION IN A CONSUMER INFORMATION PROCESSING SYSTEM: A THEORETICAL FOUNDATION

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*Although much research has focused on how consumers process information, researchers and theorists in the field of marketing, more specifically consumer behavior, still have much to gain by expanding the existing assemblage of knowledge about information processing and the theories related to this topic. A deeper understanding of how consumers habitually process information may be extremely valuable to marketers when attempting to develop marketing plans, strategies, and messages that will effectively influence consumer attitudes and behavior. The most seemingly unified theory of information processing is the information integration theory. This theoretical approach concentrates on the ways individuals accumulate and organize information to form attitudes toward various concepts including individuals, objects, situations, or ideas. However, marketers must also consider the limitations of the human information processing system. Considering the research on information integration theory and information overload, a model for understanding consumer-oriented marketing messages is discussed. The model suggests that multiple, focused marketing messages should be more effective than relatively few, complex marketing messages. However, the complexity of messages should increase as the consumer becomes more involved with the product, moving from awareness to action.*

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## INTRODUCTION

The foundations of information integration theory are deeply rooted in the field of psychology. More specifically, research concerned with attitude formation and modification seems to have had a significant influence on the development of integration theory (Anderson 1971). Most of the research efforts utilizing integration theory have been in the field of psychology, specifically dealing with attitudes of individuals (Anderson 1973; Detweiler and Zanna 1976; Grush 1976; Sawyers and Anderson, 1971; Simms 1978). Such findings from information integration theory research significantly impact marketers. However, few studies have examined specific aspects of consumer attitudes using integration theory (Bettman, Capon and Lutz 1975; Herrmann and Wricke 1998; Smith 1993). Much of the research examining attitude

formation and change can be directly applied to the field of marketing and consumer behavior. One of the primary objectives of marketing is to satisfy the perceived needs of the consumer. Thus, a thorough understanding of attitude change and formation should be invaluable to most successful marketers.

The very roots of marketing communication lie in the foundations of changing and forming attitudes in the mind of consumers. Marketers strive to form, influence, or change the attitudes of consumers to increase sales of products (e.g., Kardes, Posavac and Cronley 2004). Understanding how consumers perceive, integrate, and utilize marketing information can be especially useful in this process. There are some needs that inherently exist in the mind of consumers before any marketing communication efforts are implemented, such as the need for food. Other needs may not be inherent and may result from the efforts of marketers to help consumers recognize unmet needs.

Successful marketing involves the process of presenting to consumers the right kind and the right amount of information (Johar, Mahesestsm and Peracchio 2006). This process could be more effectively manipulated by marketers who understand how individual consumers process and integrate various chunks of information. Furthermore, in considering the elements of integration theory as it applies to marketing, it may be of equal importance to consider the limitations of integration processes. Research has led to the assumption that an optimal level of available stimuli exists, and exceeding this level may decrease the effectiveness and accuracy of the integration process (Kanaan 1993).

### INFORMATION INTEGRATION THEORY

Information integration theory provides a unified conceptual framework that has successfully been applied to numerous areas of significant research ranging from personality impression formation and attitude change to psychophysical judgments and decision making (Anderson 1968; Shanteau 1985; Simms 1978). The significance of integration theory is due, in large part, to both the simplicity and complexity of multiple causation. Pratkanis (1994: 441) reiterates the simplicity of the theory by stating that, "...it is amazing how so seemingly simple a theory can account for so much social cognition." The foundation of the integration research philosophy is based upon a set of inherent processes that are often inadvertently stimulated. As noted by Anderson (1974), the integration of stimulus information is an attribute of information processing that has been time honored in perception and judgment. Most judgments, or decisions, reveal the joint action of multiple stimuli that are combined, or integrated, to produce a single response. According to Anderson (1981), the integration theory has developed around four interlocking concepts: *stimulus integration*, *stimulus valuation*, *cognitive algebra*, and *functional measurement*. The connection between these concepts is represented in Figure 1.

The integration diagram shown in Figure 1 was first introduced by Anderson (1981). The diagram represents the cognitive organization of information through a goal-directed method of processing. The field of stimuli shown in the diagram,  $\{S_1, S_2, \dots\}$ , progresses through three sequential operations of processing. The three operational sequences are also referred to as functions and schemas (Anderson 1981; Anderson 1991a; Anderson 1991b).

The primary concern of the valuation function,  $V$ , is assessing meaning and implications of the information field relative to the fundamental goal (Anderson 1991b). The process transforms the given stimuli,  $S_i$ , into their psychological representations, or values,  $s_i$ . This function represents what is commonly referred to as the psychophysical law (Anderson 1981). The psychological stimuli,  $s_i$ , are then combined to form an implicit response,  $r$ , through the integration process. The function of the integration function,  $I$ , is to combine the processed information into a unified cognition. This function represents what is ordinarily referred to as the psychological law (Anderson 1981). Finally, the action function,  $A$ , translates cognition into behavior. The implicit response,  $r$ , is externalized by the action schema and becomes the observable response,  $R$ . This function represents what is typically referred to as the psychomotor law (Anderson 1981).

### Functional Measurement

The path from the observable stimulus,  $S_i$ , to the observable response,  $R$ , can be represented by three linked functions (Anderson 1981). These are:

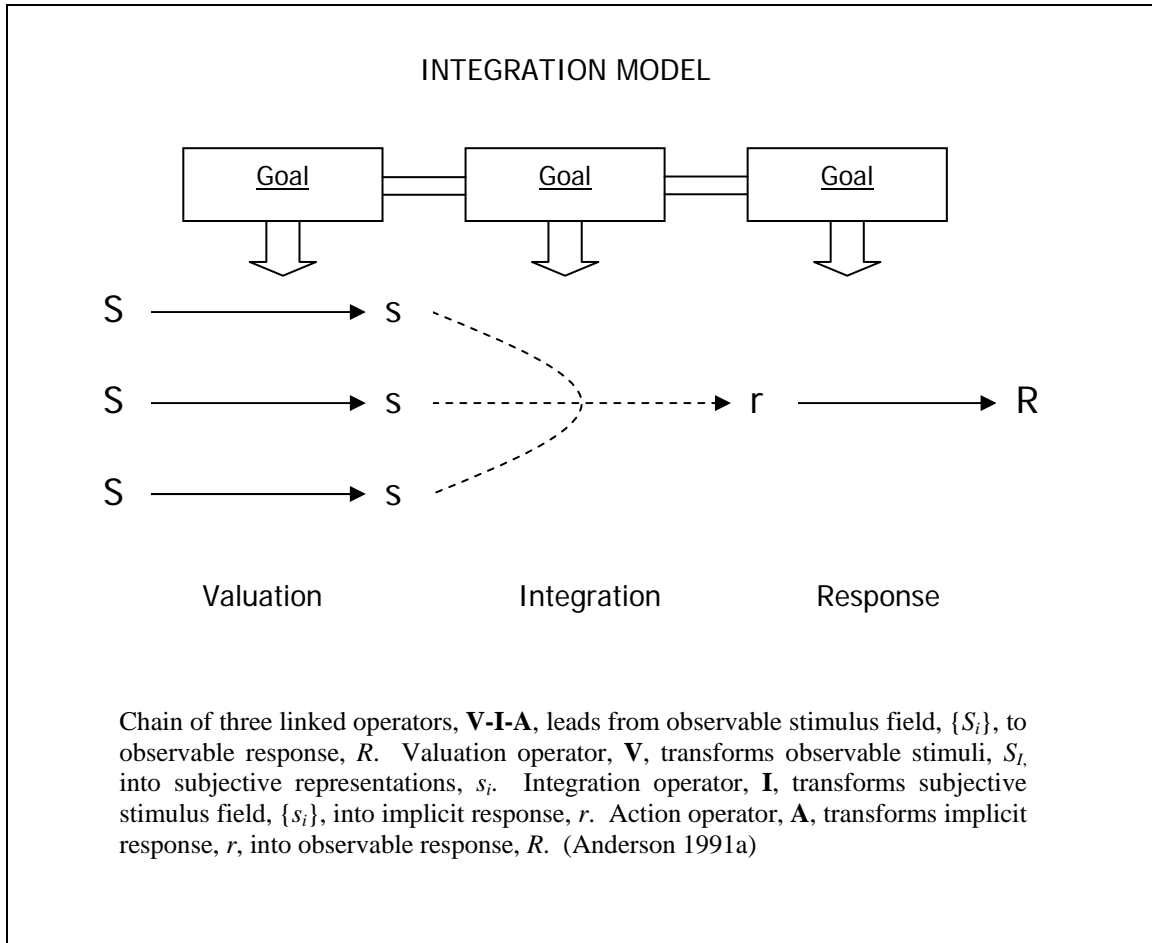
Valuation function:  $s_i = V(S_i)$

Integration function:  $r = I(s_1, s_2, \dots)$

Response function:  $R = A(r)$

In these formulas, and in the integration diagram, upper-case letters are used to represent external, observable stimuli and responses, while lower-case letters represent their internal, unobservable counterparts.

**FIGURE 1**  
**Information Integration Diagram**



Three interconnected problems must be answered to determine the integration function (Anderson, 1981). These problems are:

1. Measuring the psychological values of the stimuli.
2. Measuring the psychological value of the response.
3. Determining the psychological law or integration function, **I**.

Functional measurement provides a solution to all three problems. The integration function provides the structural frame for the measurement scales that represent stimuli and responses. Although all three problems deal with unobservable entities, whose existence and definition are subjective, an accurate and objective foundation for these unobservable

entities can be developed from the observable stimuli and response (Anderson 1981).

**Stimulus Integration**

The central concept of integration theory is stimulus integration. The term integration refers to the processes through which multiple stimuli are combined and organized to determine an overall response (Anderson 1974; Anderson 1991a). Many situations that arise in everyday endeavors require a judgment or decision that results from considering several pieces of information simultaneously. Common tasks, such as voting, playing a sport, taking an examination, deciding what to have for lunch, and even simply watching a television show, all involve information integration. Typically, thoughts and behavior result from integrating a

variety of stimuli. Multiple causation, rather than a single cause, is considered to be the rule for sufficiency in understanding and prediction.

The importance of integration parallels that of multiple determination (Anderson 1991a). Multiple determinants influence the development of judgments and actions. Factors such as the constraints of the existing situation, the current motivations and goals of the individual, and the past experiences of the individual are organized to influence present judgments and actions. One of the principal methods of conflict resolution is a form of integration referred to as compromise. As an individual attempts to balance conflicting information or opinions, an averaging process is employed. The ultimate compromise, in many cases, may depend upon which piece of information is held to be more favorable or less negative. The individual uses a process of integration to determine a level of value for each alternative.

Anderson (1981) uses the example of depth perception to help demonstrate the integration process. Depth perception involves the integration of various cues including form interposition, relative size, perspective, hue, and texture. The advancement of knowledge regarding such informational cues to depth is exemplified in the evolution of depth in painting. An example of a consumer considering which brand to purchase can also be used to illustrate the process of information integration. Individual opinions regarding a brand are the result of effectively integrating various pieces of information about the brand. For instance, when developing an opinion about a brand one might consider pieces of information from television commercials, print advertisements, company websites, and the remarks of others.

Virtually all thought and behavior is caused by multiple co-acting factors. Multiple causation may be examined in terms of two interrelated components (Anderson 1981). The first component of multiple causation, synthesis, analyzes the response to a multiple stimulus

domain. In the above examples, these domains are perceptual and social. The concept of synthesis is consistent with the integration function, which combines multiple stimuli to produce an overall response. Comparatively, the purpose of analysis directly opposes the purpose of synthesis. Analysis attempts to dissect an overall response into its individual causal components. The primary concern of integration theory is with the synthesis of, or rules of integrating, information.

### **Stimulus Valuation**

A second fundamental principle of integration theory is that stimulus values depend on the predominant motivational state and objective of the individual (Anderson 1982). When an individual encounters a stimulus for the first time, value is not an intrinsic property of the stimulus. As a result of the stimulus-organism interaction, the psychological value of the stimulus emerges within the individual. The variation of these psychological values depends upon the task and goal at hand. Anderson (1981) uses the term valuation to refer to the processes that extract the information from the physical stimulus to determine the stimulus parameters. In other words, valuation is the processing of each separate stimulus variable for its information content (Schlottmann and Anderson 1993).

Physical stimuli and psychological stimuli may be considered in the valuation process set forth by Anderson (1981). Physical stimuli are those that are observable and can potentially be controlled by the marketer (e.g., product size, shape, color). However, marketing communications cannot always convey a product's physical stimuli accurately. Stimuli at the psychological level tend to be immediate causes of thought and behavior, and therefore, are the primary concern of integration theory. A better understanding of the transformation of a physical stimulus to its psychological counterpart requires an analysis of the valuation operations.

Analyzing subjective perceptions can be exceptionally complicated. The interpretation of a single adjective will vary, often substantially, between individuals. Each individual will go through a chain of processes that begins with sensory perception and involves a system of linguistic knowledge, general background knowledge, and task-specific knowledge (Anderson 1991a). Most of this knowledge is complex and virtually incomprehensible, or at least unobservable, and therefore, it might seem as though the notion of an exact theory at the level of judgment and action is impractical. However, Anderson (1991a) asserts that exact theory is possible by means of cognitive algebra. The psychological *s*-value of the integration diagram (Figure 1), regardless of how complex, interactive, or unknowable it may be, is a complete and exact summary of all the valuation processing.

### Information Organization

Information integration theory efficiently utilizes various algebraic models of perception and judgment. Numerous research efforts have found that simple algebraic models can be used to provide a thorough, quantitative explanation of reasonably complex cognitive activity (Anderson 1973; Anderson and Cuneo 1978; Hermann and Wricke 1998; Schlottmann and Anderson 1992; Smith 1993). Individuals frequently make use of averaging, subtracting, or multiplying stimulus information when developing an overall response. These algebraic rules have been termed cognitive algebra (Anderson 1981).

The algebraic models used in integration theory consist of two main classes. The first class includes adding, subtracting and averaging models, while the second class includes multiplying and dividing models (Anderson 1974). Adding and subtracting are similar in mathematical function, but may be psychologically different. Adding and averaging are both psychologically and mathematically different. Although adding and averaging may have a simple analysis and lead to identical predictions under certain

circumstances, the averaging model becomes non-linear and more complicated with the application of differential weighting. There are numerous variations in formulas for the linear, multiplying, and averaging models. However, the adding and averaging models are most consistent with consumer information processing. Therefore, the perspective adopted herein by the authors is based upon the fundamental formulas of these two models.

When numerous stimuli are influencing the thought or behavior development of an individual, for example product evaluations, with each stimulus impacting the observer in a unique way, quantitative analysis is often utilized to predict a combined effect. Furthermore, as a general rule, such analysis must be considered in terms of the psychological values of the individual (Anderson 1981). To help determine statistical values that could accurately reflect their corresponding psychological values, Anderson (1968) proposed that an overall response resulting from the integration of multiple stimuli is a linear function of the values of the item.

The resulting model can be written as a weighted sum:

$$R = \sum_{i=0}^N w_i s_i \quad [1]$$

where:

$R$  = the overt response

$w_i$  = the weight or importance of  $i$

$s_i$  = the value or strength of belief about  $i$

$N$  = the number of items considered

In equation 1, the overt response,  $R$ , is measured on a numerical scale, such as attitude toward the brand. However, in some cases,  $R$  may be used to represent the attitude that serves as the foundation for an overt yes-no response (Anderson 1971). This formula parallels the theory of attitude presented previously by Martin Fishbein for explaining the interactive nature of attitude development (Bettman, Capon and Lutz 1975). Fishbein's model

includes beliefs and evaluations in place of weights and values. This formula was used to develop the multiattribute attitude model that appears in numerous marketing textbooks to help explain and understand consumer attitudes.

Mathematical simplicity and visceral plausibility have been significant influences on the popularity of adding models (Anderson 1981). Despite their popularity, adding and other linear models have seldom succeeded when simple critical tests have been made. The averaging model has been supported by many of these same tests. While the adding model focuses on the absolute weight of each stimulus, the averaging model makes a distinction between the absolute weight,  $w_i$ , and the relative weight,  $w_i/\hat{w}_i$  (Anderson 1981). The averaging model can be written as follows:

$$R = \frac{\sum w_i S_i}{\sum w_i} \quad [2]$$

It is assumed that both absolute weights and scale values are constant across different sets of stimuli. Relative weights, on the other hand, vary depending on the other stimuli with which they are combined. The significance of this configural quality can be revealed by considering that attitudes based on a considerable amount of information are harder to change than attitudes based on less information (Anderson 1981). In essence, the application of these models to marketing communications suggest that consumers will pay attention to and interpret those marketing messages that are deemed most important or relevant for satisfying needs.

### INFORMATION PROCESSING LIMITATIONS

Multiple causation and the proper integration of multiple stimuli result in the formation of judgments and perceptions that guide individual thought and behavior. Although multiple

stimuli integration is an important component of information processing, it is equally important to consider the limitations of human cognitive capabilities (Weinberg, Berger and Hanna 2004). The limited processing abilities of individuals may cause a reduction in the accuracy and effectiveness of information integration, especially when the amount of available information, or stimuli, increases beyond an optimal level (Kanaan 1993). Marketers, as well as individuals in other areas of human communication, should value the importance of understanding information overload and its implications.

### Information Accumulation

The ability of an individual to process and integrate information into decisions is limited (Kanaan 1993). Previous research suggests that all humans are information processing systems (IPS) with certain organizational features in common (Newell and Simon 1972). The research of Allen Newell and Herbert Simon (1972) represents the most detailed and complex empirical research to date on the nature of human problem solving. The outcome of their research was a comprehensive description of the cognitive mechanisms involved in human problem solving. According to Newell and Simon, the human IPS is a sequential system that can execute only one elementary process at a time. It consists of a short-term memory (STM) of very limited capacity (approximately five to nine symbols) which is immediately and completely available for elementary processes. However, the STM decays and must be rehearsed frequently to avoid extinction. The human IPS also includes a long-term memory (LTM) that is used for all practical purposes of unlimited capacity and is organized associatively. The LTM contains symbols and symbol structures. Symbols represent "chunks" of information that may be of any complexity, size, and organization. Symbols are treated identically by LTM and STM, but must be searched for and transferred from LTM to STM before they can be used. Finally, problem solving occurs in a goal-driven manner. Specifically, a class of symbol

structures called goal structures is used to organize problem solving.

For consumers, the product of the human thought process takes the form of impressions, or ideas pertaining to a brand. Impression generation may result from retrieving an information chunk from the LTM, be formulated from other symbols retrieved from the LTM, be caused by an external stimulus, or some combination (Nagasundaram and Dennis 1993). Following exposure to marketing messages, consumers often generate ideas or impressions about the promoted product, the brand, or the company. A common assumption regarding idea generation is that an increased number of stimuli will result in a greater variety of ideas generated. This in turn should result in better ideas. However, this may not be a desirable outcome in a consumer context. For example, presenting consumers with a variety of selling points within a single marketing message may lead to more variation in the number and types of impressions generated about the product. Especially relevant when trying to attract new customers to the brand, the result may be inconsistent or conflicting impressions.

Findings in organizational research also suggest that multiple stimuli may inhibit idea generation. For example, many organizations employ the brainstorming approach to idea generation in hopes of utilizing multiple stimuli to generate new ideas. Although brainstorming is a widely used approach, numerous research efforts have shown that for groups of two or more people, non-interacting groups consistently produced superior results to verbally brainstorming groups (Lamm and Trommsdorff 1973; Mullen, Johnson and Salas 1991). Multiple studies have found production blocking to be the primary cause of brainstorming productivity losses (Diehl and Stroebe 1987; Gallupe and Cooper 1991). Diehl and Stroebe (1987) found that the longer a participant had to wait to verbalize an idea, the greater the loss in productivity. They concluded that production blocking results from at least one of three reasons. Participants who

were unable to verbalize their ideas as they occur might (a) forget or suppress them because they seem less relevant later; (b) be unable to think of other ideas during the wait time due to STM limitation; or (c) be unable to think of ideas because exposure to other ideas is distracting or interfering with their thinking. In essence, working with groups resulted in new stimuli being presented before individuals were able to fully integrate previous chunks of information and therefore, were unable to fully develop new ideas. Consumer impressions of brands tend to be somewhat malleable prior to direct exposure to the brand. Therefore, marketers must be conscientious to provide simple and easily-processed information to consumers. Presenting too much marketing information simultaneously may confuse consumers, thereby inhibiting their abilities to fully develop accurate impressions of the brand.

Typically, most individuals are capable of performing only one type of process at a time (Nagasundaram and Dennis 1993). These processes include accessing existing ideas or developing new ideas, rehearsing ideas, and listening to and storing the ideas of others. When a single idea is too complex for the capacity of the STM to properly process its components, the idea will not be adequately stored. With this in mind, the simultaneous occurrence of multiple product attributes, or benefits, within a single message may create a level of interference that will lead to a partial or complete loss of ideas from an individual. More specifically, presenting consumers with too much information about a brand may be detrimental to the formation of brand impressions, especially when trying to attract new customers to the brand or reinforce a purchase decision. While attempting to communicate multiple product attributes through a relatively few number of advertisements may lead to increased awareness of a brand, doing so is likely to result in confusion and inaccurate perceptions among many consumers as to the true nature of the brand.

### Information Overload

One of the central characteristics of any group decision is compromise (Graesser 1991). Nagasundaram and Dennis (1993) discuss the role of compromise in the generation of ideas among group members, and more specifically how it relates to information overload. They assert that the same factors that appear to stimulate the generation of ideas, in some cases actually prove to hinder the process. Although brainstorming is commonly believed to produce a greater number of ideas than does a nominal group, the limitations of the individuals result in nominal groups outperforming brainstorming groups. Thus, in a consumer setting where marketers are attempting to reach new customers and promote a desired image of the brand, presenting too many unique marketing messages may be detrimental.

Considering the relationship between cognitive stimulation and idea or impression generation, to achieve maximum efficiency, in terms of the quality of ideas generated, a compromise is required. The nature and quantity of cognitive stimulation must be compromised with the nature and quantity of ideas generated (Nagasundaram and Dennis 1993) or with objectives and time delays (Wang and Wyer 2002). This means that for any given situation there is an appropriate amount and an appropriate kind of stimulation. This is referred to as the optimal level of stimulation. If an individual receives a level of stimulation that is too far below or above the optimal level, or simply the wrong kind of stimulation, the stimulation will most likely be ineffective (e.g., providing too little information in a marketing message). When the level of stimulation is too far above the optimal level to be effective, the individual experiences information overload (e.g., providing too much information in a marketing message). Information overload is a condition where the amount of cognitive processing required exceeds the limits of the human IPS (Nagasundaram and Dennis 1993; Pennington and Tuttle 2007).

Various research efforts have highlighted the ability of individuals to process and integrate information into decisions, and the limitations that face individuals as the amount of information increases (e.g., Chewning and Harrell 1990; Miyazaki, Grewal and Goodstein 2005; Paquette and Kida 1988; Kida 1988). Kida (1988) found that due to the limited abilities of individuals to effectively process information, the accuracy of prediction decreases as the amount of available information increases. Chewning and Harrell (1990) found that decision quality is significantly lower for individuals who experience information overload than for individuals who do not encounter information overload.

The findings of Paquette and Kida (1988) may provide insight into the decrease in prediction accuracy and decision quality. Their findings suggest that the lower predictive ability of the study's participants resulted from less than optimal choice of information cues. Furthermore, the actual processing of these cues by individuals did not appear to have any significance in contributing to the lower performance. This brings to light an issue that marketers should concern themselves with, in regards to communicating with consumers. A number of things can go wrong in the marketing communication process as a result of information overload. The first of these is the consumer being presented with so much information that it overwhelms him and prevents him from attempting to process the information and determine the meaning of the message. A second possibility is that the consumer will process the information properly. However, he will unknowingly process the wrong information and therefore, not be able to determine the intended meaning of the message.

The second type of communication error resulting from information overload may be more detrimental for marketers than the first, because the consumer is unaware that he has misinterpreted the message. When the consumer encounters more information than is



possible to process, he is aware of his inability to internalize the message. Therefore, he knows that the communication process was not successful. On the other hand, when the consumer is able to process and internalize the information he encounters, he assumes that he has accurately interpreted the message.

### INFORMATION INTEGRATION AND FILTRATION

Information integration theory and information overload should be mutually considered to most effectively understand and predict the formation of attitudes. The various factors that influence attitude formation and change can be applied in all fields that involve the behaviors and judgments of individuals, groups, or both. The addition of stimuli will have a positive influence on the effectiveness of the stimulus field to influence the formation and changing of attitudes until the optimal level of available information is achieved. Once the optimal level is exceeded, the effectiveness of the stimulus field to influence the formation and change of attitudes will decrease with the addition of more stimuli.

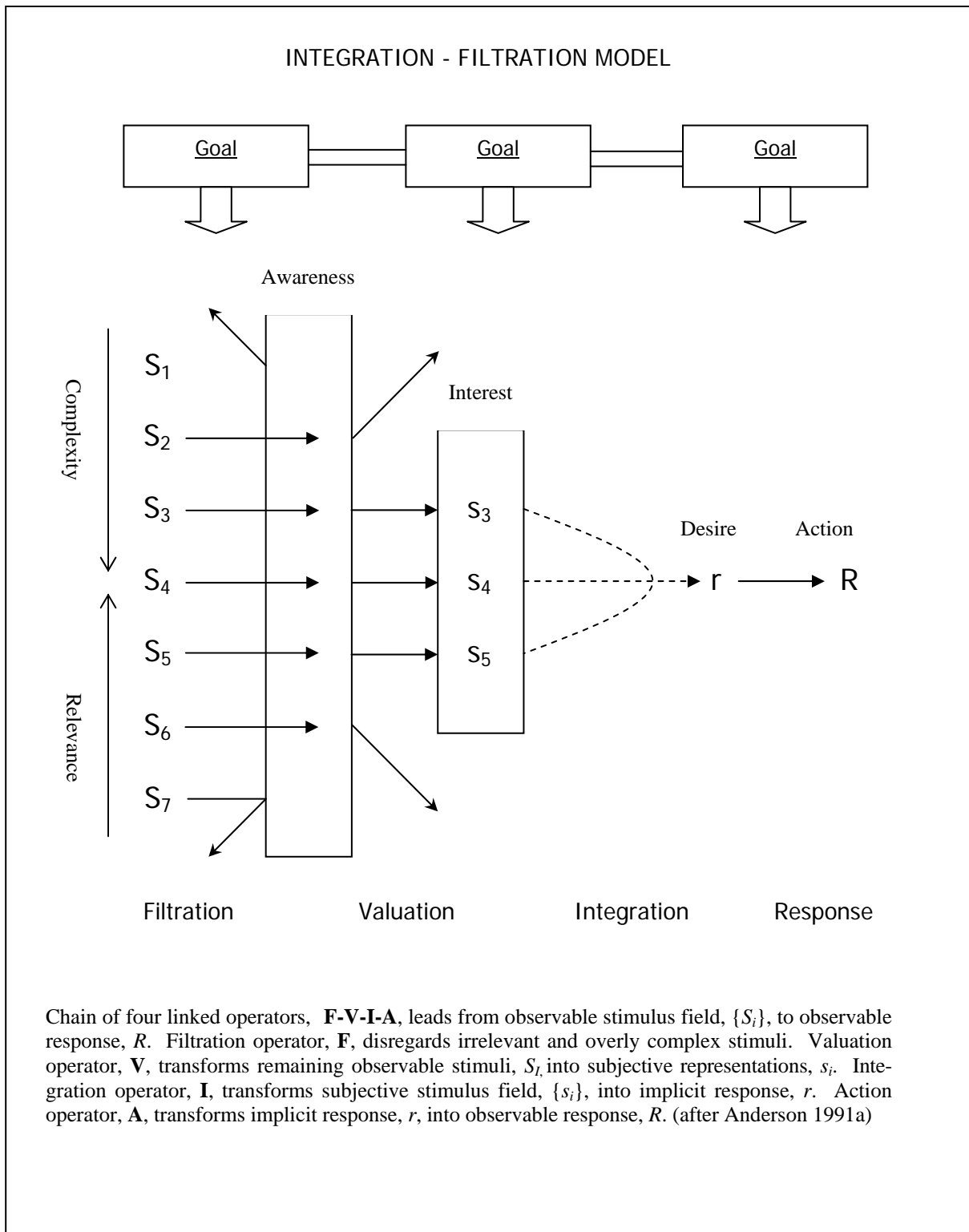
Nagasundaram and Dennis (1993) suggest one possible solution to information overload. Presenting chunks of information that are roughly equal in size may help to avoid information overload. The number of ideas, lines, or characters can determine the chunk size. When processing information, individuals must compromise between searching through a few large chunks and searching across a wide field of smaller chunks. While it may be assumed that smaller chunks are less likely to result in information overload, limiting chunk size may lead to an increase in the number of chunks. If individuals are forced to search through an excessively large number of chunks, this again becomes information overload and the individual is likely to become disoriented, disinterested, or both (Beam 1998; McCune 1998; Tetzeli 1994; Rieck 1998). Therefore, it is likely that an optimal combination of chunk size and number of chunks will produce the most effective results. In addition to the size of

the information chunk, it may be important for marketers to maintain consistency in content between chunks. Thus, communicating a similar message via multiple media should be more effective than communicating multiple messages via either a single medium or multiple media.

Rieck (1998) suggests several cures for information overload in marketing communications. First of all, messages should be clear and simple. This means using an optimal number of appropriately sized chunks of information. Secondly, the information in a message should be linked with ideas and emotions that are familiar to the individuals who will encounter the message. When piecing together the chunks that will constitute the message, ideas, opinions, or information that the individual has previously been exposed to should be included so consumers may use these chunks as a reference to more effectively relate to and understand the new information. A third suggestion for eliminating information overload is to avoid counterproductive associations and interfering messages. Presenting too many information chunks at one time may conceal the intended message of the communication effort and lead to confusion.

To successfully influence the attitudes of consumers, it is necessary for marketers to anticipate the optimal level of stimuli presentation. Following the findings of Nagasundaram and Dennis (1993), two important considerations for the integration of information may be suggested. The first of these considerations is the relevance of the information to the individual. The second consideration is the complexity of the information and ability of the individual to comprehend the information. Incorporating these two characteristics with integration theory and a hierarchy of effects models such as the AIDA model of consumer response processes (attention, interest, desire and action), the model of integration shown in Figure 2 is proposed.

**FIGURE 2**  
**Information Integration-filtration Diagram**



The model combines the characteristics of the AIDA model with those of the integration model. The filtration process, via selective perception, reduces the available stimulus field to those stimuli the individual pays attention to, thus representing the attention stage. The remaining stimuli either proceed through the valuation function or are dismissed, depending on the interest level of the individual. The integration operator will then transform the subjective representations, resulting from the valuation process, into an implicit response, or desire. Finally, the action operator transforms the implicit response into an observable response, or action.

The role of complexity and relevance can be further understood by reflecting on the decision-making process of purchasing a new automobile. When an individual gathers information before purchasing a new automobile, much of the information acquired will be ignored in the purchase decision-making process. Detailed information about features such as engine specifications or audio specifications may be too complex for the lay person to comprehend, especially when the information is not considered relevant (e.g., the awareness stage). When this situation occurs, the individual may discount or ignore the information in the final stages of decision-making. Similarly, detailed information pertaining to the engine specifications or audio specifications may not be relevant to the needs of the individual, especially in early stages of the decision-making process (e.g., awareness). Therefore, information that is high in relevance and comprehensibility will be attended to. The individual, without making any attempt to process or notice the information, will inadvertently dismiss information that is too irrelevant or complex. Thus, as the relevance of information increases, the more likely it may be that information will be utilized. Furthermore, the complexity of the information should interact with message relevance such that the likelihood of information being utilized will (a) decrease when relevance is low and complexity is high, and (b) increase when both relevance and complexity is high.

Most individuals will not and cannot attend to the entirety of the stimulus field. Rather, only a portion of the available stimulus field will capture the attention of the individual, those stimuli deemed as relevant and comprehensible. All other messages may serve to detract from the intended message thereby inhibiting the consumer's ability to make accurate assessments of the brand. Once the individual recognizes an observable set of stimuli, a process of filtration occurs as the individual sorts through the stimuli to find those of interest and usefulness for goal attainment. These remaining stimuli are transformed into subjective representations and the process of integration continues consistent with information integration theory. The complexity of messages may increase as the relevance of the message to the consumer increases. In other words, focused marketing messages (communicating a single attribute versus many attributes) should be utilized when the goal is to increase awareness. If it is deemed necessary to communicate multiple product attributes, individual marketing messages should be created to communicate each attribute individually rather than a single message created to communicate all attributes. Then, as the consumer moves from awareness to interest or desire in the product (increased relevance), it becomes more feasible to deliver increasingly complex messages (e.g., multiple campaigns focusing on multiple facets of the product or brand).

Many advertising campaigns fail because they attempt to communicate too many things to consumers. While it may seem financially viable to create relatively few advertising messages that incorporate multiple selling points, consideration of the limitations of the human IPS suggests this may not be a preferred strategy. A more effective strategy may be to create numerous, simple, focused messages that communicate a single benefit. Consumers will then selectively perceive those messages that are most relevant to their own needs. Assuming the consumer's perception of the brand is favorable once he/she has processed the first bit of information pertaining to a brand,

he/she will be more likely to pay attention to other messages about the brand because additional information will now be considered relevant. As the consumer moves from awareness to interest in the product, a wider variety of information becomes relevant and the consumer will be more involved, and thus more responsive to complex messages. Therefore, as the product becomes more firmly established in the mind of the consumer building toward a desire to purchase, the complexity of the message can and should be increased.

### CONCLUSION

Information integration theory has numerous implications for the field of marketing if researchers and practitioners alike properly utilize it. However, it is important to consider the limitations of humans as information processing systems when applying the concepts of integration theory to marketing. The integration-filtration diagram (Figure 2) may be a useful framework for considering both information integration and overload. Future studies should test the framework in experimental studies to determine appropriate boundary conditions. Increasing ad clutter and media diversification has led to many advertisements that attempt to communicate every aspect of the brand within a single advertising message. However, due to increasing ad clutter, such messages accomplish little more than getting lost in the sea of advertising surrounding consumers. Marketers need to build consumer interest in a product and its marketing efforts and the best way to achieve this is to offer “bite-size” pieces of information to initially draw in consumers (increase relevance) and then share the detailed, supporting information about the brand (increase complexity) once the consumer is engaged enough to process the information.

Marketers may benefit from using the model to develop more effective marketing strategies and programs. Marketing strategies, after all, need to fit customers’ abilities to perceive information, as well as fit their needs (Santala and Parvinen 2007). Furthermore, the model

could be effectively utilized in the fields of psychology and management to more fully comprehend human thought processes and behavior in organizational settings. While this framework was developed for understanding the consumer learning process, it may be beneficial to apply this model to curriculum development in educational settings as well. Some students may perceive a particular class to be of little value to them because they are unable to take away something meaningful from the class. In many cases, such an outcome may be the result of educators attempting to convey too much detailed information and, in doing so, they communicate nothing memorable to students. Thus, the proposed framework may be utilized in multiple learning contexts.

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