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THE DEVELOPMENT OF CHILDREN'S ABILITY TO RECOGNIZE AND EXPRESS FACIALLY POSED EMOTION

DISSEETATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Dale Michael Moyer, B. A., A. M.

* * * * *

The Ohio State University

1974

Reading Committee:
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Approved By

Advisor
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A mother's report:

I accidentally came across my (five-year-old) boy sitting in a chair and practicing smiling. He always had a special smile, like a little elf, but he never knew how cute he was before this. It made me sad to see him. It was like the end of innocence.

—from Charles Wenar's
"Personality Development"
ACKNOWLEDGEMENT

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INTRODUCTION

The human face is a potent, complicated, and potentially confusing informational source for the recognition and communication or conveyance of emotional intent. The face is a powerful vehicle of information just by its continuous presence and obvious visibility. It can also be a kaleidoscope of shifting emotional expressions, or a reflection of pervasive mood. The face demonstrates characteristics of age, sex, race, health, and for some persons the key for the art of physiognomy. Finally the face can be a source of confusion and misrepresentation through unconscious and intentional deception and disguise. The intentional control of facial affect establishes the possibility for the conscious manipulation of others.

One of the problems confronting research on emotion in the human face is that of accuracy. In other words, what is the fidelity of emotional information provided by the face, and how is it related to other indices or criteria to determine what emotion was actually experienced? Possible indices of accuracy could include one or more of the following: antecedent and/or consequent events; judgmental consensus by a group of independent raters; or concomitant behavior (physiological measures, verbal self-report, facial behavior or responses). Accuracy is also particularly relevant to the processes and conditions associated with the communication or conveyance of emotional intent by facial behavior, and the factors influencing the discrimination and
identification of facial expressions of affect made by others. More
simply, facial expressions of emotion require the study of the ef-
ficacy of performance, as well as, the efficiency of observation.

Any research into this area is immediately faced with the issue
of whether to focus upon simulated (posed) affect, or the facial
emotion that is generated in spontaneous, real-life situations. Simu-
lated facial communication of emotion information tends to lend itself
more readily to experimental control and manipulation than does the
expression of facial affect in spontaneous situations. Posing pre-
a more precise picture of which intended emotion is demonstrated when.

One of the most pertinent criticisms of posed facial emotion is
concerned with its generality or applicability to real-life behavior,
and spontaneously experienced emotion. Research in the area of facial
emotion must be especially sensitive to the problems of generality a-
cross settings and eliciting circumstances, across persons, across time
and observers. These questions require additional research directed
specifically at the inter-relationships between them before they can
be fully resolved. It seems that almost any laboratory-based study
(posed or spontaneous facial affect) is liable to the criticism of arti-
ficiality and restricted representativeness. Generality is an absolute
ideal, and partially depends upon individual tolerance levels for ac-
ceptable degrees of ambiguity.

It is assumed that, developmentally, there is a progressive differ-
entiation in the child's ability to discriminate and cognitively code
affectively charged stimuli and subjective experience. To understand
a bodily sensation of emotion or a related stimulus, the child must de-

velop a differentiated and articulated repertoire of affect concepts. The affect concepts facilitate the recognition, memory storage and anticipation of the phenomenological and bodily sensations which occur in an environmental context. Affect concept development may also play an important role in the child's ability to emit affective behavioral cues, which can be accurately deciphered by others (peers, parents, teachers, etc.).

The dissertation was designed to introduce the children to a "game" that required the posing of particular facial expressions of emotion. The posing of facial expressions of affect were conducted under two separate conditions. First, half of the children were asked to produce facial expressions representing abstract affect concepts (happiness, anger, sadness, fear, and surprise). Secondly, the remaining half of the children were asked to think of things or remember situations that made them happy, angry, etc., and attempt to pose the specifically requested facial expressions of affect. Still photographs were made of the child's facial expressions and were later rated by a homogeneous group of independent judges on accuracy of posing or affect display. Following the attempts to pose facial expressions of emotion, a semi-structured interview was administered in an effort to determine how children typically describe the locus (internal or external) of stimulation and the intentionality of their subjective emotional experience. Finally, the subject was required to categorize a standardized series of 40 still photographs of facial expressions of emotion into five pre-designated concepts of affect, e.g., happiness, anger, sadness, fear, and surprise.
The research design and the use of a sample of children allows
the opportunity for asking a number of developmentally oriented quest-
ions. Are there any sex or race differences in the ability to emit
facial expressions of emotion (posing accuracy) and the identification
of such expressions by others? Does the capacity to identify the emo-
tional meaning of facial expressions (judgmental accuracy), as well as,
"role-play," pose, or enact facial sentiments increase with chronologic-
al age? What kinds of errors are typically made by children in iden-
tifying emotional facial communications, and is there any difference
in the pattern of errors made at different age levels? Does the abil-
ity to recognize various facial emotional meanings develop differen-
tially? Does the ability to recognize anger develop differently from
the ability to identify sadness, happiness, etc.? What is the relation-
ship between the ability to identify the emotional meaning of facial
expressions (judgmental accuracy) and the ability to convey to others
(judges) the emotional intent of facial behavior (posing accuracy)?
How do children characterize the locus of arousal and their patterns
of coping with subjective emotional experience? Are the self-reports
or descriptions affected by grade, sex, or race variables? What role
do abstract and imaginal processes (instructions) as eliciting circum-
stances play in the simulation of behavior?

The developmental sample was represented by 24 kindergarten and
24 third grade children. These children were divided up into equal
numbers of boys and girls, black and white subjects. The independent
variables of the dissertation are grade, sex, race, and, through in-
structional set, the use of abstract and imaginal cognitive processes
as eliciting circumstances. The dependent variables include verbal responses to a semi-structured interview of subjective emotional experience (locus of initiation and intentionality or coping), independent judges' ratings of the child's posing accuracy in enacting facial expressions of affect, and the children's judgmental accuracy scores. The genuineness (role enactment) with which the children were to pose facial affect and the amount of time they took to give the expression before it could be photographed (reaction times) represent two additional sets of dependent variables.
Overview of Historical Traditions and Issues

The following general comparative review, of theoretical and empirical issues and problems associated with the study of emotion, will attempt to provide the background information and historical perspective which helped to stimulate the conception of the present research project. Nearly fifty years ago, David Wechsler (1925) made a contemporary observation that the psychology of emotion had been crippled by definitional controversy. His review showed little consensus on the meaning of terms. The current status of definitional agreement has remained much the same as Wechsler initially described it. As a concept, emotion is slippery and elusive. Theoretical speculations on the topic and research tendencies have become diverse and centrifugal in direction; on the surface, the increase in the bandwidth of interest seems to have been purchased at the expense of fidelity (Cronbach, 1960). Consequently, it is difficult to synthesize, or arrive at conclusive statements about the entire subject when it is so disparate and protean in form and content.

One of the sources of confusion about the meaning of emotion is that the term has been arbitrarily used to refer to several levels of behavior: (a) subjective, private, "felt" experience; (b) visceral
response patterns, e.g., running, approaching, hitting, leaving the field. Included in the last descriptive level are "expressive" responses, such as, facial, postural, and gestural reactions. A problem with "expressive" responses is that they are often used for communication purposes. In other words, it is difficult to specify whether the behavior is a genuine emotional reaction or a meaningful response produced cue or unit in a communication sequence (Peters, 1963).

Another source of confusion is the proliferation of names for different kinds of emotions. Historically, some students ascribed to a set of primary emotions (anger, fear, love) which were assumed to be innate or instinctive in nature, and a listing of their derivations (disgust, shame, surprise). Other authors presented a third set of "sentiments," which were considered to be of less intensity and more the result of socialization, e.g., reverence, admiration, sympathy. A fourth taxonomic approach has concentrated on "moods" described as representing relatively mild and enduring emotional states. Finally, emotions have been discussed in terms of Wundt's Tridimensional Theory, e.g., pleasantness-unpleasantness, tension-relaxation, excitement-quiescence (Peters, 1963).

As Peters has pointed out, another serious source of confusion has been the lack of appreciation of the cognitive-perceptual aspect of emotion. Emotional experience must be considered to be a perceptual event, involving recognition, appraisal and interpretation.

Also evident is that many emotional experiences may originate in thinking or imagining activity. An individual may voluntarily imagine an experience (say falling out of a twentieth-story window) and accordingly generate a relatively weak emotional reaction. In the case of daydreaming, the emotion can of course be much more intense. And probably even more intense
is the emotion created by recalling certain of our past experiences. Dreams, which are certainly symbolic, cognitive reactions, are sometimes the source of our most intense emotions, often leaving a residue which can last for a day or more. Any adequate theory of emotion must take into account this apparent cause-effect (cognition-emotion) relationship and at the same time avoid setting emotional behavior up as a unique, separate kind of activity (Peters, 1963).

Related to the problems and trends in definition and description, research on emotion has passed through cycles of interest and focus. Research into the various components of emotion, especially facial behavior, appears to have been relatively popular from the turn of the century until the late 1940's (Landis, 1924; Guilford, 1929; Goodenough, 1931; Goodenough and Tinker, 1931; Kanner, 1931; Coleman, 1949). Perhaps, the zenith of interest in affect was manifested in the Wittenberg Symposium on Feelings and Emotions, held at Wittenberg College in Springfield, Ohio (Reymert, 1938). The symposium was a collection of contributions by a number of well-known authors, whose discussions are historically relevant to some of the conceptual problems that continue to confront the study of emotion.

During the 1950's, there was a diminution of enthusiasm about emotion. The field was largely promulgated through the efforts of one man, a student of Woodworth, H. Schlosberg. Finally, the past decade has shown a revival of curiosity in emotion, which has culminated in several good symposia and reviews (Arnold, 1968; 1970; De Charms, 1968; Ekman, Friesen, and Ellsworth, 1972; Frijda, 1969; and, Strongman, 1973). Typically, experimental emphasis has concentrated upon either subjective emotional experience or recognition; bodily processes (visceral, somatic, and neural structures); overt response patterns; or, "emotional" stimuli (Bindra, 1970; Ekman, et. al., 1972). Research into "emotional" stimuli
is immediately faced with the problem of implicit circularity. It is
difficult to ascribe to "emotional" stimuli that are independent from
emotional responses. However, this approach has stimulated study into
the range of emotional responses that can be elicited by a particular
stimulus, and investigation into the effects of certain stimulus pat-
terns upon responses produced under specific organismic conditions,
e.g., injection of hormone related drugs (Strongman, 1973).

Parallel to the trends in experimental emphasis, four dominant con-
ceptual traditions concerning the nature of emotion have developed dur-
ing the past century. The first was a product of Darwin's theory of
evolution which suggested that not only physical structures but also
expressive characteristics evolved on the basis of their survival value.
For example, from observation and anecdotal material, Darwin concluded
the wolf's baring of fangs was related to the human adult sneer and the
facial flush of anger resembled similar behavior reported in certain
species of monkeys. Darwin believed his data could be accounted for by
his general thesis of adaptive process. Aside from the anthropomorphi-
quality of some of his reports, Darwin's conclusions about the innate
basis of expressive characteristics was grounded on four main sources
of evidence: (a) functional similarity in child and adult expressions
of emotion; (b) isomorphic expressive features by the blind; (c) expres-
sive symmetry between distinct cultural groupings of people; and, (d)
the appearance of emotions in related forms in different kinds of an-
imals (Plutchik, 1970). Modern ethology, statements by some contem-
porary authors about emotion, and the periodic debate on the innate vs. learned
or acquired nature of emotion still reflect the impact of Darwin's in-
fluence on present thinking. The early view of emotion, represented by Darwin and McDougall, considered it to be the feeling or awareness side of instincts or aroused inherited behavior mechanisms. Since these writers were more concerned about the adaptive process than emotion per se, their treatment of the subject is somewhat ambiguous. On some occasions it was proposed as a separate event and at other times as synonymous with behavior. Such a view fails to acknowledge the importance of learning. It also tends to reify emotion as a causal agent distinct from other mental states and behavior (Peters, 1963).

The second dominant tradition in the conceptualization of emotion began with William James' analysis of the sequence of perception, feeling, and bodily states. Previously, most thinkers assumed bodily response was a function of experienced emotion. In an effort to assert itself as a new science, psychology appears to have been iconoclastic in its approach to the problem of emotion. While Wundt and Titchener attempted to analyze the components or elements of emotion, James attacked the assumed foundation of emotional experience (Boring, 1957; Arnold, 1970). With the support of Lange, the physiologist, James maintained that emotion as a conscious feeling was a product, not a precursor, of bodily arousal or sensations in the viscera and skeletal muscles. One of the important consequences of James' viewpoint is that it stimulated continuing research into autonomic changes under conditions of stress and emotion, and interest in brain lesions and sub-cortical neural structures (hypothalamic and limbic systems) (Plutchik, 1970).

The third major tradition in the psychology of emotion has been
constructed upon the psychoanalytic framework. According to the psychoanalytic perspective, emotions can be divided into those that have instinctive roots (love and aggression) and those that originate in immediate threats to the ego (anxiety, guilt feelings) (Arnold, 1970a). The psychoanalytic account of emotion, as well as, the other traditions and their equivalent modern derivatives will be discussed in more detail at later points in the chapter.

Influenced by learning theory, academic psychology came to reject instincts as valid explanatory categories. Inherent patterning was vitiated; instincts became drives impelling behavior. Emotion was produced through the collision between various drives or incompatible response patterns, generalization and reinforcement (Dollard and Miller, 1950; Dollard, Doob, Miller, Mowrer, and Sears, 1939). Attention was directed toward the discordant emotions, such as fear and anger, at the cost of the positive emotions like happiness, love, and joy. Early academic psychologists did not seem to distinguish between an emotion that facilitated goal-directed behavior, and one that resulted from the disruption of goal-oriented action (Arnold, 1970a; Leeper, 1965).

According to Bindra (1970), the predominant historical trend over the past 80 years or so has been to define emotion in terms which are more and more congruent with the general principles of general behavior theory. The earliest theoretical formulations are described by Bindra as having the tendency to connect overt behavior patterns to certain sets of faculties or processes, such as, cognition or conation. "In the context of emotion, this practice of aligning particular classes of behavior to particular explanatory concepts meant that emotional pheno-
mena were regarded as a distinct class of behavior, which was to be accounted for by a unique 'emotional' process (Bindra, 1970)."

Bindra has indicated that he believes the hypotheses and research by such people as James, Cannon, Arnold, Hebb, and Leeper reflect conceptions of emotion as a unique process. The primary difficulty with the single process approach is it cannot completely account for the wide range of phenomena and experimental data that have come to be subsumed under the broad category of emotion. Although McDougall advocated the use of instinct as an intervening variable between antecedent conditions and response, his version is subject to the same criticism Bindra leveled at the others above. It still smacks of conjuring up a "unique emotional process," which lacks the specification of clear criteria distinguishing emotion from other intervening variables. Consequently, Bindra has insisted that emotional phenomena must be considered the result of the same general behavioral processes and rules that also control other diverse categories of behavior, e.g., perception, motivation, learning.

The four major traditions in the psychology of emotion may be summarized in the following manner: the Darwinian approach has focused upon the innate nature of expressive characteristics and the evolution of emotion as a consequence of adaptive process; the James-Lange-Cannon approach has been largely concerned about the relationship between experienced feeling and bodily response; the psychoanalytic perspective has concentrated on emotion as an important aspect of personality development and functioning; and finally, learning theory has attempted to account for emotion by a set of general principles that are considered applicable to almost all categories of behavior. Each approach is pro-
vical and inadequate to a certain degree; each differs in method, content, and scope of interest. A general theory of emotion should have the power to integrate all these areas of concern (Plutchik, 1970).

A good general theory of emotion should be able to stimulate research; integrate present data; increase generality through the incorporation of diverse areas of information; and, predict new relationships (Baldwin, 1968; Marx, 1963; Plutchik, 1970). Additionally, an adequate theory must be able to address itself to a long series of questions about emotion, which have traditionally confronted any effort to explain the topic: "What is an emotion?" "What are the origins of emotion?" "What is the function of emotion and how is it related to action?" "Are there any differences between emotions?" "What is the effect of maturation and learning on emotion?" (Plutchik, 1970; Arnold, 1970a).
Review of Theoretical Models

The previous discussion has shown that a number of theories of emotion have been developed throughout the history of psychology. These theoretical models differ not only in chronological order, but also in fundamental assumptions and emphasis or approach (physiological, cognitive, behavioral) to the problem of affect. It is not always easy to differentiate the theories from one another because of confusion in the theories themselves and overlap in the areas of emphasis. An adequate summary of existing conceptual models would require volumes. Consequently, this review of theorists will be representative and cursory. The purpose of this section is to give some indication of the breadth of thought that has gone into the subject. It has been organized to put some flesh on the bones of the major historical traditions that were sketched out in the preceding pages.

William James and W.B. Cannon

James' conception of emotion is probably the most famous because it has generated lasting argument among psychologists. Although he did not restrict his attention to felt reaction of only visceral changes, James did emphasize them and subsequent writers have concentrated their criticism on this aspect of his theorizing (Peters, 1963). Instead of considering bodily expression to be a consequence of felt experience, the James-Lange hypothesis states that "...bodily changes follow directly the Perception of the exciting fact, and that our feeling of the same changes as they occur Is the emotion (James, 1884)." For example, we are afraid because we see ourselves running or trembling. However,
Peters (1963) has made the salient point "...that this neat temporal scheme of events occurs only in an abstract discussion of emotion. In actual concrete experience in the laboratory or in everyday life, the sequence of events is much more complicated."

James' provocative supposition about the sequence between perception, feeling, and bodily states has elicited a number of rebuttals and refutations. Wechsler (1925) faulted James because the referents for his terms were equivocal and obscure. Wechsler called the phrase of "exciting fact" an ambiguity and charged that the term bodily changes includes a variety of responses which need to be separated and refined. Additionally, Wechsler cited James for overlooking the critical role of cognitive functions because he did not sufficiently differentiate between the perception of an object as a mental representation and the interpretation or coding of the object.

The most well-known critique of James' ideas was done by W.B. Cannon. Cannon (1927) attacked the James-Lange theory on several accounts. His first contention concerned case history observations on sympathectomized accident victims. Although such patients were paralyzed and received no somatic sensations from the neck down, they still reported normal emotional reactions of joy, affection, grief, and displeasure. Since the patients were adults, it is possible that emotional experience without visceral feedback could be maintained on the basis of prior learning (Cofer, 1972). Some indirect evidence supporting such an interpretation is the research by Wynne and Solomon (1955) on sympathectomized dogs in avoidance learning situations. Their results indicated that sympathectomy surgery does not interfere with avoidance behavior if it
was learned prior to the operation. Whereas deprivation of normal peripheral autonomic function disrupted subsequent avoidance learning.

Cannon believed James' conception of the sequence of events was inadequate because of the characteristic nature of the visceral response system. The evidence that Cannon cited from his own research is perhaps the most telling aspect of his criticism. The most significant points of his argument were that qualitatively different emotions cannot be differentiated from one another on the basis of visceral reactions; and, the rather long latencies of autonomic reactivity cannot account for startle responses like surprise or fright at a sudden noise. Two early examples of the research on emotional development certainly support some of Cannon's arguments. Bridges (1930) concluded from her extensive observations of infants and nursery school children that there is no systematic relationship between visceral responses and corresponding emotional expressions. Jones (1930; 1935) studied the association between behavior and the psychogalvanic skin response in infants and pre-school children. His results appear to be consonant with Bridges' interpretation of her data. Jones stated, "The quick transition in emotional tone, so often exhibited in young children, is probably a further indication of the 'surface' character of their emotions, and of a lack of persisting visceral reinforcement." However, he did suggest the connection between action and visceral responsiveness may become more pronounced with development as the more immediate overt behavior patterns are inhibited through socialization pressures. From his own investigations and the research of Bard, Cannon presented the alternative that the neurophysiological site of emotion was not visceral but rather subcortical or thalamic. He ar-
gued that the environment stimulates receptors which relay impulses to the cortex. In turn, the cortex activates thalamic processes which produce response patterns corresponding to specific emotional expressions (Strongman, 1973). Although the neurophysiological structure of emotion has been found to be much more complex than Cannon first described it, his position stimulated a vast amount of subsequent theory and research.

Hebb and Bindra

The Organization of Behavior represents a neurophysiological integrative account of perception, learning, motivation, attention, and emotion. Hebb's (1949) theory focuses upon hypothetical neural processes as the central factors providing mediation between stimulus and response. Hebb's principle theoretical constructs are the "cell assembly" and "phase sequence." A cell assembly consists of a collection of association area cells which can function like a reverberating circuit after stimulation has stopped. "This prolongs the time during which the structural changes of learning can occur and constitutes the simplest instance of a representative process (image or idea)." A phase sequence is the temporal pattern of neuro-excitation in a cell assembly.

In his discussion on emotion, Hebb asserted the term cannot be considered as an unitary psychological process or "...a special kind of event in consciousness." He argued that emotion concerns the "...hypothetical neural processes that produce emotional behavior; it refers neither to an immaterial state of consciousness nor to the observable pattern of behavior." Emotions can be organizing or disorganizing depending on their "...tendency to maintain or increase the original stimulating conditions (pleasurable or integrative emotions) or their ten-
dency to abolish or decrease the stimulus (rage, fear, disgust)."
Additionally, the "arousal" function of emotion contributes to the organism's perceptual readiness. Hebb postulated that "cue function" could be schematically represented by a curvilinear relationship with a level of "arousal function" (nonspecific cortical bombardment). The optimal facilitation of perceptual readiness and learning occurs in the middle of the continuum of arousal. Gradually increasing arousal to the optimal level augments alertness, interest, and positive emotion. Beyond a critical point, an increase in arousal promotes emotional disturbance and the collapse of cue perception (Thompson, 1962). Walters and Parke (1964) also emphasize the significance of emotional arousal. They believe that any condition, not merely frustration and threat, which increases emotional arousal facilitates activity, alters perceptual thresholds, increases intensity of responses, and changes the internal cues to which a response will be made. Any state of heightened arousal augments orienting and attending to other persons and therefore stimulates the formation of social behavior. In a similar vein, Des Lauriers (1971) asserts that "optimal affective arousal" maximizes the possibilities for behavioral change and communication between the child and the environment.

Hebb (1949) primarily concentrated his attention upon emotional disturbance which included the following major aspects:

1. the great variety of causes of disturbance, ranging from an unfamiliar combination of familiar things (fear of the strange) or an interruption of sleep, to hunger, nutritional deficiency, or withdrawal of a drug from the addict; (2) the fact that a single cause may produce anger, fear, or nausea and faintness, in the same subject at different times, or in different subjects; (3) the great variety of expression even of a single emotion; and (4) the different ways in which the expression of emotion
changes, as the subject is habituated to the stimulating conditions.

According to Hebb, "emotional disturbance is ... a disruption of the timing of neuronal activity in the cerebrum." The disruption of the phase sequence can be caused by either conflict of phase sequences, lack of "sensory support" for the phase sequence, or metabolic changes. Learning affects the disruption of the phase sequence in two ways: the particular temporal pattern of neuro-excitation must be learned before disjunction of the phase sequence can occur; and, "learning also modifies the nonspecific emotional disturbance and transforms it into various organized patterns of emotional behavior (Goldstein, 1968)." Hebb's theory is certainly provocative, and constitutes an advance in sophistication and scope of inquiry from the James tradition in the psychology of emotion.

Reflecting the impact of Hebb, Bindra (1970) has asserted the traditional distinction between emotion and motivation is invalid. Historically, emotional behavior has been considered to be initiated by external or environmental events, whereas motivational actions have been thought to be caused by internal or physiological states (drives). In contrast, Bindra has argued that the occurrence of any emotional or motivational "species-typical action" depends upon the interaction between environmental events and the existing organismic state. Citing some of the research on electrical stimulation of the hypothalamus which show that behavior occurs only in the presence of appropriate environmental objects, Bindra concluded "both a particular organismic state and a particular class of incentive stimulus are necessary for the elicitation of emotional or motivational species-typical action patterns."
Bindra suggested that a necessary, but not a sufficient determiner of internal and external events is the hypothetical "central motive state." He described the central motive state,

...as a set of neural processes arising from the interaction or combination of a certain type of organismic state and a certain class of incentive stimuli. The interaction results in a particular class of species-typical action. The changed neural state alters the excitability of certain groups of neurons in both afferent and efferent pathways (Bindra, 1970).

Bindra believes the central motive state is responsible for two other functions. It effects the perceptual readiness or selective attention of an organism for "a certain class of incentive stimuli" by altering the efficacy of sensory input. The central motive state also creates a response bias for the production of a particular pattern of behavior by altering neural discharge to appropriate autonomic and somatic motor sites (Strongman, 1973). Although Bindra has been primarily concerned with the integration of emotional and motivational phenomena, it is not immediately apparent how his ideas amplify our understanding of the process beyond what Hebb has already given us.

Plutchik

Plutchik has been included in this listing of representative theorists because he exemplifies not only a continuation of the dimensional analysis of emotion started by Wundt, Woodworth, and Schlosberg, but also a biological or Darwinian approach to the subject. Plutchik (1970) has developed a multidimensional model of prototype emotions, which he assumes can account for the introspective aspects of the phenomena, as well as, the elemental characteristics and blends of affect expression.

The model suggests emotion can vary in three systematic ways: intensity;
similarity; and, polarity. Analogous to the process of blending colors, the mixing of opposite emotions incites greater conflict than does the interfusion of adjacent emotions. Presumably, this provides for the possibility of scaling the "concept of conflict."

Plutchik stresses the point that emotions can be described subjectively, behaviorally, and functionally. He maintains that functional or adaptive language is the most inclusive because it is applicable to all phylogenetic strata. Consequently, he has defined emotion as "...a patterned bodily reaction of either protection, destruction, reproduction, deprivation, incorporation, rejection, exploration or orientation, or some combination of these, which is brought about by a stimulus." It should be noted that each of these functional terms has its subjective and behavioral counterpart. For example, fear and withdrawing or escaping for protection, and anger or rage and attacking for destruction, etc.

Plutchik's proposal emphasizes the adaptational or survival value emotions have for the organism. He asserts that his model is sensitive to the importance of the cognitive processes that are involved in the "evaluation of stimuli." For Plutchik, the study of emotion must become "...a central aspect of evolutionary biology." A difficulty with Plutchik's model is that the associations between the subjective, behavioral, and functional levels of descriptive emotional language appear to be somewhat attenuated and arbitrary. For instance, it is easy to imagine other behavioral referents for subjective joy and ecstasy than just mating and possessing for the
functional purpose of reproduction. And, I suppose there is more to surprise and astonishment than "stopping" to orient oneself. Finally, Plutchik does not seem to adequately address himself to the aspects of emotional disturbance that Hebb outlined at the beginning of his discussion on the topic, e.g., response equivalence, individual differences, response variation in the same person at different times, and changes in expression with habituation.

Arnold, Lazarus, and Schachter

Arnold's (1970a) exposition on emotion represents both a cognitive and physiological analysis of the subject. Since her discussion about the physiological processes mediating perception, emotion, and action is beyond the purview of this review, only Arnold's argument about the cognitive aspects of emotion will be examined. Arnold's treatment of emotion depends upon the construct of appraisal, or the evaluation of experienced stimuli. Although Arnold does not clearly specify the nature and sequence of the process, appraisal complements perception by facilitating action tendencies or response patterns.

Arnold has suggested that new experiences are interpreted in terms of their similarity with previous associations registered in a person's "affect memory." New situations can elicit the recall of similar situations experienced in the past and their impact on the individual. The mental picture generated through memory processes may not be a complete reproduction, or of the same intensity as it was first experienced, "...but is, like the original appraisal, a
positive or negative reaction (Arnold, 1970a)." These reactions help to induce an expectation or "estimate" of the harmful or beneficial possibilities an affective experience may have for us. In other words, an individual is able to plan or imagine an appropriate course of action for coping with emotionally charged situations.

In interpreting a situation, we do not merely know it as it is here and now, for instance, when we are still at a safe distance from some danger; nor do we ascribe a vague cognitive 'meaning' to it. We remember what has happened what has happened to us in the past, how this thing has affected us and what we did about it. Then we imagine how it will affect us this time and estimate whether it will be harmful (Arnold, 1970a).

Arnold has contended appraisal, as a component of emotion, is static. It is the acceptance or rejection of the expected effect a particular situation may have upon a person. To account for dynamic or action tendencies, Arnold has somewhat simplistically maintained that what is considered by the individual to be "good" is approached, while anything evaluated as "bad" is avoided.

This definition allows us to specify how emotion is related to action: if nothing interferes, the felt tendency will lead to action. It also allows us to state how emotion is aroused: whatever is perceived, remembered or imagined will be appraised; if it is appraised as desirable or harmful, an action tendency is aroused. And so we appraise the situation as more desirable or more harmful, we become aware not only that we tend toward or away from it, but also that this is an emotional tendency (Arnold, 1970a).

It is difficult to do a capsule summary of Arnold's thirty years of writing on the subject of emotion without doing violence to the totality of her thinking. Aside from promoting dialogue between authors of different theoretical persuasions, she has elucidated the salient issues and subtleties associated with the study of emotion.
Certainly, Arnold has helped to focus attention of the cognitive processes that mediate emotional experience.

Besides Arnold, another proponent of the appraisal view of emotion has been Lazarus. Although Lazarus has recently demonstrated an increasing concern with the self-regulation of emotion, he has long been interested in the variables associated with stress and coping processes. In his earlier discussion, Lazarus (1966) indicated that his characterization of stress was similar to the traditional description of the response dimensions of emotion, e.g., disturbed affect, physiological changes and motor-behavioral manifestations. Lazarus has suggested that emotion is a product of an individual's evaluation or "appraisal" of his momentary transactions with the environment. Appraisal involves the cognitive process of recognizing, interpreting, and anticipating potentially dangerous or threatening situations (primary appraisal). Additionally, appraisal is an important ingredient in the process of coping with such situations (secondary appraisal). It entails "...evaluations by the person of the kind of adaptive action called for as well as the nature and potency of his resources for managing or coping with the threat, meeting the challenge, etc. (Lazarus, 1973)." A number of factors are involved in secondary appraisal: degree of threat; characteristics of the stimulus configuration (visability of the source of threat, situational constraints); position on the phylogenetic scale and developmental level of the organism; cultural background; and, individual differences in ego resources, defensive dis-
positions and general attitudes about the environment.

Coping includes not only the mastery and control of a possibly threatening situation, but also, the internal and cognitive self-regulation of emotional states. In part, emotion is a product of adaptive interactions between the organism and its environment. As the character of the interaction is altered, the experience and expression of emotion also will change. Through phylogenetic progression man's behavior has come to be less circumscribed and dominated by instinctual mechanisms. Human responses are modulated by learning and cognitive controls rather than by "...built in reactions to external releasers (Lazarus, 1973)." The nature of this phylogenetic advancement has provided the opportunity for shifting (to some extend) "...the locus of the regulation of emotion from the external environment to the mental apparatus."

Lazarus (1973) has insisted that the self-regulation of emotion entails both the control over expressive or instrumental behavior as well as the alteration of "...the total regulation of the emotional state." The concept of total regulation requires the use of multiple sources of response information to support the distinction between the proscription of overt behavior and control over internal subjective emotional experience.

If we look only at emotional behavior (such as avoidance), albeit an important source of information about the emotional state, we cannot readily tell what elements of the emotional reaction have been controlled, and it is difficult to argue that the overt behavior is tantamount to the internal state.

The question, 'what is being regulated?', points to another distinction of potential importance, namely, between efforts to cope with the person-environment transaction that has produced the emotional reaction in the first place and efforts to regulate the emotional reaction to that transaction. For example, if a student who is facing an important examination spends the anticipatory interval reading relevant books and articles, re-
hearing his understanding with teachers and other students, and trying to determine the questions to be asked, etc., he is clearly coping with his problem, whether well or badly. Such coping activity is directed at the plight in which he finds himself, namely, the danger of failing the examination, and the preparatory activity is aimed at minimizing this potential harm. On the other hand, as the examination approaches, he is apt to find himself increasingly anxious (Mechanic, 1962), and this reaction of anxiety may itself be a source of embarrassment or interfere with his anticipatory coping efforts and performance. When such a student takes tranquilizers, or engages in certain other forms of coping designed to overcome the anxiety, he is attempting to regulate the emotional reaction rather than mastering the danger that brought it about in the first place. He is attacking the symptom rather than the disease, as it were. In all likelihood, the rules by which these two kinds of activity, coping with one's plight and regulating the emotional consequences of that plight, differ considerably (Lazarus, 1973).

The principle thesis of Lazarus' paper is that sometimes coping may precede an emotion. Coping is not always just a reaction to threat, whose purpose is to escape or master the situation. He asserts that it is important to realize much coping is "anticipatory." It is the cognitive preparation for imminent or future threat or danger. Alternative adaptive responses can be imagined, considered, evaluated and rehearsed. "If the preparatory activity leads to the successful prevention of the harmful event, then the emotions connected with that event will not take place, or will be different (Lazarus, 1973)." Mastery and control over the source of threat before it actually occurs may produce sharply experienced positive emotions (exhilaration) rather than the negative emotional (subjective) reactions that can result from the immediate confrontation with menace. Anticipatory coping can assume two forms. First, it can be deliberate, analytic, or reflective planning or thinking ahead. Secondly, it can be automatic, habitual, and stylized. This conception of anticipatory coping is similar to the constructs of perceptual defense and vigilance (Bieri, 1971). Some people may seem to be perpetu-
ally mobilizing themselves against the possibility of future catastrophe, whereas, others may ignore ominous signs and wait until the danger actually occurs before they attempt to cope with it.

Lazarus (1973) has suggested that the self-regulation of emotion does not diminish the impact of the environment, but rather it attempts to partly account for the personal control of emotional states by the self manipulation of attention to and interpretation of the environment. Lazarus' position emphasizes,

...the theme that it is the person, appraising the personal and social requirements of an emotional situation, who manages his emotional reactions willfully, as it were, rather than merely passively and automatically responding to internal and environmental pressures.

As I see it Lazarus has helped to shade in the details of what Arnold implied about the relationship between cognitive processes and the control of emotional experience and overt behavior. Although his notions are similar to the psychoanalytic concept of the executive function of the ego, Lazarus represents a shift in emphasis from the usual topics of interest for the cognitive-informational processing viewpoint. The arguments by Arnold and Lazarus highlight the point that emotion is as important an area of study as are perception, memory, attention, learning, and problem-solving. Granted this may seem obvious but the subject of emotion was not given any systematic treatment in Musen's (1970) "Carmichael's Manual of Child Psychology" and Ulric Neisser (1967) almost completely excluded it from his book on "Cognitive Psychology."

Any presentation of the cognitive approach to emotion would be incomplete without a discussion of Schachter's ingenious and fasci-
nating research. Schachter used Maranón's (1924) study as a model for his own investigation into the role situation effects play in the cognitive interpretation of physiological arousal. Maranón injected 210 patients with epinephrine. Following the injection, he was able to elicit from his subjects self-reports on the nature of their internal, introspective experiences. Seventy-one percent of the people simply described the physical symptoms that are usually associated with sympathetic arousal. Twenty-nine percent of the sample labeled their experience in terms of "as if" kinds of emotions. In other words, they indicated they felt "as if" they were afraid. Maranón could only generate "genuine" emotions by structuring the interview around certain types of cognitions, e.g., the death of their parents or a sibling. Schachter has suggested that the 71 percent of Maranón's subjects, who did not describe their experience in terms of emotion, had a reasonable alternative explanation for the physiological sensations that they felt, i.e., the injection itself.

Maranón's experimental procedure stimulated Schachter to question what effects the covert injection of epinephrine would have upon the elicitation of cognitive-evaluative needs and the identification of feelings associated with a particular situation. Schachter's argument depends upon three propositions. (1) Diffuse and non-specific physiological arousal which is not intelligible will be identified and interpreted on the basis of whatever immediate cognitions are available to the subject. (2) The search for alternative explanations and labels for experienced sensations will not occur in situations in-
volving defined physiological arousal. (3) Depending on the nature of the cognitive evaluations, emotional behavior can only be produced under conditions of physiological arousal (Strongman, 1973).

The Schachter and Singer (1962) study became a prototype for subsequent research, conducted by Schachter, on cognition and emotion. "Our experiments had all involved manipulating bodily state by injections of adrenaline or placebo and simultaneously manipulating cognitive and situational variables that were presumed to affect a subject's interpretation of his bodily state (Schachter, 1971)."

In the Schachter and Singer investigation, a number of undergraduate college students were invited to participate in a research project whose ostensible purpose was to study the effects of a vitamin supplement called Suproxin on vision. In actuality, the subjects were either injected with epinephrine or a saline placebo and were asked to wait with an experimental cohort, who was posing as another subject, for twenty minutes while the drug entered the bloodstream. The subjects' vision was to be examined at the completion of the waiting period.

The subjects who received the injection of adrenaline were divided into three sub-groups. The "informed group" were told they would experience some side effects from the injection of "Suproxin." The experimenters described to the subjects the symptoms that are produced by epinephrine. The second or "ignorant group" were told nothing about the side effects they would experience during the waiting period. The third sub-group (the misinformed) were told they would have
side effects from the injection but the symptoms that were described are not associated with epinephrine, such as, itching, headache and numbness in the limbs. Presumably, the "informed" group of subjects would have an adequate explanation for the reactions they experienced, whereas the "ignorant" and "misinformed" groups would have a more difficult time in interpreting the symptoms that developed in the waiting period. Schachter devised two types of social situations which could possibly structure the interpretations the last two subgroups used to account for their experiences.

Some of the subjects were required to remain in the waiting period under conditions contrived to evoke "euphoria." The experimental subject was asked to stay in a room, described by Schachter as being in a state of extensive disarray, with an experimental cohort who was posing as another subject for the same research project. The cohort made verbal statements that he felt good and proceeded to play basketball with waste paper, sail paper airplanes that he made and use a nearby hula hoop. The experimental subjects' reactions were observed and recorded through a one-way mirror. For a second group of subjects a similar initial procedure was followed except the cohort and the subject were given a personal questionnaire to complete. As the cohort filled out the questionnaire, he acted (vocally and visibly) as though he was becoming more and more angry with the nature of the questions they had been asked to complete. The cohort's anger culminated in the questionnaire being torn up and stalking out of the room in disgust. Following his observation of the cohort's behavior,
the subject was asked on a pretext to indicate the intensity of his subjective feelings on a five-point rating scale.

In general, the results supported Schachter's expectations. The informed group did not demonstrate a shift in mood or the tendency to act like the experimental cohort, whereas, the ignorant and misinformation subjects did tend to do so. Unfortunately, the placebo group did not perform as Schachter had predicted. Their responses were not particularly different from those of the ignorant or misinformation subjects. However, when Schacter excluded the subjects from the ignorant and misinformation groups who had attributed their reactions to the injection, the results became more pronounced and significant.

Schachter's experiments indicate a strong, critical role for our interpretations of why we are aroused in determining what emotion we report that we have. Thus, emotion is a joint product of physiological arousal and a cognitive evaluation of the situation in which the arousal takes place. This formulation does not exactly support the James-Lange theory but does not reject it either. Although the arousal does not have to be different for qualitatively distinct emotions, nevertheless emotion is an interpretation of physiological reactions. Had James emphasized situational determinants more than he did, his theory could fit Schachter's findings fairly well. On the other hand, it does place stress on physiological reactions. It avoids some of Cannon's criticisms because the arousal can be the same for different emotions, great sensitivity of the viscera is not required, and induced arousal is interpreted as an emotion given the situation in which it occurs (Cofer, 1972).

Although Aronfreed has not developed a systematic statement on emotion in general, I have included him in this review because he has suggested affectivity plays a critical part in the socialization of internalized control over behavior. A distinctive characteristic of socialization is that the child's acquired behavioral patterns gradually show an increasing independence from conditions of external control.
The principle thesis of Aronfreed's writing is that "...changes of affective state are assumed to be fundamental to the learning processes which form the basis of socialization (Aronfreed, 1968)."

Aronfreed (1969) asserts that the external contingencies of the child's immediate social environment exert a profound control over the acquisition and maintenance of broad and diverse classes of behavior. Aronfreed indicates that eventually the acquired behavioral dispositions stabilize and become progressively independent from external influence. "Internalization takes place to the extent that changes of affectivity are transferred from the mediation of external monitors to the mediation of monitors which are more intrinsically correlated to the child's performance or representation of an act (Aronfreed, 1968)." The shift toward internal monitors is a product of conditioning. And these internal representations come to assume the responsibilities which previously were the function of external contingencies. Aronfreed makes a distinction between two types of internal monitors which mediate "conditioned affectivity" and the self-regulation of behavior. The first is response-produced cues that are intrinsic to any behavioral act, e.g., proprioceptive or visual cues. The second type concerns cognitive representations that allow the child to conceptualize, evaluate and anticipate the consequences of his behavior and the situational context in which it occurs.

The quality of affective experience can be essentially classified into positive (pleasurable) or aversive (unpleasant or painful) states. Aronfreed seems to think that most categories or descriptions of emotional experience can be derived from these two affective states or their
variations. Aronfreed has attempted to extend Schachter's conclusions
to his own argument about the internalization process. He maintains
that the specific quality of an emotional experience depends upon the
child's cognitive interpretation of the arousal of affectivity and the
character of the information he receives from his social environment.
For example, in Aronfreed's (1968) discussion on fear, guilt, and shame,
he indicates "...the cognitive framework in which the affective state
is embedded will not only determine the qualitative experience of the
state, but will also sharply influence the relative probabilities of
different forms of behavioral reaction to transgression." Environmental
stimuli can be described in positive or aversive terms when it can be
shown that they induce or inhibit "...the arousal of one of the two basic
affective states."

"The induction of changes of affective state governs the child's
acquisition and maintenance of social behavior through a number of dif-
ferent kinds of contingencies (Aronfreed, 1968)." He contends that the
mechanisms of reinforcement, verbal mediation, shaping, and observation-
al learning all contribute to the incipient development of internal con-
trol over affectivity. In noting the discrepancy between moral judgment
and behavior, Aronfreed concludes that besides an account of "...the re-
presentational function of the child's cognitive capacities," mechanisms
of conditioning and behavior-contingent learning must be invoked to un-
derstand and explain the concept of internalization. The coupling of
verbal mediation with socially rewarding and punishing consequences, and
its generation of affectivity in the process, facilitates the effective-
ness of temporal delay. "The affective value that is acquired by such
representations can then intercede on subsequent occasions to control
the occurrence of the same behavior even before it is performed (Aronfreed, 1969)." Consequently, various social stimulus events acquire discriminable properties having anxiety arousing and reducing reinforcement values are attached to the child's intrinsic correlates and representations by the process of imitation involved in observational learning and direct training.

The Psychoanalytic Model of Affect

Besides the usual preoccupation with behavioral referents, physiological arousal, and subjective experience that have absorbed the attention of other theories of emotion, the psychoanalytic model has been distinctively concerned with the function of the phenomena in psychopathology. As a body of knowledge, it represents "...a long series of trials and errors" in the ideas, observations, and experiments by a line of theorists and clinicians. In 1965, Anna Freud looked back over forty years of effort, and noted:

It was at that time not possible to have full insight into the whole complicated network of drives, affects, object relations, ego apparatuses, ego functions and defenses, internalizations and ideals, with the mutual interdependencies between id and ego and the resultant defects of development, regressions, anxieties, compromise formations, and character distortions.

Almost from the beginning, emotion and drive have been key constructs in psychoanalytic theory. S. Freud's theories of affect primarily resulted from his interest in anxiety. His formulations reflected not only his clinical orientation, but also the emergence of his metapsychological viewpoint, the concept of instinctual drives, and the unpleasure-pleasure principle (Schur, 1969; Novey, 1959). Historically, Freud's conceptualization of affect went through three phases of transformation.
Early in his career, Freud considered affect to be synonymous with psychic energy in general. Later he revised his initial thinking and described affect "...as discharge processes of psychic energies." And finally, he came to view affect as an expression of conflict between the instincts of libido and aggression (Rapaport, 1961). However, throughout these changes in his ideas about affect, Freud strongly maintained that the psychological processes underlying emotion are unconscious. Rapaport (1961) has succinctly summarized Freud's concept of affect in the following manner.

...an incoming percept initiates an unconscious process which mobilizes unconscious instinctual energies; if no free pathway of activity is open for these energies — and this is the case when instinctual demands conflict — they find discharge through channels other than voluntary motility; these discharge processes — 'emotional expression,' and 'emotion felt' — may occur simultaneously or may succeed one another or either may occur alone; as in our culture open pathways for instincts are rare, emotional discharges of varying intensity constantly occur; thus in our psychic life, besides the 'genuine' emotions described in textbooks — rage, fear, and so on — an entire hierarchy of emotions exists, ranging from the most intense to mild conventionalized, intellectualized emotions.

Freud defined the affect of pleasure in a negative manner. In other words, he postulated it represented the relief from excitation. Freud assumed affect can only occur in situations which involve the inhibition or delay of action, e.g., conditions of reality. Action promotes tension discharge. Affect is associated with the absence of directedness and the inhibition of action (Schachtel, 1959). Schachtel has indicated Freud neglected the positive function of affect, its role in communication, and effecting changes in the outer world by means of communication. He sees this to be the primary function of affect. Schachtel complements Freud's view by asserting affect and action are connected with each other. Affect can be positive and appear in coordinated goal-
directed actions which can be characterized by energetic, zestful, interested, and tension-imbued feeling tones.

The function of the activity-affects is to establish an effective emotional link between the separate organism and the environment, so that the organism will be able to engage in those activities which satisfy his needs, develop his capacities, and further his life (Schachtel, 1959).

The same basic psychological factors or dynamics that underly the experience of emotion are also responsible for the organization of memory (Novey, 1961; Rapaport, 1961; Klein, 1970). Affect probably plays an important role in the development and differentiation of the mental mechanisms which may eventually become ego defenses. In addition, affect may indicate which defensive pattern an individual is using and how effective it is. If it is ineffective, the affect may presage a change in defensive functioning (Schmale, 1967). The purpose of defensive operations is to prevent the emergence of certain emotions into consciousness "...and/or to keep the ideas associated with the emotions out of consciousness (Novey, 1959)." Defense operates not only against the direct expression of instincts, but also against the affects associated with the impulses.

The ego is in conflict not only with those id-derivatives which try to make their way into its territory in order to gain access to consciousness and to obtain gratification. It defends itself no less energetically and actively against the affects associated with these instinctual impulses. When repudiating the claims of instinct, its first task must always be to come to terms with these affects. Love, longing, jealousy, mortification, pain and mourning accompany sexual wishes, hatred, anger and rage the impulses of aggression; if the instinctual demands with which they are associated are to be warded off, these affects must submit to all the various measures to which the ego resorts in its efforts to master them, i.e., they must undergo metamorphosis. At particular periods in life and according to its own specific structure the individual ego selects now one defensive method now another - it may be repression, displacement, reversal, etc. - and these it can employ both in its con-
flict with the instincts and in its defense against the lib-
eration of affect. If we know how a particular patient seeks
to defend himself against the emergence of his instinctual im-
pulses, i.e., what is the nature of his habitual ego-resistances,
we can form an idea of his probable attitude toward his own un-
welcomed affects. If, in another patient, particular forms of
affect-transformations are strongly in evidence, such as, com-
plete suppression of emotion, denial, etc., we shall not be
surprised if he adopts the same methods of defense against his
instinctual impulses and his free associations. It is the same
ego, and in all its conflicts it is more or less consistent in
using every means which it has at its command (A. Freud, 1946).

The psychoanalytic model of affect has never isolated emotion as an
exclusive area of interest or import. Instead, it has been intimately
interwoven with the development of a metapsychology of structure, adapta-
tion, and defensive processes. As has occurred with the other dominant
theoretical traditions in the psychology of emotion, affect has passed
through cycles of concern with the psychoanalytically oriented theorists.
Recently, there seems to be a recrudescence of curiosity and thinking
about the structural concept of affect (Smith, 1970; Leaff, 1971), uncon-
scious affects (Pulver, 1971), affect control (Peto, 1967), and the in-
corporation of informational processing constructs into the analysis of
adaptation, representational processes, and affect (Joffe and Sandler,
1968; Sandler and Joffe, 1969).

In reading through the psychoanalytic literature, the topic of af-
flect tends to be obscured by a multiplicity of abstract theoretical
formulations which are not always clearly coupled with "...observations
made in the psychoanalytic situation (Schafer, 1964)." However, it is
to the credit of the psychoanalytic model that it has been sensitive to
the subtle shades, nuances, and complexities that mark the "...occasions,
meanings, functions and changes of emotion." For example, Schafer has
suggested the following eight general reference points are necessary for
any adequate account of affect:
...affect existence, affect formation, affect strength (including optimal strength), affect stimuli (internal and external), affect complexity and paradox, affect location (in terms of time, layer, person, and zone, and with particular emphasis on so-called borrowed affects and repersonification of affects), affect communication (inter-personal and intrapsychic, with particular reference to empathy) and affect history (Schafer, 1964).

Several of Schafer's points will be discussed during the review of the issues associated with the recognition and expression of facial emotion.

The purpose of the preceding review of theorists is to provide a general theoretical background for a discussion of research efforts into the study of facial expressions of emotion. In some instances, these theoretical formulations have functioned as catalysts for the generation of research hypotheses. Unfortunately, the theoretical roots and implications of research into facial expressions of emotions have tended to remain vague, ill-defined, and somewhat ambiguous. There appears to be no apparent over-riding framework governing investigations into this area, except a concern about the clarification of methodological issues and the variables or parameters associated with the recognition and expression of facial emotion. One goal of the dissertation is to explore the possibility of examining facial expressions of emotion from a developmental perspective, which may have some clinical implications.

The Recognition and Expression of Facial Cues of Emotion

We probably communicate emotion in most face-to-face social interactions. As we express emotion facially, vocally, or through the content of our verbal statements, we tend to monitor and interpret our partner's expressive signs of emotion. And he or she does the same to us in a reciprocal exchange of information. "Our emotional expressions are pro-
viding stimuli to anyone with whom we might be interacting. He in
turn responds to these stimuli. He observes, judges and classifies,
and then perhaps engages in some 'answering' expression (Strongman,
1973)." The recognition of emotion depends not only on perceptual dif-
ferentiation but also the emergence of a mediational process underlying
the interpretation and assignment of symbolic meaning to registered
stimuli (Frijda, 1969).

The human face is a complex and powerful vehicle for the communica-
tion of emotionally charged information. The face is a rich source of
information by its characteristic saliency and expressive fluidity.
However, it can generate confusion and misrepresentation through uncon-
scious and intentional deception and disguise. The intentional control
of facial affect establishes the possibility for the conscious manipula-
tion of others. "The complication is not just the opportunity to glean
such a wide variety of information from this single source, but the pos-
sibility of drawing inferences which may not be correct (Ekman et al.,
1972)."

Experimental effort was especially vigorous from 1914 to the mid
1940's. Interest in this area has been most likely resuscitated by the
growing concern with non-verbal behavior and the possible cue value of
expressive responses in clinical situations (Beier, 1966; Dittman, Par-
loff and Boomer, 1965; Duncan, 1969; Ekman and Friesen, 1969; Exline,
1971; Satir, 1967; Bugental, Kaswan and Love, 1970; Bugental, Love, Kas-
wan and April, 1971).

One of the problems confronting research on emotion in the human
face is that of accuracy, i.e., what is the fidelity of emotional infor-
mation provided by the face, and how is it related to other indices or
criteria to determine what emotion was actually experienced? It would seem that accuracy is particularly relevant to the communication of emotional intent by facial behavior, and the discrimination of facial expressions of affect made by others. Facial expressions of emotion require the study of the efficacy of performance, as well as, the efficiency of observation.

If we are to show that the face provides accurate information, we must do two things. Some measurement procedure must be used to decipher the information shown in a face, and some other index of what occurred must be obtained, so that the information from the face can be compared with this index. If they coincide, the face provided accurate information. The accuracy criterion is the index of what occurred; this is compared with the facial information (Ekman et al., 1971).

The subsequent review of the research literature will show that previous efforts have concentrated upon establishing the fact that the face can provide accurate information about emotion. According to Ekman et al. (1972), accuracy refers to "...'correct' information of some nature being obtained, by some means, from facial behavior." For the advancement of knowledge about facial behavior, Ekman and his colleagues suggest that multiple indices must be examined as standards of comparison, which are independent from any measurement procedure used to decipher the information exhibited in a particular face. Independent criteria could include antecedent and/or consequent events, consensus by a group of raters, or concomitant behaviors (physiological measures, verbal self-report, facial behavior or responses).

Ekman's compendium revealed that few investigators used data from more than one of these sources as their accuracy criterion. As Ekman points out, inter-subject variability in the interpretation of facial behavior, understanding of instructions, and intentional disguise of
emotion necessitates the combination and comparison of multiple criteria in order to establish a reasonable degree of accuracy.

Ekman is sensitive to the question of relevance and makes an important distinction in his argument on accuracy.

Our definition of accuracy refers to correct information, but does not require that the information be relevant to emotion. To establish that the information derived from the face is correct does not guarantee that the correct information concerns emotion, in any of its various definitions. There is no reason to derogate findings which show accuracy. Correct information from the face is important evidence of the face's ability to provide information about personality . . . but it may or may not be related to the construct of emotion. Maintaining the distinction between accurate information from the face and accurate information about emotion is fundamental to resolving some of the confusions in the relationship between the two general research methods for studying the face, to elucidating problems inherent in the choice of eliciting circumstances, and to interpreting substantive findings on accuracy (Ekman et al., 1972).

Many of the assumptions that regulated the early research on the accuracy of judgments made about the emotional states of others originated with Charles Darwin. Darwin (1872) contended that the expressive patterns associated with emotions represented vestigial responses, which previously had a survival value or function for a particular species of animal. Darwin implicitly assumed that specific facial features or overt cues are always consonant with certain emotional states, e.g., smiling indicates happiness. Also, he seemed to believe everyone is able to accurately perceive and differentiate the cues that are associated with different kinds of emotions. Darwin ignored the problem of individual differences in the ability to recognize the expression of emotional states (Hastorf, Schneider and Polefka, 1970).

Darwin's studies on the identification of emotion provided a methodological model, which in some way or another is reflected in almost
all the subsequent investigations into the facial expression of affect. He had a number of photographs made of a male subject showing different types of facial expressions. Then he presented the photographs to naive judges and asked them to identify the feelings the subject was experiencing. Some of the photographs were correctly identified by a majority of the judges, but the other pictures elicited a wide variety of judgmental discrepancies. Since Darwin maintained the relationship between stimulus experienced affect and emotional expression was biologically determined, he argued that the judgmental discrepancies evident in his research were produced by the artifact of instructional set.

Feleky (1914) had a set of photographs taken of herself while she tried to pose such emotions as "agreeable surprise," "hate," and "pity." The photographs were given to judges, who were asked to identify the expressions from a list of emotional terms supplied by Feleky or else use their own labels that would be relevant for describing the posed emotion. The results demonstrated considerable variance in judgmental accuracy. Fifty-two per cent of the judges correctly choose the specific label of surprise for the appropriate photograph while only 8 per cent accurately identified the pose of "hate."

The low percentages of inter-judge agreement in Feleky's study resulted from the large number of different labels used by the judges to describe each photograph. Seventeen different terms were used to characterize the expression of surprise, and 29 words were chosen to label the emotion of hatred. Woodworth (1938) thought Feleky had underestimated the extent of judgmental agreement and reanalyzed her data. He combined all the terms that he believed were synonymous and found, as could be expected, the percentage of accurate judgments increased. The per-
percentage of accurate judgments increased. The percentage of judge agreement for surprise improved from 52 to 77 per cent when he pooled judgments of "wonder," "astonishment," and "amazement" with those of "surprise." In order to determine the extent of judgmental error, Woodworth put the most frequently confused poses in adjacent categories. Consequently, he was able to develop a unidimensional six category scale of adjacent and confused emotions: love-happiness-mirth; surprise; fear-suffering; anger-determination; disgust; and contempt. Through the use of his unidimensional scale, Woodworth was able to demonstrate that the median percentage of all correct identifications in the Felek study was 78 per cent (range, 60 to 93 per cent).

...Woodworth demonstrated that we can accurately discriminate among broad categories of emotional state, if not among highly specific emotions, and that the extent of our ability to discriminate between any two emotions could be represented by the distance between the emotional categories along a unidimensional scale (Hastorf, Schneider and Polefka, 1970).

Although Woodworth's study is somewhat reassuring, it is difficult to make a general definitive statement about accuracy in the perception of emotional cues. Aside from the complexity of the phenomena, part of the problem lies with the nature of the research that has been conducted on the topic. Experimenters' assumptions, interests, and methodologies have differed. Some investigators have utilized the judgmental approach, e.g., Darwin and Felek; others have concentrated upon the component analysis or the contribution of various aspects of the face itself (eyes, mouth, eyebrows, etc.) on the recognition of emotional facial expressions. Fidelity of the photographs, characteristics of the stimuli (live versus posed), and the type of situations (laboratory versus real-life) which are used to elicit the expressions, all influence accuracy in
some manner (Taguiri, 1969; Ekman et al., 1972). How refined judgments of accuracy have had to be, the dimensions examined, and individual differences among judges are additional factors which prevent the drawing of really substantive conclusions from across studies.

Many of the previous reviews have contrasted two groups of studies which either support or supposedly refute the contention that accurate judgments can be made about facial expressions of emotion. Two of the most frequently cited negative studies are those of Landis (1924; 1929) and Sherman (1927). Landis was able to get 25 subjects to participate in seventeen different stress-producing situations (smelling ammonia, being shocked electrically, decapitating a live rat, viewing pornographic pictures, etc.), and took still photographs of their facial expressions during each experience. Landis elicited only brief introspective self-reports after each event because he specifically wanted to establish a "cumulative disturbance." Later, four of the subjects were asked to remember the situations and pose a facial response for each. From a bank of 814 total photographs, Landis selected 77 which he himself thought were fairly expressive. Fifty-six of the 77 photographs were from the original situations. The remaining 21 photographs represented the remembered or posed expressions. The set of experimental photographs sampled the facial behavior of 22 subjects. Finally, Landis presented the photographs to 42 independent judges and asked them to use their own words to describe each facial expression of emotion, what the eliciting situation might have been, and the certainty they felt about their judgments. Landis stated his data definitely showed that judgment of emotions and the situations ascribed by observers to photographs of facial behavior were totally irrelevant to both actual and posed situations,
and to introspective self-reports made during the actual stress situations (Ekman et al., 1972).

Landis' research was marred by serious methodological flaws and it is difficult to accept the results with assurance. Several authors (Davis, 1934; Arnold, 1960; Murphy, Murphy, and Newcomb, 1937) have severely criticized the Landis results because of the failure to control for the cumulative effect of experiencing the various stress situations which may have obfuscated the discrimination of separate emotions by the observers. Additionally, the Landis situations may not have elicited the same emotion in all his subjects, and there is evidence that he may have unintentionally encouraged his subjects to disguise their responses to the situations (Ekman et al., 1972). Although Coleman (1949) was interested in the accuracy of judgments based upon information from the top and bottom half of the face, he used similar stress situations and attempted to rectify some of the procedural inadequacies of Landis' research. Coleman's results suggest observers can accurately identify both posed and spontaneously experienced facial expressions of emotion.

Sherman (1927) conducted an experiment in which he made continuous photographic recordings of the behavior of two infants, who were 7½ and 14½ hours old. The infants' responses were elicited by four types of circumstances: hunger (15 minute delay in the infants' regular feeding schedule); sudden loss of support (dropping the infants); restraint of head movement; and pricking the infants' cheeks six times with a needle. Graduate and freshman college students were shown the filmed post-elicitation infant behavior. The students were
asked to describe the exhibited facial expressions of emotion and speculate about what may have been the eliciting situations. This particular experiment of Sherman's was only one of a series that were similar in nature. However, Sherman considered the data from this experiment to be the most detrimental to any assertion that accurate judgments of emotions can be made from infants' facial because he presumed the eliciting circumstances produced different kinds of facial expressions of emotion, that the infants' conveyed the same emotion, and that the facial expressions had not decayed or appreciably changed by the time the post-elicitation films were made. The infants were extremely young and Sherman seems to have ignored the effect of maturational processes on the ability to facially depict emotion. "Maturation might be such that the differentiated perception of the situations necessary for differential facial response, or the differentiation of the facial responses themselves might not have unfolded prior to an age of 150 hours (Ekman et al., 1972)."

Although he was mainly concerned about the clinical aspects of affect rather than facial behavior per se, Schafer's (1964) discussion on "affect existence and strength" is relevant to the problems presented by the Landis and Sherman experiments. His article was not meant to supply any ready-made solutions. Instead, it is an attempt to sketch out some of the complexities that are involved in the study of affect, and to demonstrate the function of dynamic factors on affect expression. The clinical side of the coin is an area
that has not really been appreciated by many of the reviewers or investigators. According to Schafer, there are two facets to the concern about affect existence. First, the affect may be present but warded off by defensive processes and kept contained at an unconscious level. Second, the experience and expression of affect may indeed be artificial or superficial. The behavior may reflect the absence of a deep feeling, Schafer qualifies this by noting:

clinical and personal experience teaches us to expect certain types of feelings in certain situations. The fact that they are expressed does not prove they are genuinely felt; the fact that they are absent does not mean that they are there but hidden; the fact that they are conveyed histrionically or in an offhand manner does not mean that they are entirely artificial. The distinctions are not always easy to make. As analysts we wait and wonder, sometimes aloud, and give ourselves and our patients time and opportunity to make sure.

Affect strength refers to the intensity of existing or remembered feelings. The importance of affect strength is that emotional experience must be intense enough to correctly orient the ego in the testing of inner and outer reality, which in turn facilitates the organism's adaptive functioning. Affect intensity also contributes to the:

...inner sense of sincere involvement in experience. This definition of optimal strength is necessarily quite general; it actually covers an optimal range of intensity, and it varies among individuals and within any one individual as regards different emotions and different situations.

The analysis of affects thus includes an appraisal of affect strength from the standpoint of the ranges within which an individual's various affects are maximally informative, orienting, convincing, and useful for adaptation (Schafer, 1964).

When the Landis data is examined, Schafer's discussion becomes
especially illuminating. Landis commented smiles were frequently elicited in all his supposedly stress inducing situations. And for more than a third of the 17 situations, a majority of the subjects indicated in their self-reports that the experiences generated "no feeling" in them. The subjects' responses may have been colored by the operation of defensive processes. Ekman et al. have suggested the subjects' behavior (smiling) may "...indicate the operation of display rules either to neutralize the facial responses or to mask them with positive affect."

In addition, the situations may not have been sufficiently salient or potent in producing affect intense enough to promote a sense of personal involvement in the experience. However, supplemental anecdotal material and Coleman's experience with the eliciting situations suggest that self-reports of absent feeling may indicate "...an unwillingness to acknowledge being emotionally aroused, which could have been duplicated in the facial behavior (Ekman et al., 1972)."

Ekman and his colleagues make the cogent observation that although the Landis and Sherman experiments are troubled by methodological problems and questionable assumptions, they still continue to exert considerable influence on the investigation into judgmental accuracy and facial expressions of emotion. These two experiments appear to have prompted Hunt's (1914) argument that posed facial behavior "...is a specialized, conventionalized language which, while related to emotion words, is unrelated to the facial behavior occurring when emotion is spontaneously experienced (Ekman et al., 1972)." Given the Coleman results on accuracy, there still remains the possibility that posed facial behavior may represent a highly stylized manner of presentation, which could have little relevance to the facial expressions of emotion that occur in spon-
taneous exchanges between parents and children, friends and enemies, or lovers. There is little doubt that this persistent problem has been and probably will continue to be a thorn in the side of research into facial behavior. It is a critical validity question and demands respect and attention.

Hunt especially attacked the research on judgmental accuracy on the basis of insufficient evidence for generality across persons and time. He suggested that really informative faces may be singular or rare events which may become lost in a sequence of ambiguous facial behavior. Also, some individuals may be just particularly skilled in the ability to facially convey certain categories of emotion. Hunt's position appears to have been based more upon deductive argument and extrapolation than direct experimental evidence. Although there are a host of unresolved methodological difficulties associated with the approach, Ekman contends that evidence of adult judgmental accuracy has been sufficiently established since Hunt's article to allow for a shift in research perspective. He advocates the development of multiple independent indices or criteria, and their application to spontaneous situations which involve facial expressions of emotion.

In the past ten years, several experiments have examined judgmental accuracy and spontaneous facial behavior in laboratory and "naturally occurring" situations (Ekman and Bressler, 1964; Ekman and Rose, 1965; Frijda, 1969; Howell and Jorgenson, 1970; Lanzetta and Kleck, 1970). In most instances the subjects were randomly selected and segments were randomly drawn from continuously filmed sequences of facial behavior. All the studies had positive results suggesting that judgmental accuracy can be considered to have generality across persons
and time. However, the emotions judged in these research projects were
general (distinguishing between positive and negative emotional states)
rather than the specific categories of anger, happiness, sadness, etc.
(Ekman et al., 1972). Consequently, Hunt's criticisms have not been
completely refuted. The problem of generality of judgmental accuracy,
spontaneous facial behavior, and specific categories of emotion needs
additional research before Hunt's questions can be fully resolved.

Thompson and Melzer (1964) were interested in the accurate communi-
cation of emotional intent through facial expressions. They wanted to
"...ascertain the extent to which college students (expressors) can,
by means of facial expressions deliberately produced, convey to others
(judges) the emotional meaning intended by the expressor." In order to
determine whether any personality and intellectual factors were associ-
ated with the ability to enact various emotions, the California Person-
ality Inventory was completed by each student and the verbal and mathe-
matical scholastic aptitude scores were obtained from his school record.
Thompson and Meltzer had the fifty subjects pose ten different emotion,
two times each, to four independent judges, who sat in front of the sub-
ject during the experimental session. For each trial, the subject was
simply presented a card which had the name of one of the ten emotions
love, happiness, bewilderment, surprise, fear, suffering, anger, deter-
mination, disgust or contempt) and was given 15 seconds to portray the
representative facial expression. The results suggest that all of the
expressors were able to communicate to a certain extent their emotional
intentions through facial expressions. Happiness, love, determination,
and fear were the emotions most often judged correctly; suffering, con-
tempt, and disgust were least often correctly judged. The influence of
personality correlates was found to be absent on the ability to facially communicate emotional intent, but individual differences were pronounced. Partly as a response to the reservations raised by Hunt, Thompson and Meltzer designed the experimental procedure to simulate typical situations involving social living and interaction. They rightly or wrongly assumed that the "...subjects acted before judges who are equivalent to the small groups of people before whom one acts in everyday life. The subject's task, to give new acquaintances certain impressions of himself, is something we all must do when we meet new people."

Levitt studied the relationship between the vocal and facial expression of emotional meanings. He had sound motion picture recordings made of 50 graduate students attempting to portray six emotions (joy, surprise, fear, disgust, anger, and contempt) both vocally and facially. Using a "content-standard" sentence procedure developed by Beldock (1964) each subject alternated expressing emotional information through facial, vocal tone, and vocal-facial combination cues. The results indicated a low (.35) but significant correlation between vocal and facial emotional expressive abilities. However, contrary to Levitt's predictions, the facial communication of emotional meaning was found to be more effective than vocal communication alone. In fact, there were no significant differences between the facial and simultaneous vocal-facial modes of emotional communication. Levitt concluded that the human face is a fairly effective and potent source for the accurate communication of emotional information.

Additional confirmatory evidence that emotional meanings can be transmitted by the facial mode with substantial specificity comes from Bugental, Kaswan and Love (1970). Acted videotaped messages containing
inputs (friendly or unfriendly) in verbal (content), vocal (tone), and visual (facial expression) channels were presented to 80 children and their parents. Besides demonstrating that conflicting messages involving criticisms said with a smile were more negatively interpreted by children than the adults, the authors remarked that the visual channel contributed more in the resolution of conflicting messages than did the verbal or vocal channels. In comparison with script (verbal content) or voice, the visual mode accounted for almost twice as much of the variance.

Most of the investigations into facial expressions of emotions have been judgmental studies which ask observers to identify stimuli according to some judgment procedure or a list of words denoting emotional meaning. Two kinds of judgmental procedures that are typically used involve either having observers select their responses from a number of prescribed categories or rate the faces on a series of scales or dimensions. Judgmental studies that utilize the category approach will be concentrated on because this procedure is the focus of the dissertation. Several researchers have assumed there is a set of basic emotion categories. These categories presumably differ in intensity, degree of control, denotative meaning, and facial behavior that is associated with each. The systematic relationship between the categories and the criteria for including supposedly synomous descriptive terms has not been clearly delineated (Ekman et al., 1972).

Tomkins and McCarter (1964) postulated that facial expressions of emotion are composed of eight primary affects: interest, enjoyment, surprise, distress, fear, shame, contempt and anger. The authors photographed models who were instructed to facially pose neutrality and the
eight designated affects. Tomkins and McCarter collected 69 still photographs, which were presented to a group of 24 firemen. The judges were instructed to select the three best pictorial stimuli of neutrality and each of the eight affects. They were interested in accuracy of identifications; whether the subjects would systematically confuse some of the primary affects with others; and individual bias in the judgments of the simulated facial affects. The correlation between the affect posed and the subjects' judgments was .858. There was also additional evidence of systematic judgmental confusion of some of the primary affects, and individual bias in judgments. The issue of systematic judgmental confusion will be treated in length at a later point in this chapter.

Like Tomkins and McCarter, Felek (1914), Woodworth (1938), Plutchik (1962), and Frijda (1966) all used still photographs of posed facial expressions of emotion. Although these investigators differed in theoretical assumptions and their use of different stimulus materials and judgmental procedures, they showed that at least the following seven categories of emotion can be determined from facial behavior: happiness, surprise, fear, anger, sadness, disgust/contempt, and interest (Ekman et al., 1972). The last two categories were consistently found to be the most difficult for adult subjects to differentiate. In addition, the research of these individuals represent an important rejoinder to Hunt's criticism because they have demonstrated that facial expressions of emotional intent can be accurately discriminated by untrained observers. There now appears
to be enough positive evidence to suggest that facial responses are systematically related to emotion information and the study of spontaneous behavior (Ekman et al., 1972).

Levy (1964) examined the relationship between the ability to express and perceive vocal communications of feelings. Levy hypothesized that the following variables would be intercorrelated: the ability to express feelings vocally to others; ability to identify feelings expressed vocally by others; ability to identify one's own vocal expressions of feeling. She also projected that women would show greater accuracy in these abilities than men. Her subjects were 77 graduate students of different sex and race. The judges were ten male and female adults. The dependent variable was judged scores on Beldoch's content-standard speech method. Although she found no important sex differences, Levy obtained significant positive intercorrelations among the three communication abilities. These positive intercorrelations were sustained even after verbal intelligence was partialled out. Levy interpreted her results as suggesting that a general communication factor may possibly underlie the three separate communication abilities.

Such results...give rise to the hypothesis that the communication of feeling, regardless of the medium through which it occurs or its manner of expression, and regardless of the particular aspect of the process in question, demands certain stable and uniform ways of organizing and responding to internal and environmental cues. The response to such cues would seem to operate in a consistent, characteristic fashion in individuals, transcending both contextual and content changes. Thus, it would seem likely that those individuals who demonstrate a high degree of accuracy in one aspect of the communication process, or through one medium or mode of expression, will show corresponding accuracy in other aspects of the process and through other media or expressive modes (Levy, 1964).
Although Levitt (1964) found a low but significant correlation between facial and vocal modes of communication, only Lanzetta and Kleck (1970) have specifically studied the relationship between recognizing (decoding) and expressing (encoding) emotional facial behavior. Lanzetta and Kleck "expected that those persons who provide nonverbal cues which facilitate accurate identification of their affective state would also be those persons most successful at decoding the nonverbal displays of others." Twelve college males learned to avoid experiencing "moderately irritating" electrical shock by discriminating which of two differently colored lights signaled the occurrence of the noxious stimulation. Along with continuous recordings of skin-resistance measures, each subject's nonverbal responses to the red and green signal lights were photographed without their knowledge. The videotapes were later seen by each and five other subjects, individually, and they were asked to discriminate between shock and non-shock trials. Judgmental accuracy was found to be above what would be expected by chance, but the authors' hypothesis had to be rejected because an inverse relationship occurred in the ability to display and interpret facial affect-related cues. Subjects who were substantially accurate in the interpretation of the facial displays of others, were themselves poor expressors (exhibited ambiguous facial cues) and vice versa. It is difficult to compare or generalize Lanzetta and Kleck's results to the previous research on the judgments of emotion categories because of the limited number of subjects, the inclusion of upper body cues, and the question of what kind of emotion was actually generated in
the situation. Obviously the nonverbal behavior was spontaneous, but Lanzetta and Kleck failed to specify in their procedures whether the judged facial affect-related cues represented fear, pain, anger, annoyance or whatever. However, their interest in the relationship between the decoding and encoding of facial communications of emotion is suggestive and stimulated one of the hypotheses of the present study.

Usually affect is not a static condition but rather a dynamic process that is part of a situation. Landis (1929) and Goodenough and Tinker (1931) noted accuracy and inter-judge agreement was facilitated when observers were provided information about the situation of the pictured person. They concluded informational cues about emotional intent could not be judged from facial expressions. Instead, these authors maintained the accurate determination of exhibited emotion depends upon inference from knowledge of the situation. Since the time of these early research efforts, enough evidence has accumulated to suggest that facial, instead of situational, cues may be the principle source of information about expressions of emotional intent (Janis, Mahl, Kagan, and Holt, 1969).

Munn (1940) found that judgments of emotion from photographs of facial expressions were not enhanced by the inclusion of situational cues in the pictures. Munn presented to college students enlarged pictures of the faces of people supposedly experiencing various emotions (joy, terror, anxiety, surprise, and disappointment). A week later, the subjects were given the opportunity to see the same pictures but in this case they saw the entire stimulus persons in the natural
setting. Judgmental performance was not appreciably improved when the context was added. However the issue has not been clearly resolved because of certain methodological inadequacies in Munn's experimental procedures (Ekman et al., 1972). Dashiell (1927) asked children to match photographs of facial expressions to passages in a story and elicited more subtle recognitions than had been reported at the time (Frijda, 1969). In situations involving a discrepancy between contextual and facial cues, most of the research indicates the facial expressive features become the dominant source of information for judgments about the communication of emotional intent (Flores d'Arcais, 1961; Frijda, 1969; Bugental, Kaswan, and Love, 1970; Strongman, 1973). Although the impact of contextual configurations on judgmental accuracy is not the concern of the dissertation, it is an important facet of research into facial communication and warranted brief comment.

**Display Rules and Role Theory**

Hebb (1946) has indicated that the control of facial behavior and the social pressures which govern such expression can distort or conceal the responses the investigator attempts to elicit. Ekman et al. (1972) believe that when a subject is asked to pose an emotion the researcher is implicitly suggesting the person exhibit an extreme example of the emotion. They assume the subject will not "... deintensify, mask or neutralize his facial appearance." It is speculated that if the subject were given a low intensity word cue (e.g., annoyance), the presented facial behavior would simulate a moderate to low intensity emotion. Also, the experimental subject could be
instructed to communicate the facial behavior he would show in a situation where a display rule was operating, such as, an angry confrontation with an authority figure. "With such an instruction posing might well yield facial behavior which is quite similar to much spontaneous conversational behavior where display rules for the management and control of facial appearance are operative."

Ekman and Friesen (1969) discussed four management techniques for the control of facial behavior: (1) intensifying, (2) deintensifying, (3) neutralizing, or (4) masking a felt emotion with the facial behavior usually associated with a different emotion (Ekman et al., 1972). They theorize:

...these control techniques for managing facial behaviors associated with emotion are operative in most social situations, and that display rules are learned, usually early in life, for each facial behavior which specify what management technique should be applied by whom in what circumstances. The display rule dictates the occasion for the applicability of a particular management technique in terms of (a) static characteristics of the persons within the situation (e.g., age, sex, physical body size), (b) static characteristic of the setting (e.g., ecological factors, and social definition of the situation, such as funeral, wedding, job interview, waiting for a bus, (c) transient characteristics of the persons (e.g., role, attitude), and (d) transient regularities during the course of the social interaction (e.g., entrances, exits, transition points, periods in conversation, listening, etc.). The face appears to be the most skilled non-verbal communicator and perhaps for that reason the best 'nonverbal liar,' capable not only of withholding information but of simulating the facial behavior associated with a feeling which the person in no way is experiencing (Ekman et al., 1972).

One of the most salient issues in role theory is the degree of organismic involvement in role enactment. Sarbin (1954) suggested that organismic investment could be differentiated along seven descriptive levels which range from mundane, casual roles with little affect and effort to conditions representing hypnotic experience, hysterical fugue,
ecstatic states, mystical experiences, sexual climax, and Voodoo death. In between these extremes of intensity, are the levels of "mechanical" and "heated" acting. Mechanical acting consists of performing the motions necessary for the portrayal of a particular role with little affective involvement. This appears to be only a short step above the automatic assumption of a consumer role in the supermarket. Heated acting entails an intense "living the role" in which the actor deeply experiences the affect he is trying to portray. Frijda (1969) constructed a set of 27 bipolar 7-point scales to represent approximately 400 terms used by 30 subjects in a free-labeling experiment. Twelve subjects rated each of 30 photographs selected from a set of over 200 facial expressions posed by an actress. A centroid factor analysis revealed the presence of four predominant factors: pleasantness-unpleasantness, level of activation, attention-rejection, and a final dimension which is relevant to Sarbin's presentation of role theory. This fourth factor was most highly loaded by the "natural-artificial" scale. Initially, Frijda interpreted this factor as representing a social evaluation embodying the impact upon the observer rather than an aspect of the subject's inner life. Stringer (Frijda, 1969) re-evaluated Frijda's conclusions and maintained the factor instead represents a reactive versus active opposition which can be characterized as attitudes elicited by the environment in comparison to those initiated by the subject. From Sarbin's perspective, the factor probably reflects the degree of organismic involvement or investment in role enactment.

Another aspect of role enactment which is related to the operation of display rules and the development of affect language is that of ac-
cessibility or the "as if" dimension. The "as if" is a conditional clause which provides the opportunity to categorize a number of disparate events.

In the as if statement, or the conditional clause, something unreal, untrue, problematical, or fictive is stated. With this assumptive behavior is associated the maintenance of the assumption in spite of its fictive character. The maintenance of the assumption is possible only if the organism has developed verbal symbols and the capacity to bind time and tension. The imaginal processes, fantasy, identification, etc. are now seen to depend upon the capacity to engage in as if behavior (Sarbin, 1954).

Sarbin insists "as if" behavior can be considered to be an aptitude or skill, which is applicable to all imaginative behavior, e.g., drama, hypnosis, fantasy, play, facial expressions of emotion. Sarbin concludes that to determine whether "as if" behavior exerts a significant impact on the performance of a subject "...we can observe the overt action of persons under instructions to behave 'as if' something is or is not occurring." Consequently, it can be argued that the assumption of the "as if" behavior of facial communications of emotional intent to abstract affect concepts or word prompts may represent a form of "mechanical acting" if there is little evidence of organismic involvement. Whereas, imagining affectively charged concrete things, situations, or experiences may constitute "heated acting" when there is an associated indication of intense involvement.

The Correct Recognition of Facial Communication of Emotional Intent

The research into the recognition of facial expressions of emotion has been marked by examples of both substantial consensus between judges and the pronounced failure of such consensus. Consensus may be possible because familiarity with the human face has taught
us it can be an important source of information, and "...its 'constancy' is maintained despite the most extreme stimulus variations (Tomkins and McCarter, 1964; Ittelson and Slack, 1958)." Support for such an assumption comes from Gibson's (1969) summary of the research on the development of perception of the human face. Gibson's model of perception represents a stimulus oriented differentiation theory. Perceptual learning involves the progressive differentiation of distinctive and economical features of informationally rich stimuli. Feedback promotes the development of higher levels of differentiation, abstraction, and generalization. The perceptual process involves active, adaptive, and self-regulated search and exploration, which is structured by the task at hand and intrinsic cognitive motives. The goal of perceptual search is the reduction of uncertainty. After reviewing the research on infants' perception of the human face, Gibson concludes:

The term 'schema' has been used by Kagan (1965) and by Lewis (1965) to refer to a concept of a correctly structured face, and they believe that development of such a schema underlies differential response to real faces, distorted faces, and pictured faces. It is my thesis, however, that the schema does not underlie discrimination, but rather follows it. Development takes the course of first responding discriminatively with crude compulsory fixation of high contrast edges or spots in the field. Then follows gradual extraction of distinctive features of the oft-presented face object, differentiated as individual features only. Later comes noticing of invariant relationships between features such as the two eyes in a given orientation in the head; later still, the array of features characterizing a real face as distinct from a dummy's or from schematic drawings is distinguished, with no one feature any longer dominant. Eventually, the unique feature pattern characterizing a particular face is selectively responded to. This pattern is itself a structural characteristic of the face object, there to be grasped perceptually. A schematic concept of 'face in general' would seem to follow, rather than to precede perceptual selectivity (P. 356).

In his delineation of the descriptive-regulative orthogenetic principle of development, Werner (1957) states that wherever development oc-
curs it proceeds from a state of relative globality and lack of differentiation to a state of increasing differentiation, articulation, and hierarchic integration. On the basis of Gibson and Werner's ideas, I think we can propose that children's recognition of facial stimuli, communicating some kind of emotional intent or information, would gradually become more refined, differentiated, and accurate with age. In addition, the judgment of emotional categories approach to the study of facial expressions of affect has received some support from Bruner's view of perception. Bruner (1973) maintains the perceptual process entails "an act of categorization." Succinctly, "...adequate perceptual representation involves the learning of appropriate categories, the learning of cues useful in placing objects appropriately in such system of categories, and the learning of what objects are likely to occur in the environment (Bruner, 1973)." Consequently, judgmental accuracy and consensus about facial arrays depicting emotional information can be achieved:

Because of the affective responsiveness of human beings to the faces of others, because of the importance of the information communicated by the human face and because of the years of experience in interaction with faces, the individual is constantly challenged to organize this information in more skillful and efficient ways so that eventually he is capable of interpreting an extraordinary amount of information from momentary, slight facial responses. He learns the language of the face (Tomkins and McCarter, 1964).

According to Tomkins and McCarter, another factor contributing to the development of accuracy is the isomorphic relationship:

...between the visual face of the other and the interoceptive face of the self. Although the feedback from our own face is in non-visual modalities, we learn the rules of translation between what the face looks like to what it feels like and from both of these to the motor language, so that eventually we are capable of imitating either what a face looks like or what it feels like.

These rules of translation are for the most part not explicitly
formulated, but they are learned either involuntarily as when one smiles to a smile of the other, yawns to a yawn, becomes angry to anger, frightened to fear, saddened by the grief of the other, or, in a voluntary way, as when one self-consciously imitates a facial expression or dissimulates (Tomkins and McCarter, 1964).

The vicarious conditioning of emotional responsiveness may also play a part in judgmental consensus about the facial communication of emotional information. Bandura (1969) has suggested affective expressions of a model can serve as arousal stimuli for observers. Some of the clearest examples of affective learning through aroused emotions has occurred with experiments on infra-human subjects (Hebb, 1946, 1949). Miller and his cohorts (Miller, Murphy, and Mirsky, 1959; Miller, Banks, and Ogawa, 1962, 1963) trained Rhesus monkeys to avoid an electrical shock by pressing a bar whenever a stimulus light appeared. Following avoidance learning, the monkeys were placed opposite each other. The restraining chair of one of the monkeys was equipped with a bar but no light; the other monkey was able to see the signal light but had no bar to push to avoid the shock. Consequently, the monkey that only had access to the conditioned stimulus (light) had to communicate the appropriate affective cues (startle response and leg retraction movement) to his partner with the response bar, who could then perform the instrumental response that would enable both animals to avoid a painful shock. The results demonstrated significant evidence of cooperative avoidance. Subsequent modifications of the experimental procedures by separating the monkeys in different rooms so that the animal with the response bar could only see the face of the first monkey on a television screen produced the same results. Miller also found that presenting color slides showing the stimulus monkey in fear or pain elicited more avoidance re-
responses than pictures of the same animal in non-fearful poses. Finally
to indicate the importance of experience upon sensitivity to expressive
cues, Miller, Cail, and Mirsky (1967) discovered that monkeys reared in
total isolation during their infancy were unresponsive, either behavior-
ally or autonomically to facial expressions of emotion of other monkeys
(Bandura, 1969).

Bandura's (1969) discussion of the experiments on children's repro-
duction of modeled responses and Schachter and Singer's (1962) use of
provocative situations to evoke copying responses to an experimental co-
hort's cues of happiness and anger lend credence to Tomkin and McCarter's
contention that we gradually become capable, through the learning of
translation rules, of imitating facial expressions of emotion. Unfortun-
ately, the relationship is not necessarily a clear cut one. Hamilton
(1972) presented slides of a female model posing emotional expressions
(interest-excitement, enjoyment-joy, surprise-startle, distress-anguish,
fear-terror, shame-humiliation, contempt-disgust, anger-rage and neutral-
ity) to 54 white, upper-middle class university preschool children rang-
ing in age from 50 to 67 months. Judges who saw the individual children
from behind a one-way mirror were asked to categorize the child's facial
expression as he viewed each slide. The observers were unable to see
the projected slides, so assigned judgments depended upon facial cues of
emotion emitted by the child. Observations were conducted under three
types of experimental manipulations: simply viewing the slides; viewing
the slides and then having the subject record that emotion he thought
the model in the slides was posing; and finally, prior to seeing the
slides, having the child play a "follow-the-leader" game with a differ-
ent model. During the game, imitation responses were verbally praised.
Although the accuracy of the observers' judgments was above chance, there was a disappointing absence of significant differences between the three treatment groups. Even though the experimental conditions did not produce an increase in the number of accurate judgments made by observers, Hamilton did show that children can spontaneously imitate, or exhibit parallel responses to facial expressions of a model presented in slides.

It can be inferred from Tomkins and McCarter's argument and the above that with experience, development, and the acquisition of the translation rules between facial appearance and interoceptive cues of the face, children's capacity to exhibit or imitate facial expressions of emotion should become more articulated, discriminable, differentiated, and decipherable to others (judges). Verification of this assumption is one of the concerns of the dissertation.

**The Failure to Recognize or Express Facial Cues of Emotion**

Now turning to the other side of the coin, why does consensus fail? What accounts for the difficulty people have in discriminating or expressing facial cues of emotion? As the reader has probably already noticed, few outside of Tomkins and McCarter have attempted to analyze the patterns of confusion which underlie judgments about the facial communication of emotional information. The problem is a Gordian knot. Tomkins and McCarter's efforts to unravel the twisted strands can only be considered to be a beginning. The most immediately apparent reason for judgmental inefficacy is the qualitative inadequacy of the presented stimulus. Models differ in the skill of portraying facial expressions of emotion and the ability to translate the instructed or requested af-
fect into unambiguous overt facial cues. For example, some may not be able to evince anger whereas others may have trouble with expressing surprise or another category of emotion. A cooperative and friendly model may find it impossible to pose anger. A depressed, reluctant, or hostile subject may be unable to generate expressions of happiness. In a passing comment, Tomkins and McCarter remarked that their 6 and 7 year old children disavowed feelings of anger and had pronounced difficulty mimicing the experimenters’ angry facial expressions.

Aside from the dilemma of guaranteeing an accurate pose of affect in each photograph, real life facial expressions of emotion may not be isomorphic with the isolated and segmented responses that are elicited under experimental or laboratory conditions. "A still picture lacks one of the most salient forms of information that stimulation from the real world provides; that is, the continuous transformations over time that permit detection of invariants over an event (Gibson, 1969)." It has to be recognized that this factor may substantially confound any research which uses the technique of posed, still photographs. The review has already touched upon and contrasted the methodologies and results of research using this approach versus live and spontaneous units of behavior. Perhaps, the most astonishing finding of all is that consensus can be appreciably achieved with still photographs.

A question that is especially pertinent to developmental research is whether young children can adequately recognize and differentiate the distinctive and invariant features of pictured objects. If the stimuli display certain eye patterns and movements, infants will respond with equal attention to both schematic and real faces. Gradually the infant becomes able to differentiate between simulated and real faces.
Fidelity of the representation appears to be the crucial factor in this process. "When the representation lacked critical properties of the real object—for instance, when it was flat, cut off short, without symmetry, without movement, or had randomly arranged features—evidence of differential response was found by the end of three or four months of life (Gibson, 1969)." Hochberg and Brooks (1962) taught a referential vocabulary to a child by presenting only solid objects which occurred in his environment (toys, relatives, common objects). Contact with pictured content was carefully avoided. At 19 months, the child was asked to identify a number of pictured and line drawn items that he had had previous experience with (tennis shoe, roller skate, toy airplane, whistle, etc.). From the child's responses it was fairly evident that he was able to accurately discriminate the photographed and schematically drawn items. Gibson (1969) concludes from this project and others that, "...differentiation of pictured objects is learned at the same time that distinctive features of the real object are learned. That is, the features will also be recognized when they are present in pictures."

Another possible source of confusion is the sometimes ambiguous relationship between affects and the words that are used for these expressions. Selective reinforcement, punishment, or attention by parents may augment or impede the development of making associations between affect labels and responses. The parents may not cognitively structure or identify the child's feelings and emotional behavior. Consequently, the child may have available only an impoverished and diffuse repertoire of affect concepts to catalog and guide the recognition and expression of facial cues of emotion. Harvey, Hunt, and Schroder (1961) specify
the import of concept development in the following manner.

We assume that an individual interacts with his environment by breaking it down and organizing it into meaningful patterns congruent with his own needs and psychological make-up. As a result of this interchange, perceptual and behavioral constancies develop, which stem from the individual's standardized evaluative predilections toward differentiated aspects of his external world. We will refer to such evaluation tendencies as concepts... A concept is a system of ordering that serves as the mediating linkage between the input side (stimuli) and the output side (responses). In operating as a system of ordering, an intervening medium, or program through which impinging stimuli are coded, passed, or evaluated on their way to response evocation.

Once a concept develops, it serves as an experiential filter through which impinging events are screened, gauged, and evaluated, a process that determines in large part what response can and will occur.

A similar conception can be derived from the psychoanalytic perspective, which maintains drive related patterns of functioning are gradually transformed into ideational representations. The progressive development of this representational or signal function in the human implies the development of ego capacities. This aspect of psychoanalytic theory—the signal function of the ego—appears to require the notion of affect concept development, the categorization and meaning assigned to stimuli and bodily sensations in a perceived environmental context (Gilbert, 1969; Joffe and Sandler, 1968; Sandler and Joffe, 1969).

The impact of deprivation and mismanagement in the cognitive structuring of affective experience is highlighted by the previously reported work of Miller, Caul, and Mirsky (1967) and Hess and Shipman's (1965) research on early experience and the socialization of cognitive modes in children. Tomkins and McCarter present the following imaginary situation as a plausible example of parental failure to structure and differentiate affective experience in a child.
The child's anger may be the occasion of an interpretation of his character so that he is taught that the complex of anger and loud shouting is a sign of moral defect. Many years later if he has not learned otherwise he will likely to respond to similar displays whether from himself or other adults or his own children as signs of 'badness' and 'lack of consideration.' If these words have been taught and more specific affect names have not been taught, it is altogether possible for a human being never to attain a working knowledge of the correct names for the specific affects with which he and others respond.

I imagine more than a dozen reasons could be advanced to explain the failure to achieve judgmental consensus. I would like to briefly touch upon one more of these: selective perception and cognitive controls. There seems to be enough evidence to suggest that people selectively attend to or ignore emotionally charged visual and auditory stimuli (Bruner, 1973; Erdelyi, 1974; Klein, 1970). In addition, certain cognitive structures can moderate and control the behavioral expression of motives and affects (Bieri, 1971; Santostefano, 1971). Child rearing variables and dynamic intra-psychic processes may play a role in the accurate recognition and expression of facial cues of affect.

If parents unduly punish the facial expression of affect or any particular facial affect, then this source of information may be lost to the individual as a guide to the perception of the same expression in others. Or he may be sensitized to its expression in others but defend himself against this perception in others as he has been forced to defend himself against the affect in himself. Thus, he may avoid looking at a face which is in anger or in excitement, or he may avoid friendship or contact with individuals with vivacious facial expressiveness.

Just as the interpretation of facial expressiveness of the other may be impaired by impairment of one's facial expression, so the latter may also be impaired by parents or other models whose facial expressiveness has itself been inhibited, or who provide insufficient interaction...there is the absence of affective stimulation, negative sanctions for what is regarded as too excessive emotional display, and frequently a gross re-
duction in interpersonal communication...there tends to be a circular reinforcement between parents and their children which accelerates the skill in interpreting both one's own and the other's facial expressiveness or which decelerates or blocks the acquisition of this skill...the skills of receiving and sending are intimately interdependent because the face one sees is not so different from the face one lives behind (Tomkins and McCarter, 1964).

Tomkins and McCarter's last assumption that the emission and perception of facial expressions of emotion are interdependent components of the same process has received only partial confirmation through research with adult subjects. As the reader may remember, Levy (1964) found positive intercorrelations between the expression and recognition of vocal communications of emotion. However, Lanzetta and Kleck (1970) discovered an inverse relationship between exhibiting and decoding facial cues of affect. Besides being interested in the developmental aspects of the accurate recognition and expression of facial stimuli of emotion, the dissertation is also specifically concerned with investigating the relationship or correspondence between these two abilities in children. The amount of developmentally oriented research on these variables is truly impoverished. A few studies with a developmental perspective are available on the recognition aspect of facial expressions of emotion. Most of the leads have to be extracted from the research on adults or the work on the vocal communication of emotion, e.g., Ekman et al., Tomkins and McCarter, Thompson and Meltzer, Davitz, Levy, and Levitt. I know of no research conducted specifically to investigate the development of the ability to emit increasingly discriminable facial responses of affect to others (judges), or of the relationship between encoding and decoding capacities in children. From the theorizing of such individuals as Ekman and his colleagues, Tomkins and McCarter, Peters, Arnold, Laz-
arus, Hebb, Gibson, and Werner, I think it can be reasonably hypothesized that children's perception, recognition and categorization of facial communications of affect will gradually become more precise and refined. With age and experience, children should be able to differentiate the "invariants" and "distinctive features" of various categories of facial expressions of emotion, which arise from different sources (stimulus persons) in different situations and conditions, and those that are of different intensity.

Dimitrovsky (1964) studied the ability of 224 children to identify the emotional meaning of vocal expressions at successive age levels. Her findings suggest that, between the ages of five and twelve, there is a gradual and progressive increase in the ability to identify the emotional meaning of vocal expressions. Girls tended to be more accurate judges than were boys. Expressions of sadness were more frequently identified correctly by the children. Anger, happiness, and love followed in respective order. There was no evidence that the children at the various age levels made any systematic confusions or incorrect responses.

Gates (1923) presented six still photographs of facial expressions of emotion to 458 children, ranging in age from 3 to 14 years. The results indicated that the differentiation of the pictures improved successively with age, and the order of increasing difficulty in accurately identifying the photographs was laughter, pain, anger, fear, surprise, and scorn. No appreciable sex differences were noted and the influence of social status was practically negligible. In order to show that children's perceptual accuracy of inverted photographs of classmates'
facial expressions were not confounded by the age of the children in the pictures, Goldstein and Chance (1964) showed unfamiliar kindergarten, third, and eight grade children's pictures to different groups of kindergarten, third, and eight grade children. During three five second exposures in spaced learning trials, each subject learned eight "critical" pictures from three distinct groups of 48 photographs. The subjects, individually, were asked to differentiate and select the "critical" faces from among five "background" faces of the same age. Goldstein and Chance found the ability to recognize or discriminate selected faces from background stimuli improved with chronological age.

The three preceding examples of research show the value and promising potential of a developmental approach to the communication of affect information though facial expressions. A developmental orientation may be able to shed some light on the following questions about emotion: its origins and functions; the differences between categories of emotional facial expressions; the effects of learning and maturation; and, the impact of child rearing variables and defensive processes on the gradual differentiation and precise communication of facial affect. Even though the developmental-clinical approach would seem to offer exciting possibilities, for some reason or another this particular perspective on the problem has generally remained neglected.

Sherman (1927), Guilford (1929), Gates (1923), Coleman (1949), and Levy (1964) reported the absence of clear-cut sex differences in the perception of emotion of facial stimuli. Kanner (1931) and Thompson and Meltzer (1964) found a generalized trend that males were slightly better in perceptual accuracy. However, Buzby (1924), Dusenbury and Knowler
(1938, 1939), and Dimitrovsky (1964) obtained results that suggested that women and girls may be superior to males in the identification of facial or vocal cues of emotion. On the basis of his experiments, Jenness (1932) commented that females are somewhat intuitive in their discrimination of facial stimuli because the reaction times for their judgments were made in half the time it took for the men. Kellogg and Eagleson's (1931) data demonstrated black girls were consistently better than black boys in the accurate perception of facial expressions of emotion. Drag and Shaw (1967) indicated females tended to be better expressors of emotion; they were especially successful in conveying expressions of happiness, love, fear, and anger. Gitter and Black (1968) determined a significant interaction between sex of the expresser and the pattern of correctly perceived emotion: surprise and fear were more correctly perceived when the expressers were females.

Besides the influence of sex, there is enough evidence available to suggest the perception and expression of emotion may be affected by race differences. Dickey and Knowler (1941) presented pictures of a man and a woman portraying different emotional expressions to American and Mexican high school students. The Mexican adolescents were significantly more accurate in the discrimination of emotion than were the Americans. Dickey and Knowler interpreted the findings of race differences as indicating the Mexicans were more sensitive to communicative symbols of action. Kozel and Gitter (1968) had five white and five black female expressers enact seven different categories of emotion. They found blacks were more accurately perceived in the expression of the emotions of anger and pain, whereas whites were more accurately perceived when expressing fear and happiness (Gitter, Black and Mostofsky, 1972). Employing a factor-
ial design, Gitter, Black and Mostofsky (1972) studied the effects of 
sex and race on the recognition and emission of facial cues of emotion. 
They had twenty professional actors (ten white and ten black; five males 
and five females of each race) enact seven categories of affect: anger, 
happiness, surprise, fear, disgust, pain, and sadness. The actors were 
filmed at 3/4 full figure, and each simulation was recorded by a 16mm 
motion picture camera. Through judgmental agreement among three gradu­ 
ate students, 120 3" x 5" still photographs considered to be the most 
representative of the seven emotions, were selected from the continuous 
recording. One hundred and sixty undergraduate students were divided 
into four equal sets of race and sex groups. Each subject saw 35 indi­ 
vidually presented pictures of either five white male, white female, 
black male or black female expressers. The subjects were asked to 
match each photograph with one of the seven pre-designated categories 
of emotion. The authors were interested in the patterning of correctly 
and erroneously perceived emotions. The results of the experiment dem­ 
onstrates significant main effects for both race and sex of expressers, 
and for race of the perceiver on overall accuracy scores. The emotions 
portrayed by white and female expressers were judged more accurately 
than the enactments by black expressers; and black perceivers were more 
accurate than their white counterparts. Of the seven categories of emo­ 
tion, happiness and pain were the most accurately perceived by the sub­ 
jects. Fear, disgust, and sadness were the least correctly perceived 
emotions. White expressers scored higher in the portrayal of anger, 
surprise, fear, and sadness, while the scores of black expressers were 
pronounced for the conveyance of pain. Finally anger, surprise, and
fear were more accurately judged when the expressers were female, while male expressers led to more correct judgments with sadness, pain, and disgust. Gitter et al. have suggested the race effects may reflect the impact of cultural and institutional constraints. They argue that historically blacks have had to be sensitized out of survival necessity to the facial cues of emotion in others, especially whites. Although black expressers' facial communications of pain were more accurately perceived than any other category of emotion, blacks tended to generate more erroneous judgments of anger, disgust and sadness than did the white expressers. Gitter and his colleagues contend that the erroneous perception of blacks as angry, disgusted, and sad may be an artifact of recent racial conflict and black militancy. Pain may be one of the few acceptable avenues of emotional expression that are available to blacks in American society.

If indeed black emotional experience is considered undesirable, and the expression of emotion in general is a function of practice, it might be anticipated that the part of the emotional spectrum under consideration which the black is 'allowed' to express would be the one with which he is most familiar. The experience of the black man in America may be characterized, at least, as painful. The inability in emotional expression, the relatively effective expression of pain, and the poorer expression of anger can perhaps be considered in the context of our extended history of cultural and institutional constraints (Gitter, Black, and Mostofsky, 1972).

Besides a concern about the improvement in accuracy with development, race and sex variables have been included in the dissertation in order to determine whether these factors are associated with children's ability to recognize facial cues of affect in others and the expression of facial communications of emotional intent.
Recently other means of investigation have focused upon the development of the language of emotions and affect concept attainment. The assumption is affect concepts may be somewhat isomorphic with the development of geometric concepts, or be as necessary for problem solving in relation to subjective experience as mathematical concepts are for structuring the physical world. Affect concepts permit the assignment of meaning to experience and are crucial in the recognition, retention, and anticipation of emotionally charged stimuli. Conceptual processes allow for the organization and categorization of informational input, and control and structure output activities. The cognitive coding of affect suggests that children can learn its parameters of conservation in varied forms of expression, its sources, legitimate avenues of emotional expression, and its role in interpersonal relationships (Gilbert, 1969).

Gilbert (1969) examined awareness of affect concepts in 102 children, who either were in a nursery school program, kindergarten or first grade. Besides information on age, sex, socioeconomic status (SES), religion and birth order, Gilbert's data consisted of a WISC IQ and Verbal Concept Score, teacher ratings on a 32-item adjective check list, and sex "affect-aware" test scores for each child. The "affect-aware" tests represented inferences from stories to certain TAT cards, descriptions of the Sarbin Stick Figures, ability to define affect words (happy, sad, mad, angry, scared), and deciding to sort ten items from the Tomkins and McCarter Photographic series according to either age, sex, or type of facial expression. The modest (extremely low but significant) results of a
cluster analysis of teacher ratings and intercorrelations with the six verbal and performance "affect" tests suggested that a child's affect awareness is a general orientation which he uses in his selective response to other people and in his awareness of self. Interestingly, high level verbal concept ability was not necessarily associated with the differentiated awareness of affect concepts.

In addition, Gilbert found a distinctive age trend in children's preferences for certain criteria for sorting facial stimuli. "The youngest child, age 4, sorts by age or size (adult vs. child pictures); the 5-year-old tends to sort by sex; increasingly, the 6-year-old pays attention to facial expression (Gilbert, 1969)." Generally, sex, SES, religion, and birth order differences were not pronounced.

Wolman, Lewis, and King (1972) have taken a developmental approach to the processes associated with a child's identification, description, and categorization of emotional experience. Instead of theorizing about the general nature of emotion, these authors have been more concerned with the child's use of language for the cognitive coding and representation of affect. They have defined emotion as the "awareness of an altered body state." Wolman and his colleagues have generated a series of studies concentrating on the language used by children for the communication of these experiences to others. They designed and administered a semi-structured interview to a group of 256 children, ranging in age from 5 to 13 years or from kindergarten to sixth grade. The interview was structured to elicit verbal self-report responses from the children about their subjective experience of emotion, e.g., under what kind of conditions do they experience a
particular emotion? What is the quality of the experience? In what part of the body is it felt and how is it typically handled or coped with?

Some of the questions asked by Wolman et al. will be discussed in detail because they are relevant to the interests of the dissertation. How do children characterize conditions or situations involving emotional arousal? What constitutes children's symbolic representation of affect experience, which can be communicated through conventional language? How do children report they handle or cope with emotional experience?

Lazarus (1973), Schafer (1964), Witeman (1967) have indicated that the source or origin of affect stimuli may be either internal or external.

Unconsciously, if not consciously, the patient experiences his affects as responses to specific stimuli. Sometimes he finds the stimulus within himself and sometimes outside...we also attempt to evaluate his accuracy. Is his judgment as to the stimulus correct or complete? Objectively the site of the stimulus may be primarily internal, that is, the matrix of instinctual tension and fantasy processes, etc. Sometimes the site is primarily external, the affect expressing internal processes set in motion or brought to a head by a particular impingement from the environment (Schafer, 1964).

How do children describe the stimulus situation involving a particular emotion, e.g., happiness, anger, sadness, fear, or surprise? Does he describe the situation as occurring outside or within himself?

We predicted that older children would respond more to internal stimulation than external stimulation. This hypothesis is in line with Piaget's description of the transition from concrete to formal operations, the interiorization of concepts in general, and the ability to be free of perceptual influence in the formation of ideas. The Freudian notion of introjection is also relevant here (Wolman, Lewis, and King, 1972).

The authors concluded from their results that there is a general developmental progression in the internalization of the conditions of
emotional arousal. "As children of both sexes grow older, they report that the conditions which stimulate emotions occur more frequently within themselves (Wolman et al., 1971)." Contrary to their expectations, females demonstrated a tendency to be more dependent than males on external cues for affect arousal. Finally, intelligence, SES, birth order, and academic achievement variables were not systematically related to children's verbal attribution of the locus of initiation (internal or external) of emotional experiences. Wolman, Lewis, and King (1971) believe that the crucial variable accounting for the arousal conditions of emotions "...is not the concrete or abstract description of the sensation but, rather the description of the locus of stimulating conditions assigned by the child's verbal description."

Once a child is able to specify the source or origins of his affect experience, is he also able to indicate how he typically handles or copes with the emotions of happiness, anger, sadness, fear, and surprise? What do children say they want to do when they experience a certain affect? How do they describe their attempts to resolve situations involving emotional arousal, and which emotions are considered to be the most difficult to handle? "In other words, when children say they feel angry, happy, sad, etc., do they tend to avoid painful emotions, actively cope with them (by retaliation as in the case of anger, mastery in the case of sadness) or do they do something entirely different (Wolman, Lewis, and King, 1972)?" The authors examined children's statements of their intentions or how they coped with certain experienced emotions to determine whether any developmental patterns might emerge according to age, sex, and specific affect word (Lewis, Wolman, and King, 1972).
Children's responses to the question, "What do you want to do when you feel happy, angry, sad...etc.?" were scored on the following criteria of intentionality: fighting, coping or mastery of animate or inanimate objects; flight (physical withdrawal); avoidance through daydreams, fantasies, wishes, diverted expression of affect and ego defensive maneuvers; or inactivity.

Lewis, Wolman, and King (1972) focused their study on only children's self-report responses, which they admit may or may not predict behavior in real-life situations. However, their data suggests children's descriptions of their intentions to resolve emotional experiences improves with age. Physiologically based emotions such as hunger and thirst elicit the clearest statements of intention. This finding seems to hold across all age levels. Both boys and girls tend to want to prolong experiences of happiness, to physically retaliate or attack when angry, and to flee from situations evoking sensations of fear. The children try to psychologically avoid feelings of sadness, but girls struggle more intently to evade the experience than do boys. Besides being concerned about race differences or effects, the present project is interested in replicating the age and sex trends found by Wolman et al. on their semi-structured interview. Another feature of the dissertation will entail an attempt to determine whether the recognition and communication of facial expressions of emotion are associated with children's identification, description, and categorization of emotional experiences, e.g., internal-external locus of affect stimuli and intentions of coping with different emotions.

Concerning children's designations of affect experience, another
study investigating the relationship between affect and self-gratification is of methodological interest. Underwood, Moore, and Rosenhan (1973) asked children to think of things that made them happy and sad, and then allowed the subjects to self-reward themselves to money. They found children in both the happy and sad conditions self-rewarded more than controls, and that children asked to think of happy things self-rewarded more so than subjects in the sad condition. The study is important because it shows the possible potency of imaginal processes for the induction of affective states, which can influence certain behavioral consequences. A content analysis of the child's imaginal processes was not systematically conducted in the experiment. Certainly such an analysis would enhance our knowledge of the relationship between abstract and imaginal processes, and the induction of affect conditions. Underwood et al. (1973) found that girls tended to self-reward more than males did.

**Imagery and Instructions**

The past decade has been marked by a recrudescence of interest in imagery, which has produced several historical reviews of the subject and books of collected readings, e.g., Holt (1962), Bugelski (1970), Segal (1971). According to Hebb (1966), images represent the activation of neural cell assemblies or "...the occurrence of perceptual processes in the absence of stimulation which normally gives rise to the perception." In order to account for data indicating that imagery can be related to abstract thought, Hebb (1968) has hypothesized that clusters of association area cells may be grouped together into lattices of lower and higher order assemblies. Sub-assemblies of simple cells repre-
sent particular sensory events, while larger aggregates of neurons are responsible for an increasing degree of abstraction and generalization.

The actual perception of an object...involves both primary and higher order assemblies. The object is perceived both as a specific thing in a specific place with specific properties, and as generalized and abstracted from—but not all of this simultaneously. In imagery, only part of this activity may be reinstated. First-order assemblies directly excited by sensation, must be an essential feature of perception, but need not be active when the excitation comes from other cortical responses. A memory image, that is, may consist only of second- and higher-order assemblies, without the first-order ones that would give it the completeness and vividness of perception. The theoretical analysis...implies a continuum from the very vivid imagery of hallucination through the less vivid memory image to the completely abstract conceptual activity that has nothing representational about it (Hebb, 1968).

Knapp (1969) contends vivid imagery and intensely experienced emotion are interfused with each other. Images are imitations of palpable experience and may guide bodily expressive patterns like facial displays of emotion. As images become more abstract, they are less and less imbued with intensely felt affect. The dissertation is interested in determining whether instructions, which encourage the generation of either vivid images from specifically remembered sensory events or presumably emotionally-vitiating abstract images, contribute anything to children's ability to express facial cues of affect. It is assumed that particular memory images of emotionally-charged specific sensory events represent the firing of first-order assemblies. This should facilitate the more complete and compelling expression of facial displays of affect that can be easily or accurately deciphered by others (judges). Asking the subject to pose an abstract and generalized facial expression of emotion (e.g., happiness, sadness, anger, fear, surprise) may entail cortical responses associated with the activation of higher-order assemblies.
Facial responses elicited by this particular mode of instruction may not be as sharp, detailed, intense, or recognizable as those produced by children when requested to remember a time or occasion when they actually felt the emotion.

Conclusion

The essential contention of the dissertation is that emotional expression can be considered to be an especially salient form of communication, which is affected by developmental and social variables, such as, grade, sex, and race.

...affects serve as essential forms of communication from the beginning of life. As the child develops organized awareness and intentionality (which means as his ego development proceeds), he comes to use affects as signals for desired environmental responses and as a means of controlling and manipulating the environment. At the same time the environment also signals and controls the child through affect communications. Much of this communication goes on without conscious awareness and without being put into words (Schafer, 1964).

The recognition and emission of facial expressions represent only the visual form of the transmission of emotion information. As a modality of communication, it should be of notable interest to the clinician for its relevance to therapy (Beier, 1966; Singer, 1970; Ekman and Friesen, 1969), personality correlates (Davitz, 1964), and certain psychopathological conditions, e.g., childhood psychosis and autism (Szekely, 1969); schizophrenia (Turner, 1964; Herron and Kantor, 1968; McPherson et al., 1970); paranoia; depression; and acting-out disorders. These groups may be differentially responsive to affect cues in other's faces and therefore tend to misinterpret the environment or the communication of emotion information. On the other hand, defensive operations may modify the expression of the various categories of facial emotion, or
the facility and intensity of its presentation.

It is safe to assert that every patient shows disturbance in the realm of affect communication, each in his own way. By silence, minimalization, exaggeration, or obfuscation; by displacement, reversal, introjection, and projection; by uncertainty, confusion, inarticulateness, and intellectualization; by rigidity, somatization, conversion, and acting-out; or by numerous other distortions, the patient's communication of what he feels will be significantly disrupted. This disruption is one aspect of his generally disturbed object relations (Schafer, 1964).

Through the intervention of certain treatment programs, accuracy in recognizing facial cues of emotion, and the strength or clearer expression of affect may be improved (Schafer, 1964). Ekman and Bressler (1964) determined that facial and body stimuli randomly selected from interviews of depressed patients during the acute period of their hospitalization were rated as more unpleasant and more immobile than those stimuli selected from the remitted phase. Ekman and Rose (1965) replicated these findings with a smaller sample of subjects but with a larger collection of randomly selected stimuli for each person.

The investigation of posed facial expressions of affect may illuminate one of the problems associated with role-playing, which is the extent of involvement or investment in simulated behavior. If an adequate standard of comparison can be derived, it may be related to questions of whether emotion can be as intensively re-lived as it was originally experienced and its capacity to be effectively generated and controlled through the experience of hypothetical situations. Through role-playing and simulating facial expressions of affect, the child may come to attend more readily to, and understand his subjective experience of emotion and the consequences of its expression. Aronfreed (1968) has indicated that the process may perform an important function in the control,
mastery, and socialization of emotional expression. Child-rearing variables and parent-child relationships may substantially contribute to the development of the accurate communication of emotion information through facial stimuli and the ability to precisely decipher these cues from the expressions of others (Mishler and Waxler, 1967; Tomkins and McCarter, 1964). Bugental, Love, Kaswan, and April (1971) videotaped parent-child communications within ten control, and 20 experimental families having a child referred by schools for chronic behavior or emotional problems. Parental messages were scored on verbal content, tone of voice, and visual behavior, e.g., facial expressions, gestures. A significant number of the mothers of the "disturbed" children produced more conflicting messages through discrepancies between the various communication channels. Boys of such mothers were rated higher on aggressiveness in school than were the sons of mothers from the control families, who tended to produce non-conflicting messages. Finally, the recognition and communication of emotion information show potential for studying the use of posed facial affect as a tool for the conscious manipulation of others. The dissertation was designed to provide some basic initial information about simulated facial expressions of emotion in children and to explore the fruitfulness of a particular experimental design, which could be used as a springboard for future research into the above questions.

The Problem

While the adult's use of the body to understand others has been studied under the heading of social intelligence or interpersonal perception or social sensitivity, almost no work has been done with children. We know more about the child's understanding of the world of things than we do about his understanding of the world of people; there is more data on how
he learns to distinguish a circle from a square than on how he comes to distinguish the expression of love from the expression of anger. The process of learning to read behavior and the consequences of faulty reading have been largely unexplored (Wenar, 1971).

Research into the role the development process plays in the consolidation of recognition and communication skills in the area of facial affect information is generally lacking. Since research strategies into this topic are relatively uncharted, the dissertation represents an attempt to sketch certain possibly relevant developmental parameters or implications of facial expressions of emotion. It represents an effort to study the influence grade, sex, race, and abstract or imaginal processes as eliciting circumstances have on the child's judgmental accuracy of facial expressions of emotion, and the ability to communicate emotional intent by the simulation of facial behavior. The dissertation will also examine the impact of grade, sex, and race variables upon the child's conceptualization and language characteristics used in the description of subjective emotional experience. It is hoped that should the experimental procedure prove to be profitable, it may help to provide a supportable base of information to extend research into the child's facial behavior in spontaneous exchanges.
Hypotheses

1) There will be grade, sex, and race differences in children's ability to accurately identify the emotional meaning of posed facial expressions.

2) Grade, sex, and race differences will influence the ability to accurately communicate emotional intent by posing facial expressions.

3) The instructional set to use imaginal process will help children more than abstract concepts to communicate facial poses of emotion that can be accurately decoded by judges.

4) There will be differences across five categories of facial expressions of affect in children's ability to accurately recognize and pose them.

5) The ability to identify the emotional meaning of facial expressions will be positively correlated with the capacity to accurately pose emotional intent in facial behavior.

6) There will be instructional, grade, sex, and race differences in the genuineness children put into their facial enactments of emotion.

7) There will be instructional, grade, sex, and race differences in children's reaction times for the posing of the different categories of facial expressions of affect.

8) There will be grade, sex, and race differences in children's descriptions about the locus of initiation and their method of coping with subjective emotional experience.
CHAPTER II

EXPERIMENTAL DESIGN

The dissertation is primarily concerned with children's ability to recognize or identify certain types of facial expressions of emotional intent simulated by adult models, as well as, the children's skill in facially conveying the same categories of affect information which can be sufficiently deciphered by others (in this case adult judges). The research design has been constructed to determine whether children can correctly distinguish between simulated facial behaviors reflecting happiness, anger, sadness, fear, and surprise. At the same time, it is also in the same children's capacity to accurately produce differentiated and recognizable facial expressions of emotion. The project is explicitly oriented toward judgments based upon the total configuration of the face rather than breaking the stimulus down into the saliency of various component units of information, e.g., eyes, eyebrows, mouth, wrinkles, etc. Although the dissertation concentrates upon children's ability to accurately perceive, label, and express facial information involving emotional intent, it cannot be assumed positive results will represent clear-cut evidence that the observers were agreeing about the same thing or would be able to recognize actual emotion. Judgments may have been influenced by other uncontrolled factors such as the attractiveness or "cuteness" of the model, and by sel-
ective attention to certain parts of the face at the expense of the total constellation of information available to the observer. Conversely, judgmental failure or the lack or correspondence as agreement between intent and ascription does not necessarily mean that the information contained in the sampled facial behavior was not relevant to the criterion of accuracy. "When a judgment study fails, the information may have been there in the face, and it might be unearthed by a component study, if for some reason the observers failed to utilize the information which was there (Ekman et al., 1972)."

Any research into this area is immediately faced with the issue of whether to study simulated (posed) affect, or the facial expressions of emotion that are generated in spontaneous real-life situations. The investigation into simulated or posed facial expressions of emotional intent tends to lend itself more readily to experimental control and manipulation than does the expression of facial information in spontaneous situations. Posing presents a more precise picture of which intended facial expression of emotion is demonstrated when. However, the experimental gains that are acquired through the exclusive use of this technique may represent a pronounced sacrifice in relevancy and generality to the facial behavior that occurs in real-life settings. As was suggested in the preceding literature review, it is an empirical problem and before a definitive conclusion can be made additional research specifically aimed at the comparison of the data generated by different eliciting circumstances will have to be completed. It should be noted that the intent of the dissertation is to study the influence of several variables upon the recognition and display of emotional information contain-
ed in facial expressions or behavior. Although the project is interested in children's characterizations of the source of their emotional arousal and the manner of their coping with emotional experience, it does not presume that the recognition and expression of posed emotional facial information is similar or relevant to the actual emotion or facial behavior that is produced in everyday occurrences.

Ekman and his colleagues (1972) have indicated that:

Posing is easy to arrange; clear records are readily obtained; and the record is composed of separate units identified in terms of specific emotions according to the poser's intent. But there are problems. Although posing may differ from other situations in terms of the relative absence of display rules to deintensify, neutralize, or mask facial behavior, posers may well differ in their ability to simulate given emotions, and the typical study has unfortunately used only one or two posers. While the actor may intend to show only one emotion, posed behavior may contain blends of intended and unintended simulated emotions. Another difficulty is that of choosing which poses to consider, since most actors will not achieve a pose acceptable to them or the investigator on every attempt....

The purpose of this brief discussion is to review some of the methodological assumptions and problems that have been traditionally associated with research into facial expressions of emotion. The control of all these factors is probably unfeasible due to practical limitations in any experimenter's available resources. The import of these methodological issues highlight the importance of caution in the drawing of inferences and conclusions from the data obtained by different eliciting circumstances. Besides grade, sex, and race, instructional set has been included as an independent variable in the dissertation. In addition to a theoretical interest in the influence of supposedly abstract and imaginal processes upon facial behavior, the manipulation of instructional set has been incorporated into the present study on the basis of
a suggestion pointed out by Ekman et al. (1972). They recommended that the posing of facial expressions of emotion should be generated by different situations, activities or instructions "...to avoid the hazard that peculiarities in one way of eliciting the pose will bias the sample." In response to the deficit in the number of posers that have been typically used in previous studies and to partially eliminate the chance that the present results might be confounded by idiosyncratic distortions in facial displays, the dissertation sampled 48 children each of whom attempted to accurately emit five different categories of posed facial expressions of emotion. The task that required these same children to recognize slides of 13 adult model's posed facial expressions of emotional information is somewhat diminished in representativeness. However, the dissertation attempted to compensate for the limited number of adult models by using at least two and not more than seven facial responses for each model. Consequently, the children were asked to discriminate 40 stimuli (eight stimuli for each of the five categories of facial expressions of affect) representing adult facial behavior. The forty slides of adult facial displays were extracted from a series of photographs developed by Ekman and Friesen and are supported by normative data. The Ekman and Friesen photographs will be detailed at a later point in the chapter. Finally, it should be noted that most previous investigators have considered individual or group differences in facial behavior to be a source of error in their experiments. Through the use of various types of experimental designs and sampling techniques, they have attempted to partial out and minimize these factors which may confound or obscure their results. In contrast to this approach, the
present study is specifically focused upon developmental and social group differences in the ability to discriminate and display facial responses conveying emotional information.

Theoretical fragmentation and the absence of consensus on the definition of terms have made the selection of the categories of emotional intent for study all the more difficult (Ekman et al. 1972). The work by the Ekman group and by Tomkins and McCarter (1964) suggest facial behavior can be theoretically reduced to a restricted set of basic or "primary" categories. Although generality can be facilitated by extending the number of categories sampled, the assumption is facial behavior beyond this limited set represent complex and subtle blends of the eight or nine "primary" categories of facial affect information. The selection of happiness, anger, sadness, fear, and surprise as the categories of study was based upon an effort to maintain continuity with the preceding review of the research literature. Most of the antecedent research seems to have employed these five categories or their equivalents. Although the Ekman and Friesen photographic series also contains stimuli representing disgust, contempt and emotional neutrality, they were excluded from the dissertation because financial limitations in the purchase of photographic supplies and the realities of collecting data within a public school setting precluded the opportunity for obtaining similar responses by the children. Since one of the concerns of this research project is the correlation between the recognition and the expression of facial displays, it is important that the same categories of affect information be consistently maintained in both instances (recognition and expression tasks).
A critical problem confronting any research into this topic of interest is the choice of an appropriate recording procedure. Historically, two types of recording methods have been used: motion or videotape and still photographs. Essentially the selection depends upon the character of the questions that the investigator asks. Ekman, Friesen and Ellsworth (1972) have stated that if the purpose of the research is not the judgment of sequential facial behavior that are elicited during contrived or spontaneous situations, but rather the accuracy of judgments about and the expression of posed (static event) facial displays then use of still pictures should be sufficient.

Baltetes (1968), Kessen (1960), and Schaie (1965, 1970) have noted a number of internal and external validity problems associated with the traditional cross-sectional research design which exclusively manipulates age as an independent variable. The results achieved through the use of a cross-sectional design are likely to be confounded if certain sources of variance are left uncontrolled, e.g., sex, race, socioeconomic status, intelligence, educational background, restricted or selective sampling, halo and Hawthorne effects, novelty and the order of stimuli presentation (Bracht and Glass, 1968; Friedrich, 1972). In order to control for extraneous effects on independent-dependent variable relationships, Kessen (1960) suggested that developmentally-oriented research should attempt to utilize factorial designs that account for interactions between age, population characteristics, and environmental changes. Although there are realistic limits to what can be made amenable to experimental control, Friedrich indicates factorial designs and random sampling help to reduce the obfuscation surrounding age-related data and
facilitate generalization. According to Schaie (1959) and Bayley (1956) a cross-sectional research design is valuable for the "...(a) purposes of immediate prediction and control, and (b) obtaining normative characteristics and trends of central tendency and variability (Friedrich, 1972)." Friedrich contends the approach is especially pertinent if the experimenter is primarily interested in analyzing dependent variable variation across different groups of subjects rather than in intra-individual differences. These arguments about the advantages and sources of error associated with age-related experiments provided a helpful guideline for the construction of the following factorial cross-sectional research design.

Subjects

The study was composed of 24 kindergarten and 24 third grade children (n=48). Each grade group was divided into equal numbers of boys and girls, which were further separated into equivalent sub-groups of white and black children. All the subjects were selected in alphabetical order from the classroom rosters of an inner-city public elementary school setting. The children typically came from families characterized by low socioeconomic status. Differences in intelligence and educational background were controlled for by the random sampling procedure. The racial composition of the school population has stabilized over the past several years so that it is approximately equal at the present time. Since the school has been a research resource for projects associated with Ohio State University and the Columbus Children's Hospital, the administrative personnel and teachers were receptive and supportive while the children appeared to be generally comfortable with the mechan-
ics of their participation in an experiment.

Ten male suburban high school teachers voluntarily served as judges to evaluate the photographs of the children's facial expressions of emotion. The judges were purposely kept uninformed about the nature of the dissertation. They had no previous experience in judging the experimental pictures and were completely unacquainted with the children.

**Apparatus and Description of Dependent Variable Measures**

**Apparatus:** The children's posed facial expressions of emotional intent were photographed with a Polaroid Model 440 camera. The camera has a double window/range-finder, a mechanical timer, and must be hand-held since it is constructed of a plastic body which has no tripod socket. It is equipped with a three element lens, 114 mm, f/8.8, and has an electrical eye for non-flash pictures. The closest the camera could be bought to the subject without distortions in the quality of the photograph was 3.5 feet. Since the camera was set for this optimal distance, each child's face and upper torso were recorded. To maintain methodological continuity with some of the previous research into facial expressions of emotion and to avoid extraneous cues of facial coloring (flushing and becoming pale), only black and white film (Polaroid Land Pack Type 107) was used at a camera film speed setting of 3000. Besides the normal lighting available in the testing room, illumination was provided by two separate 250 watt photo-flood light bulbs in ten inch aluminum reflectors. The reflectors were clamped to the back of chairs and placed at oblique angles about ten feet away from the subject. Reaction times for the posing of facial expressions of emotion were recorded by a Swiss Aristo stopwatch. A Kodak Carousel 800 projector was used to show the
facial display slides developed by Ekman and Friesen onto a cream color-
ed wall of the testing room. The low intensity setting for the projec-
tor's light source was maintained throughout the judgmental phase of
the research project. The slides were manually advanced by a hand-held
control unit.

The Ekman and Friesen Photographs

For the past several years Paul Ekman and Wallace Friesen have con-
ducted significant research on affect and non-verbal behavior at the
Langley Porter Neuropsychiatric Institute's Laboratory for the Study of
Human Interaction and Conflict, which is associated with the San Fran-
cisco branch of the University of California. From the large pool of
stimuli that they have collected through their experiments on facial ex-
pressions of emotion, Dr. Ekman and Dr. Friesen have extracted 110 black
and white 35 mm slides of affect poses made by white male and female
adults. Norms on the photos were acquired through five different exper-
iments. The following experimental summaries were provided in personal
correspondence with Dr. Friesen. In Experiment 85, each photograph was
shown for ten seconds to large groups of 50-75 male and female college
sophomore judges. The judges identified each stimulus by putting a circle
around one of sex affect words (happy, sad, fear, anger, surprise, dis-
gust) on a record form. The number and percentage of judges choosing
each affect word were calculated for each photo. A similar procedure
was used in Experiments 951 and 952. Each photo was shown for ten sec-
onds to judge groups of 10 to 20 college sophomores, juniors, and seniors.
There were approximately equal numbers of males and females. Subjects
who were foreign-born were deleted from the experiments. Besides having
the judges circle one of the six affect words, the subjects were required to rate each photo on a 7-point scale of how convincing the photo was posed (1 = phony; 7 = convincing). Again the number and percentage of judges choosing each affect word were calculated for each photo. Mean convincingness ratings were computed without regard to the affect word choice. For Experiments 79 and 80 the judges were allowed to identify more than one affect in each photo to determine whether the pose represented a blend of affects. The stimulus presentation procedure and the use of a college population was consistently maintained. In Experiment 80 the judges were asked to rate the photos for the six standard affect words plus neutrality (poser or model's intention of moving no facial muscles) on a 9-point scale of "intensity."

Through a loan arrangement, Drs. Ekman and Friesen graciously agreed to have the 110 35 mm slides reproduced and made available for the dissertation. Accompanying the slides was a computer print-out of the data from the previously described experiments. Each photo was noted with the appropriate experiment number, an identification of the intended pose, and the number and percentages of judgmental responses to the stimulus across all the affect words.

Forty photos were selected from the 71 of the 110 Ekman and Friesen slides that represented intended poses of happy, anger, sad, fear, and surprise. The remaining stimuli were photos of expressions of disgust, contempt, and neutrality which were not of immediate concern for the dissertation. There were eight stimuli or photos for each of the five categories of facial expressions of emotion. The selection of the 40 photos was based upon inspection of the normative data con-
tained in the computer print-out supplied with the slides, and examination of the responses made by six male and female children (pre-school, kindergarten, second grade) in pilot research for the dissertation.

Some of the photos for the different categories of facial expressions were found in the pilot research to be either too difficult or too easy for the children as a group to discriminate. To avoid artificially skewing the results in one direction or the other, these particular photographs were excluded from the final selection of slides for the dissertation. The average and range percentage of adult judges agreement (values for each photo were determined from the Ekman and Friesen data) for the eight photos or stimuli for each category of facially posed affect are as follows: happy, mean is 97.53 percent, range 100-93.75 percent; anger, mean is 88.91 percent, range 100-74.19 percent; sad, mean is 85.88 percent, range 100-70.97 percent; fear, mean is 87.35 percent, range 100-77.42 percent; and surprise, mean is 90.58 percent, range 100-74.19 percent.

The forty stimuli constitute the facial poses of twelve white adult models, five of whom were male and seven were female. By chance, the women accounted for most of the 40 slides (27 photos of female models vs. 13 of males). As it turned out the categories of happy and sad, and fear and surprise had the same but different sex ratio of models: four males to four females, and two males to six females respectively. The category of facially posed anger was composed of the photos of seven females and only one male. At least two and not more than seven facial responses by each model were selected as experimental stimuli for the dissertation. The reader may wish to refer to Appendix A for a listing
of the 40 photos that were used in the present research project. The identification code utilized by Ekman and Friesen has been retained. The first two letters of the code are the initials of the model. The numbers refer to the roll of film number and the frame on that roll of film so that the photo can be traced back to Ekman and Friesen's negatives. The final letter(s) represent the intended facial pose of affect made by the model.

**Judgmental Accuracy Scores**

The forty Ekman and Friesen 35 mm slides were placed in random order to minimize the effects of psychological set on the children's judgments. The judgmental accuracy scores refer to the agreement between the child's judgments about the category of emotional information conveyed by the model's face and the model's intention. Criterion is the number of correct judgments the child makes on the eight photos for a particular category of facial expressions. Thus, for each child there are five judgmental accuracy scores, one for each emotion, which range in value from zero to eight.

**Posing Accuracy Scores**

Each of the 18 children facially posed five different categories of emotion. These photographed responses produced a battery of 240 Polaroid black and white pictures, which were randomly shuffled to reduce the possibilities for psychological set effects. The entire battery of photographs was then individually presented to the ten male high school teachers (judges) for evaluation. The posing accuracy scores represent agreement between the child's posed intent and the judges'
evaluation or attribution of the appropriate category of emotional information to the photograph. A child's posing score is the number of correct judgments of his single enactment of a particular facial display of emotional intent as made by the ten judges. Thus, for each child there are five posing scores, one for each emotion, which may range in value from zero to ten.

Genuineness or Role Enactment Scores

These scores represent the judges' evaluations on a seven-point rating scale (see Appendix B) of the involvement or investment the child conveyed in the photographs of each particular facial expression. The 7-point rating scale used by Ekman and Friesen in some of their research on adult facial expressions of emotion served as a basic model and incentive for the inclusion of a similar device in the present study. They defined the end points of their scale and allowed judges to assign a numerical value to the photographic slide as to how "phony" or convincing the subject's pose was. Although the labels associated with the various points on the scale constructed for the dissertation are admittedly somewhat arbitrary, an effort was made to define the numerical values along the continuum to facilitate and further clarify the ratings made by the judges.

The ten male high school teachers (judges) were individually instructed that they were going to see 240 pictures of children showing different kinds of emotion with their face. The judges were informed that the five categories of facial expressions of affect were happiness, anger, sadness, fear, or surprise. They were asked to carefully look at each photograph, one at a time, and determine what category of facially displayed emotion
information they believed the child was showing. Following each judgment about the facial expression the child was exhibiting, the judges were asked to rate the genuineness of the child's pose on the seven-point rating scale. Before evaluating the pictures, the judge was given a copy of the rating scale and a listing of the predesignated categories of facial expressions of emotion. The judge's responses were recorded by the examiner, and each evaluation session lasted about 75-90 minutes. All the judges were interested in the task and appeared to be very conscientious in their evaluations.

**Reaction Time Scores**

The reaction time score is the amount of time that elapsed between the completion of the instructions given to a child to pose a particular facial expression and the moment it was photographically recorded with the Polaroid camera. The previously described stopwatch was used to record the reaction times measured in seconds.

**Locus of Initiation and Intentionality or Coping Scores**

The semi-structured interview procedure developed by Wolman et al. (1971, 1972) to study children's descriptions about their subjective experience of emotion has been modified for the dissertation. Wolman and his colleagues asked a standard series of questions about each of a number of emotions (hunger, thirst, sleep, sad, happy, anger, fear, and nervous). The "emotions" of hunger, thirst, sleep, nervous or questions about physiological sensation and their body locations were excluded from the interview format used here. Wolman (1972) has reported that he found no evidence of differential responding to various inter-
viewers. In addition, he observed no detectable differences in the children's characterizations of their emotional experiences while actually feeling the affect and descriptions made from recall. Interjudge reliabilities in scoring responses for locus of initiation and intentionality (coping) were 86 and 87 percent respectively (Wolman, Lewis, and King, 1971; Lewis, Wolman, and King, 1972).

In the order that the child posed the five predesignated categories of facially displayed emotional information, he was asked, "When have you ever been...(happy, angry, sad, scared, or surprised)? When does that happen? Give me an example." And secondly, "What do you want to do when you feel...(happy, angry, etc.)?" An assistant manually recorded the children's verbal responses verbatim. Later, two female adult judges (high school counselor and a doctoral candidate in clinical psychology) rated the responses according to the scoring criteria supplied by Wolman for locus of initiation (see Appendix C) and intentionality (see Appendix D).

Experimental Procedure

The testing room had five chairs appropriately arranged for the child to be seated facing the photographer, who crouched in between two chairs that contained the lighting equipment (photo-flood bulbs and reflectors). An assistant sat close but off to one side of the child so she could record reaction times and administer the semi-structured interview on locus of initiation and coping. A table was set up out of the child's line of vision for the development and coding of the photographs.

The children were individually introduced to a "game" that re-
quired the simulation of particular facial expressions of affect. The posing of the facial expressions were conducted under two different instructional sets. Half of the children were asked to produce facial expressions representing general or abstract affect concepts. These children were told, "Sometimes we can know what someone is feeling by the look they have on their face. We're going to play a game to see how good you can make some of these looks with your face. We'll ask you to show us a feeling with your face and when you do it we'll take a picture of you with this camera. We are going to ask you to make five different kinds of faces, one at a time. Do you have any questions or is there something you're not sure about? Are you ready? Now show me a...(happy, angry, sad, scared, or surprised) face." Secondly, the remaining half of the children were asked to think of things or remember situations that actually made them happy, angry, sad, scared, or surprised and then attempt to pose the specifically requested facial expression of affect (imaginal instructions). The order of posing the facial expressions of emotion were determined by a 3-way Latin Square to partially control for possible order effects (see Appendix E).

Still photographs of the child's posed facial expressions were taken with the Polaroid Model 140 camera. Pilot research with a foot pedal buzzer system activated by the child when he felt he had the appropriate facial response was found to disrupt or distract the child in his efforts to pose facial expressions of affect. Consequently the procedure was dropped from use with the experimental subjects. The photographer had to rely upon his own timing and rapport with the child to catch the child's facial pose at the height of its expression. The experimenters
are confident that the timing of the photographs with the child's moments of posing were reasonably successful. A period of approximately five minutes followed each posed facial expression. This time allowed for the administration of the semi-structured interview questions for that particular category of emotion and the development, coding, and coating of the photograph with a protective substance supplied in each film pack. It also provided an opportunity to question the children who were given the imaginal instructions to determine whether they actually did draw upon remembered emotional experiences prior to the posing of a particular facial expression.

After the completion of the posing sequence, each child was shown the 40 Ekman and Friesen slides, which were projected onto a blank wall of the testing room. It was explained to the subject that he was going to see a number of pictures of grown-ups posing the same kind of faces that he had just posed. The child was asked to identify the category of emotional information that was facially conveyed in each slide. As each picture was exhibited, the experimenter reminded the child of the five predesignated categories of facial expressions and recorded his verbal responses. Although the subject was given as much time as he wished to make his response, most of the children were able to respond to any given picture in approximately 10-15 seconds.
CHAPTER III

RESULTS

Judgmental Accuracy

It was hypothesized that there would be grade, sex, and race differences in children's ability to accurately recognize the emotional meaning of facial expressions posed by adult models. It was also predicted that the children would find some of the categories of facial expressions to be more difficult to recognize than others. Both of these projections were generally confirmed. A $2 \times 2 \times 2 \times 5$ analysis of variance of the children's judgmental accuracy scores showed significant grade differences in the ability to correctly identify the emotional meanings conveyed in the Ekman and Friesen photographs (see Table 1). Third grade children ($m = 5.68$, range 0 - 8) were more accurate in their judgments about facial expressions posed by adult models than were kindergarten subjects ($m = 4.41$, range 0 - 8). White children ($m = 5.41$, range 0 - 8) as a group did significantly better than black subjects ($m = 4.68$, range 0 - 8) in discriminating affect information from the photographs.

(Insert Table 1)

The correct perception of facial expressions varied substantially with the particular categories of affect information. Happiness and anger gave the highest, while fear, surprise, and sadness respectively gave the lowest proportion of correctly perceived facial expressions of
Table 1

Analysis of Variance for Subjects in Terms of Accuracy
of Identifications of Facial Expressions of Emotional Meaning

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>97.54</td>
<td>1</td>
<td>97.54</td>
<td>13.62**</td>
</tr>
<tr>
<td>Sex</td>
<td>2.20</td>
<td>1</td>
<td>2.20</td>
<td>0.31</td>
</tr>
<tr>
<td>Race</td>
<td>31.54</td>
<td>1</td>
<td>31.54</td>
<td>4.41*</td>
</tr>
<tr>
<td>Grade x Sex</td>
<td>3.04</td>
<td>1</td>
<td>3.04</td>
<td>0.42</td>
</tr>
<tr>
<td>Grade x Race</td>
<td>1.20</td>
<td>1</td>
<td>1.20</td>
<td>0.17</td>
</tr>
<tr>
<td>Sex x Race</td>
<td>14.50</td>
<td>1</td>
<td>14.50</td>
<td>2.03</td>
</tr>
<tr>
<td>Grade x Sex x Race</td>
<td>0.10</td>
<td>1</td>
<td>0.10</td>
<td>0.02</td>
</tr>
<tr>
<td>Ss between Groups</td>
<td>286.37</td>
<td>40</td>
<td>7.16</td>
<td></td>
</tr>
<tr>
<td>Emotions</td>
<td>156.06</td>
<td>4</td>
<td>38.02</td>
<td>35.86**</td>
</tr>
<tr>
<td>Grade x Emotions</td>
<td>124.94</td>
<td>4</td>
<td>31.24</td>
<td>9.82**</td>
</tr>
<tr>
<td>Sex x Emotions</td>
<td>36.03</td>
<td>4</td>
<td>9.01</td>
<td>2.83*</td>
</tr>
<tr>
<td>Race x Emotions</td>
<td>29.94</td>
<td>4</td>
<td>7.49</td>
<td>2.35</td>
</tr>
<tr>
<td>Grade x Sex x Emotions</td>
<td>11.61</td>
<td>4</td>
<td>2.90</td>
<td>0.91</td>
</tr>
<tr>
<td>Grade x Race x Emotions</td>
<td>17.36</td>
<td>4</td>
<td>4.34</td>
<td>1.37</td>
</tr>
<tr>
<td>Sex x Race x Emotions</td>
<td>7.98</td>
<td>4</td>
<td>1.99</td>
<td>0.63</td>
</tr>
<tr>
<td>Grade x Sex x Race x Emotions</td>
<td>17.29</td>
<td>4</td>
<td>4.32</td>
<td>1.36</td>
</tr>
<tr>
<td>Ss within Groups</td>
<td>508.78</td>
<td>160</td>
<td>3.18</td>
<td></td>
</tr>
</tbody>
</table>

** p less than .01
* p less than .05
happiness and anger were the easiest for children to recognize. Fear came next, but surprise and sadness together were the most difficult for the children to correctly identify.

(Insert Table 2)

Grade level significantly interacted with the pattern of correctly identified facial expressions of emotion (see Table 1 and Graph I). The two grade levels had essentially equivalent mean judgmental accuracy scores for facial expressions of happiness. Third grade children were more accurate in their identifications of the Ekman and Friesen photographs which represented intended poses of anger, surprise, and fear whereas, the kindergarten level subjects were only slightly better in perceiving sad stimuli. Consequently, it appears that the discrimination of surprise and anger stimuli improves substantially with maturation and experience. Only modest gains are made for facial expressions of fear. The results suggest the recognition of facial expressions of happiness is adequately acquired by the time children are in kindergarten, and that this high level of discrimination ability tends to remain stabilized. Interestingly as children get older, it is the sad facial expressions which remain the most difficult for them to recognize. Although there were no important main effects between boys and girls, sex significantly interacted with the categories of facially posed affect (see Table 1 and Graph II). In contrast to the boys, it was the girls who had the most pronounced difficulty in recognizing sad facial expressions. Males were slightly more proficient in identifying happy and anger stimuli, while females did better with photographs representing fear and surprise.
Table 2

Mean Correct Judgments for all Children for Each Category of Facial Expressions of Emotion\(^1\)

<table>
<thead>
<tr>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.04</td>
<td>6.15</td>
<td>3.56</td>
<td>4.88</td>
<td>3.60</td>
</tr>
</tbody>
</table>

\(^1\)The range of Judgmental Accuracy scores for each category is from 0 to 8.
Table 3 provides a clearer picture of which categories of facial expressions generated the most errors and tended to be over-used by kindergarten and third grade children. Third graders seemed to have viewed the world of adult poses of facial affect as being predominantly angry while kindergarten subjects vaciliated equally between misperceiving the photographs to be mostly expressions of anger and fear. Tables 4 and 5 indicate the mis-classification of the stimuli by both grade levels was systematic and did not extend in the same manner to all the categories of emotional information. All the children tended to selectively mis-identify anger more frequently than any other category for expressions of sadness and fear. Although third graders showed some improvement in discrimination ability, the second category of facial expressions most incorrectly over-used by both grade levels was that of fear for intended facial poses of surprise.

Posing Accuracy

Split-half reliability correlations between the odd and even numbered judges' correct evaluations with intended poses suggest that judges can reliably rate individual differences among children in accuracy of posing different categories of facial expressions of emotion. Since the correlations were based on half the number of judges, the reliability coefficient for all the judges for a particular
Graph I

Grade Differences in Children's Ability to Accurately Identify the Emotional Meaning of Five Facial Expressions

Categories of Facial Expressions of Affect

--- Kindergarten
--- 3rd Grade
Graph II

Sex Differences in Children's Ability to Accurately
Identify the Emotional Meaning of Five Facial Expressions

Categories of Facial Expressions of Affect

--- Females
--- Males
Table 3

Number of Emitted Responses in Each Category of Emotional Meaning for Kindergarten and Third Grade Children

<table>
<thead>
<tr>
<th>Grade</th>
<th>HAPPY</th>
<th></th>
<th></th>
<th>ANGER</th>
<th></th>
<th></th>
<th>SAD</th>
<th></th>
<th></th>
<th>FEAR</th>
<th></th>
<th></th>
<th>SURPRISE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kdgn</td>
<td>168</td>
<td>55</td>
<td>223</td>
<td>118</td>
<td>139</td>
<td>257</td>
<td>89</td>
<td>71</td>
<td>160</td>
<td>109</td>
<td>138</td>
<td>247</td>
<td>45</td>
<td>28</td>
<td>73</td>
</tr>
<tr>
<td>3rd</td>
<td>170</td>
<td>12</td>
<td>182</td>
<td>177</td>
<td>140</td>
<td>317</td>
<td>82</td>
<td>19</td>
<td>101</td>
<td>125</td>
<td>65</td>
<td>190</td>
<td>128</td>
<td>42</td>
<td>170</td>
</tr>
</tbody>
</table>

C-Correct
I-Incorrect
T-Total

* Maximum number correct responses for each category of emotional meaning: 192
(24 subjects x 8 stimuli for each category)
Table 4

Judgmental Accuracy

Frequency in Each Response Category for Each Stimulus Category

for Kindergarten Children Identifying Facial Expressions of Emotion

<table>
<thead>
<tr>
<th>Children's Responses*</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ekman &amp; Friesen Stimuli</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HAPPY</td>
<td>168</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>ANGER</td>
<td>16</td>
<td>118</td>
<td>26</td>
<td>30</td>
<td>2</td>
</tr>
<tr>
<td>SAD</td>
<td>8</td>
<td>61</td>
<td>89</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>FEAR</td>
<td>3</td>
<td>47</td>
<td>29</td>
<td>109</td>
<td>4</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>28</td>
<td>27</td>
<td>15</td>
<td>77</td>
<td>45</td>
</tr>
</tbody>
</table>

* Maximum number correct responses for each category of emotional meaning: 192
Table 5

Frequency in Each Response Category for Each Stimulus Category for 3rd Grade Children

<table>
<thead>
<tr>
<th>Ekman &amp; Friesen Stimuli</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>170</td>
<td>3</td>
<td>7</td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>ANGER</td>
<td>1</td>
<td>177</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>SAD</td>
<td>0</td>
<td>92</td>
<td>82</td>
<td>15</td>
<td>3</td>
</tr>
<tr>
<td>FEAR</td>
<td>2</td>
<td>34</td>
<td>7</td>
<td>125</td>
<td>24</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>9</td>
<td>11</td>
<td>0</td>
<td>44</td>
<td>128</td>
</tr>
</tbody>
</table>

* Maximum number correct responses for each category of emotional meaning: 192
category of facially posed affect may be estimated by using the Spearman-Brown formula. From inspection of Table 6 we can see that happiness, anger, and sadness have modest but respectable reliability coefficients. There was substantial judge agreement about accurately posed facial expressions of surprise whereas error was most pronounced for intended facial poses of fear. With the Spearman-Brown corrections the reliability coefficients are generally high enough to put reasonable confidence in the magnitude of the obtained posing accuracy scores.

(Insert Table 6)

Although there were no main effects for instructions, sex, or race, a $2 \times 2 \times 2 \times 2 \times 5$ analysis of variance demonstrated a significant grade difference in children’s ability to pose facial expressions of emotion in general (see Table 7). Congruent with the results for judgmental accuracy, third graders were more precise ($m = 4.73$) in posing facial expressions of emotional intent than were kindergarten children ($m = 3.44$). Therefore the hypothesis that there would be grade, sex, and race differences in ability to adequately pose facial affect received only partial support from the results. The projection that the instructional set to use imaginal processes would help children more than abstract or general concepts to communicate facial poses of emotion that can be sufficiently decoded by judges was not corroborated. Imaginal instructions did not augment the accuracy with which children were able to pose the various facial expressions of emotion. Twenty-four of the children were instructed to think of something or remember a time when they had felt a particular emotion before they attempted to pose it for the purposes of the experiment. These 24
Table 6

Reliability Correlations Between Odd and Even Numbered Judges' Evaluations of Children's Ability to Accurately Pose Each Facial Expression of Emotion

<table>
<thead>
<tr>
<th>Facial Expression</th>
<th>Split-Half Reliability Correlations</th>
<th>Spearman-Brown Corrections for 10 Judges</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>.69</td>
<td>.82</td>
</tr>
<tr>
<td>ANGER</td>
<td>.77</td>
<td>.87</td>
</tr>
<tr>
<td>SAD</td>
<td>.63</td>
<td>.77</td>
</tr>
<tr>
<td>FEAR</td>
<td>.47</td>
<td>.64</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>.91</td>
<td>.95</td>
</tr>
</tbody>
</table>
children produced 120 poses that were photographically recorded. For only 51 (43 percent) of the 120 responses were the children able to verbally specify that they had imagined or remembered a personal incident or experience with the emotion prior to the posing of it. For the remaining 57 percent of the poses the children indicated that they either imagined "nothing" or just "didn't know."

(Insert Table 7)

The prediction that the children would have differential difficulty in accurately portraying some of the facial expressions was strongly confirmed. The accurate posing of facial expressions varied significantly with the category of emotion (see Table 7). From Table 8 it can be determined that the children were quite effective in posing facial expressions of happiness. Facial poses of anger and sadness were markedly harder for the children to communicate than were happy facial expressions. Finally the emotional intent of surprise and fear were the most difficult for the children to facially convey or pose.

(Insert Table 8)

Grade level significantly interacted with children's posed facial expressions of emotion (see Table 7). The two grade levels had very similar mean posing accuracy scores for facial expressions of happiness (see Graph III). Third graders were more skilled in accurately posing facial expressions of sadness, anger, and surprise while kindergarten subjects were just a little more proficient in facially posing fear. The grade differences in actually posing facial expressions were in some ways similar to and different from the grade differences found for the recognition of facial affect posed by adult models.
Table 7

Analysis of Variance in Terms of Accuracy of Posing Facial Expression of Affect

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions</td>
<td>7.35</td>
<td>1</td>
<td>7.35</td>
<td>0.77</td>
</tr>
<tr>
<td>Grade</td>
<td>98.82</td>
<td>1</td>
<td>98.82</td>
<td>10.37**</td>
</tr>
<tr>
<td>Sex</td>
<td>12.15</td>
<td>1</td>
<td>12.15</td>
<td>1.28</td>
</tr>
<tr>
<td>Race</td>
<td>1.07</td>
<td>1</td>
<td>1.07</td>
<td>0.11</td>
</tr>
<tr>
<td>Instructions x Grade</td>
<td>4.27</td>
<td>1</td>
<td>4.27</td>
<td>0.45</td>
</tr>
<tr>
<td>Instructions x Sex</td>
<td>1.67</td>
<td>1</td>
<td>1.67</td>
<td>0.18</td>
</tr>
<tr>
<td>Grade x Sex</td>
<td>0.67</td>
<td>1</td>
<td>0.67</td>
<td>0.01</td>
</tr>
<tr>
<td>Instructions x Race</td>
<td>16.02</td>
<td>1</td>
<td>16.02</td>
<td>1.68</td>
</tr>
<tr>
<td>Grade x Race</td>
<td>6.02</td>
<td>1</td>
<td>6.02</td>
<td>0.63</td>
</tr>
<tr>
<td>Sex x Race</td>
<td>0.17</td>
<td>1</td>
<td>0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Instructions x Grade x Sex</td>
<td>0.17</td>
<td>1</td>
<td>0.17</td>
<td>0.00</td>
</tr>
<tr>
<td>Instructions x Grade x Race</td>
<td>0.67</td>
<td>1</td>
<td>0.67</td>
<td>0.01</td>
</tr>
<tr>
<td>Instructions x Sex x Race</td>
<td>0.27</td>
<td>1</td>
<td>0.27</td>
<td>0.03</td>
</tr>
<tr>
<td>Grade x Sex x Race</td>
<td>4.27</td>
<td>1</td>
<td>4.27</td>
<td>0.45</td>
</tr>
<tr>
<td>Instructions x Grade x Sex x Race</td>
<td>2.02</td>
<td>1</td>
<td>2.02</td>
<td>0.21</td>
</tr>
<tr>
<td>Ss between Groups</td>
<td>305.06</td>
<td>32</td>
<td>9.53</td>
<td></td>
</tr>
</tbody>
</table>
Table 7

<table>
<thead>
<tr>
<th>Effect</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotions</td>
<td>4</td>
<td>1426.71</td>
<td>356.68</td>
<td>53.82**</td>
<td></td>
</tr>
<tr>
<td>Instructions x Emotions</td>
<td>4</td>
<td>19.69</td>
<td>4.92</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>Grade x Emotions</td>
<td>4</td>
<td>78.56</td>
<td>19.64</td>
<td>2.96*</td>
<td></td>
</tr>
<tr>
<td>Sex x Emotions</td>
<td>4</td>
<td>144.81</td>
<td>11.20</td>
<td>1.69</td>
<td></td>
</tr>
<tr>
<td>Race x Emotions</td>
<td>4</td>
<td>18.56</td>
<td>4.64</td>
<td>0.70</td>
<td></td>
</tr>
<tr>
<td>Instructions x Grade x Emotions</td>
<td>4</td>
<td>25.94</td>
<td>6.48</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Instructions x Sex x Emotions</td>
<td>4</td>
<td>20.62</td>
<td>5.16</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>Grade x Sex x Emotions</td>
<td>4</td>
<td>52.22</td>
<td>13.06</td>
<td>1.97</td>
<td></td>
</tr>
<tr>
<td>Instructions x Race x Emotions</td>
<td>4</td>
<td>8.61</td>
<td>2.15</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td>Grade x Race x Emotions</td>
<td>4</td>
<td>19.43</td>
<td>4.99</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Sex x Race x Emotions</td>
<td>4</td>
<td>32.02</td>
<td>8.01</td>
<td>1.21</td>
<td></td>
</tr>
<tr>
<td>Instruct. x Grade x Sex x Emotions</td>
<td>4</td>
<td>9.77</td>
<td>2.44</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>Instruct. x Grade x Race x Emotions</td>
<td>4</td>
<td>13.39</td>
<td>3.35</td>
<td>0.51</td>
<td></td>
</tr>
<tr>
<td>Instruct. x Sex x Race x Emotions</td>
<td>4</td>
<td>4.11</td>
<td>1.03</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>Grade x Sex x Race x Emotions</td>
<td>4</td>
<td>14.77</td>
<td>3.69</td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Instruct. x Grade x Sex x Emot. x Race</td>
<td>4</td>
<td>9.20</td>
<td>2.30</td>
<td>0.35</td>
<td></td>
</tr>
<tr>
<td>Ss within Groups</td>
<td>128</td>
<td>618.27</td>
<td>6.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** p less than .01
* p less than .05
Table 8

Means for Accurately Posing Each Category of Facial Expressions of Emotion by All Children

<table>
<thead>
<tr>
<th></th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8.48</td>
<td>4.13</td>
<td>4.13</td>
<td>1.42</td>
<td>2.27</td>
</tr>
</tbody>
</table>

1 The range of posing accuracy scores for each category is from 0 to 10.
Both kindergarten and third grade children tended to excel in the recognition and posing of happy facial expressions. Similar to the pattern demonstrated for judgmental accuracy, maturation and experience seemed to enhance the posing of facial expressions of anger and surprise. In comparison with the grade differences on the recognition of sad and fear stimuli, the results indicate the pattern was reversed for the posing of these expressions. In spite of their problems in correctly recognizing sad facial affect, third graders' ability to accurately pose sad facial expressions was better than their capacity to exhibit any other expression outside of happiness. Of all the categories of emotional information, it is the fearful facial expressions that the third grade children had the most difficulty in posing.

(Insert Graph III)

Tables 9 and 10 show the kinds of errors that the kindergarten and third graders made in their intended attempts to pose the various categories of emotional information. Although there generally was a decrement in the number of errors made by the older children, both grade levels presented the same basic pattern of posing mistakes. Children in kindergarten and third grade more frequently emitted happy facial expressions when they actually had intended to facially pose surprise or fear. In fact the total frequencies of judges responses indicate the children produced substantially more happy facial poses correctly, as incorrectly, than any other expression. It appears as though the children tried to opt towards conventionality, and avoid facially presenting the other "negative" emotions. It is interesting that the children more frequently substituted poses of anger for facial attempts
Graph III

Grade Differences in Children's Mean Posing Accuracy

Scores for Each Category of Facial Expressions of Emotion

Kindergarten

3rd Grade

Categories of Facial Expressions of Emotion
to convey sadness. Conversely for the kindergarten children, they emitted more errors of sad facial expressions for intended poses of anger.

(I Insert Table 9)

(I Insert Table 10)

Table 11 shows that children's ability to accurately pose facial affects is not systematically associated with the capacity to correctly perceive facial expressions of emotion posed by adult models. The recognition and expression of facially posed affect appear to be independent skills which are not mediated by some underlying common process. Only the posing and judgmental accuracy scores for surprise turned out to be significantly correlated. However this relationship is difficult to interpret because the correlation is low and isolated from the other categories of facial expressions of emotion. Therefore the hypothesis that the ability to identify the emotional meaning of facial expressions would be positively correlated with the capacity to accurately pose emotional intent in facial behavior must be rejected.

(I Insert Table 11)

Facial Enactment Genuineness

It had been predicted that there would be instructional, grade, sex, and race differences on genuineness ratings for children's poses of facial expressions of affect. A 2 x 2 x 2 x 2 x 5 analysis of variance of the rating evaluations made by ten male high school teachers (judges) did not support the hypothesis for main effects. But the results did reveal certain interesting interactions. The genuineness of investment that the children were able to put into the
Table 9

Frequency in Each Response Category for Each Stimulus Category for Kindergarten Children Communicating Facial Expressions of Emotion

Number of Judges Responses*

<table>
<thead>
<tr>
<th>Intended Pose</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>197</td>
<td>4</td>
<td>8</td>
<td>18</td>
<td>13</td>
</tr>
<tr>
<td>ANGER</td>
<td>46</td>
<td>78</td>
<td>67</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>SAD</td>
<td>40</td>
<td>71</td>
<td>71</td>
<td>35</td>
<td>23</td>
</tr>
<tr>
<td>FEAR</td>
<td>76</td>
<td>34</td>
<td>41</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>SURPRISE</td>
<td>176</td>
<td>8</td>
<td>14</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>537</td>
<td>195</td>
<td>199</td>
<td>143</td>
<td>126</td>
</tr>
</tbody>
</table>

* Maximum number of correct responses for each category of posed facial expressions of emotion: 240.
Table 10

Frequency in Each Response Category for Each Stimulus Category for Third Grade Children

Communicating Facial Expressions of Emotion

<table>
<thead>
<tr>
<th>Intended Pose</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>210</td>
<td>8</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>ANGER</td>
<td>49</td>
<td>120</td>
<td>44</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>SAD</td>
<td>16</td>
<td>72</td>
<td>127</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>FEAR</td>
<td>72</td>
<td>31</td>
<td>49</td>
<td>27</td>
<td>61</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>115</td>
<td>15</td>
<td>12</td>
<td>15</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>246</td>
<td>210</td>
<td>87</td>
<td>165</td>
</tr>
</tbody>
</table>

* Maximum number of correct responses for each category of posed facial expressions of emotion: 240.
Table 11

Pearson Product-Moment Correlations between Children’s Judgmental and Posing Accuracy Scores for Each of the Facial Expressions of Emotions

<table>
<thead>
<tr>
<th>Judgmental Accuracy</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>-.01</td>
<td>-.02</td>
<td>-.07</td>
<td>-.246*</td>
<td>.09</td>
</tr>
<tr>
<td>ANGER</td>
<td>.16</td>
<td>.13</td>
<td>.01</td>
<td>-.23</td>
<td>.240</td>
</tr>
<tr>
<td>SAD</td>
<td>.02</td>
<td>.19</td>
<td>-.02</td>
<td>.12</td>
<td>.39**</td>
</tr>
<tr>
<td>FEAR</td>
<td>.05</td>
<td>.04</td>
<td>.15</td>
<td>-.22</td>
<td>.02</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>.15</td>
<td>.07</td>
<td>.15</td>
<td>-.01</td>
<td>.27*</td>
</tr>
</tbody>
</table>

* r less than .05
** r less than .005
posing of facial expressions varied significantly with the particular categories of affect (see Table 12). Children's intended facial expressions of surprise and happiness were rated by the judges as demonstrating the most genuineness (see Table 13). Efforts to facially pose fear, anger, and sadness, whether correct or not, were rated as showing less real investment of emotion. Although the role enactment ratings for all the facial poses of emotion ranged from mechanical and phony to genuine and convincing, the mean rating scores for the five categories of facial expressions clustered around the middle of the continuum. It seems the children were able to appear to be at least mildly genuine and convincing in their expressions even though they may have been unsuccessful in accurately posing a particular facial expression of emotion. In addition the evaluations within each category tended to be normally distributed which suggests the judges were fairly discriminating in their ratings.

(Insert Table 12)

(Insert Table 13)

Grade and sex significantly interacted with intended emotion to influence genuineness rating (see Table 12). The data indicate there were large sex differences in the role enactment scores for third grade children for facial expressions of sadness. This sex difference was smaller and in the opposite direction for kindergarten children. Interestingly a distinctive sex reversal in the configuration of ratings occurred between the two grade levels. Kindergarten females were able to facially pose surprise, happiness, and fear with more genuineness than they were able to convey expressions of anger and
### Table 12

Analysis of Variance of Role Enactment Scores for Children Posing Facial Expressions of Emotion

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions</td>
<td>0.44</td>
<td>1</td>
<td>0.44</td>
<td>0.30</td>
</tr>
<tr>
<td>Grade</td>
<td>1.49</td>
<td>1</td>
<td>1.49</td>
<td>1.00</td>
</tr>
<tr>
<td>Sex</td>
<td>0.20</td>
<td>1</td>
<td>0.20</td>
<td>0.13</td>
</tr>
<tr>
<td>Race</td>
<td>5.92</td>
<td>1</td>
<td>5.92</td>
<td>3.96</td>
</tr>
<tr>
<td>Instructions x Grade</td>
<td>1.46</td>
<td>1</td>
<td>1.46</td>
<td>0.98</td>
</tr>
<tr>
<td>Instructions x Sex</td>
<td>0.55</td>
<td>1</td>
<td>0.55</td>
<td>0.37</td>
</tr>
<tr>
<td>Grade x Sex</td>
<td>0.92</td>
<td>1</td>
<td>0.92</td>
<td>0.06</td>
</tr>
<tr>
<td>Instructions x Race</td>
<td>2.22</td>
<td>1</td>
<td>2.22</td>
<td>1.49</td>
</tr>
<tr>
<td>Grade x Race</td>
<td>0.88</td>
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</tr>
<tr>
<td>Sex x Race</td>
<td>2.11</td>
<td>1</td>
<td>2.11</td>
<td>1.41</td>
</tr>
<tr>
<td>Instructions x Grade x Sex</td>
<td>4.57</td>
<td>1</td>
<td>4.57</td>
<td>3.06</td>
</tr>
<tr>
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<td>1</td>
<td>0.78</td>
<td>0.05</td>
</tr>
<tr>
<td>Instructions x Sex x Race</td>
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<td>1</td>
<td>1.00</td>
<td>0.67</td>
</tr>
<tr>
<td>Grade x Sex x Race</td>
<td>0.19</td>
<td>1</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td>Instructions x Grade x Sex x Race</td>
<td>0.42</td>
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<td>0.42</td>
<td>0.28</td>
</tr>
<tr>
<td>Ss between Groups</td>
<td>47.83</td>
<td>32</td>
<td>1.50</td>
<td></td>
</tr>
</tbody>
</table>
Table 12

<table>
<thead>
<tr>
<th>Factor</th>
<th>F</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotions</td>
<td>23.31</td>
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<td>5.83</td>
</tr>
<tr>
<td>Instructions x Emotions</td>
<td>2.41</td>
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<td>0.60</td>
</tr>
<tr>
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<td>2.56</td>
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<td>0.64</td>
</tr>
<tr>
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<td>0.27</td>
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<td>0.67</td>
</tr>
<tr>
<td>Race x Emotions</td>
<td>3.28</td>
<td>4</td>
<td>0.82</td>
</tr>
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</tr>
<tr>
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<td>2.65</td>
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<tr>
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<td>2.14</td>
<td>4</td>
<td>0.54</td>
</tr>
<tr>
<td>Grade x Race x Emotions</td>
<td>2.38</td>
<td>4</td>
<td>0.59</td>
</tr>
<tr>
<td>Sex x Race x Emotions</td>
<td>1.50</td>
<td>4</td>
<td>0.37</td>
</tr>
<tr>
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</tr>
<tr>
<td>Instruct. x Sex x Race x Emotions</td>
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<td>0.16</td>
</tr>
<tr>
<td>Grade x Sex x Race x Emotions</td>
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<td>0.87</td>
</tr>
<tr>
<td>Instruct. x Grade x Sex x Race x Emotions</td>
<td>7.37</td>
<td>4</td>
<td>1.84</td>
</tr>
<tr>
<td>Ss within Groups</td>
<td>100.55</td>
<td>128</td>
<td>0.79</td>
</tr>
</tbody>
</table>

** p less than .01
* p less than .05
Table 13

The Mean Role Enactment Scores for All Children
Posing Each Category of Facial Expressions of Emotion

<table>
<thead>
<tr>
<th></th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.75</td>
<td>4.12</td>
<td>4.10</td>
<td>4.43</td>
<td>4.86</td>
</tr>
</tbody>
</table>

1Scores represent 10 judges' evaluations on the 7-point role enactment rating scale for each subject for each facially posed affect.
sadness (see Graph IV). Kindergarten boys were more convincing than girls for the facial portrayal of sadness and anger. Whereas, the pattern of genuineness ratings for all the categories of affect information was completely reversed for female and male third graders (see Graph V).

(Insert Graph IV)

(Insert Graph V)

Reaction Times

One of the hypotheses of the dissertation maintained that there would be instructional, grade, sex, and race differences in children's reaction times for the posing of the different categories of facial expressions of affect. Although main effects for grade, sex, and race did not materialize, a $2 \times 2 \times 2 \times 2 \times 5$ analysis of variance indicated instructions generated marked differences in the reaction times for the posing of facial expressions of emotion (see Table 14). Imaginal instructions facilitated shorter latencies for posing ($m = 7.43$ seconds) than did the abstract instruction ($m = 13.53$ seconds). These differences in latencies may have been a product of the length of the imaginal instructions, which may have allowed the subject more time to cognitively prepare and rehearse his response.

(Insert Table 14)

The prediction received some additional support from two sets of complex interactions. Instructions and sex significantly interacted with the categories of facial expressions of emotion (see Table 14). With imaginal instructions, the mean amount of time it took boys and girls to pose each of the five different types of facial ex-
Graph IV

Sex Differences Among Kindergarten Children on Mean Role Enactment Scores for Posing Each Category of Facial Expressions of Emotion

Categories of Facial Expressions of Emotion

--- Male
--- Female
Sex Differences Among Third Grade Children on Mean Role Enactment Scores for Posing Each Category of Facial Expressions of Emotion

<table>
<thead>
<tr>
<th></th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- **Male**
- **Female**

Graph V
Table 1b

Analysis of Variance of Reaction Times for Children Posing Facial Expressions of Emotion

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions</td>
<td>2226.50</td>
<td>1</td>
<td>2226.50</td>
<td>7.73**</td>
</tr>
<tr>
<td>Grade</td>
<td>139.54</td>
<td>1</td>
<td>139.54</td>
<td>0.48</td>
</tr>
<tr>
<td>Sex</td>
<td>42.50</td>
<td>1</td>
<td>42.50</td>
<td>0.15</td>
</tr>
<tr>
<td>Race</td>
<td>155.20</td>
<td>1</td>
<td>155.20</td>
<td>0.54</td>
</tr>
<tr>
<td>Instructions x Grade</td>
<td>40.84</td>
<td>1</td>
<td>40.84</td>
<td>0.14</td>
</tr>
<tr>
<td>Instructions x Sex</td>
<td>97.54</td>
<td>1</td>
<td>97.54</td>
<td>0.34</td>
</tr>
<tr>
<td>Grade x Sex</td>
<td>92.50</td>
<td>1</td>
<td>92.50</td>
<td>0.32</td>
</tr>
<tr>
<td>Instructions x Race</td>
<td>0.50</td>
<td>1</td>
<td>0.50</td>
<td>0.00</td>
</tr>
<tr>
<td>Grade x Race</td>
<td>61.00</td>
<td>1</td>
<td>61.00</td>
<td>0.21</td>
</tr>
<tr>
<td>Sex x Race</td>
<td>90.04</td>
<td>1</td>
<td>90.04</td>
<td>0.31</td>
</tr>
<tr>
<td>Instructions x Grade x Sex</td>
<td>283.84</td>
<td>1</td>
<td>283.84</td>
<td>0.99</td>
</tr>
<tr>
<td>Instructions x Grade x Race</td>
<td>367.54</td>
<td>1</td>
<td>367.54</td>
<td>1.28</td>
</tr>
<tr>
<td>Instructions x Sex x Race</td>
<td>100.10</td>
<td>1</td>
<td>100.10</td>
<td>0.35</td>
</tr>
<tr>
<td>Grade x Sex x Race</td>
<td>4.00</td>
<td>1</td>
<td>4.00</td>
<td>0.01</td>
</tr>
<tr>
<td>Instructions x Grade x Sex x Race</td>
<td>121.84</td>
<td>1</td>
<td>121.84</td>
<td>0.42</td>
</tr>
<tr>
<td>Ss between Groups</td>
<td>9219.96</td>
<td>32</td>
<td>286.12</td>
<td></td>
</tr>
</tbody>
</table>
Table 14

|                          | Value 1 | df | Value 2 | df | Significance  
|--------------------------|---------|----|---------|----|--------------- 
| Emotions                 | 165.96  |    | 41.49   |    | 1.05          
| Instructions x Emotions | 14.72   |    | 3.68    |    | 0.09          
| Grade x Emotions         | 367.94  |    | 91.99   |    | 2.33          
| Sex x Emotions           | 283.89  |    | 70.97   |    | 1.79          
| Race x Emotions          | 177.77  |    | 44.44   |    | 1.12          
| Instructions x Grade x Emotions | 188.64 |    | 47.16   |    | 1.19          
| Instructions x Sex x Emotions | 468.86 |    | 117.21  |    | 2.96*         
| Grade x Sex x Emotions   | 557.14  |    | 139.29  |    | 3.52**        
| Instructions x Race x Emotions | 12.61  |    | 3.16    |    | 0.08          
| Grade x Race x Emotions  | 307.39  |    | 76.85   |    | 1.94          
| Sex x Race x Emotions    | 139.11  |    | 34.78   |    | 0.88          
| Instruct. x Grade x Sex x Emotions | 207.97 |    | 51.99   |    | 1.31          
| Instruct. x Grade x Race x Emotions | 193.85 |    | 48.46   |    | 1.23          
| Instruct. x Sex x Race x Emotions | 192.70 |    | 48.18   |    | 1.22          
| Grade x Sex x Race x Emotions | 357.39 |    | 89.35   |    | 2.26          
| Instruct. x Grade x Sex x Race x Emot. | 120.31 |    | 30.09   |    | 0.76          
| Ss within Groups         | 5063.69 | 128 | 39.56   |    |               

** p less than .01
* p less than .05
pressions was fairly uniform (see Appendix F). The categories that produced the most distinct discrepancy between the sexes in posing latencies were fear and surprise. For those categories, the females had the slightly longer reaction times. Reaction times for poses to abstract instructions were more variable and demonstrated a different pattern for the sexes from the latencies obtained under imaginal instructions. Under abstract instructional conditions, it was the boys who had longer reaction times for the facial poses of fear and surprise (see Appendix G). Finally girls needed greater latencies for facially conveying expressions of sadness with abstract instructions.

Grade and sex differences in reaction times significantly interacted with the various expressions of facially posed affect (see Table 14). Within kindergarten subjects it was the girls who generally produced shorter latencies for correct and incorrectly posed facial expressions of emotional intent (see Appendix H). Boys, especially, needed a very long time to generate happy facial expressions while both sexes seemed to have difficulty in producing expressions of facially posed anger. For certain kinds of facial expressions, there is a remarkable reversal in the constellation of reaction times for male and female third graders. Instead of the boys as it was with the kindergarten subjects, third grade girls required a considerable amount of time to pose intentions of happiness and sadness (see Appendix I). Reaction times for poses of fear and surprise have essentially the same characteristics as those manifested by the younger children, but differences between the sexes became magnified as the
boys tended to linger longer than the girls. However, third graders, males more so than females, exhibited a dramatic decrement in latencies for posing intended facial expressions of anger.

**Correlations between the Dependent Variables and Posing Accuracy**

In general children's ability to facially convey emotional information is not related to the genuineness with which they evince the expression or to the amount of time it took them to pose the affect. The ability to give accurate facial poses of happiness was substantially correlated with the genuineness the children were able to invest in the production of this particular category of expressions. The posing accuracy scores and role enactment or genuineness ratings for the other categories were unrelated (see Table 15). None of the posing accuracy scores for each category were appreciably associated in a meaningful manner with the reaction times for the facial expressions of emotional intent (see Table 16). From Table 17 it can be determined that ratings of genuineness were inversely correlated with latencies for posing the facial expression of happiness and fear. A systematic relationship between role enactment scores and reaction times for anger, sadness, and surprise did not crystallize. These three sets of correlations suggest the accurate communication of posed expressions of emotional intent is relatively free from the contribution of the genuineness of the response or the amount of time it took to generate it.

(Insert Table 15)

(Insert Table 16)

(Insert Table 17)
Correlations between Children's Posing Accuracy Scores and Role Enactment Scores for Each Category

<table>
<thead>
<tr>
<th>Role Enactment Scores</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>.65**</td>
<td>-.05</td>
<td>-.12</td>
<td>.30*</td>
<td>.31*</td>
</tr>
<tr>
<td>ANGER</td>
<td>.14</td>
<td>.04</td>
<td>.14</td>
<td>.08</td>
<td>.05</td>
</tr>
<tr>
<td>SAD</td>
<td>-.04</td>
<td>-.15</td>
<td>-.16</td>
<td>.04</td>
<td>-.13</td>
</tr>
<tr>
<td>FEAR</td>
<td>.02</td>
<td>.33*</td>
<td>.20</td>
<td>-.12</td>
<td>-.03</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>.09</td>
<td>-.16</td>
<td>-.18</td>
<td>.00</td>
<td>.16</td>
</tr>
</tbody>
</table>

* r less than .288 = .025
** r less than .165 = .001
Table 16

Correlations between Children's Posing Accuracy Scores and Reaction Times for Each Category of Facially Posed Affect

<table>
<thead>
<tr>
<th>Posing Accuracy Scores</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>-.23</td>
<td>-.08</td>
<td>-.06</td>
<td>-.05</td>
<td>-.07</td>
</tr>
<tr>
<td>ANGER</td>
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<td>-.22</td>
<td>-.11</td>
<td>-.07</td>
<td>-.14</td>
</tr>
<tr>
<td>SAD</td>
<td>.03</td>
<td>.11</td>
<td>.06</td>
<td>.15</td>
<td>.21</td>
</tr>
<tr>
<td>FEAR</td>
<td>.12</td>
<td>-.08</td>
<td>-.19</td>
<td>-.12</td>
<td>-.08</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>-.16</td>
<td>-.18</td>
<td>-.19</td>
<td>-.12</td>
<td>.12</td>
</tr>
</tbody>
</table>

* r less than .243 = .05
Table 17

Correlations between Children's Role Enactment Scores and Reaction Times for Each Category of Facial Affect

<table>
<thead>
<tr>
<th>Role Enactment Scores</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>-.31**</td>
<td>.03</td>
<td>.04</td>
<td>.00</td>
<td>.05</td>
</tr>
<tr>
<td>ANGER</td>
<td>- .03</td>
<td>.05</td>
<td>.13</td>
<td>.00</td>
<td>-.09</td>
</tr>
<tr>
<td>SAD</td>
<td>.07</td>
<td>.09</td>
<td>.13</td>
<td>.00</td>
<td>-.26*</td>
</tr>
<tr>
<td>FEAR</td>
<td>-.26*</td>
<td>.21</td>
<td>-.09</td>
<td>-.26*</td>
<td>-.18</td>
</tr>
<tr>
<td>SURPRISE</td>
<td>-.07</td>
<td>.01</td>
<td>.17</td>
<td>.00</td>
<td>.10</td>
</tr>
</tbody>
</table>

* r less than .243 = .05
** r less than .288 = .025
Intercorrelations Among Facial Expressions for Each Dependent Variable

The intercorrelations presented in Table 18 indicate that only the perception of surprise is significantly associated with the correct identification of anger, happiness, and sadness. In addition to surprise, the recognition of fear is related to the accurate perception of anger. However, it is difficult to see the reason for the pattern of these correlations. Neither the accuracy of judging facial expressions posed by adult models nor the tendency for the children to confuse one emotion with another (see Tables 4 and 5) seems to predict these correlations.

(Insert Table 18)

Interestingly just fear is significantly correlated with surprise for children's posing accuracy scores (see Table 19). The children's task of posing facial expressions of emotion appears to be rather robust because there is little evidence that the scores were influenced by some common source of variance. Except for the relationship between surprise and fear, the posing of any one facial expression seems to be distinct and separate from the conveyance of the other categories of affect information.

(Insert Table 19)

Table 20 demonstrates that the role enactment ratings for poses of surprise are associated with ratings of genuineness for happiness and fear. Ratings of genuineness and convincingness for fear are significantly related to those for happiness while sadness co-varies only with anger. In contrast to the correlations among the categories of emotional information for posing accuracy and role enactment ratings,
### Table 18

**Inter-Correlations Among Judgmental Accuracy Scores for the Categories of Facial Expressions of Emotion**

<table>
<thead>
<tr>
<th>Judgmental Accuracy Scores</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>1.00</td>
<td>-0.07</td>
<td>0.17</td>
<td>0.22</td>
<td>0.28*</td>
</tr>
<tr>
<td>ANGER</td>
<td>1.00</td>
<td>0.21</td>
<td>0.33**</td>
<td>0.52***</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td>1.00</td>
<td>0.06</td>
<td>0.28*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEAR</td>
<td>1.00</td>
<td>0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SURPRISE</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* r less than .243 = .05  
** r less than .288 = .025  
*** r less than .465 = .001
Table 19

Inter-Correlations Among Posing Accuracy Scores for the Categories of Facial Expressions of Emotion

<table>
<thead>
<tr>
<th></th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>1.00</td>
<td>.24</td>
<td>.00</td>
<td>-.11</td>
<td>.24</td>
</tr>
<tr>
<td>ANGER</td>
<td>1.00</td>
<td>.05</td>
<td>.10</td>
<td>.03</td>
<td></td>
</tr>
<tr>
<td>SAD</td>
<td>1.00</td>
<td></td>
<td>-.11</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>FEAR</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td>.29*</td>
</tr>
<tr>
<td>SURPRISE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

* r less than .288 * .025
it is difficult to differentiate the posed facial expressions from each other by examining the intercorrelations for reaction times (see Appendix J). The only consistent intercorrelation pattern which is maintained across the three dependent variables of posing accuracy, role enactment, and reaction times is that between surprise and fear. The meaning of this particular pattern is obfuscated by the absence of definitive relationships among the dependent variables (see Tables 15, 16, and 17).

(Insert Table 20)

Locus of Initiation and Intentionality or Coping Scores

It had been predicted that there would be grade, sex, and race differences in children's descriptions about the locus of initiation and their method of coping with subjective emotional experience. In comparing kindergarten and third grade subjects, it had been expected that the older children's responses to Wolman's semi-structured interview questions would reflect a trend toward initiating and assuming responsibility for their subjective experiences of emotion. Wolman et al. suggested that as children get older they tend to describe themselves to be the source of emotional experiences rather than the external world. Another facet of the dissertation was to determine whether certain modes of coping (described by Wolman) with five kinds of emotional experience would be affected by sex and race variables.

The children's responses were scored by two judges according to the criteria developed by Wolman, and response frequencies were analyzed through a series of Chi-square tests. The results were disappointing. No sex differences appeared for locus of initiation. The only grade
Table 20

Inter-Correlations Among Role Enactment Scores
for the Categories of Facial Expressions of Emotion

<table>
<thead>
<tr>
<th>Role Enactment Scores</th>
<th>HAPPY</th>
<th>ANGER</th>
<th>SAD</th>
<th>FEAR</th>
<th>SURPRISE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAPPY</td>
<td>1.00</td>
<td>-0.01</td>
<td>-0.76</td>
<td>0.39**</td>
<td>0.56**</td>
</tr>
<tr>
<td>ANGER</td>
<td></td>
<td>1.00</td>
<td>0.36*</td>
<td>0.16</td>
<td>0.00</td>
</tr>
<tr>
<td>SAD</td>
<td></td>
<td></td>
<td>1.00</td>
<td>0.03</td>
<td>0.17</td>
</tr>
<tr>
<td>FEAR</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
<td>0.34*</td>
</tr>
<tr>
<td>SURPRISE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

* r less than .338 = .01
** r less than .372 = .005
*** r less than .465 = .001
and race differences that occurred were for emotional experiences of surprise. However the grade finding (Chi-square = 5.71, df = 2, p less than .05) went against the grain of the hypothesis because 20 out of 24 of the third grade children gave responses that were rated as external. None of the third graders produced responses reflecting an internal orientation. In contrast to the older subjects, fifteen of the kindergarten children gave external responses and five indicated that they considered themselves the cause of the subjective emotional experience of surprise. In addition black children tended to be less external and more internal in locus of initiation than were the white subjects (Chi-square = 5.76, df = 2, p less than .05).

Grade and sex differences in modes of coping with the various kinds of emotional experience did not develop. Race differences in coping strategies occurred just for experiences of anger (Chi-square = 11.30, df = 5, p less than .05). The white children were more variable in their choice of coping techniques than were the black subjects. When angry the Caucasian subjects reported that they attempted to cope with the experience by resorting to mastery of inanimate and animate objects, physical flight from the situation, avoidance through mental fantasy activities and inactivity. Seventy-one percent of the black children (versus 38 percent for white subjects) reported they handled angry feelings by delaying gratification, retaliation or engaging in activity involving people or animate objects. However, the coping strategies relied upon by the black children were basically restricted just to the mastery of animate objects and simply leaving the field or source of frustration.
Summary of Results

All in all the results supported the contention that the accurate recognition and posing of facial expressions of emotion increase or improve significantly with grade advancement. Additionally, the prediction that some of the categories of emotional information would be more difficult than others to identify and facially pose was confirmed. The ability to recognize facial expressions posed by adult models and the children's capacity to facially portray posed affect appears to be independent skills. The genuineness the children manifested in their poses of emotional intent and the amount of time they took to give the expressions produced some interesting findings, but these results were not systematically related to the accuracy of posing facial affect. The Ekman and Friesen photographs were found to be effective, salient and discriminable stimuli for the children. The results of the dissertation indicate the Ekman and Friesen pictures can be usefully extended from adult research to the study of children. The procedure of photographing children's poses of facial expressions of emotion seems to be a potent technique which could be applicable to future research on children's communication of affect. Wolman's semi-structured interview for studying children's descriptions of their subjective emotional experiences did not prove to be profitable for the purposes of the dissertation.
CHAPTER IV
DISCUSSION

The dissertation was designed to provide basic normative data regarding age, sex, and race differences in the recognition and communication of various kinds of facial affects. It was felt that such data were essential before theorizing and theoretically oriented studies could fruitfully proceed. In this section, the results will be discussed in terms of their implications for theories regarding the development of affective recognition and communication skills. It will frequently be necessary to refer to general developmental theories since theories of affective communication itself are at present not highly articulated. In this section, we will first consider the implications of the findings for general accounts of the development of affective communication skills. We will attempt to elucidate the relative roles maturation (especially cognitive) and experience (especially with other persons in intimate relationships) play in the development of these communication skills. The nature of the results will further require that we consider the possible reasons for the separate development, in any one individual, of recognition and expressive skills within the general context of improvement in both skills over the developmental years. Finally, we will be concerned with the possible reasons for the differences in difficulty of both identifying and expressing the five distinct affect categories included in the
Developmental, Sex, and Race Differences in Recognition and Expressive Skills

In comparing kindergarten and third grade children, the results of this investigation found that the older children were generally more accurate in their ability to recognize facial expressions of affect posed by adult models. The data supports previous research which suggested that children’s ability to identify facial or vocal expressions of emotion improves successively with grade advancement (Dimitrovsky, 1964; Gates, 1923; Goldstein and Chance, 1964). The dissertation results demonstrated that the older children also were clearly more proficient in posing facial displays of emotional intent. Thus, regardless of the children’s performance on any specific category of affect information, the overall picture is that for both tasks skill and competence improve over the age span studied. This proved to be one of the most significant and salient results of the dissertation.

Although recognition and communication abilities for both races and sexes appear to improve with age, it was found that white subjects were more accurate than black children in their judgments. This proved to be a general effect which did not extend differentially to the various facial expressions of emotion. Unfortunately all the Ekman and Friesen photographs were posed by white models. Consequently the stimuli may have been unintentionally but favorably biased in the direction of white children. Although the children had white male and female teachers, it is possible these experiences were not enough to fully sensitize the black children to nuances in poses of facial affect made by white adult models. It is difficult to compare the present
results with Gitter et al. (1972) findings that adult "...black perceivers were significantly better judges of emotion than the white counterparts." Gitter speculated the perception of emotion is a function of practice and that out of necessity of survival in our society blacks may have had to be especially "...sensitive to the communicative symbols of action." Until the facial stimuli posed by adults are controlled for the race of the model, definitive conclusions about race differences among children must remain tentative and incomplete. However, the present results do indicate that black subjects improve with age in the interpretation of white affective expressions. Thus, cognitive-perceptual processes appear to be involved in the development of identification accuracy. These processes account for the increase, rather than decrease, in recognition accuracy even when the facial stimuli belong to individuals with somewhat different cultural backgrounds.

Instructions which supposedly encouraged the generation of either vivid images from specifically remembered sensory events or presumably emotionally-vitiated abstract images or symbols did not contribute to children's ability to express facial cues of affect information. On the basis of Hebb's (1968) model, it had been argued that particular memory images of emotionally charged sensory events should facilitate the more complete and compelling expression of facial displays of affect. The argument was not particularly substantiated by the results. This is not to say that imagery does not play a role in the accuracy of posing facial expressions. It was very difficult to get the children to spontaneously evoke concrete images of personal emotional experiences.
The problem is still open-ended because impoverishment in response evocation confounded the present findings. The absence of instructional differences appears to satisfy the suggestion that different eliciting circumstances should be examined in order "...to avoid the hazard that peculiarities in one way of eliciting the pose will bias the sample (Ekman et al., 1972)." One value of this comparative-descriptive dissertation project is that it highlights which variables appear to be not as promising as others seem to be potentially fruitful for future research.

The implications of these results on the main variables are that the experimental methods of the dissertation were sensitive and productive. Ekman and Friesen's photos of adult models' expressions of emotional intent were effective and workable stimuli for the recognition accuracy task. Likewise, adult judges (high school teachers) were found to be sensitive to the accuracy of children's poses. Skill in identifying facial affect does not seem to be so culturally bound to be determined by race and sex variables alone. The results suggest basic maturation to be a major factor in the communication and recognition skills. The dissertation evidence suggests that ability in accurately identifying and expressing facial examples of emotional intent depends upon experience and a highly generalized form of learning. Finally, the correct recognition of affective communications by others does not require the establishment of particular or enduring interpersonal relationships. Strangers having had no contact with the children modeling emotional intent can effectively discriminate the posed facial expressions of affect. At times, the clinical literature
seems to imply that only family members or highly experienced clinicians can accurately interpret affective expressions made by children and adolescents.

Processes Underlying the Recognition and Communication of Facial Expressions of Affect

The results suggest that the recognition and communication of facial expressions of emotions are not highly inter-related within any one age group. This raises the question as to what the exact sequence of events is in each process, and what elements the two processes may share (to account for general developmental improvement) and what elements differ (to account for relatively high skill in one process and low skill in the other by the same child)

The identification problem required the children to perceptually recognize, discriminate, and appraise different facial stimuli posed by adult models of differing sex, age, and morphological characteristics. Then the stimuli had to be interpreted according to a predesignated set of reference categories or abstract labels. Bruner (1973) has suggested "...adequate perceptual representation involves the learning of appropriate categories, the learning of cues useful in placing objects appropriately in such a system of categories, and the learning of what objects are likely to occur in the environment." Through maturation, experience, and learning, the child's repertoire of functional categories for conceptualizing emotionally-imbued information tend to become increasingly differentiated, articulated, and integrated (Davitz, 1969; Farmer, 1967; Langer, 1969; Mussen, Conger, and Kagan, 1969). The dissertation results are compatible with the theory that distinctive and invariant features and cues are necessary for successfully classifying a set of
posed facial expressions by a certain system of conceptual categories (happy, anger, sad, fear, and surprise). Increasingly clear and distinct categories for facial expressions, as for other kinds of stimuli, would be expected with increasing maturation and experience. Gibson's theory, as well as, Bruner's would lead to this expectation. The present results support the notion of increasing ability to discriminate most but not all types of facial expressions with increasing age. It appears that the discrimination of surprise and anger stimuli improves substantially with maturation and experience. Modest age-related gains resulted for facial expressions of fear. The current findings suggest the recognition of facial expressions of happiness is adequately acquired by the time the children are in kindergarten, and that this high level of discrimination ability tends to remain stabilized. Interestingly as children get older, it is the sad facial expressions which remain the most difficult for them to recognize. The implications of these differences among the various facial affects will be discussed in more detail at a later point in the chapter. The experimental procedures of of the dissertation appear to be of value for further exploration into children's problems in discriminating and categorizing facial expressions. In particular, it might be worthwhile to study children's understanding of the affect concepts and categories, apart from the application of them to particular stimuli.

The sequence for communicating posed facial affect information is different in some respects from the identification aspect but equally as complex. Initially for this task, the children had to comprehend the eliciting verbal cues (instructions). Then they had to search
through their memory for previously experienced kinesthetic sensations, appropriate symbolic or schematic guides, and concrete images of the visual face of the other and of the child himself (the author has observed his own son practicing different facial expressions in front of a hallway mirror for frequent but brief periods of time). Finally, the child had to translate and coordinate all these channels of information into a motor response that would adequately imitate what a particular facial expression "...looks like or what it feels like (Tomkins and McCarter, 1964)."

Tomkins and McCarter (1964) believe the successful or accurate communication of facial displays of emotion depends upon the development of a crystallized "interoceptive face of the self." According to Wenar (1971), the role of labels and vision is critical in the origins of the body (facial) concept. Parents and infants often play a game that entails the mutual touching and verbal identification of parts of the face. The procedure helps the infant to focus his attention to distinctive features and to distinguish the similarities and differences between his face and that of the parent. Verbal terms provided by the parent represent conceptual pegs for the child's experience of his facial concept.

Labels help the infant build up an image of his face. Unless he frequently looks in the mirror, he knows his face only in terms of nonvisual sensations. Through the reciprocal naming game, he learns that he shares visible facial features with the rest of humanity. When he points to the mother's visually apparent nose and then to some unseen region on his face, the label 'Baby's nose' carries with it the implication that he has a visible nose also. The baby's image of his own unseen face, then, must be a fantastic conglomeration of his mother's features and any picture he has been able to evolve of facial features in general (Wenar, 1971).

From this "fantastic conglomeration" the child progressively extracts the economical and invariant features from the informationally
rich stimuli of other people's faces, as well as, from his own face. Piaget and the psychoanalytic approach suggest that the sensory input from the child's active manipulation of his facial features, and the erotically charged kinesthetic feedback from the surface of the face as it is stimulated through touching, stroking, and kissing expedite the construction of a mental image of the face (Wenar, 1971). Unity and cohesiveness of a facial concept requires time to become established through continual use. Indirect supporting evidence comes from Simmel's (1966) research upon the development of phantom limb experiences following amputation. Simmel's data demonstrated a distinctive increase in the percentage of reported phantom limb phenomena with older children. Only 33 percent of two-to-four year olds compared to 100 percent of the eight year old children reported phantom limb sensations.

The significance of the kinesthetic and mental image of the face and its translation into public or observable responses is highlighted by Tomkins' (1962, 1964) theory of affect because it is directly relevant to expressive facial behavior. Tomkins has provided a provocative conceptual stand or framework against which the dissertation data can be compared, evaluated, and discussed. He has assumed that:

...affects are primarily facial behaviors and secondarily outer skeletal and inner visceral behavior. When we become aware of these facial responses (with or without concurrent visceral responses), we are aware of our affects. Later, we learn to generate from memory, images of these same responses which we can become aware of as affect, with or without repetition of facial, skeletal, or visceral responses. On the other hand, we have also assumed that one may respond with facial affective responses without necessarily becoming aware of the feedback from these responses. In short, although the awareness of the feedback of the facial response is the experience of affect, the same experience may later be retrieved from memory, thus bypassing the necessity for a facial response, or the feedback of the facial
response, or feedback of the facial response may remain uncons-
scious and not be transformed into a conscious message (Tomkins

Thus theories about the expression of facial affect emphasize the
concept of an image of the face, as well as, a set of conceptual cate-
gories for different facial expressions. One supposition to account
for the present finding of no connection between recognition and posing
accuracy within age groups could be based in the assumption that child-
ren who develop a clearcut system of verbal categories for emotion may
not necessarily have developed a clear and consistent internal image of
their own face (though both the category system and the facial image
could be expected to show improvement in definition with age).

The Relationship Between Recognition and Posing Accuracy

A salient conclusion to result from this research project is that
the learning to accurately discriminate and pose facial expressions of
emotion is not mediated by an unitary factor but rather by multiple pro-
cesses. We cannot predict a child's performance on one of the tasks
from our knowledge of his responses on the other. Levy (1964) obtained
positive intercorrelations between the ability to express feelings voc-
ally to others, the capacity to identify feelings expressed vocally by
others, and skill in recognizing one's own vocal expressions of feelings.
Levy interpreted the intercorrelations to suggest a general and unspec-
ified communication factor mediated the three separate abilities. She
contended that the communication of feeling through any channel "...de-
mands certain stable and uniform ways of organizing and responding to
internal and environmental cues." Levy maintained the underlying pro-
cess was independent from contextual cues and alterations in the content
of the messages. Proficiency in one mode of expression was to be associated with skill in other media of communication. Levy's argument received support from Levitt (1964) who found a low but significant correlation between the ability to perceive facial and vocal expressions of emotional intent. More recently Lanzetta and Kleck (1970) discovered an inverse relationship between the capacity to display and interpret facial affect-related cues.

The combined results of these research projects are difficult to extrapolate to the current set of data. Each studied adult subjects. Two investigations included the vocal communication of feelings, and all the projects were concerned with either feelings in general or just "negative" and "positive" distinctions of emotion. The dissertation focused upon a sample of children and examined the relationship between recognition and expression skills for five different examples of posed facial displays of affect. The present facts show that children's ability to accurately pose facial affects is not systematically associated with their capacity to correctly perceive facial expressions of emotion posed by adult models. The recognition and portrayal of facially posed affect appear to be independent skills which are not mediated by some underlying common communication process. Although the influence of an ubiquitous communication factor may be more evident in the behaviors of adult subjects, it appears as though recognition and expression skills develop under separate and distinct conditions and rules. An additional relevant finding is that the five categories of emotional facial behavior for both judgmental and posing accuracy were not inter-related in any coherent pattern (Tables 18 and 19). This tends to lend further cre-
dence to the above dissertation results indicating the absence of a "g" communication factor. It also questions Tomkins' (1962) declaration that "...the skills of receiving and sending are intimately interdepen-
dent because the face one sees is not so different from the face one lives behind."

Differences Among The Facial Affects

As had been predicted for the dissertation, some of the facial expressions of affect information were more difficult than others for the children to accurately identify and pose. The children as a group were quite good in correctly recognizing expressions of happiness and anger. Adult model poses of fear, surprise, and sadness were the most difficult for the children to discriminate. Evidently the children's responses to the Ekman and Friesen stimuli were not appreciably affected by the sex of the adult model posing for the various photographs. By chance the categories of anger, fear, and surprise were over-loaded with female models by the ratio of seven to one and six to two males. Although the children's ability to accurately recognize anger stimuli followed only the photographs of happiness (equal ratio of male to female models), expressions of fear and surprise were more troublesome for them to dis-

It is interesting to compare the current set of data on children's recognition accuracy with Gates' (1923) results. Excluding Gates' category of pain and the dissertation's category of sadness which were not descriptively equivalent, the order of the remaining four categories for
the two studies were the same. Both Gates and the present project ranked the following categories of facial expressions in order of increasing difficulty to identify: happiness, anger, fear, and surprise. Using adult subjects, Tomkins and McCarter (1964) and Thompson and Meltzer (1964) reported happy facial stimuli to be the easiest to recognize. Tomkins and McCarter found expressions of surprise to be the most difficult to discriminate while Thompson and Meltzer noted expressions of suffering produced the most trouble for their subjects. The striking similarities between these studies representing samples of adults and children supplement each other and therefore enhance the validity of the results and the potency of the research strategy.

The pattern for posing accuracy was the same in some ways and different in others as compared with the data for judgmental accuracy. Although the children were very effective in posing accurate facial expressions of happiness, the poses of anger and sadness were demonstrably (but equally) more difficult for them to enact. The emotional intent of surprise and fear were extremely hard for the children to facially pose. Happiness was the easiest for the children to recognize and communicate. Anger proved to be the second easiest to both recognize and pose. The ordering of fear and sadness were reversed on the two tasks. Although sad stimuli were the most difficult for the children to recognize, the subjects were noticeably more skilled in communicating sadness while fear turned out to be the most difficult to nose. Surprise consistently was the most difficult category of affect information for kindergarten children to either identify or display. While individual children do not necessarily learn to recognize and
pose a given facial emotion at an equivalent level (demonstrated by the lack of correlation between posing and recognition accuracy), there would appear to be some communality between posing and identifying a particular emotion, as compared with other emotions, within one age group. Somehow younger children find surprise is hard to discriminate and pose. In contrast to happiness, surprise may represent an unfamiliar concept to the children. Or the facial image associated with surprise may be more difficult to internalize. The present results do not provide an answer, but the further application of the dissertation's methods might be useful in this matter.

The current results do indicate different developmental patterns for recognition and posing accuracy for the different categories of affect information. Proficiency in identifying and facially displaying expressions of happiness appear to have been sufficiently acquired by the time the children are in kindergarten, and it tends to improve only slightly with grade advancement. It seems that the recognition and communication of facial expressions of happiness reach a plateau of "non-optimal challenge" relatively early in the game beyond which improvement may no longer be as satisfying and reinforcing as it once was or it may become "...inherently too difficult and so discourages effort (Tomkins, 1962)." As children become older, their ability to correctly determine adult facial poses of anger and surprise substantially increased. Modest but positive grade gains were noted for perceiving fear stimuli. Except for the posing of fear, third graders were the most accurate in facially communicating all the categories of affect information. Portrayals of sadness, anger, and surprise revealed the most pronounced grade increments in the refinement and preciseness of posing skill. It is
possible that this improvement may be a function of practice, motivation, and optimal complexity and challenge (Tomkins, 1962). Just what is practiced is uncertain. Could it be labels representing facial images? This question remains for further research. Particularly intriguing would be further research on the recognition of sadness, which appeared less accurate in third graders than in kindergarten children. Perhaps as children become older, they acquire anxiety about recognizing certain emotions in themselves or in adults so that the increasing cognitive skills are effectively nullified, at least for a time. The attachment literature has shown that happiness is perhaps one of the most "primitive" of emotions since the smile can be observed very early in the child's life, and it is very important for the child to recognize the expression in parents and for parents to be responsive to it in the child. However, the interpretive problem becomes particularly difficult in the case of children's recognition of adult sadness and their ability to accurately communicate it to adults. Children's posing of sadness may develop later than his natural expression of sadness in distressing situations. A motivational interpretation would suggest that the reluctance of children to acknowledge sadness in adults is related to the possibility that the recognition would threaten the child's sense of security. Although the present data rather clearly indicate that different kinds of affect are recognized and posed accurately later than others, it appears as though a developmental concept is necessary but not sufficient to account for the complete constellation of the dissertation results.

Confusions and Errors in Recognizing and Posing the Different Facial Affects

More work is also needed to explain why children tend to misperceive
and inadequately display some categories of facial expressions more frequently than others, and how certain facial expressions come to be systematically confused for other classes of facial poses. The current results suggest the younger children (kindergarten) tended to vacillate between misperceiving adult posed facial affect to be expressions of either anger or fear. The third graders primarily over-ascribed or mis-applied the label of anger. Both grade levels selectively misidentified intended expressions of sadness and fear to be poses of anger. Another finding indicated most of the children seemed to incorrectly use the category of fear to characterize intended facial poses of surprise.

Although recognition errors may be an artifact of the photographic stimuli, Silvan Tomkins has indicated that he believes the Ekman and Friesen photographs have the highest quality of any presently available in the field (personal correspondence). The normative data supplied by Dr. Friesen demonstrates that the photos were highly discriminable for adult subjects. Inadequate understanding or idiosyncratic definition of the terms may have contributed to the generation of identification errors by the children. One possible avenue for future investigation could include the effects of selective training by society at large (cultural and socioeconomic differences) and parents or peers in particular on judgmental accuracy (Tomkins and McCarter, 1964). Another explanation for perception failures is that some of the children may have in-sufficiently learned to distinguish the invariants associated with a particular class of facial behavior posed by adult models. Inaccuracy in recognizing facial expressions of emotion and the substitution of certain categories or labels for others may be coupled with the function-
ing of certain cognitive structures and styles (Bieri, 1971; Erdelyi, 1974; Klein, 1970).

Errors in posing also contain challenges to any theory about the expression of facial affect. The children more frequently have happy facial expressions when they actually were instructed to give poses of surprise and fear. The ten judges' responses suggest the children produced markedly more correct and incorrect happy facial displays then any other expression category. One of the possible factors accounting for posing errors or mistakes may be the operation of learned display rules for certain social situations. Ekman and Friesen (1969) contend people develop control strategies "...for managing facial behaviors associated with emotion." They believe these "...display rules are learned, usually early in life, which specify what management technique should be applied by whom in what circumstances." Ekman and Friesen delineate four management techniques for the control of facial behavior: (1) intensifying; (2) deintensifying; (3) neutralizing; or (4) masking a felt emotion with the facial behavior usually associated with a different emotion (Ekman et al., 1972). The character of the errors made by the children generates the impression that they actively (consciously and unconsciously) attempted to mask intended poses of the "negative" emotions, especially surprise and fear, with expressions of happiness. Although the children tended to perceive the Ekman and Friesen photographs of adult models to be facial expressions of anger, the pattern of the children's posing mistakes can give the idea that the subjects tried to present themselves as happy and conventional children. Further research is necessary to determine whether the communication errors were a result
of defensive operations and display rules or a natural consequence of development, e.g., sex differences or sex role demands. It is possible the children had not sufficiently learned the translation rules between what the face looks and feels like when they are angry, sad, fearful, or surprised, and the actual motor (facial) expression of these categories of affect information. In such a predicament, the children may have relied upon or substituted the most habituated and skillful facial expressions that they had acquired (happiness) for the "negative" emotions, which they may have been cognitively more uncertain about.

The distinction, in my opinion, is important clinically. The choice of an intervention technique with children who have been assessed as "affectively impaired" depends upon an adequate determination of whether the behavior has been distorted by motivational patterns and therefore must be re-learned, or whether essentially normal eight and nine year old children can actually still be in the process of initially learning to accurately convey facial expressions of emotion.

Race and Sex Differences for the Facial Affects

Sex and racial interactions with the different emotion categories represent the dissertation's final concerns with the recognition and communication of posed facial behavior. For this research project, race did not interact with the different emotions. Although in the present study no important main effects were disclosed for sex differences, the results indicated that sex interacted with the accurate identification of the various categories of facial affect. The boys were just a little more proficient in recognizing happy and anger stimuli while the girls did better in correctly perceiving expressions of fear and surprise.
However, it was the girls who had a pronounced liability in adequately identifying posed facial expressions of sadness. Much of the research on sex-typing has characterized males to be physically more aggressive than females (Feshback, 1970). This sex-linked difference for overt aggressiveness has not been found to consistently generalize to other response modalities, such as, verbalizations, thoughts, daydreams, stories, self-reports (Mischel, 1970). It is possible that females may be inculcated to abide by certain display rules and consequences which encourage them to inhibit or modify the recognition and communication of emotional responses that are not socially sanctioned for their sex. As girls become older, they may learn that it is acceptable for them to recognize the communication of facial expressions of fear and surprise (in comparison to other emotions) rather than attempt to act out these emotions. Conversely, males may try to conceal and obscure the emotional intent of certain motor responses because of their experience with differential consequences that follow the behavior (e.g., "smile when you say that!").

In contrast to judgmental accuracy, the children's preciseness in posing facial affect was demonstrably free from the interaction of sex and race differences. The present results do not corroborate two recent studies which did find distinctive sex differences. Drag and Shaw (1967) indicated females tended to be better expressors of emotion. The girls were especially successful in conveying expressions of happiness, love, anger, and fear. Gitter and Black (1968) determined a significant interaction between sex of the expresser and the pattern of correctly perceived emotion: facial displays of surprise and fear were more correct-
ly perceived when the expressers were female. Both experiments involved adult samples and therefore extrapolation of the results to child populations may not be warranted. Again research on race differences has tended to be made exclusively with college-aged subjects. Kozel and Gitter (1968) found blacks were more accurately perceived in the expression of the emotions of anger and pain, whereas, whites were more accurately perceived when expressing fear and happiness. An experiment run by Gitter, Black, and Mostofsky (1972) revealed that adult white subjects generally tended to be more accurate expressers of posed facial affect and consequently they were recognized better by both black and white perceivers. One possible and obvious explanation for the contradiction in findings for children and adults is that the crystallization of sex and race differences may require a number of years of experience to develop or emerge. Sex-typing in communicative expressive patterns may not be completely consolidated by the third grade. Similarly race differences in portraying facial affect may be an artifact of certain selective experiences with societal expectations. Kindergarten and third grade children may not have had sufficient experiences with these expectations to modify facial communication patterns.

**Genuineness and Reaction Times**

The genuineness that children evince in their posed facial communications of emotion and the amount of time it took them to give each expression were not meaningfully associated with posing accuracy. These may be interesting areas of study in their own right but they don't seem to be particularly important to the issue of posing facial ex-
pressions of emotion. The children were able to appear to be at least mildly genuine and convincing in their expressions even though they may have been unsuccessful in accurately posing a particular facial expression of emotion. The dissertation did not find Sarbin's (1954) concepts of role enactment and organismic investment to be especially applicable to the accuracy with which facial displays of emotion can be communicated to others. However, the results showed an interesting sex reversal in the genuineness the children evinced for the posing of the various categories of affect. Kindergarten females were more genuine in the expression of happiness, surprise, and fear. Conversely, the third grade males were more convincing in their poses of these categories of affect information, but the girls demonstrated more emotional investment for facial portrayals of sadness and anger. The distinctive sex reversal in the pattern of mean role enactment scores for kindergarten and third grade children may reflect the impact of display rules to intensify or deintensify the genuineness with which the sexes express emotion as they become older.

The dissertation disclosed little relevance of reaction time data to posing accuracy. Although imaginal instructions were not as effective an elicitor of personally remembered emotional experiences as had been expected, they markedly augmented the promptness of response delivery. The children required much less time to pose facial expressions with imaginal as compared to abstract instructions. This result is probably an artifact of the amount of time it took to administer the imaginal instructions. As compared with abstract instructions, imaginal instructions may have allowed the subject more time to consider what was
required by the task and cognitively prepare his responses. This may have produced the shorter latencies. Complex interactions between instructions, sex, and emotion and grade, sex, and emotion occured. Since reaction times were not related in any systematic fashion with the other dependent variables, it is difficult to see the significance of these specific interactions. The dissertation has shown that genuineness and reaction times by themselves cannot account for the children's differential ability in communicating various facial expressions of emotion.

**Locus of Initiation and Intentionality**

Finally, the Wolman et al. (1971, 1972) semi-structured interview which attempts to purportedly explore locus of initiation and intentionality or strategies of coping with subjective emotional experience did not prove to be productive for the purposes of the present study. The dissertation project was unable to replicate any of Wolman's major findings. What turned out to be significant was so isolated and small in quantity that comparisons across variables and categories of emotional experience were futile. Wolman stated that a major finding of their study was "...as children of both sexes grow older, they report that the conditions which stimulate emotions occur more frequently within themselves." The only confirmatory evidence for this assertion Wolman and his colleagues (1971) presented was a Chi-Square test on the percentage of children reporting an internal or external locus of initiation to "sleepy" experiences. The authors arranged their data for 256 subjects into three age groupings: young (5-7 year old), middle (8-9 year old), and old (10-13 years of age). The most pronounced difference occurred between the middle and oldest groups of children. A higher percentage of the
older male children thought that sleepiness occurs "inside" them rather than being "outside" or the result of the environment. The issues of how children cognitively process and cope with their emotional experience are timely ones (Elkind, 1967; Wolff, 1960). But the semi-structured interview developed by Wolman and his cohorts to study locus of initiation and intentionality in handling subjective experiences of emotion did not turn out to be as effective a technique for the dissertation as it putatively did so for their own research efforts.

Concluding Remarks

The dissertation was fairly successful in its study of the accurate recognition and expression of facially posed affect. The results indicate that what had once been an area of investigation devoted primarily to adult subjects can be profitably extended to samples of children. It has provided a fund of basic information about the perception and posing of facial displays of emotional intent. The results point to a need for separate theories for each emotion, as well as, for the recognition and posing of facial expressions of affect. Studying the topic of facial expressions of emotion from the perspective of accurate and inaccurate units of information having important communication value seems to be a meaningful and productive approach. Facial behavior was "...treated in terms of the communicative role it plays during social interaction and, not, for example, in terms of consumatory or tension-binding or release function it might have for the expressor (Goffman, 1959; Parsons and Shils, 1951)." The discussion section has stressed the implication of cognitive processes in any adequate account of recognition accuracy. Expressive or posing skill appears to require the
inclusion of an additional factor, i.e., the image of one's own face.

The present data on just what kinds of errors the children at each grade level make in the recognition task is relevant to the question of the clarity of the child's conceptual system at the two ages. The experimental procedures illustrate a method which could be used in future work on this issue. While the use of imaginal and abstract instructions is not directly related to the question of whether the children need to use an image of their own face to enact affects, it does provide a prototype of a method. With regard to the possible role of motivational factors, it seems the affects on which the third graders were actually poorer than the first graders represent very intriguing possibilities of interference in cognitive operations by specific anxieties which may increase during the middle childhood years. It is assumed that study into the psychodynamic and clinical implications of facial behavior will be meaningfully supplemented by normative data on the development of its communication value. Although the project was descriptive and normative in orientation, the experimental stimuli and procedures proved to be effective and promising. Consequently the dissertation methodology could serve as a springboard for future applied and clinical research into the implications of facial behavior associated with emotion. Further study may reveal a relationship between distinctive defensive operations and the child's skill in accurately expressing or communicating the various categories of emotional information or meaning. Certain clinical groups may be differentially responsive to particular affect cues in the faces of others and therefore they may selectively misinterpret their environment. Accuracy in recognizing and expressing facial affect may be improved through carefully prescribed therapeutic intervention techniques.
Therapy may facilitate the strength, clarity, appropriateness, and range of facial expressions that can be successfully communicated by a patient. Research from J.P. Guilford's Psychological Laboratory suggests the application of expressive facial behavior may be particularly relevant to the study and measurement of social intelligence in children (Wenar, 1971).
CHAPTER V

SUMMARY

The dissertation was designed to primarily study the development of children's abilities to accurately recognize and communicate posed facial expressions. An additional concern of the present project focused upon children's self-reported descriptions of the source (internal or external) of their subjective emotional experiences and the coping strategies employed to handle five different emotions (happiness, anger, sadness, fear, and surprise). Grade, sex, race, and instructional set constituted the independent variables of the dissertation. The dependent variables were represented by: recognition accuracy; communication or posing accuracy; genuineness in posing facial expressions of emotion; the amount of time it took the children to produce a particular category of facial affect information (reaction times); and, the correlations between these measures.

Based upon a review of the research literature, the dissertation projected a number of hypotheses. It was expected that older children would be more skilled in the correct identification and accurate communication of posed facial expressions of affect information. It was predicted that sex and race variables would affect children's recognition and communication skills. One hypothesis assumed there would be differences across the five categories of facial expressions of affect in
children's ability to correctly recognize and pose them. Another hypothesis suggested that ability to identify the emotional meaning of facial expressions will be positively associated with the capacity to accurately pose emotional intent in facial behavior. The instructional set to use imaginational processes was expected to help children more than abstract concepts to communicate facial poses of emotion that can be accurately decoded by judges. The dissertation was also interested in determining whether the independent variables would influence the genuineness children put into their facial enactments of emotion, and the reaction times for the posing of the different categories of facial expressions of affect. Finally, it was assumed that grade, sex, and race differences would be manifested in children's descriptions of the source of their subjective emotional experiences, and their methods of coping with affect.

Kindergarten children and third graders were alphabetically assigned to numerically equivalent groups of boys and girls, and white and black subjects. The children were then randomly divided into two groups, each of which received a different set of instructions (imaginational vs. abstract) to pose five different facial expressions of emotional intent (happiness, anger, sadness, fear, and surprise). Polaroid photographs were made of the children's poses. The photographic records were evaluated by ten "naive" male high school teachers for consensus about the category of facial affect information that was exhibited in each picture, and ratings of the genuineness that was put into the expression. Reaction times for the poses were recorded by the experimenters.

Paul Ekman and Wallace Friesen have developed a series of 35mm
monochromatic slides which represent different poses of emotional intent made by white male and female adult models. Forty of the Ekman and Friesen photographs were selected for the purposes of the dissertation (eight photographic examples for each of the five categories of affect). Recognition or judgmental accuracy was measured by the number of Ekman and Friesen stimuli that were correctly identified by the children. Finally, a semi-structured interview, developed by Wolman, was individually administered to the children to determine the internal or external source children report for subjective emotional experiences, and their characteristic strategies for handling different emotions.

The results confirmed the contention that the older children would be more accurate than kindergarten children in the recognition and communication of posed facial expressions of emotional intent. The prediction that some of the categories of affect information would be more difficult than others was strongly substantiated. Happiness was the easiest for the children to both identify and communicate. Sad stimuli were the most difficult for the children to accurately recognize, but fear was the most difficult for them to facially pose. It was the third graders who had the most trouble recognizing sad facial expressions and portraying poses of fear. The categories of anger and surprise consistently showed increments in recognition and communication accuracy or skill with the older children. However, the ability to recognize facial expressions posed by adult models and the children's capacity to facially portray posed affect appear to be independent skills. In other words, these two particular skills are not mediated by some underlying general communication factor. The genuine-
ness the children manifested in their poses of emotional intent and the amount to time they took to give the expressions produced some interesting interactions, but these results were not systematically related to the accuracy of posing facial affect. Asking the children to imagine or remember personal experiences with a particular emotion did not facilitate the more complete and compelling posing of the specifically requested facial expression. The absence of instructional set differences does reduce the possibility that the results were determined by an unique set of eliciting circumstances. Although white subjects were more proficient in the recognition of adult models' poses of facial affect in general, the finding is confounded because black adult models were not included in the set of photographic stimuli. Males tended to be more accurate in the recognition of happy and angry stimuli, whereas, the girls were more proficient in identifying posed adult expressions of fear and surprise. The most pronounced sex difference in recognition skill occurred for the category of sadness. The girls found sadness to be the most troublesome to discriminate. In contrast to children's skill in recognizing facial expressions, communication accuracy was remarkably free from race and sex differences and interactions. Consequently, the procedure of photographing children's poses of facial expressions of emotional intent seems to be a potent research technique which could be applicable to future research on children's communication of affect. Wolman's semi-structured interview, which attempts to explore children's descriptions of the source and intentionality or strategies of coping with subjective emotional experience, did not prove to be productive for the purposes of the
dissertation. The dissertation results were analyzed from a cognitive-perceptual and developmental perspective. Communication skill was related to the development of a subjective image of the face and Silvan Tomkins' theoretical model of affect. Finally, several potential clinical applications or future research suggestions were discussed.
APPENDIX A

THE FORTY EKMAN & FRIESEN PHOTOGRAPHS

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Key

H - Happiness
A - Anger
S - Sadness
F - Fear
SrP - Surprise
APPENDIX B

7-POINT RATING SCALE ON THE NATURE OF THE
FACIAL ENACTMENT OF EMOTION FOR EACH PICTURE

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<th></th>
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<td>or plastic</td>
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Five Emotions

happiness
anger
sadness
fear
surprise
WOLMAN'S SCORING MANUAL FOR DEVELOPMENT OF LANGUAGE OF EMOTIONS

Locus of Initiation (internal vs. external)

Statements in this category are in response to the question "When do you feel a particular emotion?" "Have you ever been ... etc?" "Do you ever get ...?"

Score 1: If the locus of the initiation of an activity or situation occurs outside the child and is rooted in the external world. Most responses in this category are in the passive voice with action directed to, for, or with the child as object.

Example: A. "I get mad when my brother wrecks my toys." B. "I get hungry when it is time for lunch."

Score 2: If the locus of the initiation (refers to predicate, extraneous prefacing remarks if combined with internal subject reference are 2) of an activity or situation occurs within the child and is expressed as part of the child's subjective self. Most responses in this category are in the active voice with the child (expressed as I, you, or we) as the subject.

Example: A. "I get mad when I fall down and hurt myself." B. "I get scared when I was flying in an airplane." C. "I get sad when I hear sad music." D. "I kind of shake." E. "I get mad."

Score 3: Responses which combine 1 and 2 - only if two distinct and separable thoughts or situations.

Score 4: Responses which are unscorable - responses must be ambiguous and locus of initiation is not explicit.

Example: A. "Yes and no." B. "Once in a while." C. "Sometimes." D. "All the time." E. "I don't know." F. "Never."
APPENDIX D

WOLMAN'S SCORING MANUAL FOR INTENTIONALITY OR COPING WITH EMOTION

Statements in this category are in response to the question, "What do you want to do when you feel a particular emotion?"

Score 1: FIGHTING, COPING, or MASTERY of INANIMATE OBJECTS. This category is used if the response states or implies a retaliation or activity involving inanimate objects. Refer to predicate. Examples would be: "I want to get my marbles back," or "start pounding hard."

Score 2: FIGHTING, COPING, or MASTERY of ANIMATE OBJECTS. This category is used if the response states or implies a retaliation or activity involving people or animate objects, such as pets or the self. Included would be postponement of gratification or, in the case of "happy," the prolongation of the affect. Examples: "I want to hit my brother back," "wait until dinner," "jump for joy" - happy, "cry" (when sad over personal loss).

Score 3: FLIGHT. This category is used if the response states or implies active and hasty physical withdrawal from a threatening situation or an appropriate response to a threatening situation. Examples: "I want to run away from it, fast" or "I want to jump in bed."

Score 4: AVOIDANCE. This category is used if the response states or implies withdrawal into the self through dreams, fantasies, wishes, diverted or frustrated expression of affect, ego defensive maneuvers, or inappropriate response. Examples: "I just wish it would go away," "I try to think about something else," "I want to swear," "I just want to cry or scream etc.," (not for sad, but for angry, scared) or "I read or watch TV."

Score 5: INACTIVE. Response states or implies inactivity. Example: "I don't feel like doing much," or "nothing."

Score 6: DON'T KNOW. This category is used for responses which fit the general pattern of "I don't know."

Score 7: Combination of any of the above.

Score 8: UNSCORABLE. This category includes all responses which do not fall into categories 1 through 7.
APPENDIX E

ORDER OF RUNNING SUBJECTS

Abstract Instructions

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Imaginal Instructions

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Key

K-Kindergarten
3rd-3rd Grade
M-Male
F-Female
W-White
B-Black
APPENDIX F

Sex Differences on Mean Reaction Times for Children
Posing Each Category of Facial Expressions of Emotion
Under Imaginal Instructional Conditions

![Graph showing mean reaction times for different facial expressions of emotion for males and females.]

- --- Male
- --- Female

Categories of Facial Expressions of Emotion:
- HAPPY
- ANGER
- SAD
- FEAR
- SURPRISE
APPENDIX G

Sex Differences on Mean Reaction Times for Children
Posing Each Category of Facial Expressions of Emotion
Under Abstract Instructional Conditions

[Graph showing mean reaction times for different facial expressions: Happy, Anger, Sad, Fear, Surprise for male and female participants.]

Categories of Facial Expressions of Emotion
- Male
- Female
APPENDIX H

Sex Differences in Mean Reaction Times for Kindergarten Children Posing Each Category of Facial Expressions of Emotion

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Categories of Facial Expressions of Emotion

- Male
- Female
APPENDIX I

Sex Differences in Mean Reaction Times for Third Grade
Children Posing Each Category of Facial Expressions of Emotion

Categories of Facial Expressions of Emotion

- Male
- Female
APPENDIX J

Inter-Correlations Among Reaction Times for the Categories of Facial Expressions of Emotion

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* r less than .338 = .01
** r less than .372 = .005
*** r less than .465 = .001
A r n o l d , M . B . The n a t u r e  o f  e m o t i o n . B a l t i m o r e , Md . : P e n g u i n  B o o k s , 1 9 6 8 .

A r n o l d , M . B . F e e l i n g s  a n d e m o t i o n : T h e  L o y o l a  s y m p o s i u m . N e w  Y o r k : A c a d e m i c  P r e s s , 1 9 7 0 .

A r n o l d , M . B . P e r e n n i a l  p r o b l e m s  i n  t h e  f i e l d  o f  e m o t i o n s . I n  M . B . A r n o l d  ( E d . ) , F e e l i n g s  a n d  e m o t i o n s . N e w  Y o r k : A c a d e m i c  P r e s s , 1 9 7 0 a , 1 6 9 - 1 8 5 .

A r o n f r e e d , J . C o n d u c t  a n d  c o n s c i e n c e : T h e  s o c i a l i z a t i o n  o f  i n t e r n a l i z e d  c o n t r o l  o v e r  b e h a v i o r . N e w  Y o r k : A c a d e m i c  P r e s s , 1 9 6 8 .

A r o n f r e e d , J . T h e  c o n c e p t  o f  i n t e r n a l i z a t i o n . I n  D . A . G o s l i n  ( E d . ) , H a n d b o o k  o f  s o c i a l i z a t i o n  t h e o r y  a n d  r e s e a r c h . C h i c a g o : R a n d - McNally , 1 9 6 9 , 2 6 3 - 3 2 3 .

A r o n f r e e d , J . T h e  s o c i a l i z a t i o n  o f  a l t r u i s t i c  a n d  s y m p a t h e t i c  b e h a v i o r : S o m e  t h e o r e t i c a l  a n d  e x p e r i m e n t a l  a n a l y s e s . I n  J . M a c a u l a y  a n d  L . B e r k o w i t z  ( E d s . ) , A l t r u i s m  a n d  h e l p i n g  b e h a v i o r . N e w  Y o r k : A c a d e m i c  P r e s s , 1 9 7 0 , 1 0 3 - 1 2 6 .

B a l d w i n , A . L . T h e o r i e s  o f  c h i l d  d e v e l o p m e n t . N e w  Y o r k : W i l e y , 1 9 6 8 , 3 8 - 7 9 .

B a l t e s , P . B . L o n g i t u d i n a l  a n d  c r o s s - s e c t i o n a l  s e q u e n c e s  i n  t h e  s t u d y  o f  a g e  a n d  g e n e r a t i o n  e f f e c t s . H u m a n  D e v e l o p . , 1 9 6 8 , 1 1 , 1 4 5 - 1 7 1 .

B a n d u r a , A . P r i n c i p l e s  o f  b e h a v i o r  m o d i f i c a t i o n . N e w  Y o r k : H o l t , K i n e h a r t , a n d  W i n s t o n , 1 9 6 9 .

B a y l e y , N . T h e  p l a c e  o f  l o n g i t u d i n a l  s t u d i e s  i n  r e s e a r c h  o n  i n t e l l e c t u a l  f a c t o r s  i n  a g i n g . I n  J . E . A n d e r s o n  ( E d . ) , P s y c h o l o g i c a l  a s p e c t s  o f  a g i n g . M e n a s h a , W i s c . : G e o r g e  B a n t a , 1 9 5 6 .

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