A MODEL OF AFFECTIVE PROCESSES IN NONFORMAL EDUCATION

DISSERTATION

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To My Husband, Jeff Gill
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CHAPTER I
INTRODUCTION

Background

Museums, science centers, parks, nature centers, zoos, historic sites -- all of these are settings where nonformal environmental education, also known as interpretation, can occur. Exhibits, guided tours and walks, audio-visual media, the written word, lectures, one-on-one discussions, and so on, communicate a vast array of scientific, historic, artistic, and environmental information to large numbers of persons engaged in nonformal or casual learning. Unlike students in a formal educational setting (i.e. the classroom), visitors to nonformal educational facilities are often elective learners engaged in a blend of leisure and learning (G. W. Mullins, personal communication, 1993). These learners display considerable heterogeneity with respect to age, social grouping, background, and the expectations they bring with them to the interpretive experience (Falk, Koran, and Dierking, 1986). The task of determining and meeting the learning needs of this diverse population presents an enormous challenge for nonformal educators.

Formal education may be defined as “a societally approved sanctioning system in which participants are required to learn and demonstrate certain competencies” (Mullins, 1984, p. 1). In contrast,
nonformal education features elective learning which is not sanctioned by any institutional structure. The typical setting for formal education is the formal school or university classroom. Nonformal educational settings include facilities like parks, zoos, and museums. However, nonformal educational settings may also be sites where formal education can occur, as when a school group engages in a formally sanctioned field trip beyond the confines of the classroom and school building.

Nonformal environmental education/interpretation, a professional field still in its youth, has suffered since its beginnings from a lack of effective evaluation strategies and clearly defined goals (Mullins, 1984). Shettel (1968) reported wide discrepancies in ratings by qualified exhibits personnel who were asked to rate exhibits at the Atomic Energy Museum in Oak Ridge, Tennessee. Shettel concluded that published criteria on exhibit effectiveness are generally inadequate and unreliable. The author also asserted the need for more clearly stated objectives in design and implementation of exhibits. As Shettel put it, "specifically, what do you want whom to do, know, or feel after seeing the exhibit that they could not do, know, or feel before seeing the exhibit?" (p. 150).

Lack of clear objectives and evaluation strategies results in a lack of knowledge about the effects of nonformal educational programs on the learners. Such lack of knowledge was revealed when curators at The Children's Museum of Indianapolis, Indiana, learned that many of their visitors experience the museum as more entertaining than educational (Ault, 1987). If the field of nonformal environmental education/interpretation is to move towards a state of maturity, its professionals must become adept at identifying what the nonformal educational process should be doing and
how best to do it (Mullins, 1984).

To begin to address the problem of setting clear objectives in nonformal education, the many forms of learning which occur in nonformal educational settings must be addressed. Objectives for learning can be classified into three major learning domains: cognitive, affective and psychomotor (Krathwohl, Bloom, & Masia, 1964). Cognitive learning is demonstrated by factual recall and/or higher order analytical activity using previously learned information. Affective learning involves a change in feeling, emotion, attitude, and so forth, in response to the stimulus. Psychomotor learning objectives emphasize muscular or motor skills. Learning in nonformal/interpretive settings may span all three of these learning domains. Objectives in interpretation may include environmental education messages, promoting recreational activities or social interaction, aiding in site management, public relations and promotion of tourism, or entertainment (Mullins, 1984). However, learning objectives are often less well specified in interpretation than they are in formal education, since, as Mullins (1984) explains, "Organizations which sponsor interpretive services are not sanctioned by society to formally certify that learning has occurred among the participants" (p.1). Moreover, nonformal education does not have a deliberate process of evaluation of effectiveness.

The philosophical grounding on which the field of interpretation is built offers some indication of the types of learning objectives nonformal educators should be setting. In his seminal book, Interpreting Our Heritage, Freeman Tilden (1957) defines interpretation as "an educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experience, and by illustrative media, rather than to
simply communicate factual information" (p. 8). Inherent in Tilden's definition is his intent that interpretation should operate in the affective domain of learning as well as the cognitive. Tilden writes, "the purpose of Interpretation is to stimulate the reader or hearer toward a desire to widen his [sic] horizon of interests and knowledge, and to gain an understanding of the greater truths that lie behind any statements of fact" (p. 33). Shettel (1973) also affirms the affective value of nonformal education in stating, "the primary value of the museum experience lies in the opportunities it makes available for visitors to increase their knowledge and/or to change their beliefs and attitudes toward a wide variety of things not otherwise available" (p. 34). Shettel (1968) also seems to believe it is possible to formulate learning objectives in the affective domain when asking, as quoted above, "what do you want whom to do, know, or feel [italics added] after seeing the exhibit" (p. 150).

Nonformal educational settings serve as sites for both formal and nonformal learning. These settings can be effective in promoting cognitive learning (Eason & Linn, 1976) and affective learning (lozzi, 1989). However, there is both professional opinion and empirical research which suggest that the major advantages of learning activities in nonformal settings over those in formal settings lie in the affective domain. Miles and Tout (1979) speculate, "the affective aspects of the learning process... perhaps carry slightly more weight in the museum than in formal education" (p. 212). Koran and Baker (1979), in a review of the literature, report that "field trips usually do not exceed classroom learning on measures of knowledge gained or content learned" (p. 56). They suggest the advantage of field trips is their positive effect on interest, motivation, attitude, and so on.
Flexner and Borun (1984) found that the fifth and sixth graders they studied did not demonstrate more cognitive learning at a participatory science museum exhibit, but did describe the experience as more enjoyable and interesting than the related classroom lesson. In a study with older students, Chrouser (1975) found that preservice elementary teachers who studied biology in an outdoor laboratory setting developed a better understanding of the social aspects of science and their role in the environment than did those who had the indoor lab experience.

Affect is broadly defined as “a class name for feeling, emotion, mood, temperament” (English & English, 1958, p. 15). Roberts (1990) has written, “The role of affective modes of knowing in learning processes remains an elusive, fragmented area of study. Not only does research cross many disciplinary boundaries, but language about affect changes from one individual to the next” (p. 19). Indeed, constructs which fall into the affective learning domain are notoriously difficult to measure. The situation has improved little since Krathwohl et al. (1964) noted the dearth of evaluative tools and research-based evidence on affect which motivated them to construct the *Taxonomy of Educational Objectives* for the affective domain.

If the strength of nonformal education is to facilitate affective learning gains, what affective goals should nonformal educators target, how can they best attain these goals, and how will the attainment of these goals benefit the learner? To answer these questions, a better understanding of affect as it relates to learning in nonformal educational settings is clearly needed.
Statement of the Problem

The problem to be investigated in this study is: How does affect occur among learners in nonformal educational settings, and what are some possible effects for the learner of the affect stimulated in such settings?

Purpose and Objectives

The purpose of this study is to develop a heuristic model of affect as it occurs with learners in nonformal educational settings. Specific research objectives are:

(a) to synthesize a heuristic model of affect in nonformal educational settings by drawing upon the research literature from pertinent scholarly disciplines (i.e. psychology, education, interpretation, museum studies and visitor behavior),

(b) to scrutinize and elucidate the resulting Model through field work, including consultation and interviews with expert researchers and practitioners in the field, and through naturalistic observation of learners in a variety of nonformal educational settings,

(c) to refine the Model in light of data collected in the field as well as feedback solicited from experts, and

(d) to use the resulting Model to make specific recommendations for further research and standards for practice in the area of affective learning in
nonformal educational settings.

Definitions

The following definitions are relevant to the Model developed as a result of the research, and to the study as a whole.

Affect - A class name for feeling, emotion, mood, temperament (English & English, 1958).

Affective - Pertaining to feeling, emotion, mood, attitude, etc.

Attitude - An enduring, learned predisposition to behave in a consistent way toward a given class of objects (English & English, 1958).

Attracting power - Ability of an exhibit to attract attention (Shettel, 1976).

Awareness - Consciousness of something. The taking into account of a situation, phenomenon, object, or state of affairs (Krathwohl et al., 1964).

Coding - An internal response to a stimulus in interaction with sensory input producing an internal stimulus-as-coded, which becomes associated with an overt behavior (Lawrence, 1963).

Cognitive - Pertaining to thinking, reasoning, remembering, etc.
Collative variables - A class of properties of a stimulus, including novelty, surprisingness, incongruity, complexity, variability, and puzzlingness (Berlyne, 1966).

Commitment - Loyalty, conviction, or certainty in reference to an object or type of behavior (Krathwohl et al., 1964).

Creativity - Ability to find new solutions to a problem or new modes of artistic expression (English & English, 1958).

Effectence - Motivational factor in which humans are said to desire competence in dealing with their environment (White, 1959).


Flow - The holistic sensation that people feel when they act with total involvement. The crucial component of enjoyment (Csikszentmihalyi, 1975).

Felt involvement - A subjective experience or feeling of personal relevance (Celsi & Olson, 1988).

Habituation - An increasingly weaker response over time to a constant stimulus (Bell, Fisher, & Loomis 1978).
Heuristic model - A diagrammatic representation of a concept not based on empirical verification, but designed to stimulate further discussion and/or research.

“Holding” behavior - Behaviors which keep a visitor involved with an exhibit or activity, and thus contribute to its holding power (Meredith, 1993).

Holding power - Ability of an exhibit to command selective attention (Shettel, 1976). Also, the length of time spent by a visitor at a particular exhibit or activity.

Indicating stimuli - Stimuli which serve to direct attention, such as arrows, or verbal directions (Berlyne, 1960).

Interpretation - An educational activity which aims to reveal meanings and relationships through the use of original objects, by firsthand experiences, and by illustrative media, rather than simply to communicate factual information (Tilden, 1957).

Interpretation - A place-specific, organization sponsored, leisure time activity or process involving nonformal environmental education or recreational learning in a leisure setting (Mullins, 1984).

Modeling - Technique in which a desired behavior is demonstrated by a peer (Koran, Koran, Foster, & Dierking, 1988).
Motivation - A process that differentially energizes certain responses, making them dominant over other possible responses to the same situation (English & English, 1958).

Mystery - The degree to which a scene contains hidden information so that one is drawn into the scene to try to find the information (R. Kaplan, 1974; S. Kaplan, 1974) (cited in Bell et al., 1978).

Nonformal education - An educational process which takes place outside or apart from the formal classroom and is supported by some type of institutional structure other than a formal education entity (Meredith, 1993).

Nonformal educational setting - A setting, such as a park, museum, or zoo, in which nonformal education takes place, but which also may serve as a site for formal education.

Peak experience - Moments of great awe, intense happiness, ecstasy or bliss (Maslow, 1962).

Perception - Awareness, or process of becoming aware, of objects or relations or qualities by means of sensory processes and under the influence of internal readiness and prior experience (English & English, 1958).

Psychomotor - Pertaining to muscular or motor activity.
Satiation - A state of relative insensitivity to stimulation that follows exposure to a succession of closely related stimuli (English & English, 1958).

Scanning - Random movement of an organism's sensory systems around the stimulus field in which the organism is found. Scanning may be thought of as the organism's "radar antenna," which brings sensory information to the organism (Plutchik, 1980).

Selective attention - The active selection of and emphasis on one component of a complex experience (English & English, 1958).

Sensation seeking - A personality trait which encompasses thrill and adventure seeking, experience seeking, disinhibition, and susceptibility to boredom. The level of sensation seeking varies among individuals (Zuckerman, 1979).

Sentiment - An enduring tendency to react emotionally and overtly to the object of emotion when the opportunity is given (Arnold, 1960).

Stimulus field - The totality of stimuli that act on the organism at any one moment (English & English, 1958). In the context of the Model, the stimulus field is all of the stimuli surrounding the learner in the nonformal educational setting.

Tonus - A resting, or homeostatic, level of arousal (Day, 1982).
Values - Degrees of worth ascribed to objects or activities (English & English, 1958).

Limitations of the Study

This study is not intended to provide comprehensive or generalizable results for all learners in nonformal educational settings, but rather to lay a groundwork for the understanding of affective processes for practitioners and researchers in the field of nonformal environmental education and interpretation. In disciplines such as psychology, models are seen as precursors to theory and are expected to be linked to empirical data (P. M. Clark, personal communication, 1993). As English and English (1958, p. 326) describe,

A model is a description of a set of data in terms of a system of symbols, and the manipulation of the symbols according to the rules of the system. The resulting transformations are translated back into the language of the data, and the relationships discovered by the manipulations are compared with the empirical facts.

Conversely, the Model developed in this study is a heuristic model intended to serve as a conceptual framework for discussion and further research related to the broad construct of affect as it occurs in nonformal educational settings. While information from empirical research was used in the synthesis of the Model, this study does not provide empirical verification of the Model or its components, but makes suggestions for how the Model, or parts of it, might be investigated or elucidated.

The literature from which this study draws is extensive. While every attempt has been made to perform a comprehensive survey of pertinent literature, it is impossible to ensure that all such literature has been
included. Furthermore, the theoretical perspectives on affect in the field of psychology fall into a number of categories, such as psychoanalytical, neurophysiological, behavioral, phenomenological, etc. The types of literature reviewed were in part limited by the researcher’s areas of competence. For example, an extensive treatment of psychoanalytical or neurophysiological theory would be beyond the expertise of the researcher in this study. Exploration of these areas in further nonformal educational studies may be fruitful, however.

Justification of the Problem

Nonformal environmental education/interpretation is a time and resource intensive process. Personal interpretation programs require staff time for both preparation and presentation, and quality media and exhibitry are expensive to acquire and maintain. In times of financial stress education/interpretation is often the first of an organization’s services to be cut. Knowing this, it is obvious that nonformal educators must strive for maximum efficiency in the planning and implementation of educational programs and services. Furthermore, the field of nonformal education lacks a clear understanding of how its services affect clientele and, likewise, how to effectively set goals for those services. This study aims to elucidate these areas of need.

Nonformal education differs from formal education in a number of significant ways, including audience, objective(s), and setting (Bitgood, 1988; Falk et al., 1986; Screven, 1974 (cited in Busque, 1991)). The philosophy and research related to nonformal education suggest that a main advantage of educational activities in nonformal settings is their
strength in promoting gains in the affective learning domain. Affect as a construct, however, remains poorly defined and weakly understood because of the difficulty in measurement and the eclectic sources of information in this area. Increased understanding of how various components of affect are stimulated will help nonformal educators plan, produce, and implement programming that better capitalizes on the strength of nonformal education.

Affect may have a variety of effects on the learner. It may, for example, enhance cognitive learning (Boyle, 1983; Izard, Nagler, Randall, & Fox, 1965; Winer and Clark, 1989), or may motivate desired changes in behavior. Increased understanding of the influence of affect on the learner will enable interpreters to formulate more specific objectives for desired outcomes of interpretive programming. Such understanding of how specific objectives can be met will also lend support in justifying the need for nonformal educational services in competitive budget situations. Improved understanding of affect will help point to areas of need for further research.
CHAPTER II
REVIEW OF LITERATURE

The three domains into which learning is generally categorized originated with the work of a group of psychologists meeting at a convention of the American Psychological Association in 1948 (Krathwohl et al., 1964). This meeting grew into a project of defining learning objectives in behavioral terms and further placing these objectives into an organizational matrix, or taxonomy. The psychologists and educators working on the project found that most educational objectives could be placed into three major learning domains: cognitive, affective, and psychomotor. The first taxonomy, familiarly known as Bloom's Taxonomy (Bloom, 1956), outlined objectives for the cognitive domain. The *Taxonomy of Educational Objectives, The Classification of Educational Goals, Handbook II: Affective Domain*, published by Krathwohl et al. (1964), was produced as a sequel to that of the cognitive domain after the usefulness of the latter became widely apparent. Eiss and Harbeck (1969) followed up on the work of Krathwohl et al. by developing behavioral objectives in the affective domain for science education with an emphasis on scientific literacy.
Comparison of Formal and Nonformal Educational Settings

Although the Affective Domain Taxonomy was developed for use in formal education, it has also been applied to nonformal education. There are a number of differences between formal and nonformal education which make a direct transfer of a framework developed for formal education to nonformal educational settings difficult. Busque (1991) compares formal and nonformal education, in this case museum education, in terms of four differences: population, participation, activity, and goals. The population in a nonformal educational setting is considerably more heterogeneous compared to a formal setting. Participation in the nonformal learning is voluntary, while it is mandatory in formal learning. The activity in the formal classroom is "closed" while that in a nonformal setting is "open" (Busque, p. 412), and while goals in the formal classroom are generally evident, they are not always evident in the nonformal setting.

In a comparison of museum learning and school learning, Falk et al. (1986) explain that the heterogeneity in the museum population lies in a diversity of age, social background, and motivation. In addition to the differences enumerated by Busque (1991), Falk et al. point out that learning in museums is not evaluated as it is in formal education, so that learning tends to be more intrinsically motivated in the museum. Also, museums tend to support specific, context relevant kinds of learning opportunities as opposed to the more generalized learning environment of the formal classroom. Another important difference is that museums (and other nonformal settings) are social settings where learning occurs in social groupings of the learners' choice. This discussion of setting, however, does not negate museums, zoos, parks, and other nonformal settings as field
laboratories for school children and other formal learners where formal learning is prescribed in the context of a school visit.

Bitgood (1988) enumerates even more differences between formal learning and "informal" learning. One difference is that formal education features a sustained exposure to learning material, while exposures in nonformal education are usually of short duration. Nonformal learners may visit the learning setting for no more than an hour or two, while formal learners are likely to revisit the same classroom for a semester or school year. Also, because of the free-choice nature of the nonformal setting, learning is not prescribed, but controlled by the learner. The structured, unchanging environment of the formal classroom differs from the variable environment of the nonformal setting, and formal learning tends to feature continued contact with an educator while staff contact is less frequent in the nonformal setting. One of the most important differences between formal and nonformal learning is that the latter is usually a leisure activity. Leisure oriented outcomes may be as much an objective in nonformal education as learning of factual information or development of attitudes.

The leisure setting where most nonformal environmental education/interpretation occurs and the casual nature of learning in such a setting emphasize elements of aesthetics, relaxation, appreciation of history, art, and culture, enjoyment, and so on. Thus, the affective process is of great importance in the nonformal educational setting. Although the taxonomic treatment of affect provided by Krathwohl et al. (1964) is well-formulated and useful, there is a need for a treatment that focuses on the unique characteristics of the nonformal educational setting.
Constructs Related to Affect

The complex and often difficult to define concept of affect has been approached from a variety of theoretical perspectives by different researchers and scholars. Many psychological constructs fall under the category of affect. The constructs which have been conceptualized by the researcher in this study as having particular relevance to the affective experience in nonformal educational settings are attention, curiosity and exploration, interest, aesthetic pleasure, play, creativity, emotion, and motivation. A brief introduction to the theories behind attention, curiosity and exploration, interest, aesthetic pleasure, play, and creativity is presented herein, while a more complete treatment of each concept, as it specifically relates to the Model under development, will be offered in Chapter 4. A more comprehensive review of the many theories on emotion and motivation, which do not impact the Model directly but contribute to a fuller understanding of the elements of the Model, is presented in this chapter.

Attention

Shettel (1976) proposed a model of exhibit effectiveness which says that, to be effective, an exhibit must have attracting power, holding power, and teaching power. In other words, the exhibit must attract the attention of the visitor and hold attention long enough to communicate its intended message. Attracting power and holding power are determinants of selective attention, “the processes that determine which elements of the stimulus field will exert a dominating influence over behavior” (Berlyne, 1960, p. 45). Arnold (1960) calls attention the first movement in the desire
to know, or a form of wanting that focuses and initiates perception or action.

Curiosity and Exploration

Much of what is known about curiosity and exploration in animals and humans comes from the work of psychologist D. E. Berlyne (1960). Day (1982) has succinctly summarized Berlyne’s theory by stating, “any environmental condition that contains a moderately high level of uncertainty induces a state of tension in an organism which drives it to explore its environment in order to reduce the tension” (p. 19). As arousal of this tension increases upon stimulation by uncertainty, the subject may enter the zone of anxiety, characterized by avoidance, disinterest, defensiveness, and inefficiency. Thus, too much uncertainty or stimulation may not lead to curiosity but rather to anxious behavior. Berlyne’s (1960) theory places great importance on the collative variables, so called because they involve a comparison between a present and previous stimulus, in the stimulation of curiosity. The collative variables include qualities like novelty, complexity, surprisingness, and uncertainty.

Other theorists postulate that, rather than seeking to diminish arousal by satisfying curiosity through exploratory behavior, humans have a need for variation (Fiske and Maddi, 1961; Maddi, 1961) or competence (White, 1959) and thus seek to expose themselves to stimuli that provide for such needs. These theories explain the behaviors of play and exploration when no apparent stimulus is present to initiate the behavior. Berlyne’s (1960, 1966) theory, however, does allow for such behaviors, which he refers to as diversive exploration, which generally arise from conditions of boredom and seem to be motivated by factors different from curiosity.
Regardless of which theory one ascribes to, qualities such as novelty, surprisingness, incongruity, complexity, variability, and puzzlingness, seem to be conducive to exploratory behavior in human beings. This phenomenon has obvious implications for nonformal education. Koran, Morrison, Lehman, Koran, and Gandura (1984) and Koran, Koran and Longino (1986) found that children, and to a lesser degree, adults, prefer manipulatable exhibits as opposed to comparable exhibit materials at which they can only look. Their interpretation is that the manipulatable materials are preferred because they permit the use of more sensory channels with which to satisfy the arousal of curiosity. On the other hand, Falk, Martin, and Balling (1978) found that the novelty of a field trip environment inhibited the gain of cognitive knowledge in school children. This is consistent with Day's (1982) explanation that too much arousal causes a diminishment in performance, a phenomenon embodied in the Yerkes-Dodson law (Bell et al., 1978). According to this law, performance is best at intermediate levels of arousal, following an inverted U-shaped function.

**Interest**

Unlike curiosity, it is difficult to find a clear definition in the psychology literature for interest. Studies dealing with interest tend to measure it in terms of a subjective interest that is self-reported by the subjects (Berlyne, 1970; Koran, Foster, and Koran, 1989; Washburne and Wagar, 1972). English and English (1958) give a number of definitions, one of which is "the tendency to give selective attention to something" (p. 271). Arnold (1960) defines interest as an impulse to know which becomes organized
A study by Day (1967) indicated that the level of subjective interestingness reported by subjects tended to increase with the complexity of the polygons they were viewing. Busque (1991) constructed a Likert-type instrument to measure the interestingness of exhibits. This measure included four components of interest, which were the ability to arouse enthusiasm, bring about participation, favor apprenticeship, and display aesthetic quality. Thorndike (1935) explains that interest acts in a forward direction to dispose an individual to behaviors associated with the interest, and backwards to confirm positive experiences so that the repetition of these behaviors will be favored.

**Aesthetic Pleasure**

In the psychology of aesthetics it is Berlyne (1971a) who seems to dominate the field. Although Berlyne admits that aesthetic value is not universally associated with pleasure or pleasingness, he confines his arguments to the *outward correlates of pleasure*. He groups together several phenomena, namely pleasure, reward value, positive feedback, attractiveness, and positive incentive, under the heading of positive *hedonic value*. Berlyne makes the case that, like curiosity, the hedonic value of a stimulus depends on how arousing it is.

Not surprisingly, Berlyne (1971a) contends that many of the same variables that tend to stimulate curiosity and exploration will also contribute to positive hedonic value. Accordingly, one would expect interest and pleasure to be positively related, but this is not always the case. Berlyne clearly believes that pleasingness and interestingness are not the same thing. He interprets Day's results (1967), where pleasingness was found to
peak at both high and low points of interestingness, by explaining that visual patterns that are extremely simple are pleasing but uninteresting. Patterns that are both pleasing and interesting are ones that possess both a great deal of complexity and a great deal of internal organization, so that perceptual effort can make sense out of them. Platt (1961) echoes this interpretation with his statement, "One paradox is that our response system demands new information or novelty, and yet at the same time demands regularity or pattern" (p. 405).

Kirkland (1974a), in a study where subjects viewed random polygons and rated them for pleasingness and interestingness, found that the relationship between the two was inverse. In a later study (1974b), however, he concluded that aesthetic pleasure may be considered a subset of interest. Here the inverse relationship held only when subjects were instructed to view polygons for aesthetic pleasure first, and then again for interest. Kirkland's explanation was that viewing for interest demands greater effort than viewing for pleasure, so that when this effort is expended during an initial viewing, pleasure can be derived from subsequent viewings.

Experimental studies like those described above may contribute much understanding to the way learners respond in nonformal educational settings. However, visitors to nonformal settings bring with them complex sets of experiences, tastes, and expectations. Housen (1980) identified five different types of visitors to an art museum, each of whom viewed the exhibits on different levels of aesthetic judgment. These different levels involved interactions of affective and cognitive processes. Housen described the need to devise different interpretive strategies to meet the
needs of diverse visitors.

Play

Singer (1979) makes a connection between play and affect in his description of play as an adaptive resource which helps the child avoid extreme negative affects and maximize positive affects. Many theories about play exist. Ellis (1973) cites some of the historic theorists of play: Play has been seen as occurring as a result of surplus energy (Spencer, 1896), as a result of instinct (McDougall, 1923), or as a recapitulation of the species' history (Gulick, 1898). Other classical theories of play cited by Ellis include play as a preparation for adult life (Groos, 1898), and play as relaxation (Patrick, 1916).

More recently a number of theories of play have emerged. One of these views adult play as generalization, where adults choose leisure activities which are similar to those they find rewarding in their work (Ellis, 1973). Related to this theory is that of compensation, where adults are said to choose leisure activities which compensate for the tendency for their work to deny satisfaction of psychic needs (Ellis, 1973). Play as catharsis theory sees play as a safe and sanctioned means to the release of aggression (Menninger, 1960) (cited in Ellis, 1973). Psychoanalytic theory sees play as a means of mastering unpleasant situations by repeating them under more pleasant circumstances (Freud, 1955) (cited in Ellis, 1973). Piaget is the major theorist in the developmental school of explaining play (Flavell, 1963) (cited in Ellis, 1973). In this view, the growth of the child's intellect causes, and is increased by, play. Still another theory is that play is caused by the same processes that produce learning in the child. The child
seeks to increase pleasant events and decrease unpleasant events, and
play behaviors are reinforced by pleasant events they elicit from the
environment (Ellis, 1973). Play may also be explained as a means of
arousal-seeking (Berlyne, 1960). Related to this is Maddi's (1961) view that
play can be explained by the human need for variation. White (1959) also
claims that effectence motivation is an explanation for play behavior. Ellis
(1973) chooses an integrated theory of play as arousal-seeking, as
learning, and as a developmental process for the child.

Since nonformal education typically takes place within a leisure
framework, play is a natural behavior which may occur in the nonformal
setting. Michaelis (1980) asserts that play is important for good mental
health. Play is also seen as an important vehicle for creativity (Bishop &
contend that the need for creative development continues throughout life,
not just in childhood. They point out the importance of recreation and
leisure in providing healthy playful opportunities for adults.

Creativity

English and English (1958) define creativity as "the ability to find new
solutions to a problem or new modes of artistic expression" (p. 129).
Although psychologists have traditionally characterized creativity as a
cognitive attribute (P. M. Clark, personal communication, 1993), Michaelis
(1980) describes creativity as a fusion of right-brain, affective processes
and left-brain, cognitive processes. He maintains that "the development of
the affective primary process mode is crucial for creativity and mental
health" (p. 75).
Gerard (1962) explains how the brain functions creatively. The process begins with observation and attention, or the perception of experience(s) or object(s), and the fixing of attention on it (them). Next, the experiences are put in some meaningful order, after which the imaginative process of creating new ideas occurs. Pearlman (1983) proposes a list of the characteristics of the creative person. These are effectence motivation (White, 1959), by which the individual is motivated to competently interact with the environment, perceptual attitude and ability, conceptual complexity, or the capacity to consider several disparate ideas simultaneously, deductive-analytic ability, and inductive-synthetic ability. While some individuals may be naturally more creative than others, Parnes (1962) has shown that creative ability can be developed through training.

Bishop and Jeanrenaud (1980) have developed a model of creativity through play which they claim has important implications for the leisure industry. The model stresses the importance of variables like novelty in attention and curiosity, which lead to exploration and play. Crucial to the process is the role of tutors, or parents, relatives, educators, and so forth. If the tutor exerts too much or too little control or provides inappropriate information in the process, creativity will be blocked. What is needed from the tutor is a moderate amount of directiveness and reinforcement of appropriate responses in the exploration process. Bishop and Jeanrenaud criticize that recreation professionals often act as unilateral tutors, exerting too much control over recreation experiences. They express a need for the recreation profession to foster more exploration and play, and likewise, creative behavior.
Emotion

Emotion is a term that is sometimes used synonymously with affect (English & English, 1958). Since the late nineteenth century, numerous theories of emotion have been written. One of the first emotion theorists was Darwin (1872) (cited in Plutchik, 1980), the originator of what Plutchik calls the evolutionary tradition of emotion theory. Darwin developed his theory from detailed descriptions of animal and human behavior and arrived at the conclusion that emotional expression serves adaptive functions, such as communication and preparation for action. Darwin believed that many emotional expressions are innate, while some are learned. He also felt it likely that animals have an innate ability to recognize emotional expressions in others of the same species.

Tomkins' (1962) theory may also be classified as an evolutionary theory (Plutchik, 1980). Tomkins enumerates eight basic emotions, all of which are innate and which originate in facial responses. These emotions are interest-excitement, enjoyment-joy, surprise-startle, distress-anguish, fear-terror, shame-humiliation, contempt-disgust, and anger-rage. Tomkins believes the emotions are determined by the intensity and density of neural firing in the facial muscles, which provide feedback to other body systems and to the brain.

Plutchik (1980) refers to his theory as a psychoevolutionary theory of emotion. He proposes that there are eight basic adaptive functions in all organisms: protection, destruction, reproduction, reintegration, incorporation, rejection, exploration, and orientation. Corresponding to these eight functions are eight primary emotions, which also occur to some degree in all organisms. Plutchik arranges these eight primary emotions,
(fear, anger, joy, sadness, acceptance, disgust, anticipation, and surprise) two-dimensionally in a circle, much like primary colors on a color wheel. The third dimension in the model is the emotion’s intensity, or level of arousal ranging from sleep to maximum excitement. In Plutchik’s model, a mixing of one or more of the eight primary emotions results in complex emotions, just as a mixing of primary colors gives complex colors.

James (1884/1968) was another emotion theorist of the nineteenth century. His theory, became known as the James-Lange theory, which Arnold (1968) describes as the “first contribution of the young science of psychology to emotion” (p. 15). James’ theory was that an emotion is the feeling of visceral bodily changes that occur in response to a stimulus. Thus, rather than perceiving a stimulus, experiencing an emotion, and then experiencing physiological changes, a person perceives the stimulus and experiences the physiological changes, the awareness of which is the emotion.

Cannon (1927/1968) criticized the James-Lange theory with several convincing arguments, including experiments which demonstrated that dogs with cut spinal chords still showed emotional reactions even though it was impossible for them to have feedback from the visceral system to the brain. Cannon proposed an alternative theory based on experiments he and his associates carried out (Cannon, 1928) (cited in Plutchik, 1980). The theory is that the perception of a stimulus arouses the hypothalamus in the brain, which leads to simultaneous subjective experience of emotion and physiological changes. This theory, which became known as the Cannon-Bard theory, falls into what Plutchik (1980) calls the neurological
Bull's (1951) (cited in Izard, Wehmer, Livsey, & Jennings, 1965) attitude theory of emotion emphasizes motor and neurophysiological processes and is reminiscent of the James-Lange theory (James, 1884/1968). Bull contends that, in response to the stimulus, a neural predisposition leads to a motor attitude, or a physical readiness to act. The mental awareness of the motor attitude is affect.

Some theorists held that emotions are tied to instincts or drives. Shand (1914/1968), for example, named fear, anger, disgust, and curiosity as primary instinct systems. McDougall (1928/1968) felt feelings and emotions are incidental to striving activities, or impulses. McDougall called appetition and aversion the two basic forms of primitive striving. These primitive strivings evolved into impulses directed toward specific goals, which then found expression in specific systems of bodily activity. The subjective quality associated with each bodily system is a primary emotion.

Plutchik categorizes Watson, Tolman, Skinner, and Millenson as behaviorist theorists. Watson (1924) (cited in Plutchik, 1980) defined emotions as hereditary pattern-reactions which involve changes in bodily systems. Thus, the basic patterns of emotions are unlearned, although learning can modify the non-physiological aspects of the patterns. In addition, Watson spoke of the activity level of an emotion, which determines its intensity. Tolman's (1923) (cited in Plutchik, 1980) emphasis was on defining emotion in terms of the relationship between specific stimuli and responses. The response in an emotion acts to change some aspect of the stimulus. Skinner (1953) viewed emotions as predispositions to action. Millenson (1967) (cited in Plutchik, 1980) discussed emotion in terms of
positive and negative reinforcers. He recognized three basic emotions: Anxiety results from negative reinforcers, anger results from the termination of positive reinforcers, and elation results from either positive reinforcers or termination of negative reinforcers. All other emotions result from different intensities of positive and/or negative reinforcers.

McTeer (1972) presents a review of some of the theories which emphasize emotion as a subjective mental experience. Wundt (1904) (cited in McTeer, 1972) proposed a tri-dimensional theory of feeling in which the three dimensions are strain and relaxation, excitation and quiescence, and pleasantness and unpleasantness. Schlosberg (1954) (cited in Plutchik, 1980) also presented a three-dimensional theory, with the dimensions of attention-rejection, level of activation, and pleasantness-unpleasantness. More recently, Russell and Mehrabian (1977) have presented evidence from a multiple correlation study that all emotions boil down to dominance-submissiveness, arousal, and pleasure-displeasure. Arousal and level of activation are comparable to Wundt's excitation and quiescence, so that the three theories agree on at least two dimensions.

Titchner (1917) (cited in McTeer, 1972) disagreed with Wundt's tri-dimensional theory, stating instead that affective experiences can all be placed on the one-dimensional continuum of pleasantness-unpleasantness. Carr (1925) (cited in McTeer, 1972) agreed with Titchner's one-dimensional theory of feeling, but added that feelings function as judgments of particular situations, which are judged as either pleasant or unpleasant. Pleasant judgments arise from the continuation of activities progressing toward a goal. Carr emphasized that feelings are constantly changing so that the individual cannot be constantly aware of any one
feeling. Krueger (1928) (cited in McTeer, 1972) approached the experience of feeling and emotion from the perspective of the Gestalt psychologists and proposed that feelings are the quality of the whole of experience at any one moment. McTeer (1972) favors a merging of the Carr and Krueger approaches, describing feelings as overarching judgments of momentary experience.

In contrast to the theorists who emphasized subjective experience, there are others who take no account of the experience of emotion. Duffy (1941/1968) writes that "‘emotion,’ as a scientific concept, is worse than useless” (p. 129). Duffy states that what is generally referred to as emotion can be better explained in terms of change in energy level or degree of motivation. Hebb (1949/1968) also maintains that emotion is not a category of consciousness. Rather, neural processes produce emotional behavior. Hebb also describes emotion as a disorganizing force because it disrupts or inhibits the normal functioning of the individual. Hebb is joined by other theorists in this view of emotion as disorganizing (Claparede, 1928/1968; Pradines, 1958/1968; Young, 1961/1968).

Leeper (1948/1968a, 1963/1968b) argues vehemently against the idea that emotions are disorganizing. Rather than being disorganizing, Leeper believes emotions are motivational in nature. Young (1961/1968) also sees affective processes as being motivational. He places affective processes on a hedonic continuum from extreme negative (distress) to extreme positive (delight) and thus claims that they have sign, intensity, and duration. Young says that affective processes organize and regulate behavior, although, like Hebb (1949/1968), he names emotions as a special disorganizing class of affect.
Lazarus (1968) (cited in Plutchik, 1980) rejects that emotions are motivational, focusing instead on emotion as a coping response. Lazarus says all emotions begin with a cognitive appraisal of the situation facing the organism. The appraisal determines the adaptive action the organism will take, such as attack or avoidance, and the emotion that will be experienced.

The role of cognition is also important to the theory of Schacter and Singer (1962), who performed the classic experiment which suggests that emotional states are a function of physiological arousal plus a cognition that is appropriate to the state of arousal. They proposed that people cognitively label their emotions according to the cognitive aspects of the situation they are in, but that they will experience these emotions only if physiologically aroused. The experimenters injected subjects with epinephrine to induce physiological arousal, and supplied the subjects with plausible cognitive labels by placing them with people who displayed anger or euphoria. Schacter and Singer's results supported their theoretical proposition, but they have been criticized on methodological and analytical grounds (Maslach, 1979; Plutchik, 1980), leaving the position of their theory ambiguous.

Arnold (1960) also stresses the importance of cognition in emotion, but unlike Lazarus (1968) (cited in Plutchik, 1980), does see emotion as motivational. In Arnold's theory, emotion begins with a perception of the stimulus, after which the cognitive appraisal is made. The emotion which follows is a felt tendency toward or away from the stimulus, depending on whether the appraisal indicates the stimulus is beneficial or harmful. Action, such as approach or withdrawal, then completes the sequence.
Bertocci (1988) puts forth a theory of primary emotions which argues that primary emotions are in fact unlearned motivations. The author likens the experience of these primary emotions to that of recognizing a color: The experience itself cannot be explained or learned. Only the name associated with the experience can be learned. For example, the feeling of respect cannot be known by an individual unless it is experienced, while the meaning of the word “respect” can be learned. Bertocci describes a number of primary emotions, including sex and organic needs, anger, fear, tenderness, zest, sympathy, wonder and creativity.

Buck (1984) proposes a model of emotion which incorporates an evolutionary viewpoint, an account of emotion-directed behavior, and emotion as subjective experience. He identifies three aspects of emotion: one that involves homeostasis and adaptation, one that involves external expressive behavior, and one that involves subjective experience. Buck describes the site of emotional reactions as PRIMES, the primary motivational/emotional systems associated with neurochemical systems. Affective stimuli are said to act directly on these neurochemical systems without any cognitive mediation. Emotional responses impact the cognitive system, however, and influence conscious, goal-directed behavior. Emotion I incorporates physical responses which occur through the autonomic nervous system and the endocrine system. Emotion II involves the external display of the state of the neurochemical systems, like postures and facial expressions. Emotion III involves direct subjective experience of the state of neurochemical systems.

Another theoretical perspective comes from Csikszentmihalyi (1975) and his study of flow. Csikszentmihalyi calls flow theory "a theoretical
model for enjoyment" (Chapter 4), which derives from his study of people engaged in autotelic, or intrinsically-motivated, activities. The specific activities in the study are chess, rock climbing, rock dancing, and performing surgery. Flow is experienced when there is a perfect balance between worry and boredom. When activities are seen to be stimulating beyond boredom yet still within the capabilities of the individual, flow is experienced.

Motivation

Psychology has traditionally divided mental function into the three categories of cognition, affect, and conation, which can be roughly restated as thinking, feeling, and volition, respectively. Conation is the mental process of motivation. More recently, theorists have tended not to view conation as a separate mental process, but as a process that is part of all mental functioning, whether it be cognitive or affective (English & English, 1958). Indeed, motivation is closely intertwined with all aspects of human behavior and consciousness.

Logon and Gordon (1969) define motivational factors as relatively temporary and reversible states that tend to energize or activate behavior. They are careful to point out that learning, which is a gradual, cumulative and persistent process, does not directly depend on motivation, which is transitory and reversible. Motivation can affect what and how much one chooses to learn, however.

There are many different theoretical approaches to the phenomenon of motivation. Marx and Tombaugh (1967) review the psychoanalytical theories of Freud, Jung, Adler, and Horney. Freud stressed the influence of
drives and the unconscious on behavior. Jung, a disciple of Freud, felt that behavior is pulled by the future goals of individuals as well as by drives. Adler stressed the importance of social factors in motivation, and Horney, while adhering to much of Freudian psychology, also stressed the social and cultural foundations of personality. The main sources of data for the formation of the psychoanalytic theories are clinical interviews and case studies. This school of theory has thus been criticized because of the confounding factor of not being able to separate the effects of the therapist from the effects of the theory, and also because it does not lend itself to empirical testing.

Murray (1964) discusses the cognitive, hedonistic, instinct, and drive theories of motivation. Central to the cognitive theories, which hold that behavior is a result of conscious cognitive decisions, is the concept of free will (Murray, 1964). Marx and Tombaugh (1967) refer to cognitive theory as field theory. They define field as "a psychophysical environment with its antecedent-consequent relations" (p. 61), and explain that field theorists are interested in analyzing entire situations rather than focusing on specific aspects of those situations. Perhaps the most important field theorist is Lewin (1935, 1936) (cited in Marx & Tombaugh, 1967), who conceptualized behavior in terms of the life space. The life space is the person and the psychological environment. For Lewin, motivation is an interaction between energy, need, and tension. When a need is aroused, a state of tension results, which requires the expense of energy to be reduced. The Zeigarnik (1927) (cited in Marx & Tombaugh, 1967) effect, in which subjects are shown to have better recall of interrupted tasks, is an illustration of tension in action.
Another cognitive theory is Festinger's (1957) (cited in Marx & Tombaugh, 1967) theory of cognitive dissonance. The theory assumes that cognitions associated with behavioral situations can be either consonant or dissonant. Dissonance induces a tension, which the individual will be motivated to change either by changing behavior or changing cognitions.

Hedonistic theories, prominent in the eighteenth and nineteenth centuries, are organized around the idea that behavior is moderated by the seeking of pleasure and the avoidance of pain. Hedonistic theory is supported by an experiment performed by Olds (1954) (cited in Murray, 1964), which demonstrated that there are distinct areas of the brain which, when stimulated, produce sensations of pleasure and punishment. Olds' experiment showed that rats would learn to press a bar to provide electrical stimulation to the pleasurable area of the brain, and that they never seemed to tire of doing so. The affective-arousal theory of McClelland et al. (1953) (cited in Murray, 1964) is representative of a modern hedonism. According to McClelland et al., motivation is a learned anticipation of a feeling of pleasure or pain in association with particular stimuli. Goals learned to produce pleasure are approached while those learned to produce pain are avoided.

Murray (1964) reports that the instinct theory of motivation dates back to Charles Darwin, who believed that certain actions arise through natural selection and are inherited. Instincts are thus unlearned behavioral tendencies. McDougall (1908, 1923) (cited in Marx & Tombaugh, 1967) is an example of an instinct theorist. McDougall used the term propensity to describe the inherited tendencies which motivate thought and action. Instincts are rigid, specific propensities, while capacities are experientially
pliable, nonspecific tendencies. In McDougall's view, behavior occurs in a sequence beginning with perception of a stimulus, which then activates the instinct to which cognitive and emotional elements are related. The cognitive elements then direct the instinctive behavior. Each instinct has an associated, unmodifiable emotion associated with it. McDougall set out to list the various instincts and associated emotions which influence human behavior. Some of these instincts are hunger, reproductive, flight, curiosity, and gregariousness.

Tinbergen (1951) (cited in Marx & Tombaugh, 1967) defines instinct in terms of a neurological entity which responds to external and internal stimuli to release and direct impulses. Instincts are composed of drives which motivate specific behaviors within the instinct. Behaviors are divided into appetitive and consummatory acts. For example, in mating behavior, searching for a mate is an appetitive behavior, while the act of mating is consummatory. The consummatory act constitutes the achievement of a goal, which decreases the motivation.

Murray (1964) describes drive theory as the most prominent motivation theory. The theory assumes that psychological drives to certain behaviors serve to return the body to an internal state of homeostasis. Reduction of these primary, homeostatic drives is rewarding. Secondary drives are not the result of deviation from homeostasis, but are learned responses to outwardly rewarding situations (English & English, 1958). Rewarding goals which arouse secondary drives are known as incentives. Although he is termed a field theorist by Marx and Tombaugh (1967), Tolman's (1959) (cited in Marx & Tombaugh, 1967) theory utilizes drives as the major independent variables in behavior. Rather than stressing
behavior as a reduction of a drive, however, Tolman describes behavior as
purposive, toward or away from a goal. Tolman's theory includes a
behavioral space similar to the life space of Lewin (1935, 1936) (cited in
Marx & Tombaugh, 1967).

Hull (1943, 1952) (cited in Marx & Tombaugh, 1967), the founder of
what is known as the stimulus-response, or S-R, school of learning theory,
places great emphasis on the concept of drive. Hull's theory is a
mathematical treatment of behavior involving input variables, intervening
organismic variables, and output variables. Drive, along with incentive
reinforcement and habit strength, is an input variable. Spence (1956, 1960)
(cited in Marx & Tombaugh, 1967) later upgraded the importance of
incentive reinforcement to that of incentive motivation. Another modification
of Hull's theory is the Dollard-Miller theory (Miller and Dollard, 1941;
Dollard and Miller, 1950) (cited in Marx & Tombaugh, 1967). Miller and
Dollard combined Freudian psychoanalytic ideas with Hull's theory to arrive
at the position that personality is largely a product of learning. In their view,
personality and learning are characterized by drive (wanting), cue
(noticing), response (doing), and reward (getting). Again, motivation is
basically a function of drives, both primary and secondary.

Birch and Veroff (1966) propose a theory of motivation which draws
on various theoretical schools, particularly the instinct and drive schools,
and is organized around seven incentive systems. Birch and Veroff speak
of instrumental (appetitive) and consummatory activities, as does Tinbergen
(1951) (cited in Marx & Tombaugh, 1967). They emphasize three main
determinants of behavioral tendencies: incentive, motive, and
consummatory value. Incentives are consequences of behaviors that cause
the organism to either approach or avoid the consequences. Motive, as defined by Birch and Veroff, is the strength of the attraction or repulsion to the incentive. Consummatory value is the potential of a consummatory activity to be reduced by its own occurrence. Certain activities have more consummatory value than others. For example, eating a large meal when hungry has greater consummatory value than eating a light snack. Birch and Veroff propose that incentive, motive, goal-related activities and consummatory values form a network of motivational variables known as an *incentive system*. They postulate that seven main incentive systems account for most of human behavior. These are the sensory, curiosity, affiliative, aggressive, achievement, power, and independence incentive systems.

In his review of the various theories of motivation, Murray (1964) reports that there are several types of motivation, including homeostatic, sexual, emotional, and intrinsic (including social) motivations. Homeostatic motives, like hunger and thirst, operate to maintain normal physiological functioning. Sexual motivation is also linked to physiological functioning. Emotions, too, have motivating effects on behavior. In fact, Leeper (1963b) contends that motivation runs along a continuum from purely emotional to purely physiological. He cites sexual motivation as an example which falls at an intermediate point along the continuum. While some theorists would claim that all motivations are derived from basic drives, others feel that some motives are simply innate, or intrinsic. Examples of motivations which may be intrinsic are sensory, curiosity, manipulatory, and social motivations. Two social motivations which may be of particular interest in the nonformal educational setting are affiliative and achievement motivations. Murray
(1964) describes the affiliative motive as "a desire to be with people in an affectionate and friendly relationship" (p. 102). The achievement motive has been studied by McClelland et al. (1953) (cited in Murray, 1964). It is, very simply, a desire to be successful (Murray, 1964). It may involve the manipulation and organization of objects, people, and/or ideas.

In keeping with the theory that some motivations are intrinsic, White (1959) introduced the idea of competence as a motivational factor in humans and other animals. His thesis is that behaviors, particularly those of exploration, attention and perception, language and thinking, manipulating surroundings, and producing changes in the environment, are not adequately explained by classical drive theory. Instead, these behaviors are part of a process in which the individual learns to effectively interact with the environment. Engaging in such behaviors produces a feeling of efficacy. The motivation to engage in them is therefore termed effectence motivation.

Maslow (1970) proposes what he calls a "holistic-dynamic" (p. 35) theory of human motivation which derives mostly from clinical observations. The theory is based on a hierarchy of seven basic classes of needs. The next level of needs in the hierarchy does not become evident until the current level is satisfied. The hierarchy is as follows: (a) physiological needs, (b) safety needs, (c) need for belongingness and love, (d) esteem needs, (e) need for self-actualization, (f) desire to know and understand, and (g) aesthetic needs.

Many forms of motivation may come into play in the nonformal educational setting. Screven (1974) ascribes to the concept of incentive motivation when in recommending that an exhibit should reward the visitor
with feedback for attending to the content of the exhibit. Glaser and Cooley (1973) seem to refer to effectence motivation in suggesting that students will be motivated by a feeling of control and self-management if they are able to manipulate changes in a display. Curiosity and manipulatory motivations are other examples of forces which may be aroused to influence behavior in the nonformal setting.

The overview of the concepts presented in this chapter provide a basis for more fully understanding the background for the study presented herein. Chapter 4 will continue to build upon this chapter in terms of exploration and reporting of relevant literature.
CHAPTER III
METHODOLOGY

Research Design

The research was conducted as a developmental study aimed at developing and refining a heuristic model of affective processes in nonformal educational settings. The model developed should serve as a framework, a sort of comprehensive hypothesis, for discussion and research on affective processes in nonformal education. Therefore, the focus of the research was hypothesis generating rather than hypothesis testing. Such an objective called for gathering open-ended information about the population and phenomena of interest from a variety of sources and using this information to synthesize the hypothetical model. Thus, naturalistic, also known as qualitative, methodology was deemed the most appropriate means to achieving the research objectives of this study. The methodology was naturalistic in that variables were not manipulated, hypotheses were not tested, and generalized conclusions from the research to the population of interest were not made.

A method of hypothesis formulation known as analytic induction (Robinson, 1951/1969) was employed to carry out the research. Analytic induction consists of:
(a) formulating a rough definition of the phenomenon to be explained,
(b) formulating a hypothetical explanation of the phenomenon,
(c) studying a case of the phenomenon to determine if the hypothesis fits the facts of that case,
(d) if the hypothesis does not fit the facts, reformulating the hypothesis or redefining the phenomenon, and
(e) repeating steps (c) and (d) until practical certainty is reached.

In the context of this study, the hypothesis to be refined by the method of analytic induction is the Model explaining the phenomenon of affect in nonformal educational settings. Specifically, the research was carried out in stages (see Figure 1), as follows:

1. An extensive literature review from a variety of disciplines that have relevance to the study of affect was performed. Disciplines from which literature was reviewed included psychology, education, interpretation, museum studies, visitor behavior, leisure studies, and related areas.

2. Drawing from the information found in the literature, a model of affective response/learning specifically applicable to nonformal educational settings (Model 1) was synthesized. Model 1 was the original hypothetical explanation to be refined through the analytic induction process.

3. Field research was conducted. The field research consisted of:
   (a) solicitation of review comments from a panel of researchers with expertise in fields pertinent to the model,
   (b) conducting in-depth interviews with practitioners of nonformal education, such as designers of interpretive programs/exhibits and practicing
Figure 1. Stages and sequence of the research.
nonformal educators, and
(c) observations of learners in nonformal educational settings.
The purpose of the field research was to identify negative cases (Patton, 1990) which might lead to a reformulation of Model 1. Searching for negative cases is also a means for controlling for researcher bias in naturalistic inquiry.

4. Model 1 was revised in light of the data collected in stage 3. Revision took place both concurrently with and following field research. The revised model will be referred to as Model 2.

5. Model 2 was subjected to review by the participants described in stage 3. This stage offered an opportunity to discern further negative cases, and constituted a form of member checks (Guba, 1981), where patterns emerging from the data are checked against the perceptions of participants.

6. Model 2 was further revised using feedback obtained in stage 5, resulting in the Final Model.

7. A final description of the affective processes relating to nonformal environmental education was formulated. Recommendations for further research and for standards of practice based on the Final Model were made.
Sampling

The population of interest for this study is learners in nonformal educational settings. Characteristics of this population tend to be somewhat site specific (G. W. Mullins, personal communication, 1993). For instance, visitors to national parks tend to be above average in income and education. Visitors to local nature centers tend to represent a cross-section of the community in which the facilities are located. Information about the population of interest was gained in this study through a review of literature, consultation with experts who are familiar with the population, and observations of samples of the population.

Purposeful sampling (Patton, 1990) was undertaken to derive information from all three of the above sources. Purposeful sampling in naturalistic inquiry involves the deliberate selection of information-rich cases which can be studied in depth rather than the random sampling of representative cases from which generalizations to the population can be made. Thus, results from this study are not generalizable to the population of all learners in nonformal educational settings, but may be transferable to settings similar to those studied herein.

Review of the Literature

The review of literature was the source of information from which the initial hypothesis (Model 1) to be refined through the process of analytic induction was synthesized. Literature was sampled to provide information about affective responses in the population of interest, learners in nonformal educational settings. Both theoretical and empirical literature was reviewed from a variety of scholarly disciplines, including psychology,
education, visitor behavior, museum studies, and leisure science, that were conceptualized by the researcher as having bearing on the research objectives. Specifically, readings presenting empirical evidence and/or theory on the constructs of aesthetic response, attitude, creativity, curiosity and interest, effects of affect on cognition, emotion, motivation, perception and attention, and play were reviewed. Much of this literature did not focus specifically on learners in nonformal educational settings, but attempted to elucidate universals of human response and behavior. Such literature therefore offered information on nonformal educational learners insofar as the latter are a subset of human beings in general. More applied readings dealing with the effects of exhibitry and other educational stimuli on learners in nonformal educational settings were also included in the review, however.

The sampling strategy for the literature review was that of redundancy (Lincoln & Guba, 1985) (cited in Patton, 1990), or to the point "when no new information is forthcoming from new sampled units" (Patton, p. 186). An initial listing of references to be reviewed was compiled from library database searches. Further lists were compiled from the references cited in the readings from the initial list. This process was continued until no new authors providing relevant information were encountered in the citations of readings being reviewed.

Experts Familiar with the Population of Interest

A variety of professionals work in the field of nonformal education. Researchers in the field include psychologists, educators, visitor behavior and museum studies experts, and leisure scientists. Additionally, the work
of researchers in related fields, such as educational psychology focused on formal education, may have relevance to the study of learner responses in nonformal settings. Practitioners in nonformal education include designers of exhibits and educational materials, and museum educators and natural history interpreters who plan and/or carry out nonformal educational programs. Professionals from these different areas have knowledge about the population of interest which stems from their own professional perspective. The field research component of this study (stage 3) sought to gather information from a sample of these professionals as a source of knowledge about the population of interest.

The sampling strategy for selecting experts to be participants in the field research component of the study was stratified chain sampling (Patton, 1990). Chain sampling begins with asking knowledgeable individuals for recommendations of possible participants. As recommended participants are contacted, they in turn make recommendations for additional participants. In this study, chain sampling began with consultation of committee members and advisors and progressed until a panel of participants was complete. The sample included two strata, researchers with expertise in nonformal education or related fields, and practitioners of nonformal education.

Sample size in purposeful sampling for naturalistic inquiry is determined by the type and amount of information needed for the purposes of the study rather than by a minimum number needed for generalizability to the population. Patton (1990) recommends setting a priori a minimum sample size "based on expected reasonable coverage of the phenomenon given the purpose of the study" (p. 186). A minimum of n=5 for each stratum
was set before the field research component of this study was undertaken. Five participants in the practitioner stratum would allow for at least one or two exhibit designer(s), one or two museum educator(s), and one or two natural history interpreter(s). Five participants in the researcher stratum would allow for at least one or two psychologist(s), one or two visitor behavior/museum studies expert(s), and one or two leisure scientist(s). Thus, five participants in each stratum would provide reasonable representation from the variety of professionals of interest to the study.

Prospective participants were contacted by telephone to invite their participation in the study. The final panel of participants consisted of six researchers and eight practitioners. The names of the participants and brief professional profiles are given in Table 1.

Observations of Learners in Nonformal Educational Settings

An obvious source of information about the population of interest was direct observation of samples of the population. Consequently, the field research component of the study included unobtrusive observations of learners in a variety of nonformal educational settings.

The sampling strategy for observations in the field was a selection of typical cases (Patton, 1990) that were accessible to the researcher. For the purposes of this study, typical cases refer to nonformal educational facilities judged to be reasonably typical in the broad realm of nonformal educational facilities. Judgment as to what constituted typical cases was made by the researcher in consultation with members of the advising committee, who have expert knowledge of regionally located nonformal educational facilities. Labeling the facilities sampled as typical does not imply that they
<table>
<thead>
<tr>
<th>Participant</th>
<th>Profile</th>
<th>Stratum</th>
</tr>
</thead>
</table>
| Dr. James Bigley            | **Assistant Professor,**  
Dept. Recreation & Leisure Services  
Georgia Southern University  
* Teaches courses in organizational behavior, leisure studies, public relations, and museum management.  
* Research interests in museum & historic site development & management, and marketing applications in visitor behavior and heritage tourism.                                                                                                                | Researcher|
| Dr. Stephen Bitgood        | **Professor of Psychology,**  
Jacksonville State University  
President, Center for Social Design, a non-profit visitor behavior consulting organization.  
* Teaches courses in introductory, environmental, and cognitive psychology.  
* Research interests in visitor studies, environmental psychology, and environmental design.                                                                                                                |           |
| Dr. Minda Borun            | **Director of Education,**  
The Franklin Institute Science Museum, Philadelphia  
* Administers museum educational programs.  
* Conducts program evaluation and research on museum-based learning.                                                                                                                                                                                                         |           |
| Dr. Philip Clark           | **Professor of Psychology,**  
The Ohio State University  
* Teaches courses in developmental and educational psychology.  
* Research interests in development of cognitive differences and creativity and its development.                                                                                                                                                                   |           |
| Dr. Marilyn Hood           | **Consultant,** Hood Associates, Columbus, Ohio  
* Specializes in audience research and development for nonformal educational facilities.                                                                                                                                                                                                 |           |
| Dr. Antoinette Miranda     | **Assistant Professor,**  
Educational Services and Research, The Ohio State University  
* Conducts research in school psychology.                                                                                                                                                                                                                             |           |
<table>
<thead>
<tr>
<th>Participant</th>
<th>Profile</th>
<th>Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ann Culek</td>
<td>Program Director, Slate Run Historical Farm, Columbus (OH) Metro Parks</td>
<td>Practitioner</td>
</tr>
<tr>
<td></td>
<td>* 10 years experience as a living history interpreter.</td>
<td></td>
</tr>
<tr>
<td>Karen Johnson</td>
<td>Naturalist 1, Blendon Woods Metro Park, Columbus, OH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 8 years experience as both a formal and nonformal educator.</td>
<td></td>
</tr>
<tr>
<td>Betsy Feldkamp</td>
<td>Doctoral Student, College of Education, The Ohio State University</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Formerly Special Events Coordinator at the Cincinnati Museum of Natural History</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 8 years experience as a museum educator.</td>
<td></td>
</tr>
<tr>
<td>Tim Mason</td>
<td>Licking County (OH) Park District Commissioner</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 12 years experience as an outdoor educator.</td>
<td></td>
</tr>
<tr>
<td>Beverly Mosley</td>
<td>Beverly Mosley Associates Retired exhibit designer with the Ohio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Historical Society</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 40 years experience in exhibit design.</td>
<td></td>
</tr>
<tr>
<td>Leslie Phillips</td>
<td>Interpretive Naturalist 2, Blendon Woods Metro Park, Columbus, Ohio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 14 years experience as a natural history interpreter.</td>
<td></td>
</tr>
<tr>
<td>Joseph Wisne</td>
<td>Director of Exhibit Development, Center of Science &amp; Industry (COSI),</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Columbus, Ohio</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 3 1/2 years working as a science museum educator, and 2 1/2 years as an exhibits specialist.</td>
<td></td>
</tr>
<tr>
<td>Janet Mackenzie</td>
<td>Retired Naturalist, Sharon Woods Metro Park, Columbus, Ohio</td>
<td></td>
</tr>
<tr>
<td>Yoerger</td>
<td>* 8 years experience as a professional natural history interpreter, preceded by 13 years experience as a volunteer naturalist.</td>
<td></td>
</tr>
</tbody>
</table>
are necessarily representative of all nonformal educational facilities. It does imply that care was taken to avoid unusual or atypical settings for data collection.

Observations were carried out on learners in a sample of 13 typical nonformal educational facilities located within a four-hour driving radius of the researcher's base of operations. Typical facilities included were zoos, nature centers, natural history museums, science museums, and art museums. Because the numbers and types of visitors to nonformal educational facilities can be expected to differ at different times of the day or week, observations were scheduled so that the number of morning and afternoon and weekend and weekday observations were roughly equal. Table 2 lists the 13 facilities sampled and the dates and times of all observations made at the facilities.

Instrumentation

Three "instruments" were developed for data collection during the field research component of the study: a document to be reviewed by the researcher stratum of the participant panel, an interview schedule for in-depth interviews with the practitioner stratum, and an observation strategy for collecting observational data.

Document for the Researcher Stratum

A document, entitled "A Preliminary Model of Affect in Nonformal Educational Settings" (see Appendix A), was developed to describe the synthesis of Model 1 and to present Model 1 to the researcher stratum of the participant panel. Included in the document were background information
Table 2. Dates, times, and special conditions of observations made in the field.

<table>
<thead>
<tr>
<th>Facility</th>
<th>Date(s) of Visit</th>
<th>Time of Observation(s)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Center of Science &amp; Industry (COSI), Columbus, Ohio</td>
<td>Monday, 3/15/93</td>
<td>12:00 - 3:30 pm</td>
<td>Several school groups until about 2:00 pm, then light visitation.</td>
</tr>
<tr>
<td>The Indianapolis Museum of Art</td>
<td>Friday, 3/19/93</td>
<td>11:00 am - 2:45 pm</td>
<td>Light visitation.</td>
</tr>
<tr>
<td>The Children's Museum, Indianapolis, Indiana</td>
<td>Saturday, 3/20/93</td>
<td>10:30 am - 2:45 pm</td>
<td>Extremely crowded. NCAA basketball tournament in Indianapolis same weekend.</td>
</tr>
<tr>
<td>The Indianapolis Zoo</td>
<td>Sunday, 3/21/93</td>
<td>10:00 am - 12:30 pm</td>
<td>Light visitation. Weather chilly and overcast. NCAA game being played in Indianapolis same day.</td>
</tr>
<tr>
<td>The Indiana State Museum, Indianapolis, Indiana</td>
<td>Sunday, 3/21/93</td>
<td>1:20 pm - 4:00 pm</td>
<td>Light visitation. NCAA game being played in Indianapolis same day.</td>
</tr>
<tr>
<td>The Ohio Historical Center, Columbus, Ohio Museum</td>
<td>Saturday, 3/27/93</td>
<td>9:20 - 11:45 am</td>
<td>Light visitation.</td>
</tr>
<tr>
<td>Ohio Village (recreated civil war era village)</td>
<td></td>
<td>11:50 am - 1:05 pm</td>
<td>Light visitation. Weather chilly with intermittent light rain.</td>
</tr>
<tr>
<td>Facility</td>
<td>Date(s) of Visit</td>
<td>Time of Observations(s)</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>----------------------</td>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Blendon Woods Metro Park, Columbus, Ohio</td>
<td>Saturday, 3/27/93</td>
<td>2:00 - 3:00 pm</td>
<td>Moderate to heavy visitation despite chilly, rainy weather.</td>
</tr>
<tr>
<td>Waterfowl Observation Blinds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Cleveland Museum of Natural History</td>
<td>Tuesday, 3/30/93</td>
<td>11:30 am - 3:00 pm</td>
<td>Several school groups during the morning hours, then light visitation. Observer was ill.</td>
</tr>
<tr>
<td>The Cleveland Metroparks Zoo</td>
<td>Wednesday, 3/31/93</td>
<td>11:30 am - 1:30 pm</td>
<td>New facility. Heavy visitation. Long line of visitors waiting to enter facility. Observer was ill.</td>
</tr>
<tr>
<td>Rainforest (2-acre indoor exhibit featuring rainforest animal and plant species)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Columbus (OH) Museum of Art</td>
<td>Friday, 4/2/93</td>
<td>10:00 - 11:15 am</td>
<td>Tour group consisted of four 5th grade girls, four first grade girls, one first grade boy, and a female adult leader, all from a local parochial school.</td>
</tr>
<tr>
<td>Docent-led school group tour</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility</td>
<td>Date(s) of Visit</td>
<td>Time of Observations(s)</td>
<td>Comments</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>--------------------</td>
<td>-------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>The Cincinnati Museum of Natural History</td>
<td>Monday, 4/5/93</td>
<td>1:15 - 4:55 pm</td>
<td>Moderate visitation.</td>
</tr>
<tr>
<td></td>
<td>Tuesday, 4/6/93</td>
<td>11:30 am - 1:30 pm</td>
<td>Moderate visitation.</td>
</tr>
<tr>
<td>Blacklick Woods Metro Park, Columbus, Ohio</td>
<td>Saturday, 4/10/93</td>
<td>1:00 - 2:50 pm</td>
<td>Tour group consisted of</td>
</tr>
<tr>
<td>Naturalist-led Wildflower Walk</td>
<td></td>
<td></td>
<td>- a couple in their '60s,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- three women, two in their '40s and one in her '60s,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- a middle-aged couple with a man in his '30s and two pre-teen children (boy and girl),</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- two women in their '40s,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- friend of the observer, a woman in her '30s.</td>
</tr>
<tr>
<td>Nature Center</td>
<td></td>
<td>3:00 - 4:15 pm</td>
<td>Moderate to heavy visitation.</td>
</tr>
</tbody>
</table>
on the research study, directions to the participant, a description of the development of the Model with accompanying figures, figures depicting the Model, and a glossary of terms related to the Model. Directions to the participant were to review the document and make comments on the appropriateness, completeness, and accuracy of the theoretical aspects of the model, as well as any other comments deemed applicable or important by the participant.

The document was reviewed by two members of the research advisory committee for clarity and audience-appropriateness before being mailed to the participants.

**Interview Schedule for the Practitioner Stratum**

A standardized open-ended interview schedule (Patton, 1990) (see Appendix B) was developed for the purpose of conducting face-to-face interviews with members of the practitioner stratum of the participant panel. The purpose of the interviews was to gain insight into the practitioners' experience with the affective responses of learners in nonformal educational settings. Model 1 was used as a framework for question construction in that the questions focused on constructs in the same order as they appeared in the flow of Model 1. The interview schedule also included questions about the professional and educational background of the respondent.

The interview schedule was reviewed by two members of the research advisory committee and was field tested with four individuals who had previously worked professionally or as volunteers in nonformal educational facilities. The field test participants were not part of the
research sample. Reviewers and field test participants were asked to offer feedback on question clarity, wording, whether or not questions might "lead" the respondent, and audience-appropriateness of the instrument. Feedback offered was incorporated into a minor revision of the interview schedule. The final revised instrument is shown in Appendix C. The field test also verified that the interview schedule was of an acceptable length, taking approximately 45 to 60 minutes to complete.

Observation Strategy

The observation strategy was to conduct open-ended, unobtrusive observations pertaining to learners' affective responses in nonformal educational facilities. The observations were open-ended in that no checklist of behaviors or responses to be looked for during the observational periods was established beforehand. Rather, the objective was for the observer to remain open to any behaviors or responses that might arise in the natural setting of the nonformal educational facility. Accordingly, only broad guidelines for what was to be observed were established before beginning the observations. These guidelines were to observe learners' interactions with exhibits, staff, or other learners, including quotes of things said and description of physical behaviors whenever possible. Also to be noted when possible were tone and level of voice in learners' verbal responses and interactions, facial expressions, gestures, and subjective judgments about learners' affective states. A description of the learning setting sufficiently detailed to provide a clear context for the observations was also to be included.
Before beginning the field research, practice observations were carried out by the observer at The Dawes Arboretum, Newark, Ohio, on February 27, 1993. The learning event was a volunteer-led outdoor "Maple Syrup Tour." The learners present for the tour were three children between the ages of six and nine years, five adolescents, and four adults. The tour began at 11:00 am and lasted for approximately one hour. The Dawes Arboretum was not included in the final research sample.

Data Collection

Data collected in this study were in the forms of reviewed literature, feedback from the researcher stratum of the participant panel, interview data from the participant stratum, and observational data from the unobtrusive observations conducted at nonformal educational facilities. All data collected during the study were collected by the author of the study.

Reviewed Literature

Literature to be reviewed for Stage 1 of the study was collected over a two-year period from March of 1991 to March of 1993. Public libraries, private collections, and course related literature were utilized.

Feedback from Researchers

At the end of the collection period for reviewed literature, Model 1 was synthesized (Stage 2). The document "A Preliminary Model of Affect in Nonformal Educational Settings" was then prepared and mailed to each of the six researcher members of the participant panel. A postage paid addressed return envelope was provided for return of comments. The
document was mailed on March 17, 1993. Participants were asked in the cover letter to postmark their responses by March 29, 1993 to facilitate a return date of April 5, 1993. Participants from whom responses were not received by April 5 were reminded by telephone to return their responses at their earliest convenience. Telephone reminders were repeated as necessary until all responses were returned. After responses were received, follow-up phone calls were made to obtain clarification or further detail on the comments offered.

Interviews with Practitioners

Face-to-face interviews were conducted with each of the eight practitioners of the participant panel between March 15 and April 7, 1993. Interviews lasted from approximately 45 to 60 minutes each. Table 3 lists the date, time, and location of each interview.

Since a standardized open-ended interview schedule was used, each respondent was asked the same questions. Questions and instructions for the interview were read to the respondent. Occasionally questions not on the interview schedule were inserted into the interview. These nonschedule questions arose spontaneously during the interview in situations where further probes were necessary to clarify an answer, or when an answer naturally led to another line of questioning. Such strategy is in keeping with qualitative interviewing methodology.

All eight interviews were tape recorded, and later transcribed verbatim into text on a word processor. The researcher performed the transcriptions by listening once to each interview tape through headphones. The recorder was stopped frequently to allow time for transcription of
<table>
<thead>
<tr>
<th>Practitioner Interviewed</th>
<th>Date and Time of Interview</th>
<th>Location of Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph Wisne</td>
<td>3/15/93, 10:00 am</td>
<td>Conference room in the COSI building.</td>
</tr>
<tr>
<td>Tim Mason</td>
<td>3/16/93, 9:00 am</td>
<td>Mr. Mason's office.</td>
</tr>
<tr>
<td>Janet Mackenzie Yoerger</td>
<td>3/22/93, 9:00 am</td>
<td>Local restaurant.</td>
</tr>
<tr>
<td>Beverly Mosley</td>
<td>3/23/93, 9:00 am</td>
<td>Mr. Mosley's home.</td>
</tr>
<tr>
<td>Ann Culek</td>
<td>3/29/93, 10:00 am</td>
<td>Main room of farmhouse at Slate Run Historical Farm.</td>
</tr>
<tr>
<td>Karen Johnson</td>
<td>4/7/93, 9:00 am</td>
<td>Blendon Woods Nature Center before operating hours.</td>
</tr>
<tr>
<td>Betsy Feldkamp</td>
<td>4/12/93, 4:00 pm</td>
<td>Local restaurant.</td>
</tr>
</tbody>
</table>
segments of data. After the initial transcription, each tape was listened to again for the purpose of double checking the transcription and filling any gaps in the text which may have occurred during the first listening.

**Observational Data**

Observational data were collected at each of 13 nonformal educational facilities between March 15 and April 10, 1993. The dates and times of each observational session are listed in Table 2. All observations were made by the researcher.

The researcher contacted each of the 13 facilities by telephone to explain the purpose of the study and identify a contact person authorized to grant permission for the observations to be performed. A follow-up letter (see Appendix D) officially requesting permission to perform the observations and reiterating the purpose of the study and observation plan was sent to the identified contact person at each facility.

Unless the observation was to focus on a staff-led program, an orientation to each facility was undertaken before beginning data collection. Upon arrival at the facility, the observer walked quickly through the facility in order to acquaint herself with the floor plan and the attractions available to learners visiting the facility.

Observation sessions ranged from approximately one to three hours in length. Field notes were taken by the observer during each observation session. After each observation, the observer wrote a short reflective journal entry to record overall impressions from the observation as well as any factors which might serve to introduce bias into the observation. Field notes were expanded within 24 to 48 hours after the completion of each
Member Checks

After collection and analysis of all field data, Model 1 was reformulated into Model 2 (Stage 4). Stage 5 of the study consisted of subjecting Model 2 to review by the participants in the field study component of the research. Figures depicting Model 2 were prepared and mailed to all members of the participant panel. Also included in the mailing were summaries of findings from the field research component of the study. A summary of the items included in the mailings to members of each stratum of the participant panel is given in Table 4.

The purpose of Stage 5 was to collect feedback from all participants on Model 2 and to check the conclusions drawn from the data by the researcher against the perceptions of the participants. Participants were asked in the cover letter (see Appendices E, F) of the mailing to make any comments they felt appropriate on any of the materials enclosed in the mailing. Members of the participant stratum were asked to particularly comment on whether the field research findings and the concepts represented in Model 2 matched with their own professional experience of learners in nonformal educational settings.

The mailing to the participants was postmarked on June 1, 1993. A postage paid, addressed, priority mail return envelope was enclosed in each envelope. Participants were asked to postmark their responses by June 14, 1993 and to use the priority mail return envelope to ensure fast return of the responses to the researcher. Participants from whom responses had not been received by June 16, 1993, were contacted by
Table 4. Items included in mailings to researcher and practitioner members of the participant panel during Stage 5 of the study.

<table>
<thead>
<tr>
<th>Item for Mailing</th>
<th>Researcher Stratum</th>
<th>Practitioner Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of comments from participants in the researcher stratum.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Summary of findings from interviews with practitioners.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Summary of findings from observations in the field.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Figures depicting Model 2.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Glossary of terms associated with Models 1 and 2.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Table presenting the major theoretical contributors from the literature used to synthesize the models.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
phone and asked to return their responses at their earliest convenience. Those responses that had been received by July 1, 1993 were considered the final set of member checks data.

Data Analysis

Patton (1990) asserts, "there is no right way to go about organizing, analyzing, and interpreting qualitative data" (p. 381). Still, there are guidelines which can aid in qualitative data analysis and lead to more trustworthy results. Miles and Huberman (1984) describe three concurrent processes which occur in qualitative data analysis: data reduction, data display, and conclusion-drawing/verification. Data reduction refers to selecting, focusing, and simplifying the raw data, paring it down to the most pertinent or useful data. Data display is defined as "an organized assembly of information that permits conclusion-drawing and action-taking" (Miles and Huberman, 1984, p. 24). Conclusion-drawing/verification refers to drawing meaning from the reduced and displayed data. The following sections describe the analytical methods utilized in this study.

Data From the Literature (Stages 1 and 2)

Information drawn from the literature was reduced in an anticipatory mode (Miles and Huberman, 1984) by limiting the literature reviewed to a minimum of psychoanalytical literature and neurophysiological literature. The researcher determined in the early stages of literature collection that literature in these genres would be outside the scope of her expertise and therefore inappropriate for use in the study.
Interim data reduction (Miles and Huberman, 1984) was performed by summarizing the main points from each reference on three by five inch index cards. Coding, recommended by Patton (1990), was performed by assigning categories to the main points on the cards according to the following categorization scheme:

- As - aesthetics
- Ex - exhibits
- I - interest
- C - curiosity
- Cr - creativity
- NF - nonformal education
- P - play
- R - review of research
- Ad - attitude
- F - flow
- At - attention
- Em - emotion
- M - motivation
- L - learning
- Ep - empathy
- N - novelty
- J - justifications for the study
- * - presents a model of affect

Where possible and appropriate, information from the literature was displayed through sketches showing causal networks or summaries of theory drawn from text in the literature or directly from figures in references.

Conclusion-drawing consisted of the synthesis of Model 1 (Stage 2). The model was synthesized by meshing overarching theoretical models that exist in the literature to arrive at a skeleton sequence of phenomena. This skeleton sequence was then augmented by more specific theoretical information and empirical evidence from literature. An effort was made to incorporate elements from all the reviewed literature during this stage, with the expectation that further reduction would be carried out during synthesis of Model 2 after carrying out the field research component of the study.
Figures representing the Model were produced with a diagraming software package.

Data from Field Research (Stages 3 and 4)

Data from the field research component of the study consisted of comments from review of model 1 by the researcher stratum of the participant panel, data from interviews with the practitioners, and data from the observations.

Review Comments from Researcher Participants

Comments on Model 1 from the researcher participants came in the form of letters, verbal comments over the telephone, comments written on the review document, and written summary pages. Data were reduced by removing salutations from letters, and in some cases paraphrasing comments in the interest of shortening them. All resulting comments were displayed together in a summary list.

Data from Interviews with Practitioners

Data from the interviews were reduced by reading the interview transcripts several times and enclosing the pertinent data in boxes. Data judged not to be pertinent to the study were those in which the respondent had diverged significantly from the subject of the question and/or interview. Statements within the retained data which represented main themes in the response(s), or which looked useful as illustrative quotations, were underlined.
Interview data were coded as suggested by Patton (1990) by making preliminary shorthand categorization notes in the margins of the interview transcripts. A coding taxonomy was then created to ensure consistency in coding. After preliminary notations were made, categories which could be logically combined were combined. Some categories of response data provided information beyond what was called for in the specific question under which the response occurred. For example, a respondent answering a question about curiosity might digress into a discussion of the long-term benefits of affective education. Categories which did not provide information beyond the question under which the response appeared, and which occurred very infrequently (no more than one or two times) in the data set, were either combined with other categories or eliminated as a category. The final shorthand labels used and their corresponding categories are listed in Table 5.

The interview data were displayed by combining responses from all the participants to specific sets of questions. The sets for which responses were combined consisted of numbered questions plus their lettered probe questions (see Appendix C). Because the responses on interest and curiosity (questions five and six) were found to be interdependent, these two questions and their respective lettered probes were considered one set.

A cross-case analysis (Patton, 1990) of all responses to specific sets of questions was carried out. Responses from each participant were summarized into short phrases to simplify the process of looking for similarities among responses. Where possible, consensus responses were formulated. After completion of the cross-case analysis, the data were surveyed by category to identify responses which addressed information
Table 5. Labels and corresponding categories used to code data from 67 interviews.

<table>
<thead>
<tr>
<th>Label</th>
<th>Category Represented by Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access</td>
<td>Accessibility of the facility, program, exhibit, etc.</td>
</tr>
<tr>
<td>Aest</td>
<td>Aesthetic factors</td>
</tr>
<tr>
<td>Age</td>
<td>Age factors</td>
</tr>
<tr>
<td>Animals</td>
<td>Visitor responses to animals</td>
</tr>
<tr>
<td>Att</td>
<td>Attention</td>
</tr>
<tr>
<td>Attr power</td>
<td>Attracting power</td>
</tr>
<tr>
<td>Attr</td>
<td>Attributes of the facility, program, exhibit, experience, etc.</td>
</tr>
<tr>
<td>Complaints</td>
<td>Complaints from visitors made to staff</td>
</tr>
<tr>
<td>Cur</td>
<td>Curiosity of visitors</td>
</tr>
<tr>
<td>Em</td>
<td>Emotional responses of visitors</td>
</tr>
<tr>
<td>Enj</td>
<td>Enjoyment by visitors</td>
</tr>
<tr>
<td>Escape</td>
<td>Escape as a reason for visiting facility</td>
</tr>
<tr>
<td>Expl</td>
<td>Exploratory behavior</td>
</tr>
<tr>
<td>Facial expr</td>
<td>Facial expressions of visitors</td>
</tr>
<tr>
<td>Family-social</td>
<td>Family and social interactions as factors in the experience</td>
</tr>
<tr>
<td>Hands-on/pers</td>
<td>Opportunities for hands-on or personal interaction with something</td>
</tr>
<tr>
<td>Holding power</td>
<td>Holding power</td>
</tr>
<tr>
<td>Int</td>
<td>Interest of visitors</td>
</tr>
<tr>
<td>Int struct</td>
<td>Visitor interest as a basis for structuring program</td>
</tr>
<tr>
<td>Involvement</td>
<td>Involvement of visitors in the experience</td>
</tr>
<tr>
<td>Lea</td>
<td>Learning</td>
</tr>
<tr>
<td>Level appr</td>
<td>Level appropriateness of the stimulus</td>
</tr>
<tr>
<td>Long-term</td>
<td>Long-term effects of the experience</td>
</tr>
<tr>
<td>Label</td>
<td>Category Represented by Label</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Mot</td>
<td>Motivation of visitors</td>
</tr>
<tr>
<td>Norm</td>
<td>The norm of human behavior as basis for structuring program</td>
</tr>
<tr>
<td>Obs</td>
<td>Observation as a form of evaluation</td>
</tr>
<tr>
<td>Outdoors</td>
<td>Visitor attraction to the outdoors</td>
</tr>
<tr>
<td>Post-visit fdbk</td>
<td>Post-visit feedback from visitors</td>
</tr>
<tr>
<td>Pre-held</td>
<td>Pre-held interests, motivations, attributes, etc., of the visitor</td>
</tr>
<tr>
<td>Quest-tech</td>
<td>Questioning as a technique used by staff</td>
</tr>
<tr>
<td>Quest vis</td>
<td>Questions from visitors</td>
</tr>
<tr>
<td>Returns</td>
<td>Return visitation as a basis for evaluation</td>
</tr>
<tr>
<td>Staff int</td>
<td>Interaction between staff and visitors</td>
</tr>
<tr>
<td>Surveys</td>
<td>Surveys as evaluation tools</td>
</tr>
<tr>
<td>Verbal</td>
<td>Verbalizations of visitors</td>
</tr>
<tr>
<td>Vis pers</td>
<td>Differences in visitor personalities</td>
</tr>
</tbody>
</table>
other than the question under which the response was found. Such responses were incorporated into the data for other sets of questions, or were used to represent themes occurring outside the framework of the interview schedule. Finally, a list of summary statements from the analysis was constructed. The data were physically manipulated using the “cut and paste” capabilities of the word processing program used.

Data from Observations

The raw expanded notes from the field observations were word processed to improve readability. Sections of the word processed notes were then coded using the Schatzman and Strauss (1973) categories of Observational Note (ON), Methodological Note (MN), and Theoretical Note (TN). Additionally, the categories of Descriptive Note (DN) and Researcher Note (RN) were added. According to Schatzman and Strauss, an observational note is an observed event deemed important enough to include in the fund of recorded experience. The ON may provide evidence for a proposition yet unborn or may provide context. Each ON is a unit event that can stand alone as a datum, or in the context of other ON's. A methodological note is a note from the observer to himself/herself pertaining to the procedures used during the observational data collection. A theoretical note comments on patterns of meaning that may be emerging from the data as the observation is in progress. A descriptive note describes the setting in which the observation is taking place. A researcher note describes thoughts the observer has during the observation which are not categorizable as methodological or theoretical notes.
After the notes were coded as described above, they were further coded as recommended by Patton (1990). Shorthand labels for categories of observational notes were written in the margins of the word processed notes. A coding taxonomy was then formulated. Categories were combined and/or eliminated as described above for the transcribed interview data. The final labels and corresponding categories used are listed in Table 6.

After all the notes were coded with categories, a tally of occurrences for each category by observation session and page number was constructed. Some categories of data consisted of examples of constructs not directly or strongly related to the behavior of visitors, or from which no cohesive theme could be derived. Such categories were not included in the tally. Categories for which there was only one occurrence were also omitted from the tally. The number of occurrences for each category and whether or not it was included in the tally are shown in Table 6. A summary of findings was compiled by listing the themes represented by each category in order of decreasing number of occurrences. In a few instances, summary statements were derived from a combination of two categories when the observations from the two categories were found to be related, and thus to represent essentially the same phenomena. Such was the case with the categories of age factors and enjoyment, excitement, anticipation and holding power, and "I get it!" and "I found it!"

**Synthesis of Model 2 (Stage 4)**

Conclusion-drawing from the field research component of the study consisted of revising Model 1 into Model 2. Findings from all three data
Table 6. Labels and corresponding categories used to code data from observations, with numbers of occurrences. (X=omitted from tally.)

<table>
<thead>
<tr>
<th>Label(s)</th>
<th>Category Represented by Label(s)</th>
<th>No. of Occurrences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>Accessibility of the facility, program, exhibit, etc.</td>
<td>1 X</td>
</tr>
<tr>
<td>Aest</td>
<td>Aesthetic factors</td>
<td>13 X</td>
</tr>
<tr>
<td>Age</td>
<td>Age factors</td>
<td>6</td>
</tr>
<tr>
<td>Animals</td>
<td>Visitor responses to animals</td>
<td>22</td>
</tr>
<tr>
<td>Anticipation</td>
<td>Anticipation as a motivator</td>
<td>5</td>
</tr>
<tr>
<td>Atm</td>
<td>Atmosphere in or of the facility</td>
<td>5 X</td>
</tr>
<tr>
<td>Att, Attr power</td>
<td>Attention and attracting power</td>
<td>39</td>
</tr>
<tr>
<td>Attr, notations of specific attributes</td>
<td>Attributes of the facility, program, exhibit, experience, etc.</td>
<td>9 X</td>
</tr>
<tr>
<td>Comic, laughter</td>
<td>Comic responses of visitors</td>
<td>11</td>
</tr>
<tr>
<td>Cur, explor</td>
<td>Curiosity and exploratory behavior in visitors</td>
<td>9</td>
</tr>
<tr>
<td>Discipline</td>
<td>Disciplinary behavior of adults</td>
<td>4 X</td>
</tr>
<tr>
<td>Diversions</td>
<td>Factors which divert attention from, exhibit, etc.</td>
<td>1 X</td>
</tr>
<tr>
<td>Diff vis, pers diff</td>
<td>Individual differences in visitors</td>
<td>19</td>
</tr>
<tr>
<td>Em, notations on specific emotions</td>
<td>Emotional responses</td>
<td>7</td>
</tr>
<tr>
<td>Enj, exc</td>
<td>Enjoyment, excitement</td>
<td>16</td>
</tr>
<tr>
<td>Escape</td>
<td>Escape as a reason for attending facility</td>
<td>1 X</td>
</tr>
<tr>
<td>Family</td>
<td>Family interaction factors</td>
<td>33</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Visitor fatigue</td>
<td>4</td>
</tr>
<tr>
<td>Gest</td>
<td>Hand and body gestures made by visitors</td>
<td>3</td>
</tr>
<tr>
<td>Holding power</td>
<td>Holding power</td>
<td>6</td>
</tr>
<tr>
<td>&quot;I get it!&quot;</td>
<td>The &quot;I get it!&quot; response to programs, exhibits, etc.</td>
<td>4</td>
</tr>
<tr>
<td>&quot;I found it!&quot;</td>
<td>The &quot;I found it!&quot; response to programs, exhibits, etc.</td>
<td>8</td>
</tr>
<tr>
<td>Label(s)</td>
<td>Category Represented by Label(s)</td>
<td>No. of Occurrences</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Imm, adventure</td>
<td>Immersion, large-body, body-on, or adventurous</td>
<td>6 ( \times )</td>
</tr>
<tr>
<td>Int</td>
<td>Visitor interest</td>
<td>1 ( \times )</td>
</tr>
<tr>
<td>Kids leading, tendency to lead</td>
<td>The tendency for children to move ahead of adults and lead them through the experience</td>
<td>10</td>
</tr>
<tr>
<td>Modeling</td>
<td>Modeling</td>
<td>10</td>
</tr>
<tr>
<td>Part</td>
<td>Participation of visitors in an activity, exhibit, etc.</td>
<td>21 ( \times )</td>
</tr>
<tr>
<td>Perception, sensory</td>
<td>Perception and sensory factors</td>
<td>20</td>
</tr>
<tr>
<td>Photos, camcorders</td>
<td>Use of cameras and camcorders by visitors</td>
<td>7 ( \times )</td>
</tr>
<tr>
<td>Play</td>
<td>Play</td>
<td>30</td>
</tr>
<tr>
<td>Pointing</td>
<td>Pointing at various aspects of exhibits, etc., by visitors</td>
<td>36</td>
</tr>
<tr>
<td>Pre-held</td>
<td>Visitors' pre-held interests, motivations, attributes, etc.</td>
<td>20</td>
</tr>
<tr>
<td>Q</td>
<td>Visitor questions</td>
<td>16</td>
</tr>
<tr>
<td>Quiz/check</td>
<td>Behavior where visitors quiz themselves and check their knowledge during the experience</td>
<td>3 ( \times )</td>
</tr>
<tr>
<td>Relevance</td>
<td>Visitor relating stimulus to something already known</td>
<td>28</td>
</tr>
<tr>
<td>Response</td>
<td>A non-affective response</td>
<td>5 ( \times )</td>
</tr>
<tr>
<td>&quot;Real&quot;</td>
<td>Visitors' fascination with whether or not things are &quot;real&quot;</td>
<td>6</td>
</tr>
<tr>
<td>Self-reports, expr</td>
<td>Self-reports and expressions of affect in visitors</td>
<td>48</td>
</tr>
<tr>
<td>Signage</td>
<td>Visitors' use of or response to signage</td>
<td>11 ( \times )</td>
</tr>
<tr>
<td>Social, willingness to split</td>
<td>Social interaction factors, willingness of some to split from their group</td>
<td>47</td>
</tr>
<tr>
<td>Staff int</td>
<td>Interactions between staff and visitors</td>
<td>18</td>
</tr>
<tr>
<td>Touch</td>
<td>Tendency of visitors to touch and manipulate objects</td>
<td>23</td>
</tr>
<tr>
<td>Speculative, various notations with question marks</td>
<td>Speculations by the observer about unexplained behaviors</td>
<td>14 ( \times )</td>
</tr>
</tbody>
</table>
sources from the field research, along with further reading of the literature, served to verify some aspects of Model 1, negate others, and to focus the thinking of the researcher to direct the revision of Model 1. Diagramming software was used to graphically format Model 2.

**Member Checks (Stage 5) and Synthesis of Final Model (Stage 6)**

All comments returned during the member checks were individually considered in the revision of Model 2 to the Final Model. A summary of results from the member checks is reported in narrative form in Chapter 4 of this report.

**Report of Results**

Results appear in this report as:

(a) a detailed review of literature as it was used to synthesize Model 1,
(b) findings from the field research and their implications leading to revision of Model 1 to Model 2, and
(c) findings from the member checks and their implications for revision of Model 2 to the Final Model.

**Trustworthiness**

Trustworthiness is a term which describes the quality and usefulness of the conclusions emerging from a naturalistic research study. Guba (1981) has outlined four components of trustworthiness. These are credibility, transferability, dependability, and confirmability.

Credibility may be thought of as roughly analogous to internal validity in a quantitative study. Credibility establishes the truth value of the
study's findings, at least as far as this truth value is perceived by the participants in the study. Guba (1981) recommends prolonged engagement and persistent observation, peer debriefing, triangulation, and member checks as methods to promote credibility.

In this study the researcher attempted to collect detailed and thorough data from a variety of sources so as to satisfy the requirements of prolonged engagement and persistent observation. In the review of literature, references were collected to the point of redundancy (Lincoln and Guba, 1985) (cited in Patton, 1990). In reviewing comments from the researcher members of the participant panel, follow-up phone calls were made to the participants to pursue sufficient clarity and detail in the comments returned. During interviews, attention was given to wait time during responses to ensure that the respondents were given every opportunity to answer to their satisfaction. During individual observation sessions, data were collected until researcher fatigue began to set in. Such fatigue usually occurred within two to three hours. To compensate for the short duration of individual observations, a relatively large number of facilities were chosen in which to carry out observations.

Peer debriefing is the process of interacting with other professionals during the research process as a means of testing the researcher's actions and insights. To satisfy the recommendation of peer debriefing, regular meetings with academic advisors were held during the course of the study for the purpose of discussing the progress, methodology, and emerging patterns of the research.

Triangulation is "the combination of methodologies in the study of the same phenomena or programs" (Patton, 1990, p. 187). Triangulation of
methods, sources, and theory (Patton, 1990, p. 187) was carried out in this study. Triangulation of methods resulted from collecting comments from reviewers, interview data, and observational data. Triangulation of sources resulted from use of information from both the research literature and field research. Triangulation of theory resulted from the use of information from across a variety of scholarly disciplines.

Member checks consist of testing data and interpretations from the data with the participants from whom the data was gathered. Subjecting Model 2 and summaries of findings to review by the participants of the field research component of the study constituted member checks.

Transferability is similar, but not identical, to generalizability in quantitative research. As Guba (1981) describes, "The naturalist does not attempt to form generalizations that will hold at all times and in all places, but to form working hypotheses that may be transferred from one context to another depending upon the degree of 'fit' between the contexts" (p. 81). Guba recommends purposeful sampling and collection of thick descriptive data to allow transferability. As described above, purposeful sampling and collection of thick data were both carried out. Interpretations emerging from this study are relevant to its particular context, but may be transferable to other contexts that are similar to this one. Thick data in the form of extended quotations from interviews and excerpts from field notes appear in this report (Chapter 4) so that the reader may judge the degree of transferability to any particular context.

Dependability corresponds loosely to reliability in a quantitative investigation. Dependability refers to the consistency of results, recognizing that there will be "trackable variance - variance that can be ascribed to
sources: so much for error, so much for reality shifts, so much for increased instrumental proficiency (better insights) and so on" (Guba, 1981, p. 81).

Guba suggests the use of overlap methods and leaving an audit trail to achieve dependability. Overlap methods is a triangulation process of using multiple methods during the study. As described above, triangulation was employed in this study. An audit trail consisting of copies of references, coded index cards, original comments from reviewers, interview tapes and transcripts, and field notes, both original and word processed, was retained. All such materials have been kept on file and are available for scrutiny by interested parties. Because of the multiple sources of data consulted and the extensive process of member checks undertaken in this study, both of which served to confirm the consistency of the findings, a full audit was not performed. However, the methodology used was reviewed and confirmed by a researcher experienced in naturalistic methodology.

Confirmability relates to the control of researcher bias in qualitative inquiry. With the use of qualitative methodology it is recognized that a certain amount of bias will be inevitable. Control of bias rests in making a constant effort to be aware of, and honest about, sources of bias in order to lend confirmability to the study. Triangulation, as described above, and a researcher diary of biases, both of which are recommended by Guba (1981), serve to lend confirmability to this study. The diary serves to bring the researcher's subjectivities to the forefront and make them available for investigation as part of the audit trail. After each observation session of the field research component of the study, a reflective journal entry was written, and also later included in the word processed notes, to record circumstances which might serve to bias the observation.
Patton (1990) cites the testing of rival explanations and consideration of negative cases as an important aspect of enhancing the quality of analysis. Testing of rival explanations involves careful consideration of all data which could support multiple possibilities and explanations. Consideration of negative cases involves scrutiny of cases in the data which do not fit the major emerging patterns. Rival explanations and negative cases are the essence of hypothesis reformulation in the analytic induction procedure utilized in this study. Rival explanations were considered during all stages of the research. During synthesis of Model 1, all theoretical and empirical themes encountered in the literature were incorporated into the Model. The Model was refined through consideration of rival explanations and negative cases encountered during the field research. The Final Model resulted from revision of Model 2 with consideration of rival explanations and negative cases coming out of the member checks.

Ethical Considerations

Ethical considerations are important to any research, but are of particular concern in qualitative studies where in-depth interview and observational data are collected from human participants. In this study a number of measures were taken to ensure adherence to ethical standards. These are listed as follows.

1. All reviewers and interview participants were contacted before the interview so that the purpose of the study could be explained. Participants were then courteously asked if they were willing to participate in the study.
2. Permission was requested from each interview participant to tape record the interview and to use his or her name in the final research report.

3. Permission was requested from the researcher participants to use their name and brief professional profile in the final research report.

4. Participants were informed that their responses and comments would not be identified by name in the final report.

5. Permission was requested verbally and in writing from a representative of each nonformal educational facility visited by the researcher for the purpose of carrying out unobtrusive observations. The researcher provided an assurance in writing that observations would remain unobtrusive and no questions of visitors would be asked.
CHAPTER IV
RESULTS

Gathered Literature and Synthesis of Model 1

Model 1 was synthesized from a variety of theoretical perspectives and empirical evidence found in the literature from disciplines such as education, psychology, interpretation, museum studies, visitor behavior, and leisure studies. Table 7 lists the authors, summaries of their theories or research findings, and how the theory was developed or study conducted, from the literature which contributed to the synthesis of Model 1.

Sequence of the Model

The first step in synthesis of Model 1 was to bring together theoretical perspectives which provide an overarching picture, a sequence of events in the stimulation and/or continuation of affect. These perspectives were meshed to form a preliminary skeleton for Model 1. The five major perspectives brought together in this manner were those of Krathwohl et al. (1964), Bull (1951) (cited in Izard, Wehmer, et al., 1965), Arnold (1960), Plutchik (1980), and Buck (1984).

One of the most comprehensive treatments of affect in the education literature is that of Krathwohl et al. (1964), who produced a Taxonomy of Educational Objectives for the affective domain as a sequel to that for the
Table 7. Major theoretical and empirical contributors to the model of affect in nonformal educational settings.

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Summary of Theory or Study</th>
<th>Development of Theory/Conditions of Study</th>
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</thead>
<tbody>
<tr>
<td>Alt and Shaw (1984)</td>
<td>Demonstrated that exhibits which impart a short, clear message were rated more favorably by visitors than those which demanded a larger investment of time. Potential for participation may be secondary to imparting a short, clear message in attracting visitors.</td>
<td>A list of characteristics used to discriminate between exhibits was elicited from visitors at the British Museum of Natural History. Exhibits were then rated by visitors in terms of the extent to which they possessed these characteristics.</td>
</tr>
<tr>
<td>Arnold (1960)</td>
<td>Theory of emotion in which a central tenet is that the emotion experienced depends on a cognitive appraisal of a perceived object as either beneficial or harmful. The resulting emotion is seen as an action tendency toward or away from the object.</td>
<td>Development begins with a historical review and evaluation of emotion theories, followed by a phenomenological analysis of the experience of emotion. Integration of empirical data from numerous researchers with the phenomenological analysis forms the final psychological theory.</td>
</tr>
<tr>
<td>Beck (1993)</td>
<td>Identified nine characteristics of optimal wilderness experiences.</td>
<td>Two instruments, a 22-item open-ended oral interview and a 22-item written questionnaire, were used to collect data from 66 wilderness recreationists at Canyonlands National Park.</td>
</tr>
<tr>
<td>Bertyne (1954, 1960, 1966, 1970, 1971a, b); and Boudewijns (1971); and Parham (1968)</td>
<td>Theory of curiosity and human aesthetic response which holds that both are a product of level of arousal.</td>
<td>Based on numerous empirical studies by Bertyne and his associates.</td>
</tr>
<tr>
<td>Bertocci (1968)</td>
<td>Theory characterized by the assertion that unlearned motives are primary emotions.</td>
<td>Theory derives from extensive review and analysis of existing theory.</td>
</tr>
<tr>
<td>Authors(s)</td>
<td>Summary of Theory or Study</td>
<td>Development of Theory/Conditions of Study</td>
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<tr>
<td>Birch and Veroff (1966)</td>
<td>A discussion of motivation based on incentive systems.</td>
<td>Discussion is developed through a review of contemporary motivational theory and review of experimental evidence related to motivation.</td>
</tr>
<tr>
<td>Bishop and Jeanrenaud (1980)</td>
<td>A model of creativity through the process of play.</td>
<td>Model derived from a review of work from theorists like Berlyne, Fiske and Maddi, Hull, Skinner, Piaget, Eysenck, etc.</td>
</tr>
<tr>
<td>Bower (1981)</td>
<td>Proposes an associative network theory in which emotion serves as a memory unit that can enter into association with coincident events.</td>
<td>Subjects whose moods were induced by hypnosis recalled more of material that was affectively congruent with their mood during recall.</td>
</tr>
<tr>
<td>Boyle (1983)</td>
<td>Demonstrated that emotionally disturbing stimuli may inhibit learning performance.</td>
<td>A five-minute film segment of an emotionally disturbing nature was shown to an experimental group of 69 student teachers. The treatment produced a decrease in learning performance compared to the control group.</td>
</tr>
<tr>
<td>Breckler and Wiggins (1969)</td>
<td>Demonstrated a distinction between affect and evaluation (cognitive) in the structure of attitudes. Also demonstrated that behaviors related to blood donation were more strongly related to affect than to evaluation.</td>
<td>Correlational study showing the relationship of measured affect, measured evaluation, and measured global attitude.</td>
</tr>
<tr>
<td>Buck (1984)</td>
<td>Presents a model of emotion as &quot;readout,&quot; where three levels of emotion, physiological response, facial expressions and body postures, and subjective experience, are read out from the internal neurochemical emotional system. Assumes affective stimuli act on this system without cognitive mediation.</td>
<td>Theoretical model, based on review and evaluation of existing theory and empirical data, which is part of a larger theory of communication of emotion.</td>
</tr>
<tr>
<td>Author(s)</td>
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<tr>
<td>Busque (1991)</td>
<td>Found no evidence that potential for interaction or investigation in an exhibit stimulated visitor interest.</td>
<td>Used Likert-type instrument to measure visitor interest in exhibits rated as weak or strong in interaction potential. Found no significant difference in visitor interest between exhibits with strong and weak interaction potential.</td>
</tr>
<tr>
<td>Camp et al. (1984)</td>
<td>Presents evidence that some aspects of curiosity may be related to age level in adults.</td>
<td>Correlational study. In young (25-35) and middle-aged (45-55) adults, perceived value and desire for more knowledge were positively correlated. The correlation was not significant for older (65-75) adults. An analysis of variance found a significant age level effect for a measure of diversive curiosity, older adults showing less tendency for diversive curiosity, but no significant age level effect for specific curiosity.</td>
</tr>
<tr>
<td>Celsi and Olson (1988)</td>
<td>Demonstrated that “felt involvement,” a subjective experience of personal relevance, influences attention.</td>
<td>Experimental study in which analysis of variance showed that subjects' measured felt involvement influenced the amount, direction, and focus of their attention during magazine advertisement viewing.</td>
</tr>
<tr>
<td>Czikszenmtihalyi (1975)</td>
<td>Presents a theory of “flow,” or enjoyment of autotelic activities.</td>
<td>Developed from both qualitative and quantitative data from interviews with 173 people who engaged in autotelic, or intrinsically motivated, activities.</td>
</tr>
<tr>
<td>Day (1967, 1982)</td>
<td>Presents work which collaborates with that of Bertyne on the theory of curiosity and aesthetics.</td>
<td>Empirical data demonstrated that subjective pleasingness is correlated with lower levels of complexity, while subjective interestingness increases and eventually levels off with complexity.</td>
</tr>
<tr>
<td>Author(s)</td>
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<tr>
<td>Dutta and Kanungo (1975)</td>
<td>Proposes an intensity hypothesis for the functional relationship between affect and cognitive retention of information. The hypothesis states that the more intense the affect evoked from an experience, the better the experience is retained in memory.</td>
<td>Begins with a historical treatment of the evidence on the relationship between affect and memory. Presents several experiments which support the intensity hypothesis.</td>
</tr>
<tr>
<td>Edwards (1990)</td>
<td>Makes a distinction between affect-based and cognition-based attitudes. Hypothesized that the sequence of affect and cognition in attitude formation determines the attitudes' resistance to change from affective or cognitive persuasion.</td>
<td>Two experiments showed affect-based attitudes to exhibit more change under affective persuasion than cognitive persuasion. Cognitive-based attitudes showed equal change under both forms of persuasion.</td>
</tr>
<tr>
<td>Ellis (1973)</td>
<td>Presents an integration of theory on play.</td>
<td>Provides a review of various definitions of play and classical and modern theories of play.</td>
</tr>
<tr>
<td>Falk et al. (1978)</td>
<td>Explication of the novel field-trip phenomenon.</td>
<td>Experiment showed a school group familiar with the field-trip setting to demonstrate better learning performance than an unfamiliar group.</td>
</tr>
<tr>
<td>Foster et al. (1988)</td>
<td>Supports application of curiosity theory in nonformal educational settings by demonstrating that more complex exhibits have better attracting power.</td>
<td>Measured attracting power of 10 zoo exhibits by the number of visitors attending to the exhibits. Chi-square analysis showed the most complex exhibit to have significantly better attracting power than the others.</td>
</tr>
<tr>
<td>Author(s)</td>
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</tr>
<tr>
<td>Gillies and Wilson (1982)</td>
<td>Supports assertion that potential for active participation contributes to holding power and enjoyment from exhibits.</td>
<td>Closed-format questionnaires were administered to 1,423 children and 77 teachers after their attendance at the Science Circus, Ontario Science Centre.</td>
</tr>
<tr>
<td>Gerard (1962)</td>
<td>Report on how the brain works to create new ideas.</td>
<td>Speech given by a neurophysiologist to a lay audience.</td>
</tr>
<tr>
<td>Hanes (1989)</td>
<td>Found college students who chose to enroll in an outdoor adventure experience tested more creative than students who did not.</td>
<td>Used an existing instrument to measure creativity in students enrolled in outdoor adventure course and students in a control group.</td>
</tr>
<tr>
<td>Harlow (1950)</td>
<td>Presents evidence of a manipulation drive that is aroused by patterns of external stimulation and reduced by actively changing the patterns.</td>
<td>Experiment with rhesus monkeys in which the animals were shown to solve a mechanical problem, the solution of which offered no extrinsic reward.</td>
</tr>
<tr>
<td>Harty and Samuel (1986)</td>
<td>Presents correlational evidence that attitude toward science, interest in science, and curiosity toward science are highly related in school children.</td>
<td>Likert-type instruments were used to measure the constructs of attitude toward science, interest in science, curiosity toward science, and self-concept of science ability in 228 sixth graders from the same school system.</td>
</tr>
<tr>
<td>Hilgard (1963)</td>
<td>Suggests Hull's stimulus-response theory of motivation may be insufficient and that the affect-arousal theory of motivation (McClelland et al., 1953) (cited in Murray, 1964) may be more appropriate.</td>
<td>Evaluation of motivational theory through a review of theoretical literature.</td>
</tr>
<tr>
<td>Author(s)</td>
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<tr>
<td>Izard, Wehmer et al. (1965); Izard, Nagler et al. (1965)</td>
<td>Propose that affect is a subset of personality and the primary motivational system. Demonstrate that affect can affect perception and cognitive performance.</td>
<td>Review of theoretical literature, including theories of Bull (1951) and Solley and Murphy (1960), and empirical data from studies where induced affect influenced perception and performance are presented.</td>
</tr>
<tr>
<td>Kaplan and Talbot (1983)</td>
<td>Describe the psychological benefits of wilderness experience and characterize wilderness as a &quot;restorative&quot; environment.</td>
<td>Conclusions were drawn from content analysis of participant journals over a period of 10 years in the Outdoor Challenge Research Program.</td>
</tr>
<tr>
<td>Kirkland (1974 a, b)</td>
<td>Concludes that pleasure is a subset of interest.</td>
<td>Series of studies where subjects viewed figures of varying complexity for pleasingness and interestingness showed an inverse relationship between pleasure and interest unless subjects were instructed to view for interest first.</td>
</tr>
<tr>
<td>Koran et al. (1984, 1986, 1988, 1989)</td>
<td>Body of research indicating that manipulatable exhibits have more attracting and holding power, that modeling can influence visitor behavior, etc.</td>
<td>Numerous empirical studies carried out at the Florida State Museum in Gainesville, Florida.</td>
</tr>
<tr>
<td>Krathwohl et al. (1964)</td>
<td>Presents a hierarchical continuum of affective learning and learning objectives which is analogous to Bloom's cognitive domain taxonomy.</td>
<td>Analysis of commonalities between existing affective objectives and terminology led to the final hierarchical organization.</td>
</tr>
<tr>
<td>Lawrence (1963)</td>
<td>Describes perception as a function of coding.</td>
<td>Analysis derived from learning theory.</td>
</tr>
<tr>
<td>Leeper (1948, 1963)</td>
<td>Asserts that emotion is not disorganizing, but linked to motivation, which can be described as on a continuum of emotional to physiological. Asserts that motivation has a perceptual quality. Describes factors which influence perception.</td>
<td>Ideas derived from review and analysis of theoretical and empirical literature.</td>
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</table>
Table 7. (continued)

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<thead>
<tr>
<th>Author(s)</th>
<th>Summary of Theory or Study</th>
<th>Development of Theory/Conditions of Study</th>
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<tbody>
<tr>
<td>Leuba (1955)</td>
<td>Asserts that organisms tend to seek an optimal level of stimulation.</td>
<td>Ideas derived from review and analysis of theoretical and empirical literature.</td>
</tr>
<tr>
<td>Maddi (1961)</td>
<td>Espouses theory that humans have a need for variation, which explains such behaviors as play and exploration.</td>
<td>Ideas derived from review and analysis of theoretical and empirical literature.</td>
</tr>
<tr>
<td>Maslow (1962, 1970)</td>
<td>Describes the phenomenon of “peak” experiences (1962). Espouses a theory of human motivation based on a hierarchy of needs.</td>
<td>Description of peak experiences developed from reports on personal communication from psychologically “healthy” people the author was studying. Motivation theory derives mostly from clinical experience.</td>
</tr>
<tr>
<td>Mercer (1981)</td>
<td>Found visitor interest in an exhibit to be related to attributes of the exhibit, visitor experience, and visitor education.</td>
<td>Experimental study carried out at the Ohio Historical Center</td>
</tr>
<tr>
<td>Mull (1957)</td>
<td>Study which lends support to Zajonc’s mere exposure effect.</td>
<td>Study which demonstrated that repeated hearing of pieces of modern music increased subjects’ liking of the music.</td>
</tr>
<tr>
<td>Panzarella (1980)</td>
<td>Elucidates characteristics of peak experiences.</td>
<td>A nonrepresentative sample of 103 persons were surveyed about the qualities of their peak experiences in music and the visual arts. Data were content analyzed.</td>
</tr>
<tr>
<td>Parnes (1962)</td>
<td>Presents evidence that creativity can be developed and enhanced in humans.</td>
<td>Describes a course in creativity training which operates on the principle of deferred judgment.</td>
</tr>
<tr>
<td>Patterson (1986)</td>
<td>Suggests factors which may be conducive to creativity.</td>
<td>Discusses creativity literature and the construct of creativity in comparison to androgy.</td>
</tr>
<tr>
<td>Author(s)</td>
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</tr>
<tr>
<td>Patterson and Bitgood (1988)</td>
<td>Describes exhibit factors which elicit more viewing time from visitors as well as visitor factors and architectural factors which influence the museum experience.</td>
<td>Descriptions derive from a review of research literature.</td>
</tr>
<tr>
<td>Peterson (1979)</td>
<td>Presents evidence suggesting that curiosity does not decline from childhood to adolescence.</td>
<td>Longitudinal study in which sensorimotor curiosity was evaluated in the same subjects in both 1970 and 1976.</td>
</tr>
<tr>
<td>Platt (1961)</td>
<td>Presents psychology of aesthetics theory that the human response system demands novelty at the same time as regularity.</td>
<td>Ideas derived from review and analysis of theoretical and empirical literature.</td>
</tr>
<tr>
<td>Plutchik (1980)</td>
<td>A psychoevolutionary theory of emotion which holds that there are 8 primary emotions linked to 8 basic behavioral patterns present in some form at all evolutionary levels. These primary emotions may “mix” to form more complex emotions.</td>
<td>Presents an extensive review of emotion theories from psychology, ethology, biology, psychiatry, and psychoanalysis. Review includes work of Eckman and Friesen (1969). The psychoevolutionary theory is developed as a comprehensive synthesis of these existing theories.</td>
</tr>
<tr>
<td>Rogers (1962)</td>
<td>Presents a “philosophy” of creativity.</td>
<td>Paper is a speech delivered by a psychologist at a creativity conference.</td>
</tr>
<tr>
<td>Rossing and Long (1981)</td>
<td>Suggests that the importance of curiosity as a learning motivation may decline in adulthood.</td>
<td>Correlational study of adult ratings on surprisingness, perceived value, and desire for more knowledge showed no relationship between surprisingness and desire for knowledge, but good correlation between perceived value and desire for knowledge.</td>
</tr>
<tr>
<td>Author(s)</td>
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</tr>
<tr>
<td>Russell and Mehrabian (1977)</td>
<td>Asserts that all emotions can be reduced to the three dimensions of pleasure-displeasure, arousal, and dominance-submisiveness.</td>
<td>Verbal-report emotion scales were regressed as functions of the three dimensions, resulting in most of the variance being explained by these three dimensions.</td>
</tr>
<tr>
<td>Sales (1972)</td>
<td>Describes “need for stimulation” as a social motive and uses the kinesthetic after-effects (KAE) procedure as a measure of need for stimulation.</td>
<td>Empirical study suggests “reducers” on the KAE react favorably to complex stimuli and choose complex and intense social activities.</td>
</tr>
<tr>
<td>Shettel (1976)</td>
<td>Presents model of exhibit effectiveness in which effective exhibits must have attracting power, holding power, and teaching power.</td>
<td>Position derived from experience in museum evaluation.</td>
</tr>
<tr>
<td>Schoenfeld and Cumming (1963)</td>
<td>Provides definitions of perception and describes the phenomenon in terms of behavior theory.</td>
<td>Position derived from review of theoretical and empirical literature.</td>
</tr>
<tr>
<td>Shirey and Reynolds (1968)</td>
<td>Presents evidence that attention is not a causal mediator between interest and learning in adults.</td>
<td>Study in which college students read sentences previously rated for interest. Attention allocated to and recall of the sentences were measured.</td>
</tr>
<tr>
<td>Singer (1979)</td>
<td>Asserts that imaginative play in childhood is an adaptive mechanism which allows the child to avoid extreme negative affects and maximize positive affects.</td>
<td>Position derived from review of theoretical and empirical literature.</td>
</tr>
<tr>
<td>Skinner (1953)</td>
<td>Describes emotion as a predisposition to act in a certain way.</td>
<td>Part of Skinner’s theory of behavior.</td>
</tr>
<tr>
<td>Smock and Holt (1962)</td>
<td>Presents evidence that novelty evokes positive approach behavior in children, but that the motivational properties of novelty vary among individuals.</td>
<td>Experimental study conducted with 44 first grade children.</td>
</tr>
<tr>
<td>Author(s)</td>
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</tr>
<tr>
<td>Sommers (1981)</td>
<td>Introduces the measurable construct of &quot;emotional range,&quot; the number of emotional responses displayed by an individual in a given situation. Found emotional range to be related to two social cognitions.</td>
<td>Emotional range, role-taking ability, and cognitive complexity in description of other persons were measured. Emotional range was compared in groups testing high and low in the other two constructs.</td>
</tr>
<tr>
<td>Tomkins (1962, 1965)</td>
<td>Theory states that the affective system is the primary motivational system, and that the face is the primary site of the affects. Also discusses the psychology of commitment.</td>
<td>Seeks to move beyond behaviorism and psychoanalysis to a more unified theory converging neurophysiology, communication theory, learning theory, and personality theory.</td>
</tr>
<tr>
<td>Washburne and Wagar (1972)</td>
<td>Reports on characteristics of exhibits found most interesting by visitors.</td>
<td>Visitors in four visitor centers in the Pacific Northwest were interviewed as to what exhibits they found most interesting.</td>
</tr>
<tr>
<td>White (1959)</td>
<td>Proposes the theory of effectence motivation, whereby humans desire to competently interact with their environment, to explain exploratory and manipulation behavior.</td>
<td>Critique of classical drive theory and review of other theoretical and empirical literature shape the theory.</td>
</tr>
<tr>
<td>Wilson (1979), Kunst-Wilson and Zajonc (1980), and Zajonc (1980)</td>
<td>Body of work demonstrating the mere exposure effect, in which previously encountered stimuli are rated more positively than novel stimuli. The mere exposure effect appears not to be dependent on conscious awareness of the stimulus, suggesting that affect and cognition may be two separate systems.</td>
<td>Evidence derives from experiments in which subjects are exposed to stimuli and asked whether they &quot;like&quot; the stimuli.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Summary of Theory or Study</td>
<td>Development of Theory/Conditions of Study</td>
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</tr>
<tr>
<td>Winer and Clark (1989)</td>
<td>Found that positive affect can improve cognitive performance in young children.</td>
<td>Experiment tested the effect of positive affect on third and sixth graders' performance on the remote associates test. Third graders showed better performance while sixth graders showed no difference with positive affect.</td>
</tr>
<tr>
<td>Young and Crandall (1984)</td>
<td>Found that wilderness users are slightly more self-actualized than non-users.</td>
<td>Administered a shortened version of Shostrom's Personal Orientation Inventory to a group of 222 wilderness users and a control group of nonusers.</td>
</tr>
<tr>
<td>Zuckerman (1979)</td>
<td>Describes sensation seeking and anxiety as two types of affect associated with approach and inhibition.</td>
<td>An instrument known as the Sensation Seeking Scale was developed. Scores on the instrument were found to negatively correlate with risk appraisal.</td>
</tr>
</tbody>
</table>
The taxonomy consists of a five-category hierarchical scale with subdivisions within each category. It is summarized as follows:

1. Receiving
   - awareness
   - willingness to receive
   - controlled or selected attention

2. Responding
   - acquiescence in responding
   - willingness to respond
   - satisfaction in response

3. Valuing
   - acceptance of a value
   - preference for a value
   - commitment

4. Organization
   - conceptualization of a value
   - organization of a value system

5. Characterization by a Value
   Complex
   - generalized set
   - characterization

Awareness is, in the authors' words, "the bottom rung of the affective domain" (p. 99). It merely specifies that the learner is conscious of the stimulus. Willingness to receive makes a small step up the ladder, referring to a range of mental disposition in which the learner does not seek to avoid the stimulus, or may even be willing to give it his or her attention. Krathwohl et al. point out that these first two subcategories represent activities which are mainly cognitive in nature. The third subcategory, controlled or selected attention, implies that the learner differentiates the stimulus from
other competing stimuli and favors the chosen stimulus with attention.

In the Responding category, *acquiescence in responding* indicates a sort of neutral compliance, a take it or leave it disposition toward the stimulus. Only at the next level, *willingness to respond*, does the learner voluntarily respond to the stimulus. That the response is voluntary implies that there may be a reward or reinforcement to the learner as a result of the response. The next step up is *satisfaction in response*, which is purely affective. The satisfaction experienced is seen by Krathwohl et al. (1964) to be reinforcing and rewarding, and thus serves to increase the frequency and strength of the response.

Valuing implies that the learner ascribes some degree of worth to the stimulus, or phenomena or behavior associated with the stimulus. Krathwohl et al. (1964) suggest that *belief* represents the dominant behavior in Valuing. The three subcategories of Valuing thus represent varying degrees of certainty in that belief. *Commitment* represents the highest level of certainty in the belief and is characterized by motivation to act out associated behavior(s).

Under Organization, *conceptualization of a value* refers to the individual's ability to relate a given value to previously held values or values he or she is in the process of acquiring. *Organization of a value system* moves one step further toward the bringing together of values into an ordered relationship. Within Characterization by a value complex, the *generalized set* refers to the individual's predisposition to act in a certain way out of his or her system of attitudes and values. *Characterization*, described as "the peak of the internalization process," (Krathwohl et al., 1964, p. 185) embodies the individual's worldview or philosophy of life.
For purposes of data display (Miles & Huberman, 1984), sketches of major concepts from the literature were made. The sketch of the sequence represented by the taxonomy of Krathwohl et al. (1964) is shown in Figure 2. Various constructs associated with affect (interest, appreciation, attitudes, value, adjustment) tend to overlap categories within the taxonomy. As shown in Figure 2, receiving and responding are conceptualized to apply to affective responses in short-term experiences in nonformal educational settings. Valuing may represent a shift from the responses typical of short-term experiences to longer-term experiences, such as the resident camping experience. Or, valuing might occur beyond the nonformal setting entirely and simply be reinforced by the short-term nonformal educational experience. The highest level of valuing, commitment, is viewed as representing a shift to long-term or life-long learning, which would occur beyond the nonformal educational setting, but might also be reinforced by experiences within the nonformal setting. The taxonomy of Krathwohl et al. (1964) does not directly describe all affective responses which may come into play in nonformal educational settings, particularly negative affects.

In the psychological literature, Bull (1951) (cited in Izard, Wehmer, et al., 1965) presents a sequence of events for the affective process which emphasizes motor and neurophysiological processes. In this way it is similar to the James-Lange theory (James, 1884/1968). In Bull’s view, the first response to the stimulus is a neural predisposition. The predisposition leads to a motor attitude, or a physical readiness to act. The affect which follows is a mental attitude, an awareness of the motor attitude. The sequence is completed by action, which reduces the affect. Bull sees the mental attitude which characterizes the affect as being less than a fully
Awareness
  ↓
Willingness to receive
  ↓
Controlled or selected attention
  ↓
Acquiescence in responding
  ↓
Willingness to respond
  ↓
Satisfaction in response

{ 
  Acceptance of a value
  ↓
  Preference for a value
  ↓
  Commitment
  ↓
  Conceptualization of a value
  ↓
  Organization of a value system
  ↓
  Generalized set
  ↓
  Characterization
}

Shift from short-term experience to longer-term (i.e., resident camping experience, etc.).
Shift to very long-term or life-long learning. Reinforced by shorter nonformal ed. experiences.

Figure 2. Sketch of the sequence suggested by Krathwohl et al. (1964).
conscious attitude. For Bull, when the attitude becomes fully conscious, it is a purpose, not an affect. A sketch of the sequence proposed by Bull is shown in Figure 3.

Beginning with a historical review and evaluation of existing theories of emotion, Arnold (1960) integrates a phenomenological analysis of the human experience of emotion with empirical evidence from numerous researchers to form a well-developed psychological theory of emotion. In Arnold’s theory, the affective process begins with a perception of the stimulus. Following perception, the individual makes a cognitive appraisal, a judgment as to whether the stimulus is good/beneficial, or bad/harmful. The emotion which follows is a felt tendency toward or away from the stimulus, depending on the appraisal that was made. Accompanying the emotion is an expression of the emotion, or physiological responses. Action, such as approach or withdrawal from the stimulus, completes the sequence. Central to Arnold’s theory is the idea that emotion is a motivational force. Specifically, an emotion is an action tendency, and a motive is an action tendency (emotion) evaluated by the individual as appropriate to be acted upon. A sketch of the sequence suggested by Arnold (1960) is shown in Figure 4.

Plutchik’s (1980) psychoevolutionary theory also suggests a sequence of events in the affective process. Like Arnold (1960), Plutchik sees the first event upon encountering a stimulus to be a cognitive appraisal of the stimulus. This is followed by the subjective reaction, the experience of the emotion. Following this subjective reaction is a behavioral reaction, such as withdrawal or approach. Although the terminology is different, this sequence appears virtually identical to that of
stimulus → predisposition → motor attitude (readiness, uncompleted movement) → affect (reduces oriented feeling or motor attitude (awareness of motor attitude)

Figure 3. Sketch of sequence suggested by Bull (1951) (cited in Izard, Wehmer, et al., 1965).

perception → appraisal → emotion → expression → action

Figure 4. Sketch of the theory of Arnold (1960).

stimulus event → cognitive → subjective → behavioral → function (adaptive) appraisal reaction reaction (emotion)

Figure 5. Sketch of the sequence suggested by Plutchik (1980).
Arnold. The difference is that Plutchik adds *function* as the end of the sequence. This is in keeping with his theory that emotions serve an adaptive function for the organism. For example, if the organism experiences fear, and behaves by withdrawing, the function served would be protection. Although Plutchik distinguishes between emotion and motivation, it is clear that he sees emotion as an action tendency, as does Arnold. A sketch of the sequence suggested by Plutchik is shown in Figure 5.

Plutchik (1980) also breaks the cognitive events leading to emotion down into more detail. He proposes that the process actually begins with a scanning-orienting response. *Scanning* is simply the movement of the sensory system around the stimulus field. *Orienting* involves aligning the senses to maximize the intake of a novel or unexpected stimulus, such as turning the head in the direction of a loud noise. Once the senses are oriented to one part of the stimulus field, other parts of the stimulus field may be “tuned out.” When this occurs, the individual is said to be *attending*. Attending facilitates the *comparing* of the new stimulus input to items in short-term and long-term memory. Comparing then facilitates the evaluation of the stimulus and predicting the outcome of possible behaviors which could be associated with the stimulus. Affect (emotion) follows the evaluation and prediction, provides feedback to the cognitive processes preceding it, and serves to encourage the behavioral reaction. A sketch of this process is shown in Figure 6.

Buck’s (1984) model of emotion suggests a sequence of events which departs from those of Arnold (1960) and Plutchik (1980). Buck asserts that affective stimuli act directly on the affective system, which he
Comparing (cognitive)
Predicting, evaluating (cognitive)

Figure 6. Sketch of Plutchik's (1980) view of the relationship between affect and cognition.
calls PRIMES, or primary motivational/emotional systems associated with neurochemical systems of the body. Thus, Buck does not believe a cognitive appraisal precedes the experience of emotion. As shown in Figure 7, emotion is seen as consisting of adaptive and homeostatic mechanisms which produce physiological responses, expressive tendencies which lead to facial expression, body postures, and so forth, and the subjective experience of emotion. Emotion is a result of the functioning of the affective system, which may interact with relevant learning, but does not require a previous cognition. Rather, the cognitive system becomes involved after the emotion has been experienced. Cognition is involved when the individual labels the emotion as fear, joy, or any one of a host of emotions being experienced. Cognition also facilitates goal-directed behavior following experience of the emotion. In referring to the affective system as a primary motivational/emotional system, Buck also sees the motivational aspect of emotion.

As evidenced by the different views presented above, there is not complete agreement about the relationship between cognition and affect in the affective process. The idea that cognition must precede affect (Arnold, 1960; Krathwohl et al., 1964; Plutchik, 1980) seems to be the traditional view. Eiss and Harbeck (1969), who undertook the development of behavioral objectives for science education corresponding to the taxonomy of Krathwohl et al. (1964), present a model (see Figure 8) which has been interpreted to indicate that the affective domain is the "gateway" to the learning process (Iozzi, 1989, p.3). Although the textual explanation accompanying it is unclear in this regard, the graphic representation of Eiss and Harbeck's model does seem to imply that sensory input enters the
Figure 7. Sketch of Buck's (1984) view of the relationship between affect and cognition.
Figure 8. Sketch of Eiss and Harbeck's (1969) view of the relationship between the cognitive, affective, and psychomotor domains.

Figure 9. Sketch of Zajonc's (1980) view of the relationship between affect and cognition.
conscious mind through the affective system. This is interesting, since Krathwohl et al., whose work Eiss and Harbeck were supplementing, state that awareness is a cognitive activity.

Zajonc (1980) proposes that the affective and cognitive systems are two separate systems which may interact in various ways (see Figure 9). Evidence for this proposition comes from experiments illustrating the *mere exposure* effect, where techniques were employed to reduce cognitive recognition of stimuli to chance levels and measurements of subjects' affective preference for repeated stimuli were made. The mere exposure effect is the increased preference for previously exposed stimuli regardless of whether the exposure has reached the conscious cognitive level. In one experiment (Wilson, 1979), auditory tone sequences were presented to one ear while a taped story was presented to the other ear. The distraction of the story reduced the cognitive recognition of the tone sequences to chance level, but subjects still "liked" the sequences they had heard more often. Another experiment (Kunst-Wilson and Zajonc, 1980) involved showing subjects polygons for 1 millisecond. Cognitive recognition for the polygons was at chance level, but subjects again said they "liked" the polygons they had been showed before better than new ones, even though they did not recognize them as familiar.

To achieve a meshing of the major theories described above into a skeleton sequence of events for the affective process, the major theories were displayed together, with similar elements from each theory aligned horizontally (see Figure 10). A skeleton sequence, shown in the last column of Figure 10, was devised by retaining as many elements from all the theories as possible. The most difficult theory to incorporate was that of
Figure 10. Comparison of major theories of the affective process, and resulting skeleton (labeled Meredith (1993)) for Model 1.
Buck (1984) because of his divergence from the others on the interaction of the cognitive system. Buck's theory was nonetheless accounted for in Model 1, as discussed below.

After meshing the major theories into a skeleton sequence of events, a more detailed sketch of the skeleton sequence (see Figure 11) was made. This sketch is inclusive of the five major theories, plus thoughts on where the work of some other researchers might be sensibly placed in the model. As shown at the top of Figure 11, Buck's (1984) diverging view on the interaction of the cognitive system is included in the sketch. At the bottom of Figure 11 is a block labeled learning, which is intended to suggest possible influences of interest, curiosity, affect, and so forth on cognitive learning. The sketch is continued in Figure 12, which is a blow-up of the affect blocks showing the different forms affect can take according to the five major theoretical views and others to be discussed later.

To solidify the skeleton sketch (see Figure 11) into Model 1 (see Figure 13), it was necessary to clarify and simplify the blocks. Blocks containing more than one theoretical element were given clearer titles, and some blocks were collapsed together. The awareness, perception, scanning, and predisposition block was titled awareness/perception, since all of these elements describe the perceptual process. Although Bull's (1951) (cited in Izard, Wehmer, et al., 1965) neural predisposition may not fit exactly into this category, it is unclear where else it might be placed. Given Bull's perspective of affect as a motor/neurophysiological process, neural predisposition to motor action may well embody a perception of the stimulus.
Figure 11. Preliminary sketch representing a meshing of major theories into a model of affect for nonformal educational settings.
Figure 12. Detailed view of affect from the preliminary sketch shown in Figure 11.
Figure 13. Main view of Model 1.
The willingness to receive, appraisal, and motor attitude block (see Figure 11) were titled *appraisal*. Willingness to receive, according to Krathwohl et al. (1964), indicates that the learner has an attitude of suspended judgment toward the stimulus, but at least does not act to avoid it. Thus willingness to receive may be said to represent a beginning of appraisal. Bull's (1951) (cited in Izard, Wehmer, et al., 1965) motor attitude again fits only awkwardly into this category, but a motor attitude to act toward a stimulus might be loosely considered an appraisal of sorts.

Selective attention and acquiescence in responding (see Figure 11) were collapsed into one block because in the nonformal educational setting acquiescence in responding may take the form of continuing to attend to an exhibit, program, activity, etc.

Willingness to respond is described by Krathwohl et al. (1964) as a voluntary response, possibly because the response holds the promise of a reward or reinforcement. Interest, curiosity, and sensation seeking (Zuckerman, 1979) fall well under this category, since the satisfaction of these quests is rewarding. Because these elements represent an active desire to engage in certain behaviors, and because interest and curiosity are often thought of as affective constructs, they were collapsed into the affect block, which also includes satisfaction in response. This block was titled *short-term affect*, because it is conceptualized as taking place in the short-term upon exposure to a stimulus in the nonformal educational setting.

Four of the five major theories incorporated into the skeleton sequence include the idea that affect or emotion leads to action of some kind (Arnold, 1960; Buck, 1984; Bull, 1951 (cited in Izard, Wehmer, et al.,
1965); Plutchik, 1980; ). Skinner (1953) also describes emotion as a predisposition to action. Therefore Model 1 (see Figure 13) shows short-term affect as leading to some sort of immediate action.

The taxonomy of Krathwohl et al. (1964) includes categories which might be referred to as long-term affect, or forms of affect which would be more likely to occur over a longer period of time than is generally available to the learner in the nonformal educational setting (see Figure 2). Such long-term affect is included in Model 1 (see Figure 13), and is conceptualized to be formed from or reinforced by short-term affect. Long-term affect may then influence wider patterns of action and/or behavior in the learner's life.

Short-term Affect Block

The short-term affect block of Model 1 contains the constructs conceptualized by the researcher to constitute the broad phenomenon of affect in nonformal educational settings (see Chapter 2). Reflecting upon the literature reviewed, these constructs seemed to fall within the three categories of affective expression, affective experience, and affective behavior.

Affective Expression

Affective expression refers to the facial expressions and body postures associated with an individual's affective state. Such expressions are of particular interest to Buck (1984), whose theory concerns how affect is communicated from one individual to another, and to Tomkins (1962), who proposes that the face is the primary site of affects. Tomkins believes
that affect originates in the face, the type of affect being determined by the intensity and density of neural firing in the facial muscles. The face then provides feedback to other body systems and to the brain, as well as to other individuals. Similarly to the James-Lange theory (James, 1884/1968), Tomkins’ theory says it is the awareness of the facial and bodily responses which provides the conscious, subjective experience of an affect. Tomkins distinguishes eight affects, characterized by corresponding facial responses, as follows:

(a) interest-excitement - eyebrows down, track, look, and listen;
(b) enjoyment-joy - smile, lips widened up and out;
(c) surprise-startle - eyebrows up, eye blink;
(d) distress-anguish - cry, arched eyebrow, mouth down, tears, rhythmic sobbing;
(e) fear-terror - eyes frozen open, pale, cold, sweaty, facial trembling with hair erect;
(f) shame-humiliation - eyes down, head down;
(g) contempt-disgust - sneer, upper lip up;
(h) anger-rage - frown, clenched jaw, red face.

Plutchik (1980) has reviewed a number of studies which attempted to identify dimensions of facial expression by asking subjects to rate pictures of facial expressions as to what expressions were being portrayed. He concluded that almost all of these studies arrived at two or three dimensions to account for most of the variance in the ratings. All the studies he reported identified a pleasantness-unpleasantness dimension and a sleep-tension dimension. Third dimensions which appear in the literature are not consistent. These pleasantness-unpleasantness and sleep-tension
dimensions are similar to two dimensions common to the tri-dimensional theories of emotion discussed in Chapter 2 (Wundt, 1904 (cited in McTeer, 1972); Schlosberg, 1954 (cited in Plutchik, 1980); Russell & Mehrabian, 1977).

Tomkins’ (1962) theory implies that there are universal human facial expressions associated with various affects. In his review of the literature, Plutchik (1980) concludes that cross-cultural studies and studies of facial expressions in children born blind indicate the possibility of a genetic basis for some facial expressions of emotion. It also seems clear that some facial expressions are learned responses. For example, Ekman and Friesen (1969) (cited in Plutchik, 1980) suggest that cultural factors influence how emotions are expressed. They propose that cultural display rules amplify, decrease, neutralize, blend, or mask the genetically based affective responses universal to humans and thus alter the final facial or nonverbal expression. Buck (1984) uses the idea of display rules in his theory on the communication of affect.

Besides facial expressions there are a number of nonverbal communication behaviors which serve as expressions of affect. Duncan’s (1969) (cited in Plutchik, 1980) review of the literature presents the following list as examples of such nonverbal behaviors: facial expressions, eye movements and gaze direction, gestures, posture, voice qualities such as pitch and inflections, speech hesitations, nonlanguage sounds (laughing, yawning, grunting, etc.), use of social space, touching, and odors and sniffing.
Affective Experience

Affective experience refers to the individual's subjective experience of the affective state. The first construct of affective experience shown in the short-term affect block is interest. One definition of interest given by English and English (1958) is "the tendency to give selective attention to something" (p. 271), but definitions and methods of measurement for interest vary. Most researchers measure interest with some form of self-report from subjects about their subjective level of interest (Berlyne, 1970; Koran, Foster, & Koran, 1989; Washburne & Wagar, 1972), but others have used instruments that do not rely on self-reports of the subjective state (Busque, 1991). This variability in definitions and measurement for interest make it a difficult construct to study.

Koran et al. (1989) found that the level of interest, measured by a Likert-type scale, in an exhibit is correlated with attention, measured as time spent at the exhibit. The association between attention and interest leads to the logical conclusion that giving selective attention to a stimulus means that the learner experiences some degree of interest related to the stimulus. A negative case for this conclusion was found in a paper by Shirey and Reynolds (1988), in which the authors found college students gave less attention in reading to sentences they had rated more interesting. However, this experiment included a test of recall for content of the read sentences. The reading was therefore not an intrinsically motivated task, since the subjects knew they would be tested on the performance of the task. Perhaps allocating less attention to more interesting sentences was a strategy for learning overall content of the sentences. If, for example, more interesting sentences were easier to remember, it would be more efficient to
allocate more attention to the less interesting sentences. The conditions of the experiment were quite different from those which would generally occur in the nonformal educational setting, where learner behavior is more intrinsically motivated.

Closely related to the construct of interest is curiosity. English and English (1958) define curiosity as "the tendency to investigate, to seek to observe the novel, to obtain information" (p. 134). Day's (1982) definition draws from Berlyne's (1960) theory and emphasizes the investigative nature of curiosity. Day defines curiosity as a state of tension in an organism which is induced by a moderately high level of uncertainty and which drives the organism to explore its environment. Berlyne (1954, 1960, 1966) distinguishes between perceptual curiosity and epistemic curiosity. Perceptual curiosity refers to a state of high arousal that is relieved by an exploratory response (Berlyne, 1960). This high state of arousal is caused by a state of subjective uncertainty associated with the stimulus. Similarly, epistemic curiosity is a drive to obtain knowledge which is induced by a mental conflict between what is known and some new question or piece of information. This drive is reduced by the acquisition of knowledge (Berlyne, 1954, 1966).

Berlyne's (1960) theory of curiosity stems from the basic hypothesis that there is an "optimal influx of arousal potential" (p. 194) for a given individual organism at a given time, and that a deviation from this optimum will induce a drive or an aversion. According to Berlyne, the collative variables, of which novelty is an example, tend to induce arousal, and hence curiosity. On the other hand, Falk et al. (1978) found that the stimulus of a novel environment for school children on a field trip inhibited the gain of
cognitive knowledge. This would be consistent with Day’s (1982) explanation of too much arousal causing a diminishment in performance, and with the Yerkes-Dodson law (Bell et al, 1978). It is also consistent with Cohen’s (1977) (cited in Bell et al., 1978) environmental load theory, which states that humans have a limited capacity for processing incoming stimuli. Humans adapt to more intense or unpredictable stimuli by allocating more attention to them. Thus, in the case of the novel field trip, the school children may have allocated more attention to the novelty of the environment than to the learning tasks presented to them.

Other theorists also hold the view that an optimal level of arousal serves to drive behavior. Leuba (1955) uses the term optimal stimulation to describe a tendency for organisms to seek more stimulation when stimulation is low, and less stimulation when it is high. Maddi (1961) maintains that humans have a need for variation in their exposures to stimuli, and that this need explains the behaviors of play and exploration. Platt (1961) also suggests that the human response system demands novelty at the same time as regularity, suggesting that some intermediate level of stimulation or arousal is optimal for human beings. Maddi (1961) claims that variation-seeking differs among individuals and can be measured as a dimension of personality. Wohlwill (1974) (cited in Bell et al., 1978) also holds that people vary in their optimal level of stimulation, or adaptation level as he calls it, but also believes that this variability stems from past experience.

Interest and curiosity seem to be highly related constructs. For example, Harty and Samuel (1986) found interest and curiosity in science among a group of 228 sixth graders to be highly correlated. Thus, it
seemed logical that Model 1 should reflect the relatedness of the two constructs as shown in Figure 13.

English and English (1958) define pleasure as a feeling at one end of a continuum with pain at the other end and a central neutral point, and also as "a vaguely defined emotional condition characterized by desire for its continuance" (p. 394). They also point out that, theoretically, pleasure occurs in the organism when a tension is being reduced. If, as Day (1982) suggests, curiosity is a state of tension, then the reduction, or satisfaction, of curiosity should lead to pleasure, as proposed in Model 1 (see Figure 13). Day, using the terms interest and curiosity synonymously, does claim that the satisfaction of interest leads to pleasure.

Berlyne (1971a) discusses the "outward correlates of pleasure" in relation to aesthetics. The amount of aesthetic enjoyment a stimulus provides is referred to as its hedonic value, which consists of the pleasure it produces, its reward value, the feedback it provides, its attractiveness, and the incentive it provides to attend to it (Berlyne, 1971a). As with curiosity, Berlyne contends that hedonic value is dependent on arousal. Berlyne (1960) sees the arousal associated with aesthetic pleasure as being at a lower potential than that related to curiosity. He suggests that aesthetic pleasure may result from diversive exploration, which serves to raise the level of arousal toward the optimum rather than lower it, as in the satisfaction of curiosity (Berlyne, 1966). Diversive exploration is stimulated by boredom rather than by curiosity.

Several empirical studies support the difference in arousal potential between pleasure and curiosity/interest. These experiments involved showing subjects figures which varied in shape, size, color, and so on, and
asking them to rate the figures for subjective pleasingness and interestingness. Berlyne (1970) showed colored shapes in sequences which varied in level of novelty. With simple stimuli, he found subjects’ rating of pleasingness to decrease as novelty decreased, but with complex stimuli, pleasingness remained level or increased as novelty decreased. He concluded that the highest hedonic value is associated with stimuli at mid-arousal potential. Day (1967) asked subjects to rate polygons with varying numbers of sides for complexity, pleasingness, and interestingness. Subjective complexity increased with the number of sides of the polygons. Pleasingness was rated higher at lower levels of complexity, while interestingness increased and leveled off with increasing complexity. Berlyne and Boudewijns (1971) asked subjects to rate pairs of figures for pleasingness, interestingness, liking, and complexity. They found that subjects’ rating of complexity increased with the number of differences between the figures. Pleasingness and liking followed the “inverted U” shaped curve, meaning that subjects’ ratings of pleasingness and liking peaked at mid levels of complexity. Interestingness, on the other hand, increased to a point and stayed level with increasing complexity. The authors contend their results support the adage that “uniformity in variety” (p. 195) enhances the hedonic value of a stimulus.

Kirkland (1974a, 1974b) performed a sequence of experiments from which he concluded that pleasure is actually a subset of interest. When subjects were instructed to rate random polygons for pleasingness first, and then for interestingness, an inverse effect between the pleasingness and interestingness ratings was obtained. However, when subjects viewed figures for interestingness first, and then for pleasingness, no inverse effect
was obtained. Possibly, the initial viewing provided for a pleasurable satisfaction of the interest stimulated by the polygons. The interest and/or pleasure experienced was therefore more related to the internal state of the viewer than to external attributes of the stimulus.

Russell and Mehrabian (1977) take issue with Berlyne's (1960) hypothesis that pleasure is related to arousal potential. In a multiple correlational study, they demonstrated that measured arousal accounted for less than five percent of the variance in measured pleasure. It should be pointed out that these authors measured arousal with a paper-and-pencil instrument, while Berlyne's hypothesis derives from numerous physiological measurements of arousal, such as EEG and GSR (Galvanic Skin Response) found in the psychological research literature (Berlyne, 1960).

Emotion is often considered to be approximately synonymous with affect (English & English, 1958). Consequently Model 1 proposes that short-term affect in the nonformal educational setting may take the form of one or many emotions. Theories on emotion are numerous and varied (see Chapter 2). Some theorists have attempted to devise classification schemes for the emotions. Arnold's (1960) theory holds that emotions differ in their object and its conditions and according to their degree of impulsion. Positive emotions are a tending toward an object (stimulus) appraised as good, and negative emotions are a tending away from an object appraised as bad. Impulse emotions are a tending toward or away from the object when conditions are favorable, and contending emotions are contending for or against the object when conditions are unfavorable. An example of a positive emotion is love for an object appraised as good. If the object is not
present, but conditions are favorable for attaining it, the impulse emotion of desire is experienced. If conditions are not immediately favorable for attaining the object, the contending emotion of hope or despair would be experienced. This classification scheme describes basic emotions, simple, unambiguous tendencies toward or away from the object. Complex emotions may arise as compounds of many basic emotions.

Plutchik's (1980) psychoevolutionary theory of emotion classifies emotions according to a multidimensional model. He proposes that there are eight primary emotions, all of which are associated with eight basic adaptive functions common to all organisms. The eight adaptive functions are protection, destruction, reproduction, reintegration, incorporation, rejection, exploration, and orientation. These functions are associated with fear, anger, joy, sadness, acceptance, disgust, anticipation, and surprise. Plutchik arranges these eight primary emotions two-dimensionally in a circle, much like primary colors on a color wheel. The third dimension in the model is the emotion's intensity, or level of arousal ranging from sleep to maximum excitement. Thus, the maximum intensity for fear is terror, and the maximum for joy, ecstasy, and so on. Plutchik arrived at the terms used to represent various intensities of emotions in an empirical study where college students were asked to rate the subjective intensity of a number of emotional terms on a scale from one to eleven. In Plutchik's model, complex emotions arise from a mixing of one or more of the eight primary emotions, just as complex colors derive from a mixing of primary colors.

The question may be asked as to why Model 1 represents pleasure as separate from the emotions. Disagreement exists among emotion theorists as to the role of pleasure in emotion. Arnold (1960) classifies
pleasure as a feeling, which is distinguished from an emotion. In Arnold's view, an emotion indicates an attitude to the object of the emotion, while a feeling merely refers to some aspect(s) of the object. Arnold gives the example of finding the taste of wine pleasurable, but drinking wine when offered as an indication of the emotion of liking wine. More generally, a feeling is a positive or negative reaction to some experience, but not, as an emotion is, an action tendency toward or away from an object.

In contrast to Arnold (1960), Russell and Mehrabian (1977) contend, on the basis of their multiple correlational study, that all emotions can be reduced to three dimensions: pleasure-displeasure, arousal, and dominance-submissiveness. Their regression analysis using scores from 42 verbal-report emotion scales showed that almost all the variance in these scales was accounted for by these three measured dimensions.

Unlike Russell and Mehrabian (1977), Bertoci's (1988) theory of emotion expands the concept of emotion beyond that of Arnold (1960) or Plutchik (1980). Bertocci maintains that unlearned motives constitute primary emotions. Bertocci uses as an explanatory example the emotion of respect. He writes, "Just as I cannot tell another person what the experience 'yellow' is unless he [sic] experiences it, so I cannot tell him what 'respect,' as experienced, is. In both instances, what is learned is not the non-rational experience, but the name" (p. 197). Bertocci proposes ten categories of primary emotions: lust-sex, hunger and organic needs, anger-pugnacity, fear-escape, anxiety-guilt, tenderness-protection, zest-mastery, and creativity-enlivenment. Thus, in Bertocci's broad view of emotion, interest, curiosity, and pleasure would likely all be classified under the heading of emotion.
Because there is disagreement among theorists as to how emotions should be classified, and because the intent for the Model developed herein is for it to be used by a wide audience to whom terms like interest, curiosity, pleasure, emotion, and so on, are likely to evoke some common sense meaning, the constructs of interest, curiosity, aesthetic enjoyment and pleasure, and emotions have been proposed as separate elements in Model 1.

The element of flow in Model 1 (see Figure 13) comes from the work of Csikszentmihalyi (1975), who describes his theory as "a theoretical model for enjoyment" (Chapter 4). The theory derives from the author's study, involving both qualitative and quantitative methods, of people engaged in autotelic, or intrinsically-rewarding, activities. The specific activities focused on in his study are chess, rock climbing, rock dancing, and performing surgery.

According to Csikszentmihalyi (1975), flow experiences are characterized by: (a) the merging of action and awareness, (b) a centering of attention on a limited stimulus field, (c) loss of ego or loss of self-consciousness, (d) control by the individual of his/her actions and of the environment, and (e) noncontradictory demands for action and unambiguous feedback to the individual's actions. Flow is experienced when there is a perfect balance between worry and boredom, when the opportunities for action are in balance with the actor's skills. When the activity is stimulating beyond boredom yet still within the capabilities of the individual, flow is experienced.

Csikszentmihalyi's (1975) study of flow deprivation suggests that the flow experience may be quite important to healthy human functioning. Flow
deprived subjects felt more tired and irritable, reported more headaches, judged themselves in more negative terms, felt less creative and reasonable, and suffered loss of concentration and depression. Csikszentmihalyi infers that engaging in flow experiences may create a feeling of effectence (White, 1959), and may facilitate the acquisition of an optimal level of arousal/stimulation (Berlyne, 1960; Leuba, 1955). Thus, it is logical that the affective experiences of interest and curiosity, which motivate the seeking of optimal arousal, should precede the flow experience in Model 1 (see Figure 13).

A study by Kaplan and Talbot (1983) illustrates how flow-like experience may occur in a nonformal educational setting, specifically the wilderness setting. These authors reviewed the literature and found that the enjoyment of nature is of primary value in the wilderness experience. Data from questionnaires administered to participants and a content analysis of participant journals from ten years in the Outdoor Challenge Research Program revealed a progression of psychological benefits derived from wilderness experiences:

(a) an awareness of the relationship between the individual and the physical environment, which occurs on days 3-4 of the seven day experience;
(b) an increase in self-confidence and sense of tranquility, occurring around day 5; and
(c) a feeling of relatedness to the surrounding environment, occurring around day 7.

Kaplan and Talbot use the term *restorative environments* to describe wilderness settings and their capacity to provide such benefits. From their
analysis, they suggest that restorative environments embody one or more of the following factors:

(a) being away from the everyday environment,
(b) fascination, or that which is experienced when attention is effortless,
(c) coherence, an interrelatedness between the elements of the situation, and
(d) compatibility across the domains of human functioning.

The first benefit of the wilderness experience, awareness of the relationship between the individual and the physical environment, displays both being away and fascination. As participants progress to the second benefit, increase in self-confidence and sense of tranquility, the coherence factor emerges. The third benefit category, contemplation, reflects compatibility.

These attributes of the wilderness experience show some similarity to the qualities of the flow experience discussed above. For instance, fascination, or effortless attention, suggests a merging of action and awareness. An increase in self-confidence and sense of tranquility suggests noncontradictory demands for action and unambiguous feedback to the individual's actions. A feeling of relatedness to the surrounding environment suggests loss of ego or loss of self-consciousness.

Kaplan and Talbot (1983) point out that a full-blown wilderness environment may not be necessary for restorative experiences to occur. They propose that other natural environments may be capable of providing microrestorative experiences. Certainly, their work makes clear the potential for nonformal educational settings to provide microrestorative, restorative, or flow-like experiences.
An affective phenomenon very similar to flow is the *peak experience*, described by Maslow (1962) as moments of great awe, intense happiness, rapture, ecstasy or bliss. Maslow says examples of situations from which peak experiences arise are love and sex, aesthetic moments, bursts of creativity, insight and discovery, fusion with nature, childbirth, athletic activities, and so forth. Like flow, peak experiences seem to be associated with psychological health. In fact, Maslow says, "I have been tempted to call the peak-experience a transient or temporary episode of self-actualization or health" (p. 11). Peak experiences can occur in anyone, but some "non-peakers" (p. 15) repress them.

Panzarella (1980) conducted a study of the factors common to peak experiences associated with music and the visual arts. A content analysis and factor analysis of questionnaire responses revealed four phenomenological factors: renewal, motor-sensory, withdrawal, and fusion-emotional experiences. Renewal refers to a subjective feeling that the world is a better place after the aesthetic experience. Motor-sensory experiences involve sensations of feeling "high" or "floating" (p. 76), or alterations in body rhythms or changes in posture or locomotion. Withdrawal experiences describe a loss of contact with the physical and social environment because attention is riveted to the stimulus. Fusion-emotional experiences refer to the feeling of becoming "one" (p. 77) with the music or work of art. These factors also exhibit similarity to the characteristics of the flow experience, particularly the merging of action and awareness, centering of attention on a limited stimulus field, and loss of ego or self-consciousness.
Beck (1993) studied characteristics of optimal experiences of wilderness recreationists and identified nine parameters associated with such experiences. The nine parameters are emotional orientation, novelty and escape, aesthetic responses to the environment, arousal, increased awareness and self-realization, humility and spirituality, noetic (intellectual) qualities, ineffability (difficulty in articulating the experience), and ethereal elements. These qualities share similarities with the characteristics of flow experiences, peak experiences, and restorative experiences.

Peak experiences have been linked to the concept of self-actualization (Maslow, 1970), Maslow’s term describing people who display good psychological health. A study by Young and Crandall (1984) investigated whether wilderness users are more self-actualized than non-users, and whether frequency of wilderness use contributes to the development of self-actualization. The authors found a significant, but slight difference in level of self-actualization between wilderness users and non-users, but no relationship between the frequency of wilderness use and level of self-actualization. Thus, although wilderness seems to provide opportunity for optimal and restorative experiences (Beck, 1993; Kaplan & Talbot, 1983), its role in contributing to the self-actualization process is, at best, unclear.

As shown in this discussion, the phenomena of flow and peak experiences are very similar. However, because both terms are used distinctly by different theorists, both are represented as separate, though closely related, elements in Model 1.
Affective Behavior

In addition to affective expression and affective experience, certain behaviors are included in the short-term affect block of Model 1 because of their close association with affective experiences. These behaviors are exploration, play, and creative behavior.

English and English (1958) define exploration as a series of movements that “bring different portions or aspects of the surroundings into stimulus relation to the exploring organism; or the analog of such movements in thinking, in which there is a shift from considering one aspect of a situation to considering another” (p. 195). The function of such behavior to an organism is to give the organism access to environmental information not previously available (Berlyne, 1960). Curiosity has been defined as an incentive system (Birch & Veroff, 1966), or as a motive or drive for exploratory behavior (Berlyne, 1960; Day, 1982). Accordingly, the arrow leading from curiosity to exploration in Model 1 (see Figure 13) proposes that exploratory behavior may lead directly from curiosity.

Other theorists have described exploratory behavior in terms different from the curiosity drive. Harlow (1950) uses the term manipulation drive, of which he found evidence in rhesus monkeys. He observed that the animals consistently worked to solve a mechanical puzzle even though the solution offered no extrinsic reward. Maddi (1961) explains exploration in terms of a need for variation. White (1959) argues that exploratory behavior in humans does not fit the classical theory of drives. He groups behaviors such as exploration, activity, and manipulation together as contributing to competence, which is a motivation, not a drive. The motivation involved in competence is effectence motivation, which causes humans to desire
competent manipulation and interaction with their environment. The result of acting on the effectence motivation is a feeling of efficacy.

Whatever the cause of exploratory behavior, whether it satisfies the tension of curiosity or produces a feeling of efficacy, it is likely to bring about enjoyment and/or pleasurable feelings, which is indicated by the arrow from exploration to aesthetic enjoyment/pleasure in Model 1 (see Figure 13).

According to Ellis (1973), play is a word that is usually easily understood in common parlance and an activity that is usually easily recognized. Yet, a specific scholarly definition of play continues to elude psychologists and educators. Ellis reports that play may be defined by motive, as voluntary behavior, by content, or may be considered undefinable. Definitions of play by motive include play as an expenditure of surplus energy, play as an instinctive practice, and play as a process of recapitulating activities critical for the survival of the race earlier in its history. Defining play as voluntary implies that it has no motive behind it, that it is carried out simply for its own sake, that the only reward for play is play itself. Defining play by its content involves observing the play process and describing the specific behaviors inherent in the process. For example, Gump, Schoggen, and Redl (1963) (cited in Ellis, 1973) described the play behavior of a young boy by naturalistic observation. The content of his play was described by behaviors like sensual enjoyment, manipulative amusement, investigation and exploration, stunts, games, verbal joking, teasing, and dramatics. Because play is represented by many and diverse forms of behavior, it may also be considered undefinable in any specific sense. English and English (1958) have chosen to define play as voluntary behavior, or as “voluntary activity pursued without ulterior purpose and, on
the whole, with enjoyment or expectation of enjoyment" (p. 394).

Play has been defined and described in many different ways. Ellis (1973) prefers an integrated theory of play as arousal-seeking, as learning, and as a developmental process for the child. Singer (1979) links early childhood play to affect by describing it as an adaptive resource which helps the child avoid extreme negative affects and maximize positive affects. These views together with the above discussion suggest that play is related to and may follow from curiosity and exploration and that it clearly results in enjoyment. Csikszentmihalyi (1975) also maintains that flow is characterized by play. All of these relationships are represented in the short-term affect block of Model 1 (see Figure 13).

Creativity is "the ability to find new solutions to a problem or new modes of artistic expression" (English & English, 1958, p. 129). Creative behavior, then, is the process of creating new products (Pearlman, 1983) or new ideas (Gerard, 1962). According to Michaelis (1980), creativity fuses left-brain cognitive processes with right-brain affective processes, suggesting that creative behavior has a strong affective component.

Gerard (1962) explains that the creation of new ideas by the brain consists of the following sequence:
(a) observation and attention, or the perception of experience(s) or object(s), and the fixing of attention on it (them);
(b) an ordering of experiences, sometimes through questioning; and
(c) the imaginative process in which the new ideas are created.
The sequence of events suggested in Model 1 (see Figure 13) parallels the sequence explained by Gerard. A stimulus is perceived, appraised, and made the object of selective attention. Elements of short-term affect, such
as curiosity, exploration, and play may then facilitate the ordering of ideas about the stimulus and lead to an imaginative process, or creative behavior.

Pearlman (1983) says that one quality of the creative person is effectence motivation, which is also said to explain exploratory behavior. Bishop and Jeanrenaud (1980) have synthesized a model of creativity from the literature which proposes that creative behavior can result from exploration and play. These connections further reinforce the link between exploration, play and creative behavior shown in Model 1 (see Figure 13).

Csikszentmihalyi (1975) explains the flow process as characterized by creativity as well as by play, leading to the assertion in Model 1 (see Figure 13) that creative behavior may lead to the flow experience. Rogers (1962) states that a motivation for creativity is the tendency to self-actualize, a construct which has been related to the peak experience (Maslow, 1970). Thus, Model 1 proposes that creative behavior may also lead to the peak experience.

The elements of affective expression, affective experience, and affective behavior contained within the short-term affect block of Model 1 (see Figure 13) are proposed as possible affective responses which may occur in the short-term to immediate stimuli in the nonformal educational setting. The elements may be seen as arising independently after selective attention, or as arising from interactions with other elements as indicated by the arrows between elements.

Long-Term Affect Block

The long-term affect block in Model 1 (see Figure 13) contains more enduring elements which may be held by the learner beyond or away from
the nonformal educational setting, but which may arise from or be reinforced by the short-term affect which occurs in the nonformal setting. The elements included are intended as examples of long-term affect, but do not necessarily constitute an exhaustive list.

A sentiment is an enduring tendency to react emotionally in relation to a specific object of emotion, either concrete or abstract, when the opportunity arises (Arnold, 1960). Further emotions and actions may spring from the emotion held toward the object. Arnold says that "a single basic emotional reaction may endure and develop into a sentiment, provided that the emotional object has enduring value beyond its immediate sensory appeal" (p. 199).

An attitude is "an enduring, learned predisposition to behave in a consistent way toward a given class of objects" (English & English, 1958, p. 50). As can be seen from the discussion above, attitudes and sentiments are quite similar. English and English clarify the two by emphasizing that "sentiments are complex attitudes in which the affective aspect plays a central role" (p. 50). Arnold (1960) distinguishes between emotional and intellectual attitudes. She likens the development of an emotional attitude to the development of a motor skill through exercise. Each time an emotion toward a specific object is experienced, it is experienced more easily, until a stable emotional attitude is formed. Such attitudes influence the cognitive appraisals that precede emotions as well as the emotions themselves. In contrast to emotional attitudes, intellectual attitudes are formed from a reflective, cognitive judgment. They may, however, have emotions associated with them.
Other researchers have also made a distinction between affect and cognition in attitudes. Breckler and Wiggins (1989) measured both the affect and the evaluation associated with various attitude objects as well as the associated global attitude, measured as degree of "liking." Both affect and evaluation scores correlated with global attitude. Further, the self-reported behavior of blood donation was found to be more highly related to affect than to evaluation, although this relationship decreased as experience with blood donation increased. Edwards (1990) maintains that attitudes fall along a continuum from affect-based to cognition-based. His experiment showed that affect-based attitudes, what Arnold (1960) would call emotional attitudes, were more easily changed under affective means of persuasion, while cognitive-based attitudes, Arnold's intellectual attitudes, changed equally under both affective and cognitive means of persuasion. His work also suggested that affect-based attitudes are expressed with more confidence.

Bell et al. (1978) offer a review of theories on attitude formation. According to these authors, attitudes may form from classical Pavlovian conditioning, where "we learn an unfavorable attitude toward something (an environment, a person, an object, an idea) because it is associated with something we did not like in the first place. Favorable attitudes are learned in the same way - through association with a liked stimulus" (p. 39). Similar to this is the reinforcement-affect model of Byrne and Clore (1970) (cited in Bell et al., 1978). This model proposes that a neutral stimulus associated with a rewarding or punishing stimulus will bring about the same degree of positive or negative affect as the rewarding or punishing stimulus. Attitudes can also form from Skinnerian conditioning, where the formation of the
attitude depends on the reward value of the expression of or action associated with the attitude. Still another way attitudes may arise is through observation of modeling from other people (Bandura, 1974) (cited in Bell et al., 1978).

As described by Krathwohl et al. (1964) and English and English (1958), a value is the degree of worth ascribed to an object or behavior. Commitment is the highest level of certainty in the value. As discussed earlier, values and commitment were conceptualized as elements of long-term affect when the sequence for Model 1 was first formulated.

Tomkins (1965) defines commitment in terms of what he calls ideo-affective density. Ideo-affective density is the product of the intensity and duration of affect and the concurrent ideation (non-affective cognitions and action) about the object of the affect. High ideo-affective density occurs when there is intense affect and ideation continuing at high levels over a long period of time. Commitment is an example of a positive high ideo-affective density. Tomkins says commitment is fueled by repeated triads of positive-negative-positive affect, which further reinforce the commitment. Specifically, an original engagement of thought and feeling by an ideology leads to risk-taking for the "cause." This is experienced as positive affect. Risk-taking, however, usually brings suffering, or negative affect. The suffering serves to further deepen the commitment to the object of the commitment, which is a positive affect. The deepening of commitment leads to propensity for more risk-taking, and the cycle is repeated.

The phenomenon of motivation has been the subject of much study, and many theories on motivation are to be found in the literature. Chapter 2 of this study provides a concise overview for the concept. The term
motivation refers to the process that differentially energizes certain responses or behaviors over others in the same situation. The term motive is sometimes used synonomously with motivation, but the former seems to refer to a specific factor which influences or controls behavior, while the latter is the process by which this occurs (English & English, 1958). Definitions in the literature vary. Arnold (1960) defines motive as an action impulse (an emotion, in her view) appraised as good or bad for action. For Arnold, when an emotion is judged as suitable to be acted upon, it becomes a motive. Murray (1964) defines motive as "an internal factor that arouses, directs, and integrates a person's behavior" (p. 7). Marx and Tombaugh (1967), on the other hand, define motive as a habit activated by drive.

Closely associated with motive is purpose. Arnold (1960) sees purpose as the aim or goal of an action. For Arnold, the purpose is not the same as the motive, or action impulse. In contrast, Marx and Tombaugh (1967) define purpose as a kind of motive, specifically a long-range, goal-directed motive. Definitions in English and English (1958) reflect the feasibility of both of these views.

How is motivation related to affect? The answer would seem to be that they are, at least in some senses, one and the same. There is widespread opinion among theorists that affect is a motivational force (Arnold, 1960; Buck, 1984; Hilgard, 1963; Leeper, 1948/1968, 1963a,b; McClelland et al., 1953 (cited in Murray, 1964); Young, 1961; ). The affect-arousal theory of McClelland et al. (1953) (cited in Murray, 1964) maintains that motives are learned anticipations of positive or negative emotional reactions. Hilgard (1963) favors this theory, asserting that a strict stimulus-response theory of motivation is less than adequate to explain human
behavior. Tomkins (1962) and Izard, Wehmer, et al. (1965) go so far as to
claim that affect is the primary emotional system in human beings.

Murray (1964) explains how emotions like fear and anger can serve
as motives. He describes an experiment by Miller (1948) (cited in Murray,
1964) in which rats learned to perform tasks which allowed them to escape
from a painful situation, even after the source of pain (electric shock) was
removed. Murray also reports evidence that frustration, a blocking of goal-
directed behavior which leads to anger, can increase vigor in learning and
improve performance. Of course, frustration and anger can also lead to
aggression and/or depression.

The motivation characteristic of long-term affect in Model 1 might best
be described in terms of what Arnold (1960) calls a motivational system,
which develops as the child matures into an adult, and is different for every
individual. Motivational systems are not purely affective, but develop in
conjunction with rational functioning, physiological appetites, and so on.
Development of a motivational system might also be viewed as
synonymous with the Characterization by a value complex described by
Krathwohl et al. (1964).

The last element included in the long-term affect block of Model 1 is
creativity, which is simply a term which describes individuals who display
creative behavior. Creativity has been operationalized and measured by
some investigators (Hanes, 1989; Parnes, 1962). Thus, creativity may
exist to different degrees in different people. There is evidence that
creativity can be increased in individuals. Parnes (1962) and his
colleagues developed a course in creative problem solving at the University
of Buffalo. They demonstrated an increase in creative imagination and
creative problem solving among students in the course. Michaelis (1980) maintains that the affective process is crucial to creativity. Since creative behavior is proposed as a possible form of short-term affect in Model 1, creativity is also hypothesized in Model 1 to be a long-term characteristic which may be enhanced by the affective experience in nonformal educational settings.

The Variables

Model 1 (see Figure 13) includes seven groups of variables, derived from the literature, which influence certain elements of the Model. These groups of variables are the perception, attention, interest, curiosity, enjoyment, emotion, and creativity variables.

Perception Variables
Perception is the process of becoming aware of stimuli (English & English, 1958), or of organizing recognizable patterns out of sensations provided by the physical sensory receptions (Bell et al., 1978). Definitions of perception and theories for how the process occurs vary. Solley and Murphy (1960) (cited in Izard, Wehmer, et al., 1965) see perception as consisting of a sequence starting with expectancy, a state which depends on internal factors of the organism. The second step is attending, which is followed by reception, and then by a feedback, or trial and check step. The last step is the formation of the percept, the stimulus the way the organism perceives it. Schoenfeld and Cumming (1963), on the other hand, take a more strict behavior science view of perception, stating that it is fruitless to discuss perception in other than behavioral, or stimulus -> response terms.
Thus, the response to a particular stimulus is really all that matters. Still another theory comes from Gibson (1950) (cited in Bell et al., 1978) and his concept of affordances. Affordances are inherent functional properties of objects encountered by the organism which can be directly perceived by the organism and which give the organism information on how to deal with its environment.

Arnold (1960) defines perception as an integration of impressions from sense modalities. The integration process, which seems to be a function of learning and experience, allows the individual to make meaningful sense out of sensory information. For example, a person who has seen trees before is able to integrate the visual patterns associated with looking at a tree and to recognize the object as a tree. Leeper (1963) differentiates between sensory-organizational processes, which are dependent on closely preceding sensory receptor stimulations, and representational processes, which are "matters of meaning" (p. 403), and may or may not depend on recent sensory stimulation. Arnold views perception as being distinct from the appraisal that a stimulus is beneficial or harmful, although the theorist admits that, in some cases, "it may be all but impossible to separate perception, appraisal, and emotion" (p. 177).

The variables which the literature suggests may influence perception in the nonformal educational setting are divided into external and internal variables in Model 1. External variables are those associated with the stimulus and/or environment. Internal variables are those which are internal to the learner.

Figure 14 includes a detailed view of the perception variables. Temporal and spatial patterning within the stimulus (Leeper, 1963) and
Perception variables

External variables
- Temporal and spatial patterning and physical characteristics of stimulus, "attracting power"

Internal variables
- Intelligence, experience, social and cultural influences, motivation, coding, level of satiation, habituation

Attention Variables

External variables
- Collective variables, indicating stimuli, modeling, short/sizeable messages, potential for participation, affective value, "holding power"

Internal variables
- Interest, motivation, felt involvement, potential for stimulation, satiation, fatigue, emotional state

Figure 14. Detailed views of the perception and attention variables of Model 1.
physical characteristics of the stimulus, such as size, texture, movement, and so on (Bell et al., 1978), influence the perception of the stimulus. Such characteristics, at least in part, determine the stimulus' attracting power, a term coined by Shettel (1976) to refer to the ability of an exhibit to attract visitors' attention.

The internal variables which influence perception are intelligence (Leeper, 1963), experience and learning (Bell et al., 1978; Lawrence, 1963; Leeper, 1963), social and cultural influences (Bell et al., 1978), and motivation (Leeper, 1963). Coming from a behavior science perspective, Lawrence (1963) uses the term coding to refer to an internal process which influences perception. He hypothesizes that sensory input, in combination with an internal coding response, produces a stimulus-as-coded, which in turn leads to a behavioral response. The internal coding response is described by Lawrence as a conditioned habit. Satiation is another internal variable which affects perception (Leeper, 1963). Satiation is a state of insensitivity to a stimulus which results from prolonged or repeated exposure to similar stimuli (English & English, 1958). Related to satiation is the concept of habituation (Bell et al., 1978), which refers to a weakened or extinguished response to a stimulus that is continuous over time. An example given by Bell et al. for habituation is the resident of a town located near a feedlot who no longer smells the feedlot.

Attention Variables

The external attention variables in Model 1, shown in Figure 14, include the collative variables, indicating stimuli, modeling, degree to which the message of the stimulus is short and clear, potential for participation,
affective value, and holding power.

**Collative variables** is a term used by Berlyne (1960, 1966) to indicate properties of a stimulus such as novelty, surprisingness, incongruity, variability, and puzzlingness. Berlyne's (1960) theory includes the assertion that the collative variables influence selective attention. Foster et al. (1988) observed zoo visitors to see which types of exhibits commanded the most attention. One exhibit attracted the attention of significantly more visitors than the nine others studied. This exhibit had more animal species than the other exhibits, had a high degree of environmental complexity, and a high degree of animal activity. Patterson and Bitgood (1988) reviewed the literature and found that novelty has been shown to increase exhibit viewing time. These studies provide evidence that the collative variables may indeed influence visitor attention in nonformal educational settings. Berlyne also sites *indicating stimuli*, or stimuli which visually or verbally direct attention (i.e. arrows, verbal instructions, etc.), as being capable of focusing selective attention on a particular stimulus. Berlyne uses the term *affective value* to refer to how rewarding or punishing a stimulus is, and maintains that this also influences selective attention.

Koran et al. (1988) showed empirically that *modeling*, or the demonstration of a desired behavior by a peer, can be effective in increasing participation in museum exhibits, thus influencing the selective attention of visitors, particularly adults. Koran et al. (1984) also found that more visitors were attracted to manipulatable exhibits than to exhibits that offer no manipulation potential at the Florida State Museum. Visitors also spend more time at manipulatable exhibits than at static ones (Koran et al., 1986). In a study at the Ontario Science Centre, Gillies and Wilson
(1982) found that children spent more time at fully participatory exhibits than at partially participatory ones. Patterson and Bitgood (1988) cite *interactivity* as a characteristic which elicits more visitor viewing time. These studies suggest that the potential for participation in an exhibit influences visitors' selective attention to the exhibit. On the other hand, Alt and Shaw (1984) found that potential for participation may be secondary to other features of an exhibit, such as whether or not it imparts a short, clear message. They studied visitor ratings of exhibits and found potential for participation to be less important in determining whether an exhibit was near to the visitor's "ideal exhibit" than whether the exhibit had a short, clear message. They did not, however, directly observe visitors to see which exhibits attracted the most attention.

*Holding power* is Shettel's (1976) term for the ability of an exhibit to command selective attention. Thus, holding power may embody any or all of the above external variables.

Internal variables which the literature suggests may influence selective attention are interest, motivation, felt involvement, potential for stimulation, satiation, fatigue, and emotional state.

In the context of internal variables which may influence selective attention in the nonformal educational setting, interest may refer to the particular interests the visitor brings into the nonformal experience, or to those which may be stimulated by the experience. Koran et al. (1989) found attention, measured as the amount of time a visitor spent at a particular exhibit, was correlated with the visitor's interest in the exhibit, measured with a Likert-type scale. The negative case for this is the study by Shirey and Reynolds (1988) where college students allocated less reading
time (attention) to more interesting sentences. As was pointed out earlier, the reading task in this study was extrinsically motivated, unlike most tasks available to learners in nonformal educational settings.

Berlyne (1960) lists motivational state as a factor which can influence selective attention. Related to this is the concept of *felt involvement*, a term used by Celsi and Olson (1988) to describe a subjective experience or feeling of personal relevance. The authors report on an experiment in which felt involvement was found to influence attention in the reading of tennis product advertisements. They explain that felt involvement can be situational (evoked by the stimulus or situation), or intrinsic (a result of past experience).

*Potential for stimulation* is a variable suggested by Leuba's (1955) theory of optimal stimulation. According to this theory, learners should choose stimuli which most nearly bring about their optimal level of stimulation.

Along with physical fatigue, satiation (discussed above) has long been recognized as a factor in *museum fatigue* (Robinson, 1928) (cited in Bell et al., 1978). Patterson and Bitgood (1988) name *object satiation and museum fatigue* as factors which may detract from exhibit viewing time. An experiment by Berlyne and Parham (1968) suggests that satiation may be a result of a decrease in subjective novelty, a collative variable believed to influence selective attention, upon repeated exposure to a stimulus. Subjects were exposed to sequences of colored shapes and rated them for novelty. Their novelty ratings declined as the stimulus sequences were repeated.
Finally, in a discussion of the associative network theory, to be discussed later, Bower (1981) speculates that a person's emotional state should influence a variety of factors, including attention.

**Interest Variables**

The external variables associated with interest in Model 1 are the collative variables and aesthetic value, shown in Figure 15. The external variables are experience and education, and felt involvement.

Laboratory studies have shown subjective interestingness to be related to the collative variables of novelty (Berlyne, 1970) and complexity (Berlyne & Boudewijns, 1971). Furthermore, a field study by Washburne and Wagar (1972) which investigated the qualities of exhibits found most interesting by visitors to four visitor centers in the pacific northwest revealed that attributes like motion pictures, changing lighting, music, and audio sequences, etc. were found in the more interesting exhibits. Such attributes could be said to provide novelty and complexity, and thus were subsumed under the category of collative variables for the purposes of Model 1. Washburne and Wager's study also showed that exhibits featuring aesthetics as a subject matter were found to be more interesting than average. Also, Busque (1991) developed a Likert-type instrument to measure visitor interest in exhibits based on statements used to describe interesting exhibits. One dimension included in the instrument was that of aesthetic quality. For these reasons, it is proposed in Model 1 that aesthetic value may also play a role in stimulating interest.

Busque's (1991) study tested the hypothesis that interest in a museum exhibit is related to how much interaction potential the exhibit
Figure 15. Detailed views of the interest, curiosity, and enjoyment variables for Model 1.
offers, a belief that is intuitively held by many nonformal educators. Using his Likert-type instrument to measure visitor interest, Busque found no significant difference in visitor interest between exhibits with strong interaction potential (six or more interactions offered) and weak interaction potential (one to five interactions offered). The study can be criticized for not measuring interest at an intermediate level of interaction potential to provide a finer discrimination. Still, since no other literature was found to suggest that interaction potential (or potential for participation) contributes to interest, interaction potential was not included as an external interest variable in Model 1.

In a study conducted at the Ohio Historical Center, Mercer (1981) found that visitor interest was related to visitor experience and education. Rossing and Long (1981) found that adults' desire for knowledge about a subject, which could be interpreted as interest (Arnold, 1960), correlated with the perceived value of the subject. Perceived value might also be interpreted as personal relevance, so the term felt involvement, having been used at another point in Model 1, was retained to describe this interest variable.

Curiosity Variables

The external curiosity variables for Model 1, shown in Figure 15, are the collative variables, potential for participation and stimulation, and familiarity. The external curiosity variables are age, tonus, felt involvement, and sensation seeking level.

In addition to attention and interest, the collative variables of a stimulus evoke curiosity (Berlyne, 1960, 1966). Also, questions or
information which is surprising or puzzling may evoke epistemic curiosity (Berlyne, 1954). Smock and Holt (1962) studied one of the collative variables (novelty) and its effect on approach behavior in first graders. They found novelty in a stimulus to evoke approach behavior, but also found that the effect varied among individuals, suggesting certain internal variables may mediate the novelty effect in curiosity.

Koran et al. (1984, 1986), who found visitors were more attracted to manipulatable exhibits than non-participatory ones, suggest that curiosity is better stimulated by the manipulatable exhibits because they provide the visitor the opportunity to use more sensory channels with which to satisfy the curiosity. Thus, potential for participation and stimulation in an exhibit may also influence curiosity. Berlyne (1954) also discusses the level of familiarity of patterns within a stimulus in reference to curiosity, claiming that curiosity is highest at intermediate levels of familiarity.

Some research studies indicate that curiosity may change with age. Rossing and Long (1981) found that there was no correlation between a desire for knowledge about a subject and its surprisingness, one of the collative variables said to evoke curiosity (Berlyne, 1960, 1966). Rossing and Long used level of desire for more knowledge as a measure of curiosity. This would fit Berlyne's (1954) definition of epistemic curiosity (but might also be interpreted as interest). Rossing and Long found that there was a correlation between perceived value of the subject and desire to know more about it. Thus, felt involvement may be an internal variable for epistemic curiosity, at least in adults. These authors also suggest that surprisingness may not be a primary stimulator of curiosity in adults.
Camp, Rodrigue, and Olson (1984) followed up on Rossing and Long's (1981) study by dividing their adults into different age categories. They found perceived value to correlate with a desire for more knowledge in young (age 25-35) and middle aged (age 45-55) adults, but not in older adults (age 65-75). Again, they found no relationship between surprisingness and desire for more knowledge. Going further, they used an instrument which measures for both specific curiosity (what Berlyne (1954) termed specific exploration motivated by perceptual curiosity) and diversive curiosity (what Berlyne (1954) termed diversive exploration). Recall that specific exploration is a search for specific information brought about by increased arousal, while diversive exploration results from boredom and seeks to raise arousal (Berlyne, 1960). They found no relationship between age level and specific curiosity, but a significant relationship between age level and diversive curiosity, with younger adults showing more diversive curiosity. They suggest that younger adults may be more susceptible to boredom than middle aged or older adults.

In a longitudinal study, Peterson (1979) measured sensory motor curiosity in 32 students in both 1970 and 1976 by videotaping their exploratory behavior in a museum setting. Peterson found no evidence of a decline in curiosity from childhood to adolescence.

Another internal variable related to curiosity is tonus, or the homeostatic level of arousal for an individual (Day, 1982). Day explains that arousal below the tonus level results in relaxation. Arousal beyond tonus results in curiosity, and, eventually, anxiety. According to Day, individuals differ in their tonus, so that some individuals may require more arousal for curiosity to be stimulated.
Zuckerman's (1979) sensation seeking trait might also affect curiosity and, accordingly, exploration. Zuckerman explains that novelty (a collative variable) is related to appraised risk which also correlates with anxiety. Sensation seeking level is negatively related to risk appraisal, so individuals who are high sensation seekers tend to evaluate situations as less risky than those who are low sensation seekers. Thus, high sensation seekers are more likely to approach novel situations, and likewise, may display more curiosity. Zuckerman explains the phenomenon in terms of differential strengths of the approach and inhibition mechanisms in the brain. Sensation seeking is related to Leuba's (1955) concept of optimal level of stimulation, Maddi's (1961) concept of variation-seeking, and Wohlwill's (1974) (cited in Bell et al., 1978) adaptation level. Another term from the literature which may be nearly synonymous with sensation seeking is need for stimulation (Sales, 1972). Sales operationalized this trait and found evidence that individuals with a high need for stimulation react favorably to complex stimuli and choose complex and intense social activities. Sales' theory is that persons with a high need for stimulation have nervous systems that reduce stimulus inputs, while those with low need for stimulation augment them. Sales measured need for stimulation with a psychomotor test while Zuckerman's sensation seeking scale is a paper and pencil instrument.

**Enjoyment Variables**

Only external variables were derived from the literature for enjoyment. These are the collative variables, uniformity in variety, coherence, texture, mystery, familiarity, and potential for feedback, shown in
As discussed above, Berlyne (1971a) discusses the hedonic value of a stimulus in terms of arousal. Since the collative variables have also been linked to changes in arousal potential (Berlyne, 1960), they are, again, important for aesthetic enjoyment/pleasure. Recall that studies have shown high levels of novelty and complexity to be related to interestingness, and intermediate levels to be related to pleasingness (Berlyne, 1970; Berlyne and Boudewijns, 1971; Day, 1967). Berlyne (1970) concludes that the highest hedonic value occurs at mid-arousal potential, which can result from various combinations of levels of novelty and complexity. For instance, simple-novel and complex-familiar stimuli should have high hedonic value. This tendency has led Platt (1961) to conclude that the human response system demands novelty at the same time as regularity, and Berlyne and Boudewijns (1971) to say "uniformity in variety" (p. 195) enhances pleasingness.

The human preference for uniformity in variety may influence the stimulus choices people make. Berlyne (1971b) demonstrated that subjects choose less complex stimuli when they have been exposed to a pre-choice stimulus (music, white noise, taped narrative passage, etc.) that requires a high level of information processing, and vice versa. Pre-choice exposure to white noise, which has been shown to increase arousal, still led to more complex choices, leading Berlyne to conclude that information processing before choice is more important than arousal level in influencing the complexity of choices. In other words, arousal potential may not be the only factor important to the need for uniformity in variety.
R. Kaplan (1974) and S. Kaplan (1974) (cited in Bell et al., 1978) have evaluated characteristics which contribute to "liking" in landscape scenes. These are coherence, texture, identifiability, spaciousness, complexity, and mystery. "Liking" for a scene is enhanced by coherence (organization), smooth texture, identifiability (familiarity), more visible space, greater complexity, and greater mystery (hidden information). Since spaciousness and complexity taken together seem to reflect uniformity in variety, the latter were not listed for the purposes of Model 1. Coherence, texture, familiarity, and mystery were all included in the model.

The variable of familiarity is related to what has been termed the mere exposure effect (Harrison, 1977), where repeated exposure to a stimulus increases preference for the stimulus. The effect was noted as early as the late 1950's, when Mull (1957) demonstrated, with a group of sixteen subjects, that their liking of two pieces of modern music increased after repeated hearings. More recently, Wilson (1979) and Kunst-Wilson and Zajonc (1980) have presented evidence that previously encountered stimuli are rated more positively than novel stimuli, and that this positive rating is not dependent on subjects' conscious recognition of the stimulus as familiar.

For the most part, Berlyne's (1960) theory of arousal explains the mere exposure effect quite well. If repeated exposure to a stimulus decreases its relative novelty and/or complexity, the corresponding drop in arousal should be experienced as pleasurable. The only drawback, as Harrison (1977) points out, is that the arousal theory explanation assumes a conscious cognitive activity of recognition and making sense out of the stimulus through the repeated exposures. Wilson (1979) and Kunst-Wilson
and Zajonc (1980) claim the exposure effect can occur without conscious recognition of the stimulus.

Harrison, (1977) speculates that the opponent process theory of Solomon and Corbit (1974) (cited in Harrison, 1977) may provide an explanation for the mere exposure effect. According to the theory, exposure to a novel or complex stimulus might elicit negative affect such that withdrawal of the stimulus would elicit the opposite, or positive affect. After a period of time, the stimulus will begin to trigger the positive affect, contributing to a preference for the stimulus.

The last enjoyment variable included, potential for feedback, also comes from Berlyne (1971a), who cites reward value and feedback as components of hedonic value.

**Emotion Variables**

The one emotion variable identified in the literature was the internal variable of *emotional range*, an operationalized measure of emotional responsiveness (Sommers, 1981). The higher the emotional range, the more emotions the individual experiences and displays. The emotion variable of emotional range is illustrated in Figure 16.

**Creativity Variables**

The creativity variables are shown in Figure 16. External creativity variables which have been suggested in the creativity literature are atmosphere of deferred judgment (Parnes, 1962; Rogers, 1962), freedom of spontaneous symbolic expression (Rogers, 1962), atmosphere of autonomy (Stein, 1962), and opportunity for active learning (Patterson
Figure 16. Detailed views of the emotion and creativity variables for Model 1.
Internal variables for creativity are motivation and affective state. Pearlman (1983) suggests that the motivation driving creativity is effectence motivation, while Rogers (1962) names the motivation to self-actualize. Regardless of the type, the individual’s motivational state should have an effect on whether or not creative behavior will occur. Izard, Wehmer, et al. (1965) assert that affect is an important determinant of creative behavior, leading to the inclusion of the affective state as a factor in the creative process.

Influence of Affect on Cognition

Model 1 proposes that affect influences cognition. Figure 13 features a block labeled cognitive learning, which can occur within and/or beyond the nonformal educational setting. Both short-term affect and long-term affect are shown in Figure 13 to influence cognitive learning.

Dutta and Kanungo (1975) have rather extensively examined the subject of affect and memory. They begin their treatment of the subject with a historical review of methodology and theory. According to these authors, experimental methodology used to investigate mood and memory has fallen into three main categories: free recall, affective pairing, and retention of affectively toned items. Free recall involves having subjects recall their experiences and rate them as pleasant, unpleasant, and neutral. Such studies tend to show a better recall of pleasant than unpleasant experiences. Criticisms of the free recall method include the speculations that subjects might feel inhibited from reporting emotional experiences to an experimenter and that the original affective value of an experience might be
different than that remembered at the time of rating. Affective pairing consists of pairing affectively toned sensory experiences with neutral symbols with the assumption that the neutral symbols take on the affective value of the experiences with which they are paired. Recall of the symbols is then tested. Results from this method are inconclusive, varying with the type of sensory experience employed. Retention of affectively toned items is, according to Dutta and Kanungo (1975), the “most widely used traditional method of examining the retention of affectively toned items” (p. 9). The method involves testing recall of lists of items which have been individually evaluated as pleasant, unpleasant, or neutral. Results tend to indicate a decrease in retention of items in the order or pleasant, unpleasant, and neutral. A criticism of this method is that the items in the list may not retain the same affective tone as originally judged when they are placed in a list with other items.

Dutta and Kanungo (1975) also review the theoretical positions which have been proposed for the relationship between affect and memory. The hedonistic position is based mostly on Freud’s theory of repression, and proposes that unpleasant experiences are repressed, making recall for pleasant experiences better. The tension system position says that unresolved tension connected with an experience determines whether it is retained in memory. The classic experiment supporting this theory is that of Zeigarnik (1938) (cited in Dutta and Kanungo, 1975), who found that interrupted tasks are recalled better than uninterrupted tasks, an effect known as the Zeigarnik effect. The personality type position explains differential memory of affectively toned experiences in terms of personality dispositions to emphasize either ego-threatening or ego-enhancing aspects
of experiences. Examples of personality traits which have been proposed
to influence differential memory are need for achievement and introversion-
extroversion. The contextual position proposes that the existing mental
frame of reference is the main influence on differential memory. The
retroactive inhibition position proposes that unpleasant experiences involve
a state of incompletion, which interferes with the recall value of the situation.
Dutta and Kanungo (1975) point out that this position contradicts the
Zeigarnik effect, however.

Dutta and Kanungo (1975) put forth a sixth hypothesis for the
relationship between affect and memory. This intensity hypothesis
proposes that, rather than the quality of the affect of an experience, it is the
intensity of the affect which is the major determinant of selective retention of
the experience. The authors present evidence from a series of experiments
which supports the intensity hypothesis. For example, in one experiment
they selected a sample of subjects from a linguistic group in India known to
hold strong group identification. Subjects read reports featuring adjectives
describing their own linguistic group and a fictitious group. After reading
the reports, subjects again rated the adjectives for affectivity, and were
tested for recall of the adjectives. Results showed that pleasant adjectives
were rated more intensely pleasant when they appeared in the report
describing subjects' own linguistic group. Unpleasant adjectives were
rated more intensely unpleasant when they appeared in the report
describing the fictitious group. For both pleasant and unpleasant
adjectives, those with more intense affectivity were recalled better.

Dutta and Kanungo (1975) interpret their results as support of the
intensity hypothesis that the intensity of affect associated with an
experience determines how well it is recalled. While the results do not disprove the hypothesis, they do not, in this researcher's opinion, establish a cause and effect relationship between intensity of affect and ease of recall. The best that can be said is that the two seem to be related.

Using hypnosis to induce pleasant and unpleasant moods in subjects, Bower (1981) demonstrated both mood-state-dependent retention, where subjects recall an event better when they are in the same mood as when they experienced the event, and the mood-congruity effect, where subjects attend to and learn more about events which match their emotional state. Bower proposes an associative network theory to explain these phenomena. The associative network theory says that an emotion serves as a unit of memory that is stored in association with coincident events. In keeping with Dutta and Kanungo's (1975) intensity hypothesis, Bower (1981) also found that more intense experiences were better recalled. Bower also presents experimental evidence that mood affects free associations of words, imaginative constructions, and snap judgments.

Other researchers have shown that affective state can influence learning and performance. Izard, Nagler, et al. (1965) used a method of affective pairing, showing pictures of various affective value paired with nonsense syllables. In one series of experiments they showed a picture, shortly followed by the picture and a nonsense syllable displayed below the picture. In the next series, they showed the picture with a nonsense syllable under it, followed shortly by the same picture and same syllable. Subjects viewed the picture pairings in a learning phase, and then were tested for how well they could recall the syllables that went with the pictures. In the latter case, extremely positive pictures resulted in better learning of
syllables than neutral pictures, which resulted in better learning than extremely negative pictures. In the first case, the extremely positive pictures resulted in the worst learning performance. The authors explained these results by saying that the extremely positive pictures, being pictures of attractive young women shown to young male subjects, involved an interference of the sex drive with the learning task. When the positive pictures were simply background, as in the second series of experiments, this interference did not occur.

Izard, Nagler et al. (1965) arrived at the theory that the interplay of positive and negative affect evoked from internal and/or external stimuli influence learning and task performance in one of four ways:

(a) positive affects may summate, leading to improved performance;
(b) positive affect may interfere with negative affect, excluding the negative affect and producing no change in performance;
(c) negative affect may interfere with positive affect, excluding the positive affect and hindering performance; or
(d) negative affects may summate, hindering performance.

Izard, Nagler, et al. (1965) arrived at this theory through a series of experiments.

Boyle (1983) found that viewing an emotionally disturbing film decreased learning performance on a reading task in the subjects he worked with. For the emotionally aroused (treatment) group, there was an increase in the variance predicted by non-ability interpersonal variables, such as personality factors and motivation. In other words, negative affect decreased learning performance, and seemed to inflate the importance of factors other than learning ability.
Winer and Clark (1989) tested the influence of positive affect on the learning performance of a group of third and sixth graders. They found that positive affect increased learning performance in the third graders, but had no effect on the sixth graders.

Besides the influence that the quality and/or intensity of affect may have on memory and learning, the motivational aspects of affect should have an impact on cognitive activity. As Logon and Gordon (1969) report, learning is not necessarily dependent on motivation, but motivation does affect learning. A prime example of affect as motivation is interest, which Thorndike (1935) says acts in a forward direction to dispose an individual to behaviors associated with the interest, and also acts backward to confirm positive experiences so that the repetition of these behaviors will be favored. Murray (1964) maintains that motivation influences not only learning and performance, but perception and attention, remembering and forgetting, thinking and fantasy, and social and emotional behavior.

Results from the Field Research

Comments from Researchers

All six members of the researcher stratum of the participant panel returned comments on Model 1. A summary of these comments is presented in Table 8.

The purpose of soliciting comments from the researcher participants was to check the theoretical appropriateness and usefulness of the Model in general, and of Model 1 in particular. The intent was to select researcher participants who would have familiarity with the literature cited and would be able to offer comment on the appropriateness of its use in this context.
Table 8. Summary of comments from researcher review panel.

* Can affective behavior also include expressions of joy, excitement, nostalgia, sadness, being profoundly moved? Might the “behavior” be internal: a vow to be more aware of ... and to act....?

* Does the short term response lead naturally to the long term response? Or might there be a break and then the short term response is recalled and then it might lead to a long term response? Is there any way to indicate whether this is a direct or indirect path? If a break occurs, it might be another external event that triggers recall of the short term response, which then leads to the long term response.

* Can a model accommodate all the varying views comfortably, especially when you acknowledge that Buck and Zajonc’s views deviate from the dominant flow of the model? Can you explain how these, then, belong in the same model?

* It’s unclear to me explicitly how the work of each of the many researchers you cite plays into the model. Also, is the work of each researcher referred to purely theoretical or is data support presented by the researcher?

* Apparently your up-pointing arrows in Figure 5 indicate variables likely to occur in nonformal educational settings. Does this mean that these variables would not be operative in formal educational settings?

* In psychology, models are generally seen as precursors to theories. As such, they should be clearly connectable to empirical data. What gives me most trouble with your model is that the explicit connections expected and their empirical manifestations are not apparent to me despite your numerous citations and arrows.

* I’m not very familiar with this literature, but your topic appears to be capable of making a real contribution to the field of learning in nonformal settings. Particularly important to museums, parks, etc. and can aid in a) evaluating their strategies, and b) “justifying” the importance of nonformal education in those settings. So, I would say that the study is appropriate.

* The model/study appears to be very well thought through, comprehensive, well researched, and makes intuitive as well as theoretical sense. I particularly like the integration of museum and leisure research in the study. So, it seems very complete, and accurate (but remember I’m not well versed in this field, so my assessment of accuracy may not be the best).

* The model appears very complete and comprehensive, but the “presentation” of it (appearance-wise) is somewhat overwhelming. Many boxes and arrows (loops), quite “dense,” particularly in the “Short-term Affect” block.

* Development of quantitative measures would be a major contribution. However your study is focused on development/exploration of a model (which is ok, a fine starting point).

* Great diversity of literature review. Very comprehensive.

* It may be helpful to define “nonformal educational settings.”
Model is impressive as well as overwhelming. Would probably help to be talked through the model. People familiar with the literature might have a better grasp than me.

An example of a nonformal educational stimulus and how it is played out in the model would make it clearer for me.

Consider simplifying the presentation of the model, perhaps by combining similar elements and/or showing more detail on succeeding pages.

The large size of the short-term affect block might imply that it has greater importance than blocks represented by smaller boxes.

I... find [the model] thought-provoking, interesting, and comprehensive. However, my own bias toward considering the interdependent nature of cognitive and affective responses makes me uncomfortable with seeing cognitive learning relegated to the lower left hand corner. Unlike Arnold and Krathwohl who apparently see cognition as preceding affect and Buck who sees cognition as following, I think of the two sets of variables as very closely linked and usually proceeding together and interacting at various points....
From the comments received, it appeared that, for the most part, this was not the case. Two of the participants specifically stated that they were unfamiliar with the literature used. None of the researcher participants offered specific comments on the use of any specific pieces of literature. Participants may have been generally familiar with the bulk of the literature cited, but did not feel they had time to make very specific comments about the use of specific literature. Most of the researcher participants were difficult to get in touch with, and most indicated that they were very busy and found it difficult to make time for reviewing the model. In general, though, it appears much of the literature cited in relation to the model was not familiar to the researcher participants, further supporting that there is a need for gathering of information and study on the subject of affect.

Many of the researcher participants asked, either in their written comments or in phone conversations, whether the model was to be empirically tested, indicating a need to reiterate the heuristic nature of the model. One participant criticized that it was not apparent how the literature fit together into the synthesis of Model 1. Since it had been assumed that the researcher participants would be familiar with the literature used, a fully developed discussion of how the literature was used to synthesize the model was not included in the document sent to the researcher participants. Such a treatment would have been lengthy, as evidenced by the first section of Chapter 4 of this report, which would have inhibited the participation of most if not all of the busy participants in the researcher stratum. Still, this criticism pointed to the advisability of including a succinct summary of the literature used to synthesize the Model, such as was presented in Table 7.
Other comments from the researcher participants indicated that the model seemed well researched and comprehensive, and capable of making a contribution to the field of nonformal education/interpretation. Also included in the comments were suggestions to simplify the presentation of the Model.

Results from the Interviews

A summary of the findings from the interviews with the eight practitioner participants is presented in Table 9. Full transcripts of the interviews are available for inspection from the researcher. The survey instrument is shown in Appendix C.

The purpose of the interviews was to gain insight into the practitioners' experience with the affective responses of learners in nonformal educational settings. The first two questions aimed to elucidate the motivations that bring learners to nonformal educational settings. According to the practitioners, recreation, learning, and escape are common reasons. For recreation, the social aspect of the activity seems to play a big part. As one respondent put it, “It's a social outing, um, they always come in groups.” Another summarized, “...I think people just like to come out leisurely, walk the trails with their family, and enjoy nature.” Some respondents saw learning as the primary motivation for visitation:

I think it's on the surface to have fun and to entertain themselves, but really, the reason they're coming here instead of...out to the ballgame or whatever else is because they see [name of facility] as an opportunity to learn. Learn in a fun way and non-threatening way at their own pace.
1. The main reasons people attend the participants' nonformal educational facilities are:
   - recreation and enjoyment, particularly in social and family groups,
   - to learn something,
   - for escape from everyday life, particularly in park settings,
   - nearness of the facility to place of residence.

2. Unique opportunities and experiences offered at nonformal educational settings are
   - learning opportunities presented in a non-technical, friendly, or interactive mode that is accessible to a lay public,
   - opportunities to pursue outdoor and/or nature recreation close to home,
   - unique collections or library facilities.

   a) The staff of the participants' nonformal education institutions try to facilitate these opportunities and experiences by
      - directing programming toward the interests of visitors,
      - being enthusiastic and making visitors feel welcome (saying hello when they arrive, etc.),
      - providing variety and hands-on experiences,
      - designing exhibits which make collections accessible to visitors.

   b) To evaluate their success at the above, participants look for
      - holding power (length of time a visitor stays with an exhibit or activity),
      - verbalizations, including questions,
      - facial expressions,
      - return visitation.

3. Visitors may be attracted to program offerings if
   - they feel they will be able to actively participate or have personal contact with something,
   - they will have an opportunity to be outdoors,
   - the subject matter is unique.

   a) Qualities and objects which tend to attract people's attention are
      - motion and/or activity
      - novelty
      - animals
      - flashing light
      - hands-on displays or activities
      - familiarity
      - sound
      - bright color
      - large size
      - 3-dimensional displays
      - level-appropriate, readable text

   b) A visitor's attention may be attracted by novelty, by quick or sudden movement, noise or change in noise level, etc. The visitor's attention may be held by active participation and variety. Too much novelty or overstimulation may result in decreasing holding power.

   c) Differences between people which may affect what attracts their attention are
      - age: children tend to lead the discovery process and are less inhibited to touch and participate while adults desire more intellectual stimulation,
      - home environment, background, and life-style,
      - the motivations they bring with them to the experience,
      - intellectual and emotional differences.
Table 9. (continued)

5. 6. Curiosity may be thought of as a simple, short-term or temporary desire to know something or try something new, while interest is a more sustained, long-term desire to know about a specific topic or participate in a specific activity. Curiosity may in fact lead to interest, or be thought of as an early stage of interest.

a) Curiosity may also be thought of as a sort of personality trait in which the individual values the process of discovery in general.

b) The participants use
-questions,
-active participation,
-catchy titles,
-staff enthusiasm,
-attention getting devices,
-items of personal relevance to the visitor

to stimulate interest and/or curiosity in their visitors. Curiosity may also be stimulated by building anticipation that the curiosity will be satisfied.

c) Curiosity and/or interest may be detected in the visitor through
-verbalizations and questions,
-willingness to participate,
-facial expressions,
-return visitation.

7. Nonformal educators may use a variety of techniques aimed at stimulating one or more of the senses.

a) Visuals, such as large, bright, well designed exhibits, are probably the most common sensory stimulation.

b) Hearing is also a common stimulation, and may be activated through use of recorded audio, night sounds on nature hikes, using techniques to enhance hearing, such as cupping the hands behind the ears or using a stethoscope, or mimicking animal sounds, etc.

c) Smells and tactile opportunities may exist naturally in outdoor settings or may be deliberately incorporated into indoor exhibits.

d) Taste may be the least often used sensory stimulation, but is used sometimes, such as in outdoor edibles programs or cooking demonstrations.

e) People seem to differ in their responses to sensory stimulation in the following ways:
-children may be more willing to taste, touch, smell, etc.,
-some people are afraid or disgusted at the thought of tasting, touching, smelling certain things,
-some people are more expressive in their responses to sensory stimulation.
8. The participants look for
- excited verbalizations,
- attentiveness/holding power,
- facial expressions,
- participation and involvement
as evidence that visitors are enjoying their experiences.

a) Exhibits or experiences characterized as most enjoyable for visitors by the participants are
- large-scale, "immersion" experiences,
- those which are hands-on or offer active involvement,
- those involving animals,
- something moving to a climax,
- thematically coherent exhibits,
- "real" things.

b) Differences between people which may affect what they find enjoyable are
- age,
- background and experience,
- personality differences.

Also mentioned as a factor is social grouping. Examples are
- parents enjoy themselves when they feel their children are having fun,
- adolescents are capable of communicating that something is "uncool" to others in their group,
- parents may be able to enthuse their children by communicating their own enthusiasm.

9. Emotional reactions that participants have observed in visitors are
- fun, joy, wonder, physiological excitement, smiles and laughter, affection from small children, the "I get it!" reaction, "peak" experiences,
- frustrations from not being successful at an activity,
- anger or distrust stemming from a complaint,
- fear or disgust,
- movement to action, such as wanting to become a volunteer.

Some factors which may affect the direction of emotional responses are the visitor's prior knowledge and experience and whether or not his/her motivations are satisfied during the experience.

10. The affective (emotional/attitudinal) experience in a nonformal education facility may affect the way people learn by
- inspiring interest for future involvement with the subject matter,
- increasing the memorability of the experience.
11. Long-term effects which participants believe people experience as a result of visiting their facilities are
   - belief that science is fun and relevant to their lives,
   - long-term memory of the learning experience,
   - awareness and appreciation of parks and conservation,
   - development of interest in the subject matter,
   - motivation to action, such as making a career choice,
   - teachers taking new knowledge back to their classrooms.

Evidence for these long-term effects come from
   - letters from parents and children,
   - requests for more programs or further information,
   - return visitors, especially those who come back to interact with staff.
Some of the respondents' facilities also see large visitation from school groups, as described by the following interview excerpts:

...school groups. They don't have a choice. They came, but why do they come? ...number 1, because it fits into the curriculum, it's a well-known field-trip, but also that the youngsters have a good time when they come here because they do have a chance to try something or get involved with something, and it's a unique field-trip experience for the students.

You were able to select a program...what they were studying in school, and our main purpose there was to supplement. You know, it's difficult for a school to have and house collections. We had 2000 mineral specimens. Well a school doesn't have 2000 mineral specimens.

Escape refers to some of the naturalists' belief that visitors are looking for "peaceful withdrawals," or "a place to get away and escape from the daily pressures...."

The practitioners said they try to facilitate unique opportunities and experiences for visitors by directing programming to the interests of their particular visitors, being enthusiastic and making visitors feel welcome, providing variety and hands-on experiences, and designing exhibits which make collections accessible to the visitors.

Question three focused on the attraction and holding of attention. There was a tendency for the practitioners to interpret this question in terms of what attracts people to program offerings rather than what attracts and holds their selective attention (see Table 9). Probe questions generally drew the desired information, however, and revealed that qualities like motion, novelty, animals, flashing lights, and so on are seen as attention getters. As one exhibit designer explained,

You gotta slow them down, you get something that's going to grab their attention...something that's going to stop them in their tracks.
And something that's, you might say it's dramatic.

Sudden or novel stimuli are seen as attention *attractors* while participation and variety are seen as attention *holders*. The following quotes illustrate this differentiation:

In a single computer kiosk, for example, we do an attract loop...It actually does something visually like that motion kinetic idea that actually attracts them to the exhibit. Once they get there and push start, you know, they're into something else...."

For attract attention probably would use something quick or loud, or something to maybe startle them. Um, to hold their attention, then I guess I would have something that was more focused, something where they can then use their senses, touching, smelling, asking questions.

Yeah, you would attract attention with a quickie, or again, a hands-on thing...Um, in terms of holding attention...you need to not be too long. Keep interesting, change things a little bit, um, talk a little bit, show something a little bit, do slides a little bit, walk a little bit, um, interspersed walking is great in with your talking and things. Um, so I would guess change. Um, reading their level. Asking them questions, participation.

Yeah, you can attract anybody's attention with the immediate, oh gosh, there's a bang, or that moved, or that crank turned. To hold their attention, uh, takes, I think, different levels...That takes a different set of skills, of explaining, of talking, of somehow getting that person to involve their thought processes from beginning to end. Certainly, it's much easier to attract someone's immediate attention, and then to hold it takes different skills.

Yeah, the novelty factor would draw the people. But it could be a detriment because the novelty factor could be so much in the way that they wouldn't do it. But attention would be action. They would stay longer if they had something to do. And it usually had to be active.

Another theme which emerged from answers to questions other than those to question three was that exhibits and programs need to be accessible and
level-appropriate for the visitor:

If we have a lot of older folks who are in a particular program, then we’ll just have to slow the pace down, or do something to facilitate that.

The copy was written almost always over the heads of the general people...And I always thought it was a real waste, because the level of information was too sophisticated.

I think one of the things I’ve been trying to do is, for the last five or ten years, was to have audio systems that would communicate so people didn’t have to read...I think of all the museums I worked on the most compliments I got from school teachers was the [name of facility]. You could run through that exhibit and understand everything without reading anything. It was successful because people could walk it and go through it at a relaxed pace. They didn’t have to stop and focus and concentrate. You know, a lot of times the copy gets up high. Then you’ve got the bifocal problem. Knowing where to put the [copy] high or low so that you don’t have an eyeglass problem. Making things palatable without them knowing it.

Such considerations may also be important contributors to the holding power of an exhibit or program.

Most of the practitioners thought that there are differences between individuals which affects what attracts their attention, such as age, background, motivations, and intellectual and emotional differences. For example:

And if there isn’t attentiveness, to be able to extract something from that individual or that group that might help you to understand how you could get their attention. Is it a question as to what their primary interests are, why they are on this walk, what they intend to find or feel during that couple of hours?...the ones who are chatting when they’re walking. They’re not searching the trees or the forest floor for the unusual. Maybe they’re too involved in a self-motivated project to be involved in a larger project in the out-of-doors.

Two museum personnel, however, said that visitors act very much the same in the museum setting because of the “crowd factor, so basically they acted
very similar,” or because “people that first of all walk into a museum are generally programmed to be receptive...I'd say the bulk of museum goers are attentive.”

Questions five and six aimed to differentiate, if possible, between the constructs of interest and curiosity. Many of the practitioners ideas on these constructs seemed to evolve as they thought about and formed answers to these questions. The general pattern which emerged from their answers was that curiosity is short-term desire to know or try something new, while interest is a more sustained, long-term, and topic specific desire to know or participate, as exemplified by the following quotes:

Interest is a desire to know or learn about something. Curiosity is maybe trying something that is a little different or something that didn’t originally, it’s origin was not in an interest. It’s something that’s new.

Well, curiosity can be very simple. What’s the name of this. That’s all. That’s all I want to know. I just want to know its name. But interest at least to me would indicate that they want something more than just an immediate one sentence response is necessary. Further investigation of that.

I think that curiosity is something very brief, whereas interest is something more that is carried out over a longer period of time, and interest is developed more.

The curiosity level is probably a little lower than the interest level, or is that passing, oh gee, I’m kind of curious about that, and if they don’t follow that little bit of curiosity through, they’ll either find out that they were just curious or there is something beyond their curiosity, something a little deeper.

Well, interest would be, they’d have prior knowledge that would spur them on, where curiosity would be the pure science of discovery.

One respondent’s answer reflected the exploratory nature of curiosity:

Curiosity is the questioning. Interest doesn’t necessarily have a
question involved. If you're curious, you're interested. If you're interested, you're not necessarily curious. And I think that's an answer. Because they are very much overlapped, but curiosity has the question part.

Several of the practitioners came to the conclusion that curiosity probably precedes interest:

Curiosity quite often leads to interest. Maybe curiosity has to come first.

I think curiosity leads to interest.

[Curiosity is] probably, right before interest...I see interest as being more level-oriented and curiosity being more just at the very beginning. You have the curiosity and then you see if you can rope them in and grab them for the interest level. You have to be curious I think before you're going to get any interest in something so I would see curiosity as perhaps being a lower level.

One respondent felt that curiosity was more of a personality trait than a fleeting experience, however:

[Curiosity is a ] built in predisposition to find value in that discovery process. In other words if interest is the willingness to invest the time, curiosity is, uh, [pause] it's that kind of decision that you might make in your life in general that the time you spend on any interest of yours is worth what you get back...Maybe curiosity is somebody who's got an optimistic view of the idea of discovery and investigation as being worthwhile.

The practitioners reported using a variety of techniques to stimulate interest and curiosity in their visitors (see Table 9), but generally did not differentiate between techniques that might stimulate interest and those that might stimulate curiosity. An exception was one respondent who said the following about stimulating curiosity:

[We would stimulate curiosity] by controlling the factors so that there was a level of curiosity and then a way that they could satisfy the curiosity. So when we did experiments, we would get them interested in doing it, and then carefully controlling the experiment so
they were successful in the end.

This approach is consistent with Berlyne's (1960) theory of curiosity as an aroused tension, the reduction, or satisfaction, of which is pleasurable.

Another respondent described a technique for stimulating curiosity which reflects the tension inherent in curiosity:

This method of rousing interest and curiosity both [involved] finding a situation in the woods that was interesting, and asking the people how this happened. He'd ask them questions, and he'd have them ask each other questions and research it and he never would tell them. They would hound him. They would get mad at him. They wouldn't want to speak to him again, and when they left, he still wouldn't tell them.

Question seven was asked to investigate the kinds of sensory perception experiences that are available to learners in nonformal educational settings. The practitioners said they use a variety of techniques to stimulate one or more senses. Large, bright visuals are the most common of these techniques, but techniques to stimulate hearing, smell, touch, and taste are also employed. The general feeling among respondents was that people are quite different in their responses to sensory stimulations. Some are enthusiastic, while some may react with fear or disgust:

Well one extreme we might get a person that didn't want to try it - they were afraid, didn't want to taste it or didn't want to touch it. Like "ew" or they'll back away. Um, [pause] you might get somebody relating a sense such as taste or smell to something that they've already experienced...and the far end, maybe wanting to, enjoying it so much that they want to share it with the rest of the people around them.

Some people love it...I guess that's the difference in maybe learning styles for people. Some people are a little more timid. No, I don't want to. Oh that's gross. It's got sheep poop on it. It's disgusting. Somebody else has touched this before and it's been on the ground. So you see those ideas towards cleanliness. Some people will put
their hands in the dirt, and hey that’s cool, that’s neat. Give me another plant to plant. Somebody else who’s immediately kind of, oh what can I wipe my hands on?...Oh, smells. One person will walk in and say, oh, this smells wonderful. This barn smells good. I can smell the hay, I can smell the animals. Other people go “ew,” gosh, this stinks in here.

Age may also make a difference:

Younger folks aren’t afraid to touch, or taste. Some older folks are reserved in that. Um, in smell and sight, older folks can relate that to something more so than some younger.

Question eight asked about enjoyment in an attempt to get at the difference between enjoyment/pleasure and constructs like interest and curiosity, although the question did not inform the respondent that such a differentiation was desired. Many of the experiences mentioned as enjoyable to visitors reflect Berlyne’s (1960) description of diversive exploration, which serves to increase arousal above the level of boredom. Examples are the large-scale “immersion” experiences, or hands-on, participatory experiences:

I think the larger scale experiences that are both big visually and also require more of a immersion in terms of their participation as opposed to an exhibit case where they stand on the opposite side of a piece of glass and look inside and push a button. If they can actually be inside. If they can actually be in the planetarium and be surrounded by the dark and the stars, that’s a more successful experience affectively because it’s more memorable. They feel that it’s, uh, I think it’s more adventurous. It addresses their emotions of, even fear. In some cases, the high wire cycle for example, is an exhibit that actually promotes fear, it makes you afraid. And we’ve used that in the science. Why are you afraid, what are you feeling, why are your palms sweating, you know, why is your heart racing? It’s because your body is having a physiological response to the situation. Those large body huge immersion experiences tend to have more success than the small things.
Uh, active programs for younger folks will, they will learn more from that, whereas a little bit of activity, along with, I don't think a lot of lecture works, but some activity and some discussion with some of the older folks.

Hands-on, active things. Things that they've never gotten a chance to do. They've read about it in *Little House on the Prairie* books, and this is it, they've seen it for real.

Um, ones that they can interrelate with. Hands-on. The quiz board, if they can do it. We had a tracking display there where the quilt was, where the quilt is now, and it didn't catch everyone's eye, but the quiz board does because you know, you see that and you know it's interactive.

Something that's moving. Something that has some momentum that is building to a climax. If it's a display it has to have a beginning. It has to have some place to begin and some place to end. If it's a nature walk, it has to have a goal. Either we hope to be doing or seeing this or this, or our walk will conclude at such and such a point.

(Immersion experiences are those which place the visitor directly into a simulated experience, such as the Rainforest at the Cleveland Metroparks Zoo, or the simulated limestone caverns at the Cincinnati Museum of Natural History.)

Animals were also mentioned as highly enjoyable to visitors. The responses dealing with animals seemed to indicate that they offer potential for interaction, or are novel:

Oh, I think people enjoy animals. And that's obvious. I mean, people have cats and dogs because we like to touch them and feel them and we feel there's a response that we get from that. There isn't necessarily a response we get from wild animals, but they still evoke that touchy feely kind of emotional state.

I think animals. Animal topics, of all the programs, or exhibits, seem to attract the most attention. Um, and if, and if the animal program or exhibit is something that people can have personal interaction with...And I think it's animals because people can relate more to animals...You know they're warm and fuzzy and they move around
and they have more, people can kind of personify mammals better than other animals. Um, and if they feel as though they can have personal contact with the animal. If they can't touch it, um, to actually see it closeup is real important to them.

The real things always do too...getting nature so that it's the personal level, so that you can relate to it like we said before... having a bird right there...you know, here's these bees and you can watch them in their home and you can't see that in the natural world.

Another pervasive theme mentioned as contributing to enjoyment is social grouping. Particularly, parents seem to enjoy themselves when they perceive their children are enjoying themselves:

If the parents are out with the kids, if they think that the kids are having a good time, they're having a good time too.

The touch table, I think the adults are interested in it for the sake of their kids.

We find that the parents of these four year olds who appear to have the same amount of enjoyment at the water table all day Saturday as their kids do.

I sometimes hear people come in and say, "you know, I remember this place as a child, what a wonderful time we had as a child and now I'm bringing my kids back."

Respondents named age, background and experience, and personality differences as differences between people which may affect what they find enjoyable.

Question nine focused on the emotional responses of learners in nonformal educational settings. The practitioners named a variety of emotional responses that they had witnessed during their careers, including joy, wonder, and laughter, and a "peak experience kind of thing" on the positive end and frustration, anger, or fear on the negative end. Several respondents also mentioned decisions to become a volunteer or make a
particular career choice in response to the nonformal experience as emotional responses.

One factor described by respondents as influencing the direction of visitors' emotional responses is prior knowledge and experience. This is illustrated in the following interview excerpts:

Well, um, this young Girl Scout had a chick in her hands, and the chick is very young and it's crouching down and it's all tucked up in a little ball, and she's holding it very quietly, very calmly, and she's nervous as anything, and our job is to make them feel comfortable...She turned [the chick] over, and shrieked and nearly dropped the animal because in her words, "it only has two legs." She thought that all animals that she'd seen in books ought to be four-legged. And she thought she was holding either a very special chick or a malformed chick or something, that only had two legs. And her absolute shock of surprise, that wasn't cognitive, it wasn't mental, it was strictly her reaction to that personal experience, the tactile experience, um, I'm certain it will stick with her forever.

Negative experience? Uh, I think it usually has something to do with something they found completely disgusting... a lack of understanding of how life was or how life is different for other people. That some people on a regular basis will kill their own chicken and eat it and that is not a disgusting thing for them...This person was not prepared for that experience because it is so far away from their daily life.

So there's a difference in rural and urban populations. Uh, kids who come out here, adults who come out here and they're afraid to go in the barn. Completely foreign to them.

Also described as a factor in emotional responses is whether or not the visitor's motivations and/or expectations are satisfied during the experience:

[The visitor] didn't understand what she was being asked to do and unfortunately because we were in a simulation mode, we were simulating a real space mission, she felt some responsibility, like I have to do this, and couldn't, and I sensed this incredible frustration on her part, bordering on despair. She wanted to cry. That "I can't do it, I have to do it. I'm really bad at this." That crushed me because it's the idea that we brought her in to make her feel competent and
instead we've made her feel incompetent.

Uh, I guess the person was very upset and started kind of lecturing me, very short of, maybe, yelling at us. And I can't, the first thing that pops in my mind is maybe not necessarily an interpretive experience they had but a bad encounter they had with something in the park, something not working.

This has happened many times, I think. And that is the "get it myself" response. I, you know, it was me doing something for the first time. It happens kind of over and over again. It might be as simple as a child cracking an egg and getting it to come out right into the bowl. And that feeling, gosh, you know, I did that. We did that. That's probably the "I did it" factor.

One respondent suggested that the aesthetics of certain environments can produce an emotional response:

I'm awestruck a little with the space, the weight of the columns and the massiveness of the building. Looks like barricades. And I think you do get an emotional response from people. And I'd have to point that to the architecture of the building...But what do you call that. Just monumentalism, or something? When people get and emotional uplift from something?

Related to this is the idea that immersion experiences, described above, tend to produce an emotional response:

We had a theater there then the curtains open up onto a scene. Then when the movie was over it opened up and you got to walk down to the village. I built it. And the kids would really get an emotional response because you could walk right in among the Indians and their houses...You feel like you're right in the environment.

Question ten asked the practitioners how they felt the affective experience in a nonformal educational setting might influence cognitive learning. Common answers were by inspiring interest for future involvement with the subject matter, and by increasing the memorability of the experience. Interestingly, one respondent said that visitors do not come to
her facility to learn cognitively:

I don't think that they learn factual information here. I mean, they may, but I don't think it's something that they walk away with and say, "I learned this, this and this." I think it's more that they walk away with a better understanding about the whole picture and take home more of an emotional, um, feeling, awareness, rather than just simply factual information.

Another also indicated that his facility stressed affective goals: "In fact, our educational mission has as much to do with altering attitudes toward science and technology as it does about teaching actual facts." A third respondent also indicated that the objectives of nonformal educational facilities should be more affective than cognitive:

I don't think [cognitive learning is] the mission of a nonformal institution. Because if they enjoy the experience they're more willing to go to another science experience. So maybe they'll pick up the content or the cognitive stuff at another point, or maybe they'll come back to the museum and pick up more cognitive learning. But I just don't think it's their role.

These statements further reinforce that affective gains may be the most important ones in the nonformal setting.

The practitioners all expressed a belief that experiences in nonformal educational settings provide long-term benefits for the learner. These benefits include improved attitude toward science, awareness and appreciation of parks and conservation, and development of interest in a subject matter. The following quotes are examples of these beliefs:

We do believe, however, that by and large, experiences at [name of facility] tend to underscore the impression that science is fun and that technology is not overwhelming. It is controllable and it is interesting. Um, we believe that school kids coming through on field trips are given an experience that can't be had in the classroom where the teacher's trying to connect the content and the physics and the math and all that with real world examples. We draw those real world examples as much as possible. So we talk about we're hopefully
increasing the relevance of science and technology for them in their lives.

Uh, I guess the awareness has been, awareness level has been increased and if someone reads an article about it they’re going to have a little better understanding of what a news-related article or item might be.

I really think that people develop, uh, an awareness of how important the parks are and then maybe develop how important conserving or even preserving certain types of natural areas or habitats are, and then to the degree that later on they might develop a deep emotional feeling that, especially as a child, that as that child grows up that they will have a greater respect for the environment, either through their hobbies, their interests that they pursue, or even their careers. And then even develop that awareness and appreciation in their kids.

Um, again building that, hopefully, building that long-term interest and long-term curiosity in the natural world, and then that often leads to building a concern level and a commitment level too. And I’m thinking in my mind of the long-term birders. Um, why are they coming? They probably came with their parents as kids and probably had good experiences with their parents or good experiences with scouts, or, you know, something like that so that they enjoyed it for some reason, and that was built long ago. And now that they’re coming, I’m sure that if there was a threat to the [park system], um if it was going to be cut down for wood for a housing development or something, they would then be, they’ve got the concern and they would probably be committed to making sure that didn’t happen.

To take the students out and have them see really positive high impact fun things in science, so that they can, personally I want to motivate them to like science, and these institutions do it.

A frequently mentioned belief was that experiences in the nonformal setting are memorable, perhaps more memorable than comparable learning experiences in the formal setting:

I think experiences in the out-of-doors, at least for myself definitely, tend to be perhaps the most memorable. You build on them. Because there’re so many questions and unanswered speculations about the natural world that a curious person just can’t turn it off and
on. Whatever you’re doing or whatever you’re reading it may signal an experience that you’ve had, and you can draw from that experience to better understand another subject. I think everyone remembers their trip on a nature trail.

Oh I think if they go into a museum like [name of facility] they’ll never forget it. It’s very long-range. It’s one of the reasons I got out of television is because I wanted to do things that would last, that would have a lasting effect for people.

Well, our park manager, who’s getting more sympathetic to what we do here, he said, “I remember when I was in grade school, and we made butter. And we tasted it.” That was a hands-on activity that was in his mind from now until doomsday. He remembered that. I think he remembered it as a positive experience. I think people go away with those things.

Well they had that in school all their life, but when I remind them they don’t remember it. Especially when I say, well you all had electricity when you were in school. Oh no we didn’t. Oh yes you did. And I’ll pull out the textbooks and show them, and if they used a textbook, which they all did when they were in school, they had that. But they don’t remember it. But they’ll remember wiring something up at [name of facility].

One respondent described how complex interactions of emotional factors with other elements of the experience can influence long-term memory of the experience and future motivations:

You connect those things. Not necessarily consciously, but if it’s a good experience in nature, you’re going to want to come back. It might have nothing to do with nature. It could be that that’s, say someone hadn’t seen their father, they’d been separated from him, and they met at the park. They’re going to want to come back to the park because they remember they liked the park for some reason. They won’t necessarily know why. And unfortunately the person who was scared to death to come in, won’t want to come to a park. They won’t remember why.

The practitioners mentioned letters from parents and children, requests for more information, and return visitation as informal evidence of long-term
benefits for the learners they deal with.

Data from the interviews indicated that the practitioners use essentially the same informal criteria to evaluate success at satisfying visitor motivations, success in stimulating interest and/or curiosity, and whether or not visitors are enjoying themselves. These criteria are verbalizations from the visitors, holding power, facial expressions, participation and involvement, and return visitation.

Results from the Observations

A summary of findings from the unobtrusive observations carried out at the thirteen nonformal educational facilities sampled is shown in Table 10. Fully expanded notes from the observations are available for inspection from the researcher.

One of the most striking themes emerging from the field observations was the importance of social factors to the nonformal educational experience. As noted by one of the practitioner participants, attendance at nonformal educational facilities tends to be a social activity. During all the observations conducted during the field research phase of the study, the researcher encountered no more than five or six people who appeared to be in attendance alone rather than with a group or another person.

The nonformal educational setting seems to provide a framework for conversation among friends or other visitors, as illustrated by the following excerpts from expanded field notes:

The same two thirtysomething women that I observed down in the American Collection are here. They are making much low conversation. They pause briefly at a Ming Dynasty “offering set.” (1) says, “Oh look. Fake food.” They chuckle. “Tasty.” At the next case, (1) says, “I love pottery.” They are shuffling slowly, wandering, and
Table 10. Summary of findings from observations, with numbers of occurrences shown in parentheses.

* Visitors in nonformal facilities commonly express their affective responses verbally and/or facially. (48)
* Social factors (peer influences, social interactions) heavily influence the behaviors of visitors in nonformal facilities. (47)
* Pointing, often accompanied by verbalizations like, "Look at the...," or "There it is!" is a common behavior in nonformal facilities. (36)
* Parent-child interactions in family groups are of prime importance to the affective experience in nonformal facilities. There seems to be a strong desire on the part of parents to provide a quality experience for their children, the success or failure of which plays a central role in determining the parents' affective response. (33)
* Nonformal educational settings provide both deliberate and circumstantial opportunities for child and adult play. (30)
* Visitors often verbally relate stimuli encountered in nonformal facilities to something they already know about. (28)
* Visitors seem to want to touch and manipulate things for the sake of touching and manipulating. (23)
* Age may influence the affective response in nonformal facilities, with children being more likely to exhibit extremes of enthusiasm, excitement, etc. (22)
* Visitors seem to desire to relate to or communicate with animals in nonformal settings. (22)
* Visitors may bring their own interests and motivations into the nonformal education experience. These interests and motivations influence behavior in the educational setting. (20)
* Visitors in nonformal facilities use a variety of sensory information in forming perceptions, and some seem to desire, perhaps even subconsciously, access to multiple modes of sensory stimulation as they form perceptions. (20)
* Visitors exhibit a variety of responses in nonformal facilities, but it is often possible to group these responses into a few main categories. (19)
* Positive interactions with staff can enhance the affective experience of visitors in nonformal facilities. (18)
* Spontaneous verbal questioning may be one expression of curiosity. (16)
* The "I get it!" or "I found it!" is a typical response in nonformal settings. (12)
* People seem to laugh or chuckle when they encounter something outside their norms of aesthetics or experience, although they may also chuckle “knowingly” at things that are familiar to their own experience. (11)

* Experiences or exhibits at which the visitor has reason to anticipate a conclusion or climax appear to have good holding power. (11)

* Children seem to move quickly and excitedly from exhibit to exhibit, pulling the adults in their groups on behind them. Adults without children in their groups seem to move more methodically from exhibit to exhibit. (10)

* People in nonformal education facilities seem to take cues from one another as to what they will give their attention to, participate in, or even how they will respond to the exhibit or activity. (10)

* Stimuli which contain elements of the unknown may elicit exploratory behavior in visitors. Particularly with children, such behavior may be playful. (9)

* Small children may react with fear to certain types of stimuli in nonformal facilities. Examples observed include loud, possibly unfamiliar noises, large animal figures, mysterious settings like a simulated cave. (7)

* There seems to be an interest among visitors as to whether or not things are “real.” (6)

* Prolonged engagement at the nonformal facility may lead to fatigue, which detracts from the affective experience. (4)

* Hand gestures may be one of the ways people use to express their perceptions or responses, particularly aesthetic responses, to stimuli in nonformal facilities. (3)
engaged in continual conversation."
- The Indianapolis Museum of Art, Asian Collection.

The woman closes up her binoculars, moves back to the front of the blind and looks up again at the illuminated signs [of waterfowl]. She turns to me and asks me about the mute swan sign. I reply that apparently they don't have one. I wonder if she thinks I'm an employee or a volunteer on duty since I have been sitting with my clipboard taking notes. I sight what I think is a great blue heron sitting in a tree over by the east blind. I point it out to her. She is very excited. We pass her binocs back and forth and try and make a definite i.d.

After the woman leaves, I decide to go to the east blind. I enter at 2:35 pm. The woman is there viewing the owl with her binocs. The family is also there using both pairs of their binocs. [The family and the woman] are all interacting together now.
- Blendon Woods Metro Park, waterfowl observation blinds.

Nonformal educational facilities also seem to provide opportunities for romantic interactions:

A couple, about 30. They are looking at each painting, reading signs. She points to a sign, and a quiet verbal exchange follows. He then talks and she listens closely, looking up at his face. More verbal exchange follows.

The couple is spending at least 30 seconds at each painting. Sometimes they are arm in arm. They make active conversation about each painting. Interested enjoyment/interaction.
- The Indianapolis Museum of Art, American Collection

Social interactions also seem to influence behavior in the nonformal educational setting:

As I approach the entrance to Kahn Hall, I encounter a school group, about third grade, getting ready to enter...Inside, all the kids in the group go right up to the first dinosaur, an Allosaurus...The kids sort of stop in their tracks as they get close to the dinosaur. They are all looking up at his head, fascinated. There is giggling, talking. After a minute or so, two of the kids run on to the next dinosaur at the back of the hall. This seems to be infectious, and the rest of the group
follows.

- Cleveland Museum of Natural History, Dinomation Exhibit

A couple, about 30...They stop to look in a case of Japanese ink (text) on paper. They have a brief exchange of words, which I cannot hear. She walks to the next room down the corridor. He turns around to look at another case behind where they had just been looking...The man looks briefly at this case, then fairly briskly catches up with the woman.

- The Indianapolis Museum of Art, Asian Collection

Closely related to these types of observations are those relating to parent-child interactions, which appear to be of primary importance to the affective experience of visitors in family groups. This was also mentioned several times by the practitioners during the interview portion of the study. Specifically, the quality of a parent's affective experience may be heavily influenced by whether or not he or she believes the child is receiving a quality experience. This is illustrated by the following observations where adults attempt to facilitate participation on the part of their children:

The signage at the beginning of the exhibit is in red neon, and reads, "What if...you could discover...a mummy...a coral reef...." The adult entrance is a pair of glass doors. The entrance for children is a yellow submarine tube at floor level that the kids crawl through. Many of them do...I also notice parents/adults encouraging kids to go through this entrance if they are timid to do so. One woman even went through herself to demonstrate how it works to the child.

- The Children's Museum, What if...?

Family is going through the exhibit...Grandma tries to coax the girl toward the lower level with the immersion portion, but the girl doesn't want to go. Grandma says, "I'm just going to pick you up so you can peek in. Don't you trust me?"

- The Cincinnati Museum of Natural History, Cincinnati's Ice Age

A mom and dad and toddler: Mom says, "Mr. elephant..." looking back and forth between toddler and elephant.
Parent and a baby in a stroller approach. Mom says in a whispering expressive tone, "What's that?" The baby responds with "Hi!" and waves.

This seems to be a pattern: Parents bring their small children up to look at the elephants. Sometimes the kids say hi or something like that. Sometimes the parents try to coax them to say hi, etc.
- The Columbus Zoo, elephant exhibit

Also suggested by certain observations is that parents may significantly influence their children's affective responses in nonformal facilities, as illustrated by these two contrasting observations:

Family enters the rainforest room. They notice the eel tank directly across from the exit door. Mom says, "Ooh, look," and points to the tank, looking back and forth between the tank and the kids. The kids both squeal, which draws a "shh" from dad...Mom now spots something new, a snake in a glass case. She says, "Oh wow, wait till you see this!" She picks up the younger boy from the wagon to help him see. The older boy exclaims, "Oh cool! Look at the snake!"
- The Indianapolis Zoo, World of Waters

A group of two women, about 45, and three kids, two girls and a boy, 8-11, enter, kids first. I hear one of the women saying, "You wanna go...?" as they enter. The kids go immediately over to [a set of huge moving belts and pulleys, which are displayed to illustrate a turn-of-the-century carriage industry]. The boy exclaims, "Wow! What's it for?" The woman replies dispassionately, "Some kind of wheel. Come on. Let's go." They move toward the exit for Ohio Village, and the boy proclaims loudly, "This is boring! I wanna go to the village!"
- The Ohio Historical Center, Museum

One of the practitioner participants summarized these kinds of phenomena by saying,

Some parents will try to enthuse their kids and be real good at that. And some will try and teach their kids and be real good at that. And then there are some that just don't have the skills or don't have the interest or both.
Also corroborated by the practitioners during the interviews was the observation that children seem to move quickly from exhibit to exhibit, often pulling the adults in their groups on behind them, while the adults seem more inclined to move methodically from exhibit to exhibit:

The kids in this group are keeping ahead of the parents, as if eager to get on the next thing all the time. Mom and dad, however, tend to linger behind, reading signs and discussing together. "Mom! There's a buffalo over here!" Mom and dad continue to linger behind. They are checking themselves against the rotating signs to see how well they know the species depicted in the dioramas. The two kids begin climbing up on the simulated rock wall bordering the walking path across from the buffalo diorama. Mom says, "Did you see the buffalo?" The boy replies, "I know. We saw."

- The Indiana State Museum, When Nature Ruled Indiana 200 Years Ago

One of the practitioner respondents described this phenomenon by saying that "kids sometimes lead the discovery process."

Positive interactions with staff are capable of enhancing the affective experience of learners in nonformal educational settings. This was also supported by data from the interviews, and is illustrated by this observation:

The docent now addresses the boy and tells him what his chore day would be like if he had lived during this period. He nods once or twice, but is still very reserved...Dad says he would like to take a picture of his son with the docent. She puts the dunce cap on the boy. He's smiling as he stands next to her. Dad takes the picture and says, "Very nice." He wants another picture with Mom in it. The docent asks the boy where they are from. He answers, "China." A little more conversation reveals that the family is now living in Worthington. The docent is beginning to draw the boy out. He is smiling now. She tells him, "You speak beautiful English." This elicits a big smile and a "Thank you."

- The Ohio Historical Center, Ohio Village, Schoolhouse

Another social factor observed was the tendency for learners in nonformal educational settings to take cues from one another as to what
they will give their attention to, participate in, or, in some cases, how they will behave, as illustrated in these excerpts:

A group of three girls is standing at the Braille sign labeling the dinosaur. A fourth girl approaches the group and dino from further inside the hall. She starts shaking her finger in a scolding manner at the dinosaur and says, “Don’t you…” The other girls begin doing the same thing. “Don’t you talk back to me.”

- Cleveland Museum of Natural History, Dinomation exhibit

As the rats play [basketball], [the volunteer] encourages the kids to cheer with gusto, putting his fists in the air and cheering. The kids are up on their knees and feet, especially the boys. [Volunteer] is really egging them on. Now about half of the kids are on their feet. The cheers wane a little, but [volunteer] says, “Come on, let’s root ‘em on!” Almost all the kids are on their feet and are moving in closer to the “arena.”

- Center of Science and Industry (COSI), Animal Lab

Visitors display a wide variety of responses in nonformal educational settings. Examples are verbal and facial expressions of affect, pointing at exhibits or parts of exhibits, verbally relating something encountered during the experience to something already known, spontaneous questioning, hand gestures, and laughter or chucking. The latter seems to particularly occur in response to things outside the visitor’s apparent norms of aesthetics or experience. Children seem to respond with more extreme displays of excitement or enthusiasm than do adults. Small children seem generally more likely to respond with fear to loud, unfamiliar, or mysterious stimuli. Another commonly observed response was the “I get it!” or “I found it!” response.

The observational data suggests that learners in nonformal educational settings do seem to desire interaction and opportunities to touch and manipulate things. Visitors seem to want to touch and manipulate
simply for the sake of touching and manipulating. Some observations suggest that visitors desire, on almost a subconscious level, access to multiple modes of sensory stimulation. The following excerpts are examples of such a tendency:

At the beginning of this area is a slanted quiz board with sliding answers - wooden panels that must be pulled to the bottom before the wooden flip can be lifted to reveal the answer. Some toddlers have come in and are sliding the answer boards up and down. A group of kids about six to nine years old come in and immediately begin sliding the boards. Two teenage girls come in and slide the boards, and also lift to see the answers. Everyone under the age of adulthood that I have observed enter this area has moved the sliding boards up and down. Some adults have also.

- The Children’s Museum, What if...?

In the next room, kids are progressing through the exhibit. They are touching the casts of jaw bones, etc. A girl runs her hand over a life size elephant limb skeleton. I hear lots of flips going, banging shut, etc...A girl turns a knob to make a cat jaw move. She moves on. Now a boy does this. He is turning the knob as fast as he can. A woman says, "Ok, now let the girls do it." The two girls she is referring to take a brief turn at turning the knob. They seem to just want to do it. Why? It really seems that kids are flipping flip signs just to be flipping. Why?...Dad and a toddler are progressing through. The toddler is flipping flips continuously, and (or) pushing buttons when available.

- The Cincinnati Museum of Natural History, Glacier exhibit

A group of three girls is standing at the Braille sign labeling the dinosaur. One of the girls is rubbing her hand over the braille, almost as if she is not conscious of doing it.

- The Cleveland Museum of Natural History, Dinomation exhibit

Zoo visitors displayed a tendency to want to relate to or communicate with the animals:

Upon exiting the waters building we come to the seal alcove, which has a viewing window outside and some bench seating for viewers. There are two boys, 10-12 years old, and a girl, about 10, a couple, of which the man has a camera, and six other adults in the alcove. The two boys are standing on the ledge of the viewing window right
up against the glass. A seal is also up against the glass on the other side, and seems to be interacting with the boys. The girl now goes to the window and engages in this interaction type behavior while the two boys move away. Mom says, "You must look like a marine mammal to him." Another member of the group says, "cute," referring to the seal. The girl is now moving her hand back and forth in front of the glass to see if the seal will follow it, and the oldest boy joins her in this behavior.

- The Indianapolis Zoo, World of Waters

Passing by the gazelles, I notice a man whistling as if to communicate with them, like whistling to a dog or cat. A small girl in the area says, "He's looking right at me..." Passing by the lion, I encounter the same man who was whistling at the gazelles. He is saying, "kitty kitty kitty" in a high pitched voice in the lion's direction...In the wallaby/kangaroo area, the low split rail fences do not restrain the animals from crossing the visitor walking path. I come across a wallaby on the path. A woman, 20-25, is following after it trying to touch it. She comes close, saying, "almost." She keeps trying, but it hops away. She says, "Oh..." disappointedly.

- The Indianapolis Zoo, Plains Biome

Exploratory behavior and play are commonly observed behaviors among learners in nonformal educational settings. Stimuli which contain elements of the unknown are particularly effective at eliciting this exploration, as illustrated by these observations:

In the next room, the woman bends over and peers intently into a crevice in the simulated rock, which reveals a lighted skeleton of a black bear. She looks for at least 30 seconds...A group of three elderly women have entered. They read the first rotating sign. As they pass through to the next room, they all stop to look at the bear skeleton, peering quietly into the crevice.

- Indiana State Museum, When Nature Ruled Indiana 200 Years Ago

There also seems to be a fascination with determining whether or not things are "real:"

Group of two women and three girls, about three, four, and 10. In the immersion portion, they climb on the fabricated timber wolves, stick their toes in the water, etc. An older [child] asks, "Mom, does that water look real?"...Outside the immersion experience is a mounted
mastodon skeleton with a mannequin of a scientist working on him. A toddler girl proclaims, "That's not a real person."
- Cincinnati Museum of Natural History, Cincinnati's Ice Age

I encounter [a couple], about 30. The woman knocks with her fist on one of the trees that is situated in the middle of the walkway. She looks up and down at it and walks away. She says, "That's a real tree."
- Cleveland Metroparks Zoo Rainforest

A family group is on its way out of this gallery toward the prehistoric exhibits. They stop for less than five seconds at a case in the corridor which illustrates how human remains have been excavated by archaeologists. The boy, 11 or 12, repeats three times, "That is a real skeleton." (It's not.)
- Cleveland Museum of Natural History

Experiences which promise some kind of climax or conclusion may have particularly good holding power:

There seems to be a desire among visitors to see one of the pegs get knocked over [at the giant pendulum]. My mom [who is with me during this observation] informs me that earlier in our visit, she noticed a woman watching the pendulum. The woman said excitedly, "She's gonna miss it!" and ran into the gift shop to get her friend to come out and watch the peg get knocked over.
- Indiana State Museum, the Foucault Pendulum

We are sitting in front of the observation window watching a Cooper's Hawk perched in a tree right outside the window. We are waiting for it to make its move on a prey...We discuss whether or not we think it will attack a squirrel or small bird out there. When the hawk flies off, the man with the binoculars gets up and crosses to the right to keep watching it...Our heads turn and follow it up to where it lands in a tree... [I note that] some people will sit and/or stand at the observation window for at least 20 to 30 minutes.
- Blacklick Woods Metro Park, Nature Center

Some of the observational data exemplified that visitors may bring their own interests and motivations into the nonformal educational experience, and these interests and motivations will help shape their
behavior in the nonformal setting. Prime examples are the "intense birders" described by one of the naturalist practitioners during the interviews. Several of these birders were observed during the field research at the Walden Waterfowl Refuge of Blendon Woods Metro Park. These individuals brought their own binoculars and spotting scopes to the facility and engaged in bird observation for lengthy periods of time. Another example is a family group attending the wildflower walk at Blacklick Woods Metro Park. Although they chose to attend a naturalist-led walk, they allocated much of their attention to socializing with each other, observing things in the woods that were not the object of the overall group discussion, and taking photographs. Clearly, whether they knew it or not, they had their own agenda, which was not necessarily consistent with that of the naturalist leading the walk.

Refinement of Model 1: Model 2

The purpose of the field research component of the study was to gather further, and more specific, information about the population of interest in order to refine Model 1. The refined Model, Model 2, is shown in Figure 17. In addition to providing more information about the population of interest, the field research served to focus the thinking of the researcher towards the "real world" nonformal educational setting, as opposed to the hypothetical setting of Model 1.

The field research made it apparent that Model 1 is at the same time too complex and too simple. There were several comments from the researcher participants to indicate that the presentation of the model should be simplified to make it more readable and understandable. On the other
Figure 17. Main view of Model 2.
hand, this researcher's experiences from the interviews and field observations made it clear that the linear flow of Model 1 was too simplistic to represent the complex and dynamic affective process as it occurs in the real world. It is not realistic to expect that a learner will enter a nonformal educational setting, encounter a specific stimulus, and experience a linear flow of events without any interplay or feedback between events in response to that one stimulus. The following discussion describes how Model 1 was refined to make it more simple and, at the same time, a better representation of a complex process.

Figure 17 depicts the sequence of Model 2, the refinement of Model 1. To better reflect the complexity of the affective process, an important revision was made at the beginning of the model. Reflection on observations in the field in conjunction with further reading on the perceptual process (Berlyne, 1960; Plutchik, 1980) led to the realization that when learners enter a nonformal educational setting, they are exposed to a stimulus field composed of a variety of competing stimuli rather than one isolated stimulus. The beginning point of Model 1 (see Figure 13), Nonformal Educational Stimulus was therefore changed to Stimulus Field in Model 2 (see Figure 17).

Model 1 (see Figure 13) shows the affective process flowing from the stimulus to awareness/perception, appraisal, and to selective attention. Awareness/perception was conceptualized as being linked to Shettel's (1976) attracting power and selective attention as being linked to his holding power (see Figure 14). Findings from the interview portion of the field research suggested that attraction of attention is a different phenomenon from holding of attention (see Table 9). The practitioners felt
Attraction would occur in response to sudden changes in the stimulus field, such as noise, motion, bright colors, and so on. They felt attention would be held with some kind of activity or involvement on the part of the learner. Thus, attraction seems to be related to aspects of the stimulus field, while holding of attention is more a function of the learner's behavior in relation to the stimulus field. For this reason, Selective Attention in Model 1 (see Figure 13) was separated into Attraction and "Holding" Behavior in Model 2 (see Figure 17). Not only does this separation attempt to more accurately represent the affective process, it also utilizes terminology familiar in the nonformal education literature (Shettel, 1976) and avoids an ambiguity in the term attention which will be discussed below.

Further reading of the literature indicated that attraction should be included as part of the perception process. Perception begins with a sensory scanning (Plutchik, 1980) of the stimulus field. Scanning is the organism's radar antenna bringing sensory information to the brain. When novel or unexpected stimuli are encountered, an orienting response occurs in which the sensory organs are aligned to maximize the input of sensory information (Berlyne, 1960; Plutchik, 1980). Examples of the orienting response are turning of the head in the direction of a noise, or squinting or walking closer to something in order to see it better. Following the orienting response is attending (Plutchik, 1980) or attention (Berlyne, 1960), a focusing onto a specific stimulus so that the sensory input from that stimulus is amplified compared to competing stimuli, which are, at least partially, "blocked out." In Model 2, attraction consists of the orienting response plus attention. Following attraction, a percept (Solley and Murphy, 1960) (cited in Izard, Wehmer, et al., 1965) is formed. The percept is a mental picture of
the stimulus, which may be different for every individual, depending on a
number of factors to be discussed shortly. Scanning is seen as a primarily
cognitive activity (Plutchik, 1980), while attraction and formation of percept
are both cognitive and affective in nature.

In Model 1 (see Figure 13) Appraisal is shown as preceding
Selective Attention. This sequence was derived from Krathwohl et al.
(1964), willingness to receive being equated with appraisal as put forth by
Arnold (1960) and evaluation as put forth by Plutchik (1980). Plutchik,
however, proposes that attending precedes evaluation (see Figure 10).
When the original sequence for Model 1 was formulated, the researcher
conceptualized Plutchik's attending as part of the attracting of attention, and
selective attention of Krathwohl et al. as part of the holding of attention. If
willingness to receive is indeed equivalent to appraisal or evaluation, then
this distinction is valid. It is also possible that willingness to receive is not
truly equivalent to appraisal or evaluation, in which case selective attention
of Krathwohl et al. and Plutchik's attending may be appropriately
considered one and the same. In either case, use of attraction as part of
perception and "holding" behavior as an action following affect avoids the
ambiguity in the terms.

Recall that a number of theorists view affect as a precursor to action
affect as an action tendency toward or away from an object cognitively
appraised as good or bad. In the nonformal educational setting, then, affect
should be a determinant of some sort of immediate action. Short-term
affect is thus part of an Action Decision in Model 2. While Plutchik (1980)
would agree that a cognitive evaluation precedes affect, Buck (1984) and
Zajonc (1980) would not. Apparently, whether or not affect is preceded by cognition remains a subject of disagreement among psychologists (P. M. Clark, personal communication, 1993). Consequently, the cognitive Evaluation of percept was included as interacting in either direction with short-term Affect in the action decision block of Model 2. It is conceivable that either a cognitive evaluation or short-term affect may occur spontaneously after perception and lead directly to action. It is also conceivable that either may occur first, be followed by the other, and then lead to action. Perhaps the most likely scenario is that both occur, in either order or even simultaneously, and interact with one another until the action decision is made.

Three main decisions are shown as possible following the action decision in Model 2 (see Figure 17). The first is represented by the arrow leading from Action Decision back to Perception. The learner may decide that the percept just formed does not warrant holding of attention, and may go back to scanning the stimulus field again, be attracted to another stimulus, form another percept, and make a new action decision for that percept. Alternatively, the learner may decide to change to a new stimulus field altogether (i.e. enter a new gallery of the museum, etc.). The learner may decide that the percept just formed does warrant holding of attention, and may therefore begin to engage in "holding" behavior, or exploration, play, and/or creative behavior. The "holding" behavior will then feed back to an action decision, and the interplay of evaluation and short-term affect elicited by the "holding" behavior will lead to a decision to continue "holding" behavior, focus on a new part of the stimulus field, or change the stimulus field altogether. The loops between Perception, Action Decision,
and "Holding" Behavior reflect a more complex, and presumably more accurate, representation of the affective process in Model 2 (see Figure 17) than was represented in Model 1 (see Figure 13).

In an effort to simplify presentation, the affect blocks, both short-term and long-term, were reduced in size and simplified to boxes labeled simply Short-term Affect and Long-term Affect. More detailed representations of both of these blocks are provided in Figures 21 and 23. Expressions of Affect was removed from the short-term affect block of Model 1 and portrayed as a phenomenon resulting from short-term affect. Expressions of affect are facial expressions, body postures, and verbalizations, and as such are classified as cognitive, affective, and psychomotor in nature. As was discussed at length above, the affective behaviors in the short-term affect block of Model 1 were removed into "holding" behavior, one of the forms of action which may follow from the action decision. The specific behaviors within "holding" behavior are exploration, play, and creative behavior, all of which have been characterized as cognitive, affective, and psychomotor.

Another major revision from Model 1 to Model 2 was increasing the interplay between cognition and the other elements of the Model. This revision was suggested in a comment from one of the researcher participants. Thus, in Model 2 (see Figure 17), Cognition is shown as interacting with perception, the action decision, "holding" behavior, long-term affect, and long-term patterns of behavior. The trait of creativity was also added to the cognition block, since it is a cognitive trait (P. M. Clark, personal communication, 1993) that may be developed in individuals.
During the field research, a suggestion from one of the researcher participants was made to look into the work of Alice Isen, whose research addresses the influence of affect on cognitive processes. Four studies were surveyed which lend further support that affect does in fact influence cognitive performance. Isen, Shalker, Clark, and Karp (1978) found that an induced good mood led to better recall of positively rated words. The opposite effect was not found for negative affect, however. These authors propose a cognitive loop hypothesis, similar to the associative network hypothesis of Bower (1981), in which good mood serves as a cue in memory and facilitates the recall of affectively positive material. Isen, Daubman, and Nowicki (1987) carried out experiments which demonstrated that the inducement of positive affect improved performance on two tasks related to creative ingenuity. From this, they hypothesize that positive affect cues large amounts of cognitive material in memory, leading to defocused attention and thus a more complex cognitive activity. This increased complexity of cognitive activity allows a greater number and range of interpretations of stimuli, resulting in an increase in the drawing of relationships and combinations between stimuli. Isen and Geva (1987) and Isen, Nygren, and Ashby (1988) carried out experiments relating positive affect to risk perception. Their results indicate that in high-risk situations, subjects experiencing positive affect exhibit less risk taking than control subjects. In low risk situations, those experiencing positive affect exhibit more risk taking.

The variables of Model 1 were reformulated into factors for Model 2. The term factors seems more appropriate for a heuristic model, while variables seems suggestive of hypothesis testing and cause-and-effect
relationships. Factors were again divided into internal and external, except that the term *attributes of the stimulus* was substituted for *external*, the former being more specifically descriptive.

In Figure 17, sensory capabilities is portrayed as a factor which would influence sensory scanning. Although no literature was found which specifically named this as a factor influencing scanning, it is intuitively obvious that the sensory capabilities of the learner will influence the scanning process. For example, persons with physical limitations like hearing or sight impairment will scan their stimulus field differently than "normal" persons.

The perception and attention variables from Model 1 were reformulated into attraction and percept formation factors in Model 2 (see Figures 18, 19). Of the internal variables, potential for stimulation was included as an attraction factor. The term *need for stimulation* (Sales, 1972) was substituted, since it represents an internal factor which already appears in the literature. It is logical that a learner's level of need for stimulation would influence the types of stimuli the learner will be attracted to. Zuckerman's (1979) sensation seeking trait could also be included here, but since it seems so closely related to need for stimulation, it was subsumed under the latter and not listed separately as an internal attraction factor. Also included under internal attraction factors were habituation and satiation and fatigue, all of which influence whether or not a person will "notice" a particular stimulus.

The attributes of the stimulus that are considered to influence attraction in Model 2 are, as in the attention and perception variables for Model 1, Berlyne's (1960) collative variables, indicating stimuli, modeling,
Figure 18. Detailed view of attraction factors for Model 2.

Figure 19. Detailed view of percept formation factors for Model 2.
and physical characteristics of the stimulus. Specific physical characteristics outlined by Berlyne (1960) are color, intensity, motion, and sound. All of these qualities may play a role in focusing a learner's attention on a particular stimulus. Intensity, in particular, is important to the perception of change in a stimulus. According to the Weber-Fechner function (Sommer, 1972) (cited in Bell et al., 1978), the intensity of a stimulus that is necessary for it to be noticed as different from a previous intensity of the stimulus is proportionate to the original intensity. In other words, for very intense stimuli, relatively large changes in intensity are required before the change is perceptible. Additionally, Patterson and Bitgood (1988) list the architectural factors of proximity and presence of competing stimuli as factors which contribute to viewing time in museums. While length of viewing time is related to holding power rather than attracting power, proximity and competition from other stimuli are perceptual factors and probably contribute to holding power more at the perceptual level than at the action decision level. Proximity and presence of competing stimuli are therefore included as attraction factors rather than action decision factors.

The internal percept formation factors in Model 2 are motivation, experience and learning, physical and sensory limitations, and continued exposure to the stimulus. These derive primarily from reading and rereading of Leeper (1963) on the subject. Motivation is used as an umbrella term for both interest and motivation from the internal attention variables of Model 1. Intelligence, experience, and social and cultural influences from the perception variables of Model 1 were subsumed under the heading of experience and learning for the sake of simplifying the
model. Physical and sensory limitations is the researcher's terminology for what Leeper calls "the general state and completeness of the nervous system" (p. 444). Continued exposure to a stimulus, according to Leeper, can cause temporary states of satiation which affect the way stimuli are perceived.

Leeper (1963) also names temporal and spatial patterning of the stimulus as a factor which affects perceptual organizations. This was listed as an external perception variable in Model 1 and is retained as a percept formation factor in Model 2.

Decision factors in Model 2 (see Figure 20) are largely a combination of the interest, curiosity, and enjoyment variables of Model 1. The internal variables retained as internal decision factors are experience and education, age, innate curiosity (tonus), level of sensation seeking, and felt involvement with the stimulus. Motivations and interest, which were included as percept formation factors, are also included as decision factors because they are defined as constructs which influence behavior, and because findings from the field research also suggested that they influence the behavior of learners in nonformal educational settings. Social factors was added as an internal decision factor because of the preponderance of evidence in the field research findings that social interactions influence the experiences and behaviors of learners in nonformal settings. Emotional state, which was an attention variable in Model 1, was included as a decision factor in Model 2. It is conceptualized that the emotional state of the learner upon entering into the nonformal setting should interact with any short-term affect the learner experiences as a result of contacts with stimuli in the setting.
Figure 20. Detailed view of decision factors for Model 2.
The attributes of (or associated with) the stimulus for the decision factors in Model 2 are, again, combinations of the interest, curiosity, and enjoyment variables and certain of the attention variables of model 1. Collative variables, potential for manipulation, participation, or interaction, potential for rewarding feedback, coherence, texture, mystery, and familiarity all were derived from the interest, curiosity, and enjoyment variables. Clarity of message derives from the short, clear message attention variable. Level-appropriateness of message was added because it was mentioned several times during the practitioner interviews. Both of these factors should influence whether or not the learner chooses to spend time engaged with a particular nonformal educational stimulus.

Modeling, an attention variable in Model 1, was retained as both an attraction factor and a decision factor in Model 2. Observations in the field suggested that observed behavior in others can influence both attraction to a stimulus and responses to stimuli. For instance, a crowd of people clustered around an exhibit may attract more people to the exhibit. An excited response from a staff member may influence excited responses in learners, etc.

The interest variable aesthetic value and the enjoyment variable uniformity in variety were not retained as decision factors because they are essentially embodied in the collative variables, coherence, texture, mystery, and familiarity. Color was also added to the list of decision factors because of observations in the field where visitors viewing works of art, wildlife, and quilts made mention of color as a something contributing to their aesthetic appreciation of the stimulus. The observation that visitors seem fascinated with whether or not things are "real," along with the suggestion by Patterson
and Bitgood (1988) that realism contributes to viewing time, led to the addition of realism as a decision factor.

Short-term affect (see Figure 21) in Model 2 is portrayed as a variety of possible affective responses, both negative and positive. Negative and/or positive affect may result spontaneously in response to the stimulus, and a combination of both negative and positive affects may interact to form more complex emotional states, as described by theorists like Arnold (1960) and Plutchik (1980). Such interaction is indicated by the double-headed arrow leading between negative and positive affect in Figure 21. Examples of negative and positive affect listed in Figure 21 are the main examples emerging from the interviews with the practitioner participants. The interviews also indicated that emotional responses from visitors often stem from either a frustration or a satisfaction of an expectation. This is consistent with many motivation theories like Berlyne's (1960) and White's (1959) which describe a process whereby the satisfaction of motivations leads to positive affect. For example, the satisfaction of curiosity is pleasurable, and the satisfaction of effectence motivation leads to a feeling of efficacy (the "I did it!" factor described by one of the practitioner participants).

Figure 21 also shows how positive affect can lead into a flow experience (Csikszentmihalyi, 1975), which may ultimately lead to a peak experience (Maslow, 1962), as was suggested by Model 1. The one emotion variable included in Model 1, emotional range, is retained in Model 2 as a factor influencing short-term affect.

The factors influencing creative behavior in Model 2 are the same as the creativity variables of Model 1. These are shown in Figure 22.
Figure 21. Detailed view of short-term affect for Model 2. Short-term affect may occur directly upon exposure to the stimulus, or as a result of either the satisfaction or frustration of the learner's motivations. The learner may bring these motivations into the experience, or the motivations may be stimulated during the experience. Positive and negative affect may interact to form more complex emotions. Positive affect may lead to a state of flow, or ultimately to a peak experience.
Figure 22. Detailed view of creativity factors for Model 2.

Figure 23. Detailed view of long-term affect, which is hypothesized to lead to various forms of motivation.
The long-term affect block of Model 2 is very similar to that of Model 1. In addition to sentiments, attitudes, values, and commitment, interests was added to the list of long-term affects which may develop from or be augmented by affective experiences in nonformal educational settings (see Figure 23). This change was made because of the emerging view from the practitioner interviews that interest is a more sustained desire for knowledge which may be preceded by a shorter-term curiosity. These examples of long-term affect are seen as being motivational forces, indicated by the arrow leading to the box labeled motivation. Motivation, by definition, is the set of variables which control behavior (English & English, 1958).

Results from the Member Checks

The purpose of the second mailing to members of both strata of participants was to carry out a form of member checks. Eight of fourteen participants returned comments. The eight respondents consisted of two members of the researcher stratum and six members of the participant stratum.

Both researcher respondents commented that Model 2 was much improved presentation-wise, being easier to follow and understand. One indicated that even further simplification might be desirable. Another commented that the table describing the theoretical contributions to the Model was a helpful addition.

One of the researcher respondents asked a number of thoughtful questions about the factors and affect blocks in Model 2. Most of the items mentioned by this individual are accounted for in Model 2. However, the
posing of the questions suggested that a better narrative explanation of the Model in action might be needed. One of these questions asked if “anticipation, readiness to learn or experience, and memory of previous similar experiences” might also be appropriately included as attraction factors. Further reading of Berlyne’s (1960) treatment of selective attention revealed that motivational state, an umbrella term which could be said to encompass anticipation and readiness to learn, should be included as an internal attraction factor. Other attributes of stimulus factors which could be included as attraction factors were also unearthed during this most recent reading of Berlyne (1960). Memory of previous similar experiences fits into the category of experience and learning, included as both a percept formation factor and a decision factor.

Comments from the six practitioner respondents were largely confirmatory of the summaries of findings from the interviews and/or field observations. One respondent asked of Figure 21, “Does negative affect really flow directly to positive without going back to motivation?” indicating that the purpose (to show interaction) of the double-headed arrow running between the two was not entirely clear.

Another practitioner respondent has familiarity with museum education literature and suggested some new references pertinent to the model. This person concentrated comments on the role of the factors of novelty, prior knowledge, and relevance to the visitor’s life in the nonformal educational experience. The individual feels these are perhaps some of the the most important factors to the museum experience. All of these factors are accounted for in Model 2, although the difference in terminology used may have masked this for this respondent. For example, novelty is a
collative variable, prior knowledge is a subset of experience and education, and relevance to the visitor's life is equivalent to felt involvement with the stimulus. This individual also suggested restricting cognition to "holding" behavior, and also questioned whether "holding" behavior actually influenced cognition: "If they [the learner] view and reject the exhibit, have they learned?" Upon consideration of these questions, this researcher decided that cognition is more appropriately represented as is in Model 2. Cognition occurs during all consciousness, and, as one of the researcher participants suggested in response to the first mailing, probably interacts with affect during all conscious experiences. This would include experiences within or beyond the nonformal setting. Also, rejection of an exhibit would indicate at least some level of thinking or reasoning, even if it is not in the direction desired by the exhibit designer.

Another of the practitioner respondents suggested some minor additions to Table 9, none of which impact the design of Model 2. This individual did comment that Figure 17, the main sequence of Model 2, is difficult to follow, and asked if there was anyway to simplify or clarify it. This is addressed in the discussion of the refinement of Model 2 below.

Another practitioner questioned two findings from the interview summary. These were (a) that visitors may be attracted to program offerings in which they will have an opportunity to be outdoors, and (b) that experiences involving animals are among the most enjoyable. Both of these findings came primarily from answers of the naturalists on the practitioner panel. The individual questioning these findings asserted that being outdoors or involving animals does not make an experience more attractive, interesting, or enjoyable. Rather it is the nature of the experience
itself that determines this. The criticism does point out a possible bias of individuals working in outdoor settings for outdoor and wildlife related activities. On the other hand, observations made by the researcher in zoo settings suggested that visitors seem to desire interaction and communication with animals. It is possible that humans perceive live animals as possessing more interaction potential than non-living stimuli with which they might interact. Another suggestion made by this individual was the addition of “big graphics” to the list of attraction factors, and “boredom” to the list of negative affect examples.

Overall, the questions and comments offered in the member checks indicated that, although a glossary of terms accompanied the model, the terminology used in the model was not always understood by the readers. If the model is to be useful to other professionals in the field, it might be advisable to make it more self-explanatory, or “user-friendly.”

Refinement of Model 2: Final Model

Revisions made to Model 2 consisted primarily of further simplifying its presentation and making it more self-explanatory. In the main sequence of the Final Model (see Figure 24), the perception block was reduced in size and the components pulled off to a detail diagram (see Figure 25), as were the factors influencing these components. The term attracting was retained in quotes in the perception block because it is the element of perception probably most familiar to nonformal educators and professionals. The factors influencing action decision were also pulled off onto a detail diagram (see Figure 26). The “holding” behavior block was also reduced in size and its components pulled off onto a detail diagram (see Figure 27).
Figure 24. Main view of the Final Model.
Figure 25. Detailed view of the perception process and the factors which influence it for the Final Model.
Decision Factors

- **Internal**
  - Age
  - Degree of felt relevance of the stimulus
  - Emotional state
  - Emotional responsiveness
  - Experience, knowledge, and intellect
  - Gender
  - Innnate curiosity
  - "Long-term affective dispositions"
  - Motivational state
  - Need for stimulation

- **External**
  - Aesthetics (coherence, color, familiarity, mystery, texture, uniformity in variety)
  - Curiosity factors: Collative variables (novelty, complexity, surprisingness, etc.)
  - Clarity and level-appropriateness of message
  - Modeling (imitating behavior of others)
  - Potential for manipulation, participation, or interaction
  - Realism
  - Reward value of stimulus

*See Table 11 for examples of these factors.*

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**Figure 26.** Detailed view of the action decision block and factors influencing it in the Final Model.
Figure 27. Detailed view of "holding" behavior block and factors which influence creative behavior in the Final Model.

Figure 28. Detailed view of long-term affect for Final Model.
An element labeled "Mental picture" of stimulus (percept) was added, following from the perception block, to indicate that it is the percept of the stimulus that is decided upon in the action decision, not the stimulus itself.

In the detail diagrams (see Figures 25, 26, 27, 28), the shape for the factor blocks was changed to better accommodate enclosed text. The term external, used in Model 1, was returned to in lieu of attributes of the stimulus, the former seeming more "user friendly" than the latter. Bullets were added to each individual factor in the lists of factors for improved readability. Explanatory notes for various factors and elements of the model were added in parentheses to make the model more understandable. Expanded lists of examples of certain factors are also shown in Table 11 for this purpose. Factors were listed in alphabetical order so that the order of listing does not indicate any order of importance. Within all of the factor blocks, similar terms were standardized for consistency and improved ease of understanding. For example, rather than using motivation in one block and motivational state in another, motivational state was used in all factor blocks for which motivational forces are a factor.

Figure 25 is the detailed view of the perception process for the final model. As was discussed above, motivational state was added as an internal attraction factor as a result of the comment from one of the researcher participants during the member checks. For the external attraction factors, size was added to the list of physical characteristics of the stimulus (color, intensity, motion, sound) because of a comment from one of the practitioner participants in the member checks (see above). Review of the data from the interviews revealed that size as an attractor was mentioned by more than one practitioner, and Patterson and Bitgood (1988)
also mention it as a factor contributing to selective attention. Additionally, further reading of Berlyne (1960) led to the conclusion that reward value of the stimulus would be an appropriate inclusion in attraction factors. It was included as affective value in the attention variables of model 1. A paper suggested for reading by a participant during the member checks led to the addition of sensory mode as an external attraction factor. Davidson, Heald, and Hein (1991) tracked visitor patterns through a renovated gallery in a science museum and found that children made choices for interaction based on preferred modes of sensory input. Berlyne (1960) also suggests that some forms of sensory modes may be preferred to others, and that the preferred sensory modes may increase the likelihood of attraction.

Also in Figure 25, the less technical term mental picture was substituted for percept. In the “mental picture” factors block, physical and sensory limitations was omitted from the list of “mental picture” factors. Physical and sensory limitations refers to the general state and completeness of the nervous system (Leeper, 1963). Leeper explains this influence with evidence from experiments with cortical injuries in rats. While this factor may indeed play a role in formation of percept, the evidence given for it in the literature is obscure in terms of applicability to the general audience of learners in nonformal educational settings. Furthermore, sensory capabilities is already shown in the Model as an influence in the sensing portion of the perception process. For these reasons, physical and sensory limitations was omitted as a “mental picture” formation factors. Continued exposure to stimulus refers to the phenomenon by which perception of quantities within a stimulus can be improved with prolonged exposure to the stimulus (Leeper, 1963).
Accordingly, this factor seemed more appropriate as an external factor labeled *Length of time of exposure to stimulus*.

Figure 26 is the detailed view of the action decision block, showing short-term affect and the decision factors. The lone factor block of emotional range was renamed *emotional responsiveness* to clarify its meaning, and added to the list of internal decision factors to simplify the presentation of this figure. Also for clarity, felt involvement was renamed *felt relevance*. For the external factors, those factors contributing mainly to aesthetic enjoyment were grouped together as *aesthetics*. Similarly, the collative variables were identified as *Curiosity factors*. Social factors from Model 2 was renamed *Social setting* and changed from an internal to an external factor. Although social grouping undoubtedly has internal elements, the social setting the learner is in is essentially an external factor, which affects the learner internally through the dynamic of the action decision. Extended examples of certain decision factors are shown in Table 11.

In Model 2, *interests* was included as a decision factor (see Figure 20). Interests are a form of long-term affect, which is proposed in both Model 1 and Model 2 to influence patterns of behavior (see Figure 23). Arnold (1960) suggests that the "residual effects of emotion" include a "constancy of perception and appraisal" (p. 182) and attitudes. Thus, Arnold claims that residual emotions influence perception and appraisal. It appears that interest is not the only long-term affective disposition which may influence the perception and action decision processes of the Model. For this reason, *Long-term affective dispositions* was added as a "mental picture" factor and as a decision factor in the Final Model. Examples of
Table 11. Examples of some attraction, "mental picture," and decision factors in the Final Model.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience, knowledge, and intellect</td>
<td>• Hobbies, • Intellectual capacities, • Level of education, • Occupation, • Past experience, • Place of residence (rural, suburban, or urban), • Prior knowledge, • Social and cultural background, • Socioeconomic status, • Stage of family life-cycle, etc.</td>
</tr>
<tr>
<td>Long-term affective dispositions</td>
<td>• Attitudes (toward concepts associated with the stimulus, the sponsoring organization, learning and leisure in general, etc.), • Enduring motivational dispositions such as motivation to achieve, etc., • Interests, • Sentiments, • Values and commitments, etc.</td>
</tr>
<tr>
<td>Motivational state</td>
<td>• Aesthetic motivations, • Anticipation or readiness to learn, • Curiosity, • Desire for social interactions, • Physical motivations like hunger and thirst, etc.</td>
</tr>
<tr>
<td>Reward value of stimulus</td>
<td>• Degree to which the stimulus can be expected to satisfy motivations, whether intrinsic (curiosity, manipulation, aesthetic, social, need for stimulation/relief of boredom, etc.) or extrinsic (recognition of achievement by peers, satisfaction of others' expectations, etc.).</td>
</tr>
</tbody>
</table>
such long-term affective dispositions are given in Table 11.

Another paper suggested for reading by a participant during the member checks led to the addition of another decision factor. Kubota and Olstad (1991) found gender differences in exploratory behavior among sixth-grade students at a science museum. This piece of evidence from the literature is supported by the field research data from an interview respondent who mentioned evidence of some gender differences in interest as indicated by survey data from his facility.

Also in Figure 26, the word examples was underlined in the negative affect, motivation, and positive affect blocks to clarify that these are not comprehensive lists. The interplay between negative and positive affect is now explained with a short piece of text to clarify the meaning of the double-headed arrow between the two. A double-headed arrow was also added to indicate a two-way relationship between positive affect and flow. Since flow is both a form of behavior and a subjective experience, it may be an initiator as well as a result of positive affect.

Figure 27, detailed view of “holding” behavior and the creativity factors, and Figure 28, detailed view of long-term affect, remained unchanged in the revision, except for the general types of changes already outlined above.
CHAPTER V

DISCUSSION AND CONCLUSIONS

Discussion

This study sought to answer the question: How does affect occur among learners in nonformal educational settings, and what are some possible effects for the learner of the affect stimulated in such settings? To this end, a heuristic model of affective processes as they may occur in nonformal educational settings was synthesized. The Model was synthesized from the scholarly literature of a number of pertinent disciplines, and was evaluated and revised through a period of field research. What remains is to use the Model to
(a) describe the affective process(es) in nonformal educational settings and
(b) make recommendations for standards for practice and further research in the area of affective learning in nonformal educational settings.

Such will be the purpose of this chapter.

Description of the Affective Process

According to the Model synthesized in this study (see Figures 24-28), a learner enters the nonformal educational setting with pre-held motivations, affective dispositions, personal characteristics, and so forth.

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Motivations to enter into the experience will be highly variable. The nonformal learner engaging in the experience as a form of leisure will generally be motivated by intrinsic forms of motivation, such as personal interests, or achievement or social motivations. Other nonformal learners may enter into the experience with an organized group, such as a scout troop or church group. These learners may hold intrinsic motivations, but may also be motivated by extrinsic factors like the expectations of group leaders or other group members. Yet another possibility is the formal learner engaging in a field trip away from the formal school setting. While formal learners may be intrinsically motivated by personal interests or by the novelty or complexity of the nonformal setting, they will tend to respond to the expectations and directions of the instructor who is responsible for sanctioning the occurrence of learning. Thus, a learner may enter the nonformal educational setting for specific or prescribed activities, or may be open to whatever experiences may occur during the visit.

The nonformal educational setting will comprise a stimulus field of myriad stimuli impinging on the learner's sensory organs. It may be a gallery in a museum, a forest surrounding a nature trail, or any one of a variety of possible nonformal settings. The learner scans the stimulus field with the sense organs, which begins the process of becoming aware of the available stimuli (see Figure 25). Any limitations in the learner's sensory capabilities will obviously affect this process. According to internal and external attraction factors, the learner may be attracted to a specific part of the stimulus field (an exhibit, lecturer, interpreter, sign, animal, etc.). The attraction generally begins with an orienting response, such as a turning of the head or physical movement toward something, which serves to align the
sense organs in the direction of the attracting stimulus. The attraction is completed by selective attention, which focuses the learner's awareness on the attracting stimulus and "tunes out" other competing stimuli. Once selective attention is focused on a particular stimulus, the learner forms a "mental picture" (percept) of the stimulus. The percept is shaped by internal and external "mental picture" factors and may be different for every learner. It is the percept, rather than the actual stimulus, that the learner will respond to during the rest of the experience.

Once the learner has formed a percept of the attracting stimulus, an action decision can be made. The action decision will depend on the short-term affect aroused by the percept, the cognitive evaluation or appraisal the learner makes of the percept, or, most likely, an interaction between the two. Internal and external decision factors, such as pre-held knowledge, experience, and motivations, will influence this interaction, and thus the decision that is made for action (see Figure 26). At this point the learner may express aspects of his or her cognitive activity through verbal and/or nonverbal communication, and is likely to express affect through facial expressions, body postures, and verbalizations (see Figure 24). The main actions the learner is likely to choose between are changing the stimulus field, focusing attention on another part of the stimulus field, and engaging in "holding" behavior.

If the learner decides that this stimulus, or more accurately the percept, is not worthy of further attention, he or she may go back to scanning the stimulus field for alternatives (see Figure 24). If this cycle continues and no acceptable percepts are formed, the learner may decide to change to a completely new stimulus field. Alternatively, a percept may
lead to an action decision for "holding" behavior, so named because it will hold the learner's attention beyond the initial attraction.

"Holding" behavior (see Figure 27) will start with exploration: observing, reading, interacting, and so on. Exploration may lead to play and creative behavior. The creativity factors describe the internal and external climate that is favorable for creative behavior. Holding behavior will bring the learner into sensory contact with smaller portions of the stimulus being focused on, and will thus lead to the formation of more percepts, and consequently more action decisions. Cognitive evaluations and short-term affective reactions will continue to evolve as the "holding" behavior continues, until the learner decides to focus on another part of the stimulus field or change to a new one.

The possibilities for short-term affective responses (see Figure 26) are essentially infinite, although some will probably be more prevalent in the nonformal educational setting than others. Depending on the decision factors present and the learner's cognitions at the time, various forms of motivation may be aroused. Generally, the satisfaction of these motivations, or of the preexisting motivations the learner held upon entering the experience, will lead to positive affect, and the frustration of them will lead to negative affect. The quality of the affect will play an important part in the action decision. For example, negative affect may lead the learner to avoid any further contact with the stimulus, or may motivate him or her to continue contact with the stimulus to overcome the frustration associated with it. Positive affect may reinforce continued contact, or may be consummatory in nature so that the learner is sufficiently satisfied to move on to another stimulus. Positive affect may also lead to a flow experience
(Csikszentmihalyi, 1975), which in turn may contribute to the continuation or augmentation of positive affect. Flow or positive affect may lead to a peak experience (Maslow, 1970).

According to the associative network theory (Bower, 1981), the cognitions and affect acquired together will be stored together in memory, so that the cognitive material will be recalled more easily in the future when the learner is in a similar affective state. This is one long-term effect the affect experienced in the nonformal educational setting may have on the learner. The model also proposes that the short-term affect experienced in the nonformal setting may initiate or reinforce long-term affect, such as sentiments, attitudes, interests, values, and commitment (see Figure 28). These forms of long-term affect should serve as the motivation for extended patterns of behavior.

Further Description: Scenarios of the Model in Action

The Model represents possibilities for an infinite number of scenarios for learner responses in the nonformal educational setting. Perhaps the best way to illustrate the Model in action is to provide a narrative description of a few such scenarios. The basis of each of the following hypothetical scenarios was drawn from experiences described by some of the practitioner participants or noted in the observations during the field research component of the study. The actual descriptions or observations provided skeletons around which to build the scenarios, but the details of each as they describe the Model in action are purely hypothetical.
Scenario 1: Jimmy Creates a Dinosaur Story

Nine year-old Jimmy has been touring the museum with his parents and two younger sisters since before lunch. Having just finished lunch in the museum restaurant, the family is ready to see the Dinosaur Exploration area, which is designed especially to appeal to children. They enter the area, which features brightly colored signage asking “what if” types of questions, sounds of dinosaurs roaring in the distance, and lots of things that kids can touch and play with. Jimmy, like most children his age, really likes dinosaurs and is quite excited to be here. He looks around the room (the stimulus field), taking in with his eyes and ears everything that he can take in. Jimmy has been sticking close to his family all morning, and he would really like some time to do some neat stuff on his own. (His motivational state is such that he is looking for some independent play opportunities.)

As he is looking around, Jimmy spies a kid-size alcove just ahead and to the right of the path that winds through the area. This is the only little alcove in the area (it is novel and incongruous with the rest of the stimulus field), and Jimmy fixes his eyes on it and stops looking around at everything else. (His attention is attracted to the alcove.) Inside the alcove, which looks like a little cave, are several small, colorful, rubber dinosaurs. As Jimmy looks at the alcove, he instantaneously sizes it up (forms a percept) as an opportunity to play by himself with the dinosaurs, which are extremely “cool” (interesting to Jimmy).

Jimmy now has a decision to make. He is drawn to the alcove and really wants to pick up and play with the dinosaurs. (He is motivated to play with and manipulate the figurines.) On the other hand, he knows his
parents prefer that he and his sisters don't touch things without asking them first, and that they want the family to stay together in the museum. He decides that playing with the dinosaurs would be so much fun (the reward value is high) that he will risk his parents’ reaction. Jimmy runs to the alcove and begins playing with the dinosaurs.

Jimmy’s mom and dad tell him that the family is going to go to the Dinosaur Dig and that he should come along. He asks them to let him stay and play awhile, and after a short period of considering the matter, they consent. The parents and two sisters move along toward the Dinosaur Dig, while Jimmy continues to play.

As Jimmy manipulates the dinosaur figurines, he feels the tactile stimulation of the spines on their backs, their teeth, etc. (He explores the stimulus further in a sensory mode, and for short periods of time his attention is focused on specific parts of the figurines, etc.) He begins making roaring noises for them and staging battles between them. As he continues to play, each dinosaur takes on its own personality in Jimmy’s imagination. (His percept continues to evolve.)

Jimmy is having fun (enjoyment, or positive affect). As he continues to enjoy the play, he is making momentary decisions to continue the play because it is still fun. Although he doesn’t know it, he is experiencing flow.

Jimmy is now making up a story in his mind of what is happening in the battle between the dinosaurs. He is engaging in creative behavior, which further feeds the flow experience.

Jimmy continues to play and create for several minutes, until his attention is attracted away from his activity by the familiar voice of his mother calling his name. (There is a change in the stimulus field, i.e. the
sound of his mother's voice. Her use of his name serves as an indicating stimulus, and the fact that he is typically motivated/conditioned to pay attention to his mother cues him to focus his attention in her direction.) Since mom is insisting that Jimmy rejoin the family, he makes the decision to discontinue his play and do as his mother asks. He leaves somewhat resentfully (negative affect) because his play has been frustrated.

Scenario 2: Mary Holds a Chick

Mary is a Girl Scout taking part in a science camp experience at the Science Museum. She and her group are in the Biology Lab, and a staff member is helping them learn about baby chicks. The staff member is holding a chick, demonstrating the proper way of handling it and talking to the girls as he demonstrates. Now the girls are going to get the opportunity to take turns holding a chick themselves.

Mary is the first to get to hold a chick. Mary lives in the inner city and has never seen a chick before. As the staff member carefully hands her the chick, she experiences the tactile sensation of the softness of the chick and the auditory sensation of its peeping sounds. Her attention is focused intently on the chick as she very carefully tries to hold it the correct way (her motivational state). This is an entirely new experience for Mary. As she continues to handle the chick, its smallness and softness helps her to form a mental picture of the chick as a young, helpless, fragile animal.

Mary experiences a number of feelings as she holds the chick. This is a completely novel experience for her, which has aroused her curiosity. She finds the softness and smallness of the chick aesthetically pleasing, and she is motivated to be successful in handling the chick properly. As she
continues to hold the chick, her curiosity about what the chick is like begins
to be satisfied. She begins to feel pride and confidence in the knowledge
that she is doing a good job handling the animal. Without realizing it, she is
making momentary decisions to continue engaging in the exploratory
behavior of holding the chick.

After a minute or two, Mary has gained enough confidence to explore
a little further with the chick, and she decides to gently and carefully turn it
over in her hand. As she does so, she lets out a shriek of surprise and
startle, exclaiming, “It only has two legs!” Mary’s lack of experience with
chicks has left her unprepared for the discovery that it is a two-legged
animal instead of a four-legged animal like the dogs and cats that run
through her neighborhood. Her affective reaction to this discovery is
positive; an extreme state of excitement at the discovery of something so
new. Mary has experienced a peak experience which will be quite
memorable for her in the long-term.

Scenario 3: John’s Fear of Bees

John, a 35 year-old resident of a suburb of a large midwestern city,
has been invited by a friend to spend the afternoon at the nearby state park.
After walking the trails for an hour or so, the two decide to stop in the nature
center to see what it has to offer. As they enter the one-room exhibit area of
the nature center, John begins looking around the room to see what is
there. (He scans the room with his eyes.) There is a beehive on display in
the corner of the room. John was stung repeatedly by a nest of yellow
jackets as a small child and has an extreme fear of bees. (He has a
continual motivational state to avoid bees.)
The motion and buzzing sounds within the beehive, in conjunction with his fear of bees, causes John's attention to be drawn immediately to the beehive. He instantaneously tunes out every other stimulus in the room and can think of nothing else but the hive. He recognizes the visual patterns of bees moving in the hive. He has formed a mental picture of this particular stimulus as a beehive full of live, buzzing, threatening bees.

John immediately evaluates the nature center as a place that represents a threat to him, and experiences extreme fear. He expresses his fear by yelling, and makes an instantaneous decision to run out of the nature center (change the stimulus field). John's memory of the nature center is now linked with his extreme fear of bees, and he may be unlikely to return to this particular facility, or perhaps even similar facilities, again.

**Scenario 4: Jill Explores a Wetland**

Jill is an eight year-old girl who is attending a Junior Ecologist program on wetlands at the county park. The naturalist has given a preparatory talk and demonstration of a model of a wetland, and now it is time to see the real wetland. The naturalist leads the group down the trail until they come upon the marsh. The group knows their purpose was to see and experience the marsh, which is novel for most of them, and most are curious to do so. (They have a motivational state that will help focus their attention on the marsh.) The naturalist points to the marsh and makes some explanatory comments about it. (He uses indicating stimuli to further focus the group's attention.)

Jill is a naturally curious child, and seems to have a natural tendency to seek out new and different experiences. (She has a high need for
stimulation.) Her parents have also encouraged these tendencies in her. Jill willingly takes in the sights, sounds, and smells of the marsh. She forms a mental picture of the marsh as a warm and inviting stimulus.

The naturalist indicates that the members of the group may voluntarily take off their shoes and socks and walk into the marsh now. Jill watches as the naturalist wades into the marsh (modeling). She sees the marsh as warm and inviting, and makes the decision that this would be a neat thing to do. She walks down into the marsh, sensing the warmth of the mud as it squishes between her toes. She is not at all bothered by getting wet and dirty. (The sensory input is satisfying her need for stimulation and her curiosity about what the marsh is like.) Jill expresses her delight in the experience to the naturalist: "It's so warm and gushy!" The softness and warmth of the marsh is so pleasing to Jill that she is not ready to leave as the program comes to an end.

**Scenario 5: Sue Does Not Like Mars**

Sue is an 14 year-old on a visit to the Science Museum with her church youth group. Sue's leader has scheduled a session for the group at a new exhibit called Blastoff to Mars. The exhibit is a simulation of a space mission to Mars. During the simulation session, different members of the group are assigned different roles to play on the space mission. Sue is assigned a role, and the staff person seats her in front of an instrument panel. (He serves as an indicating stimulus to direct her attention.) Sue's attention is now focused on the instrument panel. For one thing, she has a tendency to fear technical things and is apprehensive about what she will have to do. (Her motivational state is such that she wants to try to figure out
the instrument panel ahead of time.) Plus, the instrument panel is right in front of her. (It is proximate, and thus outcompetes other stimuli for her attention.) Sue forms a mental picture of the instrument panel as a complicated, mechanical apparatus.

The simulation begins, and the staff person gives directions to various students as they progress through the simulation. Sue is trying to follow directions, but she is not sure she understands what she is being asked to do. She experiences feelings of confusion, which lead to a sense of incompetence. Sue evaluates the situation as being very unfavorable for her. She would like to escape the situation, but she has been asked to play a role in the simulation and does not think she has the option to leave. The other group members might think she is stupid if she doesn't fulfill the mission (a social motivation). Sue finally gives up on being able to figure out her role, and her feelings give way to despair. The staff person notices she is near tears, and compassionately attempts to work with her, but Sue has decided she would much rather return to Earth. Sue's feelings of despair and incompetence have reinforced her discomfort with technology. Without the intervention of more positive experiences, she may be even more inclined to avoid dealing with science and technology in the future.

Strengths and Limitations of the Model

Other researchers have also made descriptions of the experience(s) which occur in the nonformal educational setting. A summary of the museum experience made by Falk et al. (1986) may be broken down into the following steps:
1. Visitors arrive at the museum with an appropriate “learning set,” meaning they perceive the museum “as possessing interesting, stimulating, and important ideas/things that are worth seeing/learning about” (p. 506).

2. Based upon a combination of the visitors’ predetermined agendas, exhibit design features, and random architectural factors, visitors are “attracted” to certain exhibits.

3. Once attracted, visitors will spend varying amounts of time looking at or interacting with the exhibit. The amount of time their attention is held depends on factors such as visitor interest, experiences, and expectations; exhibit design features; and architectural factors.

4. Cognitive learning is likely to occur at the exhibit if the visitor spends a “significant” amount of time engaged in appropriate behavior for the exhibit” (p. 506). Exhibits will also be remembered both affectively and psychomotorically.

This description does in brief what the Model synthesized herein does in detail. The model identifies the major “predetermined visitor agendas,...exhibit design features and random architectural factors” (Falk et al., 1986, p. 506) that contribute to attracting and holding power, and depicts the events that result in affective responses and experiences in the nonformal educational setting. The Model also suggests possible long-term benefits of affective experiences in nonformal settings.

Miles and Tout (1979) sum up the ambiguity inherent in the study of human behavior in nonformal educational settings in the following quote:

The body of objective knowledge making up museum technology cannot be regarded as a set of laws which permits the prediction of the future state of a fully deterministic system. People visit museums for many different reasons (Morris 1962; Alt 1977, pp. 254-255) and there is no means of telling what knowledge or interest any given
visitor will bring to bear on the exhibits, how he [sic] will interact with other people in the museum, or how he will be influenced by his expectations of the visit. In short, the number of stimuli to which visitors might respond and the degree to which the response can vary from one individual to another are so great, that it would be a hopeless task to predict the behaviour of a particular visitor.

The Model developed in this study is an attempt to reflect these complexities of learner behavior in the nonformal educational setting.

Miles and Tout (1979) imply that there is a tendency for some visitor behavior researchers to believe that human behaviors are "fundamentally responses to external stimuli." They further caution, "This leads to the questionable conclusion that the visitor's behaviour can be determined completely by controlling the conditions" (p. 214). Indeed, two museum personnel interviewed during the field research component of this study said that visitors act very similarly in the museum setting. One reason given was the "crowd factor." The respondent added, "It's easier to manage 600 people in a museum than it is to manage three kids in a classroom."

While it is undoubtedly true that the "crowd factor" influences certain aspects of visitor behavior, possibly because of the modeling phenomenon (Bandura, 1974) (cited in Bell et al.,1978), it is also undoubtedly true that visitors display great variability in their responses to stimuli in the nonformal setting. As Falk et al. (1986) say of their description of the museum experience, "...it is only mostly true, most of the time" (p. 506).

The Model developed here identifies as many as possible of the "factors" which contribute to the variability of visitor responses in nonformal educational settings and identifies the stages of response where these factors are likely to exert their influence. As such, the Model is a more
detailed, comprehensive, and possibly "realistic" description of visitor affective response than has been offered by most previous work. The flexibility of the Model in this type of description is demonstrated in the five scenarios of the Model in action presented earlier in this chapter.

The Model provides for rich detail and description of visitor response because it breaks phenomena down into what might be termed small "subphenomena." For example, the perception phenomenon is broken down into sensing, attracting, and formation of the percept. Perception itself might be considered a subphenomenon of the overall affective process. While this type of organizational scheme permits detailed study of the subphenomena, and thus of the overall phenomena, it is also artificial. It is similar to breaking the continual and dynamic process of cell division into five discrete phases. When does one phase end and the next begin? The answer has no bearing on the healthy functioning of the cell and is useful only so far as it promotes increased and useful understanding of the process by humans.

The caution must be made that the overall affective process is part of the whole of human functioning. Consequently, the artificial partitioning of such a process surely introduces potential for misunderstanding of the process at the same time that it promotes a better understanding of it. It is also reasonable to ask whether such a partitioning can accurately be made. The overlap and similarities between the attraction, mental picture, and decision factors of the Model certainly reflect the difficulty of doing so. As Arnold (1960) observes, it may be "all but impossible" (p. 177) to distinguish between the processes of perception, appraisal, and emotion.
As was stressed in the first chapter of this report, the Model developed in this study is heuristic and represents a working hypothesis of the affective process in nonformal educational settings. No empirical tests were performed to "verify" any parts of the Model. Since it is hoped that the model will be useful to other professionals in the field of nonformal education, the input of a purposeful sample of these professionals was sought during the building of the model. The conceptualizations that these participants hold of the realities related to the population of interest were considered in the reformulation of the hypothesis, as were first hand observations of the phenomena of interest made by the researcher.

Recommendations for Standards for Practice

Because of the heuristic nature of the Model developed in this study, any recommendations for practice based upon the Model must be considered somewhat tentative. Yet the Model was developed from much empirical data as well as theoretical perspectives in the literature. Also, certain patterns emerged quite strongly during the field research component of the study. Thus, some limited recommendations for practice, follow.

Visitors Respond to Percepts

A very general, yet important, recommendation which can be made is that nonformal educators always keep in mind that the learners at their facilities respond to percepts, not to stimuli. That is, the learner will form an individualized mental picture of the exhibit or program, and it is to this mental picture that the learner responds. Differences in sensory
capabilities and preferences for certain sensory modes will affect the formation of this mental picture. Providing multiple modes for sensory exploration may enhance the process of percept formation for visitors (Davidson et al., 1991).

The other internal and external attraction and "mental picture" factors will also influence percept formation. While some of these factors, such as motivational state, cannot be controlled, nonformal educators should strive for the optimum configuration of the factors which can be controlled in their facilities. Experienced nonformal educators may be well aware of such factors as the need to provide variety to guard against habituation, satiation, and fatigue, but may be less sensitive to other "mental picture" factors. For example, if different cultures ascribe different meanings to certain applications of specific color schemes, such pre-held meanings will influence their perceptions of stimuli.

Know Your Audience

"Know your audience" is a common sense piece of advice that has long been given to communicators, including nonformal educators (Lewis, 1986). What are the most important things nonformal educators should know about their audiences? Many nonformal facilities collect numerical and demographic data on their visitorship. Such data are useful for predicting social groupings and age brackets of visitors, but do little else to elucidate the motivations visitors bring with them to the nonformal setting. The Model developed here would suggest that motivational state is crucial to every stage of the affective process, and the satisfaction or frustration of the visitor's motivation(s) is a main determinant of the quality of that affective
Because of practical considerations, nonformal educators may find themselves lumping visitors into a few broad categories. As Miles and Tout (1979) put it, "The only practicable possibility is of making predictions concerning populations, not individuals" (p. 214). A respondent from the field research interviews, while acknowledging differences in visitors, admitted, "if the differences are there, we design for the average, the mean, the norm." The problem therefore lies in identifying the norm, if there is a norm to identify. There may in fact be several categories of the norm that could be targeted for the purpose of program structuring. Housen (1980) has identified five main categories of visitors who frequent art museums: the egoistic realist, the utilitarian viewer, the viewer who sees the work of art as a statement by the artist, the viewer who responds to the work in an individualistic and symbolic fashion, and the viewer who sees the work as significant in its own right. Housen suggests that specific types of programming be designed for each visitor type. Such an approach would go far to enhance the experiences of visitors who do not currently fit "the norm."

What level of information is needed to determine the motivations of learners in nonformal educational settings? It is possible that some motivations may hide within other motivations. For example, in a study of American birdwatchers, Kellert (1985) determined that the majority of "casual" birdwatchers engage in the activity to satisfy an aesthetic motivation while the majority of "committed" birdwatchers engage in the activity because of a fascination with birds. Thus, determining that visitors come to a facility for birdwatching may not get at their underlying
motivations.

The recommendation to "know your audience" means more than knowing how many of them there are, where they live, or how much income they have. The Model would suggest that developing visitor profiles which identify the real motivations of visitors, in addition to the traditional demographic data, could help educators structure programs that would be more satisfying to larger numbers of visitors.

The Importance of Social Factors

A dominant pattern emerging from the field research component of the study was that social interactions seem to be crucial to the nonformal educational experience. Tracking family groups in a natural history museum, Falk (1991) found that these visitors allocated from 15 to 20 percent of their attention to their own social grouping and another three to eight percent to other people. The observational data collected here suggests that visitors may allocate attention to exhibits and people simultaneously, and such interaction may greatly influence the quality of their overall experience. Parent-child interactions seem to be particularly important to the affective experience. Parents appear to be highly motivated to provide a good experience for their children in these settings.

A logical recommendation growing out of these observations is that nonformal educators structure programs to provide learning experiences that maximize social interactions within groups in a meaningful way. Koran et al. (1983) report that dynamic exhibits, those that require the visitor to act on them in some way, elicit increased levels of verbal interaction among visitors. The conventional wisdom that "hands-on" learning is a preferred
mode in the nonformal educational setting may be true from the standpoint of increasing opportunities for social interactions as well as providing increased sensory modes for exploration. This is consistent with observations made in this research, especially at the Children's Museum in Indianapolis. The Museum featured highly interactive learning opportunities which fostered a high incidence of parents and children working together to solve problems, play, explore, and so on. Interestingly, many of the exhibits and learning activities were relatively "low-tech," such as puzzles, non-mechanical play equipment, and laminated learning guides.

Also observed at the Children's Museum was a large number of volunteers and staff who were integrally involved in working with family groups during the learning experiences. Staff involvement may be an aid to parents as they work with their children and may enhance the parents' feelings of competency, and thus the quality of their affective experience. Staff involvement may help with other aspects of the experience as well, such as increasing visitor comfort level with stimuli that are too novel, or simply giving the visitor a chance to share information, thus meeting both social and effectence types of motivations.

In contrast to the observations at The Children's Museum were those at some of the zoo facilities visited during the field research. At one zoo, for instance, it was observed that parents' opportunities for "teaching" their children seemed largely limited to reading the signs and telling the children the names of animals. This raised the question as to whether their experience would have been improved by some means of improved "teaching" interaction, such as a programmed learning guide, for example.
Recommendations for Research

A major objective in this study was to develop a model which could serve as a framework for further research in the area of affective learning in nonformal educational settings. Based on the findings from the field research component of the study and on the Final Model developed, a number of avenues have emerged which should be fruitful for further research. A discussion follows.

Need for Standardization of Terminology

Both in the literature and in the field research component of this study it was readily apparent that there is an ambiguity of terminology associated with affective constructs. Two prime examples are the confusion over the terms interest and curiosity and the ambiguity in the term attention. Practitioner participants in the interviews consistently used a number of terms to refer to the same types of phenomena. For example, there was little apparent discrimination between the phenomena of interest, curiosity, attention, and enjoyment until probe questions were pursued. Furthermore, the practitioners reported using essentially the same types of informal evidence to evaluate all of these affective phenomena. This would suggest that a necessary first step in pursuing more research in this area would be a clarification and standardization of terminology used to identify affective phenomena and the development of more discriminatory methods for evaluating and/or operationalizing these phenomena.
Incorporation of Physiological Evidence

As stated in Chapter 1 of this report, this study was limited by the exclusion of physiological literature dealing with the phenomenon of affect. A study surveying the physiological evidence and theory on affect, such as that coming from the field of neurophysiology, so that it might be compared and contrasted to the literature presented here would serve to further clarify understanding of affect as a construct.

Identifying the Most Important Factors

The Model enumerates attraction, mental picture, decision, and creativity factors which are hypothesized to influence various subphenomena within the affective process in nonformal educational settings. The influence of some of these factors has been demonstrated empirically, but more research is needed to support existing evidence and provide initial evidence for factors which have not been investigated. After a solid body of evidence is accumulated to confirm the influence of the various factors, research should be pursued to determine if some factors are more influential than others. For example, which of the external attraction factors is (are) most important in the attraction phase of perception? Which of the external decision factors is (are) most influential in the making of action decisions?

Enhancement of the Affective Experience

Research is needed to clarify how the affective experiences of learners in nonformal educational settings might be enhanced. As suggested by this research, the satisfaction of visitor motivations is probably
a major determinant of the affective quality of the visitor's experience. Visitor profile studies which identify the significant and operative motivations of visitors are needed to help nonformal educators set goals and objectives in their programming.

Also suggested was the significance of social interactions to the nonformal educational experience. There appears to be a strong social motivation among learners in nonformal settings. Research to develop and evaluate methods of incorporating social interactions into the learning activities in nonformal settings may prove to be valuable in enhancing affective experiences.

Another social factor which might play a role in the enhancement of affect is the communication of affect. Certain observations made during the field research component of this study suggest that learners may take affective cues from others for the experience and expression of their own affect. Perhaps this is a form of the modeling phenomenon suggested by Bandura (1974) (cited in Bell et al., 1978). Tomkins' (1962) theory also places importance on the potential of affect expressed through the face to influence affect in others. The potential for the modeling of affect as a means of enhancing the affective experience could make for an interesting line of research.

Practitioner participants interviewed during the field research suggested that large-body, immersion-type experiences, hands-on experiences, experiences involving animals, and experiences featuring "real" things tend to be the most successful affectively. This would be another question worthy of research.
Long-term Benefits of Affect in Nonformal Educational Settings

Roggenbuck et al. (1990) have articulated a need for more research on the long-term benefits of nonformal educational experiences as follows:

The "big issues" of learning, e.g., environmental sensitivity and stewardship, pride and commitment to our nation's heritage and ideals, and sense of who we are as individuals and as a people, have rarely been addressed. We need more information on whether leisure engagements foster these benefits.

Perhaps the most important, and certainly the most difficult, research need is to identify the long-term effects of affective processes in nonformal educational settings. There is some evidence to indicate that affect is long-lived. In Panzarella's (1980) analysis of aesthetic peak experiences, for example, respondents reported attribution of long-lasting, usually permanent effects to their peak experiences. These long-term effects included enduring memories which revive the experience, a lasting appreciation of the aesthetic object, increased appreciation for music and art in general, and positive changes in worldview. Lozzi (1989), in a review of the environmental education literature, reports that "Positive environmental attitudes and values, once acquired, appear to be long lasting" (p. 6).

Additional research on the long-term benefits of affective experiences in nonformal educational settings would be most useful in justifying the need for nonformal programming. Examples of important questions in this area are:

(a) Do experiences in the nonformal educational setting promote long-term memorability of the learning experience?

(b) If so, is this memorability related to the affective quality of the
experience?

(c) Do affective experiences in the nonformal educational setting build and/or reinforce long-term forms of affect, such as sentiments, attitudes, interests, values, and commitment?

These will be difficult, but important, questions to investigate. A balance of qualitative and quantitative methodology will be useful in these investigations. Open-ended interviews may shed light on these issues and help focus and structure empirical studies. Longitudinal studies of membership groups of nonformal institutions may provide useful data.

Conclusions

This study has focused on the affective processes in nonformal educational settings. An assumption on which the study was founded is that nonformal settings provide particularly strong opportunities for affective learning experiences. This should not be taken to mean that nonformal education is necessarily superior to formal education for affective development.

There are many differences between nonformal and formal education, as outlined in Chapter 2. Nonformal education offers novel experiences, collections, settings, and so on, that are typically not available in the formal setting. Nonformal education also offers opportunities for family and social interactions that formal education typically does not offer. Nonformal education features opportunities for voluntary life-long learning that are not as readily available through formal education. Nonformal education at zoos, museums, nature centers, extension workshops, adult learning centers, and so on, contribute to the life-long process of learning.
Nonformal education can provide great support to the important processes that occur in the formal setting, and improved knowledge and understanding of the nonformal learning process should serve to benefit both nonformal and formal education.
A Preliminary Model of Affect in Nonformal Educational Settings

Background

A number of research studies have indicated that, while cognitive learning does occur in nonformal educational settings, the major benefits of activities in these settings over those in formal settings lie in the affective domain (Chrouser, 1975; Flexner & Borun; 1984 Koran, 1979).

Affect is broadly defined as "a class name for feeling, emotion, mood, temperament" (English and English, 1958). Roberts (1990) has written, "The role of affective modes of knowing in learning processes remains an elusive, fragmented area of study. Not only does research cross many disciplinary boundaries, but language about affect changes from one individual to the next." Indeed, constructs which fall into the affective learning domain are notoriously difficult to measure. The situation has improved little since Krathwohl et al. (1964) noted the dearth of evaluative tools and research-based evidence on affect which motivated them to construct the Taxonomy of Educational Objectives for the affective domain.

If the strength of nonformal education is to facilitate affective learning gains, what affective goals should nonformal educators target, how can they best attain these goals, and how will the attainment of these goals benefit the learner? To answer these questions, a better understanding of affect as it relates to learning in nonformal educational settings is clearly needed.

Purpose of the Study

The purpose of the study is to develop a working model of affect as it operates in nonformal educational settings. Specific research objectives
are

1) To synthesize a model of affect in nonformal educational settings by drawing upon the research literature from pertinent scholarly disciplines (i.e. psychology, education, interpretation, museum studies and visitor behavior).

2) To scrutinize and elucidate the resulting model through field work, including consultation and interviews with expert researchers and practitioners in the field and through naturalistic observation of learners in a variety of nonformal educational settings.

3) To refine the model in light of data collected in the field and feedback solicited from experts.

4) To use the resulting model to make specific recommendations for further research and practice standards in the area of affective learning in nonformal educational settings.

Purpose of this Document

The purpose of this document is to provide an overview of the model of affect, as it may operate in nonformal educational settings, which has been synthesized by the researcher. Please make as many comments as you feel appropriate to provide feedback on the model. Feel free to write on this document, and to attach additional pages if necessary. Extra sheets of paper have been provided for this purpose.

The researcher is particularly interested in feedback on the appropriateness, completeness, and accuracy of the theoretical aspects of the model presented. Please feel free, however, to make any comments that you feel are applicable and/or important.
The Model

The model [Figure 13] was synthesized from numerous theoretical perspectives and empirical evidence found in the literature of a variety of pertinent disciplines, including education, psychology, interpretation, museum studies, visitor behavior, and leisure studies. First, perspectives which provide a broad or overarching theory on affect were combined to provide an inclusive skeleton model. This skeleton was mainly drawn from the work of Arnold (1960), Tomkins (1962), Krathwohl et al. (1964), Bull (cited in Izard, Wehmer et al., 1965), Plutchik (1980), Zajonc (1980), and Buck (1984). Next, perspectives with more narrow areas of focus were incorporated into the skeleton at points where they made the most "sense," both theoretically and intuitively. The work of investigators like Berlyne (1954, 1960, 1966, 1970, 1971), Maslow (1962), and Cziksentmihalyi (1975) was drawn from at this point, as were perspectives from the literature of creativity (Bishop and Jeanrenaud, 1980; Gerard, 1962; Michaelis, 1980; Parnes, 1962; Rogers, 1962) and play (Ellis, 1973; Singer, 1979) and the more applied perspectives coming from visitor behavior, museum studies, interpretation and leisure studies, including the work of researchers like Shettel (1968, 1973, 1976), Washburne and Wager (1972), Glaser and Cooley (1973), Screven (1974), Eason and Linn (1976), Falk et al. (1978), Miles and Tout (1979), Kaplan and Talbot (1983), Koran et al. (1983, 1984, 1986, 1988, 1989), Alt and Shaw (1984), Young and Crandall (1984), Kellert (1985), Foster et al. (1988), Patterson and Bitgood (1988), Roggenbuck et al. (1990), Busque (1991), and Beck (1993).
As can be seen from Figure [13], the model flows from a specific nonformal educational stimulus (i.e. a given exhibit, experiential element, or communication/interaction with an educator) to awareness/perception, appraisal, selective attention, short-term affect and any immediate action(s) associated with it, to long-term affect and long-term patterns of behavior associated with it. This overall flow draws from the taxonomy presented in Krathwohl et al. (1964) [Figure 2], but also incorporates the theories of Arnold (1960) [Figure 4], Plutchik (1980) [Figure 5], and Buck (1984) [Figure 7].

Short-term affect is seen as corresponding to “responding” in the taxonomy of Krathwohl et al. (1964). This short-term affect component incorporates the theories of Tomkins (1962), Bull (cited in Izard, Wehmer et al., 1965), Izard (cited in Plutchik, 1980), and Buck (1984) with regard to “affective expression,” such as facial expression and body postures, etc. Also included under short-term affect are a variety of “affective experiences” which may occur in nonformal educational settings, like interest, curiosity, and aesthetic enjoyment/pleasure (Berlyne, 1971), emotions (Arnold, 1960; Bertocci, 1988; Buck, 1984; Carr (cited in McTeer, 1972); Izard, Wehmer, et al., 1965; Krueger (cited in McTeer, 1972); Leeper, 1963; Plutchik, 1980; Russell, 1977; Titchner (cited in McTeer, 1972); Tomkins, 1962; Wundt, (cited in McTeer, 1972)), flow (Cziksentmihalyi, 1975), and Maslow’s (1962) peak experiences. “Affective behaviors” like exploration (Berlyne, 1960, 1966), play (Ellis, 1973; Singer, 1979), and creative behavior (Bishop & Jeanrenaud, 1980; Parnes, 1962; Rogers, 1962;) are also included in the short-term affect block. While it is acknowledged that these affective
experiences and behaviors may also have a cognitive component, they are classified as “affect” here because they are seen as differing substantially from strictly cognitive activities such as the learning, understanding, and processing of factual information. Note that each component in the short-term affect block can occur independently or may interact with other components as indicated by the arrows in the model. Short-term affect may lead to immediate action and behavior.

Long-term affect corresponds to “valuing,” “organization,” and “characterization by a value complex” in the taxonomy of Krathwohl et al. (1964). Included in this block are the sentiments, attitudes, values, commitments, and sense of motivation and purpose that may lead to more enduring patterns of action and behavior. Creativity, a characteristic which can be developed in individuals (Parnes, 1962; Rogers, 1962) is also included in this block.

The model assumes that short-term affect is likely to occur within the nonformal educational setting, whereas long-term affect is more likely to occur beyond this setting. Both types of affect may affect cognitive learning and recall (Izard, Nagler et al., 1965), which may occur in or beyond the nonformal educational setting. For example, Bower (1981) has demonstrated that affective congruence with mood during recall. Boyle (1983) presents evidence that negative affect may decrease learning, and Winer and Clark (1989) have shown that positive affect can enhance cognitive performance in children.
Not all theorists agree on the relationship of cognition to affect. Arnold (1960) believes that affect is preceded by a cognitive appraisal, a judgment about the stimulus as to whether it is good/beneficial, or bad/harmful. Krathwohl et al. (1964) also adhere to the view that cognition precedes affect in their description of awareness and willingness to receive [Figure 2] as cognitive activities. In Buck's (1984) model of emotion [Figure 7], the functioning of the affective system precedes that of the cognitive system. Zajonc (1980) presents experimental evidence by which he claims affect and cognition are separate systems which may or may not interact, depending on the situation. Buck and Zajonc's views, which deviate from the predominant flow of the model, are also presented in Figure [13].

A variety of internal variables within the individual and external variables of the stimulus may influence various phenomena which make up elements of the model. Such variables which have been explained in the literature are noted in Figure [13] and detailed in Figures [14,15,16].

Selected definitions for elements and variables within the model are given in [the accompanying glossary].
APPENDIX B

ORIGINAL INTERVIEW SCHEDULE FOR THE PRACTITIONER STRATUM
Practitioner Interview - Standardized Open-Ended

As you know, this interview is part of my dissertation research. I am particularly interested in the affective, the emotional/attitudinal, experiences of learners in nonformal educational settings, but don't limit your answers to the affective domain if you don't feel it's appropriate to do so. The interview should take about 45 minutes. Do you mind if I tape record the interview? Okay, let's get started.

1. First, would you describe what your main responsibilities as an interpreter (designer) here are?
   a. Describe the typical activities you perform in your job.
   b. How long have you worked here?
   c. Did you work as an interpreter (designer) before coming here?
   So you've been in this line of work for approximately ___ years?

2. What do you think are the main reasons people come to (name of facility)?
   a. (If specific activities are given) Why do you think people like to engage in those activities?

3. What kinds of opportunities or experiences, if any, can a facility like (name of facility) provide for people that they cannot find elsewhere?
   a. What do you and the rest of the staff do to try and facilitate those opportunities and experiences?
      a-1. (probe) For example, how do you structure the programs and/or exhibits to this end?
   b. What do you look for in the visitors to see if you're being successful at this?

4. In your experience, what are the characteristics of programs and/or exhibits that seem to attract peoples' attention?
a. (probe) Can you be more specific about the kinds of characteristics or qualities that attract attention?

b. Are there any differences between the ways you would attract attention and the way you would hold attention for an extended period of time? If so, please describe.

c. Can you describe any differences among people in terms of what attracts their attention, such as age differences or different personality types, for example?

5. How would you define interest?

   a. What do you do to try to stimulate interest in your programs and/or exhibits?

   b. What do you look for in people to see if you've been successful in stimulating interest?

6. How would you define curiosity?

   a. What do you do to try to stimulate curiosity in your programs and/or exhibits?

   b. What do you look for in people to see if you've been successful in stimulating curiosity?

   c. How is interest different from curiosity, if at all?

   d. How might you distinguish whether a visitor was showing interest versus curiosity in response to a program or exhibit here?

7. What techniques do you use in programs and/or exhibits to try to stimulate peoples' senses?

   a. What differences among people do you observe in terms of how they respond to these techniques?
8. What do you look for as evidence that people are enjoying, or not enjoying, their experiences here?
   a. What kinds of programs, experiences, or exhibits seem to be most enjoyable, and why do you think this is?
   b. Are there age differences, or any other kinds of differences among people that seem to affect what they find enjoyable?

9. What kinds of emotional responses, both positive and negative, do you observe in people as a result of their experiences here?
   a. Try to describe the most extreme positive and the most extreme negative emotional response you have observed in a visitor during your career.
   b. What circumstances or sequence of events seemed to lead up to these extreme emotional responses?

10. How do you think the affective experience in a facility like (name of facility) affects the way people learn? Feel free to give specific examples from your experience with visitors if you like.

11. Although you may not have much opportunity to observe this directly, what kinds of long-term effects do you believe people experience as a result of visiting facilities like (name of facility)?
   a. What kinds of feedback or evidence do you receive, if any, to indicate that these long-term effects may be occurring?

Background Questions

I have a few more questions that are designed to help me understand your background as a professional.

1. Education, etc.
APPENDIX C

REVISED INTERVIEW SCHEDULE FOR THE PRACTITIONER STRATUM
As you know, this interview is part of the research study I am carrying out for my graduate degree. I am particularly interested in the affective, or the emotional/attitudinal, experiences of learners in nonformal educational settings, but don't limit your answers to the affective domain if you don't feel it's appropriate to do so. I am asking everyone on my interview panel the same basic questions in order to gain the most information possible. If some of the questions seem a little redundant, please bear with me.

The interview should take about 45 minutes. Do you have any questions before we get started? Do you mind if I tape record the interview? Okay, let’s get started.

First, I have a few questions to help me understand your background as a professional.

1. Would you describe what your main responsibilities in your work are?
   a. (probe) Describe the typical activities you perform in your work.
   b. How long have you been in this field?
   c. Did you work anywhere else in this field before beginning your current (or most recent) position? If so, where?
   d. What is your educational background?
   e. Do you mind if I use your name in my research report? (If yes, would it be alright for me to describe your background and/or use your professional title?)

And what is your professional title?

We’re ready to start into the rest of the interview now. Since you’ve been in this field for ___ years, you may want to base your answers on your experiences from your whole career rather than just on your most current/recent experiences, and that’s fine.
2. What do you think are the main reasons people come to (name of facility)?
   
   a. (If specific activities are given) Why do you think people like to engage in those activities?

3. What kinds of opportunities or experiences can a facility like (name of facility) provide for people that they cannot find elsewhere?
   
   a. What do you and the rest of the staff do to try and facilitate those opportunities and experiences?
      
      a-1. (probe) For example, how do you structure the programs and/or exhibits to this end?
   
   b. What do you look for in the visitors to see if you’re being successful at this?
      
      b-1. (probe) Are there other, perhaps more informal, indicators that you would look for?

4. In your experience, what are the qualities or characteristics in (programs/exhibits/outdoor experiences, etc.) that seem to attract peoples’ attention?
   
   a. (probe) Can you be more specific about the kinds of characteristics or qualities that attract attention?
   
   b. Are there any differences between the ways you would attract attention and the way you would hold attention for an extended period of time? If so, please describe.
   
   c. Can you describe any differences between people in terms of what attracts their attention?
      
      c-1. For example, age differences or different personality types.
5. How would you define interest?
   a. What do you do to try to stimulate interest in your programs and/or exhibits?
   b. What do you look for in people to see if you've been successful in stimulating interest?

6. How would you define curiosity?
   a. What do you do to try to stimulate curiosity in your programs and/or exhibits?
   b. What do you look for in people to see if you've been successful in stimulating curiosity?
   c. How is interest different from curiosity?
   d. How might you distinguish whether a visitor was showing interest versus curiosity in response to a program or exhibit?

7. What techniques do you use to try to stimulate peoples' senses?
   a. What differences between people do you observe in terms of how they respond to these techniques?
   a-1. (probe) How do different people respond to these sensory stimulation experiences?

8. What do you look for as evidence that people are enjoying, or not enjoying, their experiences here?
   a. What kinds of (programs, experiences, or exhibits) seem to be most enjoyable, and why do you think this is?
   b. Are there age differences, or any other kinds of differences between people that seem to affect what they find enjoyable?

9. What kinds of emotional responses, both positive and negative, do you observe in people as a result of their experiences here?
   a. Try to describe the most extreme positive and the most extreme negative emotional response you have observed in a visitor during your
career.

b. What circumstances or sequence of events seemed to lead up to these extreme emotional responses?

10. How do you think the affective (emotional/attitudinal) experience in a facility like (name of facility) affects the way people learn factual information? Feel free to give specific examples from your experience with visitors if you like.
   a. (probe) Does it affect how well or how much they learn?

11. Although you may not have much opportunity to observe this directly, what kinds of long-term effects do you believe people experience as a result of visiting facilities like (name of facility)?
   a. What kinds of feedback or evidence do you receive to indicate that these long-term effects may be occurring?

12. Okay, that's all I have to ask. Do you have anything that you would like to add?
APPENDIX D

SAMPLE LETTER OF REQUEST FOR PERMISSION TO CONDUCT OBSERVATIONAL RESEARCH
March 8, 1993

Betty Bryan  
Center of Science & Industry (COSI)  
280 East Broad Street  
Columbus, OH  43215-3773

Dear Ms. Bryan:

I am writing in reference to our recent phone conversation regarding the observational visitor behavior research I hope to carry out at COSI. I am a Ph. D. candidate in environmental education at Ohio State. I am working on my dissertation research with Dr. Gary Mullins and Dr. Rosanne Fortner as advisors. The purpose of my study is to investigate affective learning in nonformal educational settings. I will be collecting observational data in a variety of museums and similar settings during the course of my research.

I am interested in carrying out unobtrusive observations of short duration (no more than one day). No visitor interviews will be conducted. If any of the visitors inquire about my activities I will provide full disclosure and answer any questions they might have about my study and its purpose. As we discussed, I will be happy to share my findings with you.

I am planning to carry out my observations at COSI on Monday, March 15. I have an appointment to interview Mr. Wisne at 10:00 am that day as well. I will plan to arrive before 10:00.

Please feel free to contact me if you require additional information about my research and data collection plan. In addition to the home phone number above, I can be reached at my office at 292-9826.

Thank you very much for your help in this matter.

Sincerely,

Joyce E. Meredith  
Ph. D. Candidate  
The Ohio State University
APPENDIX E

SAMPLE COVER LETTER FOR MAILING SENT TO RESEARCHER STRATUM DURING THE MEMBER CHECKS PHASE OF THE RESEARCH
June 1, 1993

Dear _____:

I would like to express my sincere thanks for your participation in this research project. Since my first mailing to you, I have completed a period of field research consisting of in-depth interviews with nonformal educators and open-ended observations of learners in a variety of nonformal educational facilities. Following content analysis of the field data, I have incorporated the field research findings, plus comments from you and the other researchers on the review panel, into a revision of the original model I sent you.

Many of the researcher reviewers inquired if I planned to test the model empirically. I have proposed to develop a heuristic model that will serve as a framework for further discussion and research on affective learning in nonformal education. I am not gathering data to test the model, but rather to help formulate the model. I will include suggestions for lines of research related to the model and indicate literature bases for these suggestions in the final research report.

Enclosed in this second mailing are:
- a summary of comments from the researcher review panel
- summaries of findings from the field research component of the study
- a copy of the revised model with accompanying glossary
- a short version of a table under development to explain the theoretical and empirical literature used to synthesize the model
- a copy of the original version of the model for comparison purposes.

As before, I would like your comments on the model and other materials enclosed. Feel free to write directly on the materials to make your comments.

As is usual with graduate research, I am working under a very tight time schedule in order to finish my degree this summer quarter. I would be most appreciative if you would postmark your responses by Monday, June 14. Please use the priority mail envelope provided for mailing. This will ensure a quick return of your comments to me.

Once again, many thanks for the time and effort you have contributed to this project.

Sincerely,

Joyce E. Meredith
Ph. D. Candidate
APPENDIX F

SAMPLE COVER LETTER FOR MAILING SENT TO PRACTITIONER STRATUM DURING THE MEMBER CHECKS PHASE OF THE RESEARCH
June 1, 1993

Dear __________:

I want to express my sincere thanks for your participation in this research project. Since our interview session I have been busy transcribing and analyzing data. I am most eager to get your feedback on the findings.

Enclosed is a summary of the comments from the interview data, plus a summary of trends from my observations of visitor behavior at various facilities. I would appreciate your comments on these findings. Do they, for example, match with your experience? Is anything missing?

Also enclosed is a series of figures depicting a model compiled based on research literature and on interviews and observations from this study. The model represents a working hypothesis of how people respond, particularly in an affective (emotional/attitudinal) way, in parks, nature centers, museums, zoos, or other nonformal/informal learning centers. I have also included a short glossary which may clarify some of the terms in the model. Please comment on the model. Does it make sense according to your experience? Is it complete, readable, understandable, etc.?

As is usual with graduate research, I am working under a very tight time schedule in order to finish my degree this summer quarter. I would be most appreciative if you would postmark your responses by Monday, June 14. Feel free to write directly on the summaries and figures and enclose them in the priority mail envelope provided for mailing. This will ensure their fast return to me.

Once again, many thanks for the time and effort you have contributed to this project.

Sincerely,

Joyce Meredith
LIST OF REFERENCES


