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tion of their development. The first issue to be discussed, therefore, is the topic of the topology of emotional features. Embedded within this is a consideration of the development of these features. Finally, the developmental sequence over the first 3 years of life is considered.

In order to talk about developmental issues involved in the study of emotion, it is important that we first make clear what we mean by the term "emotion." "Emotion," like the term "cognition," refers to a class of elicitors, behaviors, states, and experiences. If we do not distinguish among these features of emotion, the study of them and their development becomes difficult. For example, Zajonc (1980)—and, more recently, Barrett (see Lindquist & Barrett, Chapter 34, this volume) and Niedenthal (see Chapter 36, this volume)—argued that emotions can occur without cognitions, while Lazarus (1982) argued that

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emotions require cognitions. As we shall see, Zajonc and Lazarus were describing different features of emotional life. Because of this, each could arrive at diametrically opposing positions without endangering his own argument. The reasons for this are quite simple: As we shall see, one was arguing for emotions as states, perhaps connected to action patterns and environmental triggers, whereas the other argued for emotions as experiences.

Emotional Elicitors

In order for an emotion to occur, some stimulus event—what I will call the “emotional elicitor”—must trigger a change in the state of the organism. The state of the organism can be a change in an idea, or it can be a change in the physiological state of the organism. The triggering event may either be an external or internal stimulus. External elicitors may be nonsocial (e.g., loud noise) or social (e.g., separation from a loved one). Internal elicitors may range from changes in specific physiological states to complex cognitive activities. Since it is obviously much harder to identify and manipulate an internal elicitor than an external one, it is not surprising that most research deals with external stimuli; that is, it attempts to determine precisely which features of the elicitor activate the emotion.

A major problem in defining an emotional elicitor is that not all stimuli can be characterized as emotional elicitors. For example, a blast of cold air may cause a drop in body temperature and elicit shivering, but one is reluctant to classify this occurrence as an emotional event. In general, we use our “common sense” to define an event as an emotional elicitor. Thus, for example, the approach of a stranger or experience on a visual cliff apparatus is usually the eliciting event for fear in the very young. The approach of a familiar parent is not used for fear, but is used as an elicitor to measure joy or happiness. Events that we use to elicit particular emotions grow out of our common experiences. Unfortunately, such experiences may not be correct. As we can see in studies on fear, not all children show fear at a stranger's approach (Lewis & Rosenblum, 1974).

The problem of the nature of elicitors becomes even more serious when we try to measure physiological reactions to emotional events. For example, in the presentation of a horror film and the measurement of physiolog-

ical response to that horror film, one assumes that the elicitor is a fearful one. What physiologically appears is then taken as the response to fear. When subjects are questioned as to the nature of the elicitor and what emotions it produces, it is often the case that (1) they do not produce the emotion believed associated with the elicitor, or (2) they produce a diverse set of emotional reactions. Schwartz and Weinberger (1980), for example, asked subjects what emotions they had to a set of different events and found that they offered a variety of emotions for the same elicitor. Likewise, a colleague and I asked adults to mention the emotions produced by such elicitors as going to the wedding of their child or the death of a parent, and found that they gave a variety of emotions as their responses (Lewis & Michalson, 1983). Such research as this suggests that we have little information, excluding our common experience, in regard to the nature of emotional elicitors.

While from a scientific viewpoint little information about which emotions are elicited by which stimulus events is available, it appears to be the case that within a culture adult individuals seem to possess common knowledge in regard to how they should react emotionally to particular stimulus events. So, for example, at the death of a friend's parent, we know the emotion others either are likely to have or are expected to show. The script learning of appropriate emotions by stimulus conditions, whether these are “true” emotions or simply play-acting, informs us that knowledge about emotional elicitors and appropriate emotional responses is something that is acquired. In reviews of this subject (see Harris, 1989; Lewis, 1989), data on children's acquisition of such knowledge reveal that by the age of 10 years children have a good sense of the appropriate emotions for appropriate stimulus elicitors. The learning of these emotional scripts appears to take place quite early. For example, when children were asked to choose which emotional expression was likely to go with a set of stories that included receiving gifts at a birthday party, being lost from your mother in a grocery store, and falling and hurting yourself, children as young as 3–5 years were already capable of responding appropriately—that is, the way adults would respond to these same emotional scripts (Lewis, 1989). Learning what is appropriate vis-à-vis the culture is important for children, and they acquire such knowledge early.

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Serious child maltreatment results in failures in this domain (Pollak, Cicchetti, Hornung, & Reed, 2000). The acquisition of such knowledge does not necessarily imply that the situations do not produce the emotions that are commonly believed to occur under such conditions. All that needs to be pointed out is the possibility that specific stimulus events are more likely to elicit some emotions rather than others. The emotion elicitors can be a function of what a child has learned in terms of how to behave, as well as a function of some automatic process whereby specific events elicit specific emotions.

Development of Elicitors

The problem of the development of elicitors raises an important issue: Namely, what is the relation between emotions (states, experiences, and expression) and elicitors? Darwin (1872/1965), arguing for the bioevolutionary approach, suggested that emotional behaviors or action patterns are adaptive responses to specific events (or elicitors). Thus one might suggest that anger is the result of a blocked goal, sadness the result of loss, and fear the result of uncertainty or loss of control. Izard's (1977) original differential-emotions theory held to this view, although there may not be as close to a one-to-one relation as he proposed. To test this view, my colleagues and I (Bennett, Bendersky, & Lewis, 2005; Lewis, Hitchcock, & Sullivan, 2004; Lewis & Ramsay, 2005; Lewis, Ramsay, & Sullivan, 2006; Sullivan & Lewis, 2003) examined 4-month-old infants' response to frustration. Darwin argued that anger is the action pattern that evolved to enable humans to overcome a barrier to a goal. After the infants in our study were taught to pull a string to get to see a picture, and after they had learned the response to the goal, the pull no longer resulted in the picture's coming on (frustration or goal blockage). Across many studies, we found that the action pattern most frequently associated with this elicitor was an anger-like face, increased pulling, increases in autonomic nervous system (ANS) response, and no increase in stress hormone. Children who showed not anger-like faces but sadness-like faces showed no increases in pulling nor in ANS response, but did show significant increases in stress hormone levels. Such findings support Darwin's idea that emotions—action patterns—evolved as adaptive responses to particular events (elicitors).

Although these studies of anger in response to a blocked goal appear clear in showing a perhaps innate connection between elicitor and action pattern, more work with other elicitors is needed. The difficulty is in the need to specify the elicitor carefully—a problem that is not readily addressed, and one that Gibson (1960) expressed concern about over 45 years ago in his paper on the nature of the stimulus. Unless we can specify the elicitor carefully, much difficulty in understanding emotional behavior and its development will continue.

It would appear, therefore, that there is a class of elicitors that has little developmental history. A blocked goal causes angry action patterns in organisms throughout their lives. The looming of a visual event causes startle and attention, and perhaps fear as well. The sight of food always serves as a positive elicitor, if one is hungry. It would therefore seem possible to imagine a class of events, biologically connected, that would produce a particular emotional state. Even for this class of more automatic-seeming elicitors, the developmental events of the organisms may be such as to inhibit or restrict the elicitors from operating in their natural way.

In the class of elicitors with a developmental course, the structure that supports the elicitor-response connection is likely to undergo change. Within this class are elicitors that are biologically connected to a response, as well as elicitors that are connected to a response through learned associations. For example, infants' fear of strangers may be biologically programmed; over time, stranger fear may decline because the biological structure supporting the elicitor-response connection has broken down or has been altered by experience. Learned associations between elicitors and responses may also be subject to developmental change because new structures are formed or old ones are extinguished; for instance, the formation of new structures can be predicated on cognitive changes. The data from numerous sources suggest that important cognitive factors play a role in mediating the effects of classes of events in the elicitation of fear (see, e.g., Campos & Stenberg, 1981; Feinman & Lewis, 1984). Several of these cognitive processes are considered here, and more could probably be added to the list. These capacities are regarded as critical and serve as examples of the role that cognitive development may play in mediating the development of fear elicitors. First, memory must

play an important role. Children must be able to recall past events that are associated with the coats of doctors' masks, and thus acquire the fear in terms of cognitive expectations. This does not seem to be a function of expectancy of a particular emotion, but whether the organism can control the event (Lewis, 1991). Events that are uncontrollable, such as fear as well (see Gu

Tracing the development of an emotion is a difficult task to undertake, and other cognitive processes such as socialization, reasoning, and learning are likely to influence the emotional responses. A task that produces sadness in 12-month-olds produces sadness in 18-month-olds, which is likely to be well as sadness. The different emotions, and the cognitive capacity for them, are their actions against the goal. At achieving a goal, children are capable of the emotion as a consequence, likely to be pride (Lewis, 1991). As these alert us to specific emotional elicitors, specific elicitors may have a causal adaptive connection, whereas others are associations; (2) the extent to which different emotions; between emotional events comes changes as a system of a particular

Emotional States

Emotional states are defined as changes in somatic activity. Emotional states are defined as individuals' being able to respond to a particular elicitor and a particular state that they may involve changes in hormonal responses, facial, bodily, and v

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play an important role in the elicitation of fear. Children must be able to recognize and associate past events that were noxious. The white coats of doctors may be associated with pain and thus acquire the capacity to elicit fear. In terms of cognitive expectancy, violation *per se* does not seem to be a fear elicitor. In fact, violation of expectancy may be arousing, and the particular emotion produced may depend on whether the organism can assimilate and control the event (Lewis & Goldberg, 1969). Some events that are uncontrollable are likely to elicit fear as well (see Gunnar, 1980).

Tracing the developmental course of elicitors is a difficult task to do. The development of other cognitive processes—categorization, classification, reasoning, and the like—is also likely to influence which elicitors produce what emotional responses; for example, failure in a task produces sadness in children prior to 24 months of age, while failure at a task after 24 months is likely to produce shame or guilt, as well as sadness. The same elicitor produces different emotions, depending upon children's cognitive capacity. Before children can evaluate their actions against some standard, the success at achieving a goal results in happiness. Once children are capable of this evaluation of self, the emotion as a consequence of the success is likely to be pride (Lewis, 1992b). Such findings as these alert us to several problems concerning emotional elicitors. These include (1) that specific elicitors may have an automatic biological adaptive connection to specific emotions, whereas others are connected through learned associations; (2) that individuals may differ in the extent to which the same elicitor produces different emotions; and (3) that the relation between emotional elicitors and emotional outcomes changes as a function of the meaning system of a particular individual.

Emotional States

Emotional states are inferred constructs. These states are defined as particular constellations of changes in somatic and/or neurophysiological activity. Emotional states can occur without organisms' being able to perceive these states. Individuals can be angry as a consequence of a particular elicitor and yet not perceive the angry state that they are in. An emotional state may involve changes in neurophysiological and hormonal responses, as well as changes in facial, bodily, and vocal behavior. As Darwin

(1872/1965) and more recently I (Lewis, 2005a; Lewis et al., 2006) have discussed, states are considered action patterns that include facial changes and physiological responses.

Two views exist concerning emotional states. According to the first, states are associated with specific receptors; indeed, they constitute the activation of these receptors (Izard, 1977; Tomkins, 1962, 1963). In the second, emotional states are not associated with specific receptors and stimuli and do not exist as specific changes; instead, they are general response tendencies associated with specific cognitions (Mandler, 1975, 1980; Ortony, Clore, & Collins, 1988; Schachter & Singer, 1962).

In the first view, specific emotional states or action patterns are postulated that have concomitant physiological components and that are expressed in specific facial and bodily behaviors. There is a one-to-one correspondence between an emotion, such as anger, fear, sadness, or happiness, and some internal specific state that matches this emotion. This view of specific emotional states has served, since Darwin's (1872/1965) initial formulation, as the basis of what we believe to be the correspondence between the specific emotions we experience and the functions of our bodies (see Niedenthal, Chapter 36, this volume). Except for bodily and facial expressions, no one-to-one correspondence has been found in adults between such inferred physiological changes and emotions. Investigators exploring brain function (Davidson & Fox, 1982; Nelson & Bosquet, 2000; Nelson & Bloom, 1997) and those looking at specific ANS changes (Ekman, 1989) argue for some correspondence between specific internal states and specific emotions. Even so, the evidence for specific states remains lacking.

The nonstate theories, cognitive in nature, argue less for a specific correspondence between an internal state and emotions; rather, cognitive activity is seen as the determiner of specific emotions. Either general arousal models, such as Schachter and Singer's (1962) model, or cognitive theory models have as their basic tenet a denial of the existence of specific states; rather, emotions occur as a consequence of thinking (Elster, 1999; Lazarus, 2001; Ortony et al., 1988).

Specific states, having specific stimuli that elicit them, have been suggested. The theory of innate releasing mechanisms (IRMs) suggests

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Emotional States

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or distress state and a positive or satiated state. Subsequent states emerge through the differentiation of this basic bipolar state. Differentiation theories focus on the modulation of both the bipolar state and general arousal state. Hedonic tone and arousal may be the dimensions necessary to generate specific emotional states. This idea was proposed by Bridges (1932) and is considered a differentiation hypothesis. This theory has been adopted by others, including Spitz (1965), and more recently Sroufe (1996).

The way in which the interface of arousal and hedonic tone develops into specific emotional states remains speculative. It has been argued that both mother-child interaction and maturation underlie the process of differentiation (Als, 1975; Brazelton, Koslowski, & Main, 1974; Sander, 1977). The regulation of the child's state may be the mechanism leading to differentiation. Although some theorists stress that emotional differentiation is determined more by biological than by interactive factors, the combination of the two forces seems most likely. While such a theory is appealing, the derivation of specific emotional states remains without empirical support.

A much simpler developmental model concerning differentiation can be considered from a purely biological perspective. Such a biological model can be imagined in which undifferentiated emotion becomes differentiated as a function of maturation. According to such a view (see Lewis & Michalson, 1983), the rate of differentiation and the unfolding of differentiated emotion states are programmed according to some physiological timetable. The differentiation from general to specific structures is a common process in morphology; there is no reason not to consider such a possibility in emotional development. The most likely explanation of emotional development is the differentiation of emotion states that occurs as a function of maturation, socialization, and cognitive development. Whatever processes underlie this differentiation, the model is developmental in nature.

An alternative model is that some discrete states are preprogrammed in some sense and need not be further differentiated (Izard, 1978). They exist at birth, even though they may not emerge until a later point in development. The view is unlike the differentiation model in that discrete emotional states do not

develop from an original undifferentiated state, but are innate at birth in already differentiated form. In this discrete-systems model, specific emotion states emerge either in some predetermined order or as needed in the life of the infant. They may co-occur with the emergence of other structures, although they are independent of them. The emotional system essentially operates according to biological directives.

These different models address the conceptual difference between experience and structure found in the arguments of Hume and Kant. In one case, experience produces a structure (Hume, 1739/1888). In the other case, experience is assimilated into innate structures (Kant, 1781/1958). In the study of emotional development, the question is whether emotional states are preformed and depend only on the development of cognitions, or whether cognitions themselves produce the emotional states or structures. Such a distinction is rather fine, but has important theoretical implications. Such a distinction can be seen in the study of fear: Is each fear state the same as other fear states, regardless of the circumstances, or do fear states differ as a function of the elicitors? For example, is the fear state produced by a loud noise the same as the fear state produced by the association of a doctor's white coat with the pain of a needle? Are emotional states independent of or dependent on particular cognitions? If emotional states are independent, they need not be created by the cognitions.

The first issue in the development of states concerns the origin of discrete emotional states. The second issue focuses on the developmental changes in emotional states once they have emerged. For example, 8-month-old children may show behaviors reflecting fear at the appearance and approach of strangers, and 2-year-old children may exhibit fear behaviors when they have broken their parents' favorite lamp. Do similar fear states underlie the fear expressions in both cases? Although the elicitors of states and the children's cognitive capacities are different in these two cases, the underlying emotional states may be similar.

Major developmental changes may occur in (1) the events that produce emotional states, (2) the behavioral responses used to reference states, and (3) the cognitive structures of children. Whether the emotional state itself changes as a function of development is diffi-

cult to determine. However, there may well be important physiological and neural changes that differentiate young and old organisms. Given that important physiological changes occur over age, the physiological processes associated with emotional states may change over time. If this were the case, then the consistency of an emotion may be a function of our experience of it more than the underlying state. What is clear and what will be shown below is that the appearance of particular emotions may depend on new cognitions, as well as the fact that new cognitions may allow for the development of new emotions. The former case can be seen again in the example of fear. While 1-year-old infants may fear falling off a "visual cliff," they do not fear failing an exam or being caught cheating on their income tax. Such fears in an adult are due to elaborate social and cognitive development. An example of the latter—that is, cognitions producing new emotions—has to do with classes of emotions called "self-conscious evaluative emotions." These emotions, such as pride and shame, cannot occur until elaborate cognitive processes have occurred (see Stipek, Recchia, & McClintic, 1992). Although cognitions are related to new emotions, the materials of these emotional states or action patterns are not likely to be the materials of the emotional states. As such, it is hard to believe that experiences or even cognitions (thoughts) create the states. If that is the case, then states are a feature of human life having an evolutionary developmental history.

Emotional Expressions

Emotional expressions are those potentially observable surface changes in face, voice, body, and activity level. Emotional expressions are seen by some as the manifestations of internal emotional states (Ekman & Friesen, 1974; Levenson, Ekman, & Friesen, 1990). In fact, no single measure of emotional states or action patterns is more differentiating than emotional expressions. The problem with emotional expressions is that they are soon capable of being masked, dissembled, and in general controlled by an individual (Saarni, 1999). Moreover, emotional expressions are subject to wide cultural and socialization experiences. Thus the relationship between expressions and states remains somewhat vague (Lewis & Saarni, 1993). The measurement of emotional expression is reviewed in detail in other chapters, so I

spend little time on the definition of emotional expression except to make several points.

First, emotional expressions tend to be studied in terms of facial expression, and while body postures have been studied (see, e.g., Argyle, 1975), the study of children's emotional expressiveness in terms of body postures and activity has received little attention. Vocalizations are one of the least understood aspects of emotional expression, although they seem to be important conveyors of emotional states. Indeed, vocal expressions are extremely powerful and may have the ability to elicit similar emotional states in others. Vocalizations may be much more contagious than facial or bodily expressions. For example, movies are much funnier when seen with others who laugh out loud than when seen by oneself. Because of the contagious nature of vocalization, vocal expression may be the target of early socialization efforts. Crying is a case in point. Crying behavior is quickly brought under control as parents socialize their children not to cry when distressed or in need. Locomotion may be another mode of expressing emotions. For example, moving away from and moving toward an object are physical responses associated with different emotional states (Schneirla, 1959). Indeed, an infant's movement away from an unfamiliar toy or person, independent of facial expression, is often used to reference fear (Schaffer, Greenwood, & Parry, 1972). Interestingly, movement toward can be part of two different action patterns: It can reflect either joy or anger.

Although there are some data on emotional expressions in each of these four modalities (facial, postural, vocal, and locomotor), the relations among them have received almost no attention. It seems reasonable to assume that sobbing, crying, and running away form a coherent response that reflects the emotional state of fear. The particular modality used to express an emotion may be a function of specific rules of socialization or of a response hierarchy in which one modality has precedence over another. Such a hierarchy may be determined either by a set of biological imperatives or by a set of socialization rules. The use of one or more channels to express a particular emotion may be determined by a complex set of interactions. One issue of particular interest is the effect on some expressions when one modality is inhibited. Inhibition in a particular modality can be experimentally produced, for example, by preventing a child from moving about. For instance, if children are pre-

vented from running away from a stranger because they are in a chair, they may express distress more intensely through facial changes. Changes in facial muscle activity of the use of different modalities of emotions occurs in children (Lewis, Ramsay, & Saarni, 1999). For example, found that children show distress when pain is likely to show large facial expressions (Suomi (1991) and others). They have found that mothers' cries of distress upon seeing their mothers' are much more effective than adrenocortical responses among modalities of emotions. A important role in determining emotional expressions are present in them.

Development of Emotional Expressions

The question concerning the development of emotional expressions is complex and foremost is the question of the particular emotional states and the relation of a set of physical movements—appears to be a developmental course (see Chapter 17, this volume). They are argued for their appearance in evolutionary history (Camras, Lambre, & others, 2005) have shown that neuromuscular development of the face and torso is all the more complex there are no theoretical models of the chronization taken into account of some environmental factors. Data on how environmental factors influence movements, although that environmental factors in facial expressions of an expression, for example, some infants show distress at the approach of a difference may be due to interaction with the environment. There is no evidence of the neuromuscular development of belief in a connection between a specific action pattern and the action pattern itself. The action pattern is by adaptive evolution.

vented from running away from an approaching stranger because they are restrained in a high-chair, they may express their internal state more intensely through alternative means, such as changes in facial musculature. Another example of the use of differential modalities in expressing emotions occurs in the work on stress. We (Lewis, Ramsay, & Kawakami, 1993), for example, found that infants who do not express distress when pained by inoculation are more likely to show large adrenocortical responses. Suomi (1991) and Levine and Wiener (1989) have found that monkeys that do not show loud cries of distress upon being separated from their mothers are much more likely to show higher adrenocortical responses. Thus the relations among modalities of expression may play an important role in determining what emotional expressions are presented and the intensity of them.

Development of Emotional Expressions

The question concerning the development of emotional expressions takes many forms. First and foremost is the question of whether a particular emotional expression—the synchronization of a set of particular facial musculature movements—appears *de novo* or has a developmental course (see Camras & Fatani, Chapter 17, this volume). Izard (1977), for one, argued for their appearing as part of the adaptive evolutionary history of humans, while others (Camras, Lambrecht, & Michel, 1996; Oster, 2005) have shown changes in the facial neuromusculature synchronization. This controversy is all the more interesting, given that there are no theories suggesting how the synchronization takes place except for proposals of some environmental organizer. There are no data on how environments organize these muscle movements, although there is a suggestion that environments affect individual differences in facial expressions—that is, in the likelihood of an expression, given the same elicitor. For example, some infants show more joy than others at the approach of their mothers, and this difference may be a function of the infants' interaction with their environments. Even so, there is no evidence for environments' organizing the neuromusculature. Alternatively, the belief in a connection between elicitors and specific action patterns leads to the belief that the action pattern itself is a given, established by adaptive evolutionary processes.

Another issue related to the facial musculature question is the nature of the association among facial, vocal, and physiological behaviors that make up an action pattern. As described earlier, my colleagues and I have shown that an anger-like face, increased action toward a goal, lower stress response, and greater ANS organization appear to be such an action pattern evolved as an adaptive emotional response to the blockage of a goal. How does the organization of multiple modalities come about? The full developmental course of emotional expressions, then, is uncharted.

We are much more inclined to believe that particular emotional expressions reflect a specific underlying state in infants and young children when we see particular faces in particular contexts. Thus, for example, when children show wary or fearful faces at the approach of a stranger, we are more apt to credit those faces as meaning that the children are in a fear state than if the children show those same faces toward their mothers, who are sitting next to them. Faces, expressed in the context of particular situations, lend validating meaning to the connection between facial expression and internal state. Nevertheless, the question of whether a facial expression truly reflects an emotional state cannot be readily answered, except through phenomenological report.

Emotional Experiences

Emotional experiences are the interpretations and evaluations by individuals of their perceived situations, emotional states, and expressions. Emotional experiences require that individuals attend to their emotional states (i.e., changes in their neurophysiological behavior), as well as the situations in which the changes occur, the behaviors of others, and their own expressions. Attending to these stimuli is neither automatic nor necessarily conscious. An emotional experience may not occur because of competing stimuli to which the organism's attention is drawn. For example, consider the following scenario: The car a woman is driving suddenly has a blowout in the front tire; the car skids across the road, but the woman succeeds in bringing it under control and stopping the car on the shoulder. Her physiological state as well as her facial expression may indicate that while she is bringing the car under control, her predominant emotional state is fear. Because her attention is directed toward controlling the

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experiences also require a particular cognitive ability—that is, the development of a concept of self. Emotional experiences take the linguistic form “I am frightened” or “I am happy.” In all cases, the subject and object are the same: that is, oneself. Until an organism is capable of objective self-awareness (Duval & Wicklund, 1972), the ability to experience may be lacking. Emotional experience requires both general cognitive capacities—something I touch upon below—and the specific cognitive capacity of self-referential behavior, or what I have referred to as “consciousness” (Lewis, 1992b, 2003b).

General cognitive processes necessary for organisms to perceive and discriminate elicitors of particular behaviors (whether these be internal or external to them), as well as overt emotional expressions of themselves and of others, have a developmental course. For example, infants younger than 6 months are generally unable to discriminate between facial patterns and do so on the basis of discrete features (Caron, Caron, & Myers, 1982). Schaffer (1974) demonstrated that children cannot make simultaneous comparisons prior to 7 or 8 months of age. This would suggest that infants are not capable of experiencing emotions prior to this point. Moreover, some emotional experiences may require a higher level of cognitive processing than others, and some are likely to develop earlier than others. For example, fear probably emerges earlier than shame, since the former requires less cognitive and evaluative processing than the latter (Lewis, 1992b).

If emotional experience is the consequence of an evaluation of one's bodily changes, and also of the context and the behaviors of others, then two processes are necessary for most emotional experiences: (1) the knowledge that the bodily changes are uniquely different from other changes (i.e., they are internal rather than external), and (2) the evaluation of these changes. The internal-external distinction for emotional development is important, because it addresses the differences between experience and expression. If we believe that facial expression is equivalent to an emotional state or experience, then it is possible to infer an internal event by examining its external manifestation. If, however, we do not subscribe to the view of a one-to-one correspondence between expression and experience, then all we can say is that there is an external manifestation of some unperceived internal event. Emotional experi-

ences, by nature, are internal events. Moreover, the internal and external distinction can only be carried out by a self capable of making the distinction between the self and the other. Such evaluation may involve the process of self-awareness.

Self-awareness is an information-processing and decision-making event related to internal stimuli. It logically requires an organism to possess the notion of agency (Lewis, 2003a). The term “agency” refers to that aspect of action that makes reference to the cause of the action—not only who or what is causing the stimulus to change, but who is evaluating it. The stimulus change itself may have the effect of alerting the organism and forcing it to make some type of evaluation. Emotional experience requires that the organism be capable of attending to itself. Thus the statement “I am happy” implies two things: first, that I have an internal state called happiness, and second, that I perceive that internal state of myself. Until organisms are capable of this cognitive capacity, they should not be capable of emotional experiences (Lewis, 2003b, 2005b; Lewis & Brooks-Gunn, 1978, 1979). This does not mean that infants, prior to acquiring an objective self or consciousness of the self, do not have unique emotional states; they do. What seems reasonable to postulate is that an individual can be in a particular emotional state and yet not experience it. Just as we have seen in the example of the woman whose car slides off the road, an emotional state can exist without experience, so we can imagine an infant's having an emotional state without being able to experience it. This leads to the rather peculiar proposition that a child can be in a state of pain or can be in a state of fear, yet not experience that state, if by “experiencing it” we mean being able to make reference to the self as having that state. In a series of studies, my collaborators and I have demonstrated that the emergence of this self-conscious process does not occur prior to 15 months of age, and that it seems to emerge mostly as a function of maturation in the second half of the second year of life. It is only then that children can be both in a particular emotional state and can be said to experience that state. Moreover, the production of certain states requires self-awareness; therefore, certain emotions are unlikely to occur until this cognitive process emerges (Lewis, Sullivan, Stanger, & Weiss, 1989).

Once the basic cognitive processes that allow for objective self-awareness or consciousness occur, organisms are capable of experiencing emotions. As I have pointed out, they may be capable of experiencing existing emotional states as well as capable of experiencing emotions that have no internal state, either because internal emotional states do not exist or because the organisms are experiencing a different emotional state from that which exists. The rules that govern how we experience our emotional states or how we create emotional experiences themselves are complex and varied. Clearly, socialization rules are involved, on a cultural as well as on a familiar or individual level. For example, in cultures that do not tolerate interpersonal aggression—Japan, for example—the experiencing of anger is culturally inappropriate. It may be the case that Japanese children or adults may act in an angry way and may even have an emotional state of anger. However, because having such a state is inappropriate, they are not likely to have the emotional experience of anger. Exactly how the socialization process proceeds so as to influence, modify, alter, or accent emotional experiences is little understood. Clearly, the topic of the socialization of emotion involves the socialization of at least all four features of emotion discussed here. It affects the meaning of stimuli and what we allow events to do in terms of acting as elicitors of particular emotions. It affects the emotional-expressiveness dimension of emotion, and, finally, it affects the emotional experience.

From an interpersonal and intrapersonal point of view, the socialization rules that act on the experiencing of emotion are somewhat better articulated. Freud's theory of the unconscious and of defense mechanisms addresses this point. Defense mechanisms have as their chief function preventing individuals from experiencing emotions or, alternatively, from having emotions that they do not like to have. For example, denial and repression serve the function of preventing people from having particular emotional experiences that they deem unacceptable. They prevent it by not allowing them to become conscious or self-aware. Projection, on the other hand, allows for the experiencing of the emotion—not as the self's experiencing it, however, but as the self's experiencing it in another. As we can see in each defense mechanism, the major function is to provide means for altering emotional experience.

REINTEGRATING EMOTIONAL LIFE

In the preceding discussion, I focused upon specific features of emotional life in order to see how the developmental process can affect each of these components. Unfortunately, the focus on individual features does a disservice to the complexity of emotional life. Moreover, it does not allow us to look at developmental issues that may be related to the relationships between various components, such as the relation between emotional expression and state (Lewis & Michalson, 1983). Very early in life, emotional expressions and states may have little correspondence. At some point in development, there appears to be some coherence between emotional states and expressions—a young child smiling with joy at someone's joke. With socialization and further development, the disassembling of expression from internal state takes place. Children very quickly learn to detach expression from states, and thus to disassemble: Children as young as 2½ years of age are quite capable of successfully lying about committing a transgression, through verbal response as well as through facial response (Lewis, 1993). Thus there is a developmental course in the connection between expression and state. A similar analysis can be made for the coherence between internal state and experience. Earlier in the developmental process, children may have internal states that they do not experience. There may then be a period in which internal states and experiences form some coherence, only to change once again so that experiences of emotion can take place without internal states. These developmental sequences in the coherence between features of emotional life need more careful study.

A MODEL OF EMOTIONAL DEVELOPMENT

In what follows, I present a model of the emergence of different emotions over the first 3 years of life. I choose this period because it represents the major developmental leap of the majority of adult emotions in emotional development. This is not to say that past 3 years of age other emotions do not emerge, or that the emotions that have emerged are not elaborated more fully. I suspect that both are the case.

One problem with articulating a model of the emergence of emotional life has to do with

the appropriate manner of making reference to expressions, or are various states or experiences than observe the emotion is needed, but behavior all that is possible. experiences, we need am sad" or "I am period the language the study of emotion Likewise, the study ment is difficult but success to date in tions of neurophysi mark unique emotion dren and infants.

What we are left expressions and behavior of a behavior from the adult me the child's expression Observation of fe stranger, or joy wh us to accept that a exists. With these following discussion development can

Following Bridg we assume that at lar emotional life general distress m ity. On the other h by satiation, atten environment. Att environment appears and we can place we choose, we ca ing a tripartite d end, distress at the rate dimension (L Figure 18.1).

By 3 months, smile and appear ness when confr such as faces of pe miliar faces. Al emerges, especially positive stimulus dren show sadness teracting with the primitive form—a of unpleasant-ta mouth. Thus by 3 showing interest,

OTIONAL LIFE

I focused upon specific life in order to see how process can affect each other. Unfortunately, the focus is a disservice to the field. Moreover, it does not address developmental issues or the relationships between such as the relation between emotion and state (Lewis, 1991). Early in life, emotions may have little point in developing some coherence and expressions—a key at someone's joke. Further development, transition from internal to external, very quickly learn to regulate, and thus to distinguish, as 2½ years of age, successfully lying about, through verbal, high facial response is a developmental between expression and state. This can be made for internal state and external developmental process, states that they do then be a period in which experiences form change once again so on can take place these developmental between features of careful study.

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model of the emergence over the first 3 years because it represents a developmental leap of the child in emotional development—that past 3 years of life emerge, or that the model are not elaborated both are the case. Calculating a model of life has to do with

the appropriate markers for the emotions. Are we making reference solely to emotional expressions, or are we talking about emotional states or experiences? The ability to do more than observe the emitted behaviors of the child is needed, but behavioral observation is often all that is possible. In order to get at emotional experiences, we need language in the form of "I am sad" or "I am ashamed." Since during this period the language of the child is quite limited, the study of emotional experience is difficult. Likewise, the study of emotional-state development is difficult because there has been little success to date in finding unique configurations of neurophysiological measures that mark unique emotions in adults, let alone children and infants.

What we are left observing are emotional expressions and behaviors in context. Observation of a behavior in context allows us, at least from the adult meaning system, to assume that the child's expression reflects an emotion. Observation of fear over the approach of a stranger, or joy when a mother appears, allows us to accept that an internal state of fear or joy exists. With these limitations in mind, the following discussion and mapping of emotional development can take place.

Following Bridges (1932), as well as others, we assume that at birth the child shows a bipolar emotional life. On the one hand, there is general distress marked by crying and irritability. On the other hand, there is pleasure marked by satiation, attention, and responsivity to the environment. Attention to/interest in the environment appears from the beginning of life, and we can place this in the positive pole; or, if we choose, we can separate this, thus suggesting a tripartite division with pleasure at one end, distress at the other, and interest as a separate dimension (Lewis & Michalson, 1983; see Figure 18.1).

By 3 months, joy emerges. Infants start to smile and appear to show excitement/happiness when confronted with familiar events, such as faces of people they know or even unfamiliar faces. Also by 3 months, sadness emerges, especially around the withdrawal of positive stimulus events. Three-month-old children show sadness when their mothers stop interacting with them. Disgust also appears in its primitive form—a spitting out and getting rid of unpleasant-tasting objects placed in the mouth. Thus by 3 months children are already showing interest, joy, sadness, and disgust, and

exhibiting these expressions in appropriate contexts.

Anger has been reported to emerge between 4 and 6 months (Stenberg, Campos, & Emde, 1983). Anger is manifested when children are frustrated—in particular, when their hands and arms are pinned down and they are prevented from moving. However, we (Lewis et al., 1990) have shown anger in 2-month-old infants when a learned instrumental act was removed. This study demonstrates the earliest known emergence of anger. Anger is a particularly interesting emotion, since, from Darwin (1872/1965) on, it has been associated with unique cognitive capacity. Anger is thought to be both a facial and motor/body response designed to overcome an obstacle. Notice that in this definition of anger the organism must have some knowledge regarding the instrumental activity toward a goal. For anger to be adaptive, it must be a response that attempts to overcome a barrier blocking a goal. In some sense, then, means–ends knowledge must be available, and the demonstration of anger at this early point in life reflects the child's early knowledge acquisition relative to this ability (Lewis, 1991).

Fearfulness seems to emerge still later. Again, fearfulness reflects further cognitive development. Schaffer (1974) has shown that in order for children to show fear, they must be capable of comparing the event that frightens them with some other event; for instance, in stranger fear, infants have to compare the face of a stranger to their internal representation or memory of faces. Fear occurs when the face is found to be discrepant or unfamiliar relative to all other faces that the child remembers. Children's ability to show fearfulness, therefore, does not seem to emerge until this comparison ability emerges. Children begin to show this behavior at about 7–8 months, although it has been reported by some to occur even earlier, especially in children who seem to be precocious. In the first 8–9 months of life, children's emotional behavior reflects the emergence of the six early emotions, called by some "primary emotions" or "basic emotions" (see, e.g., Izard, 1978; Tomkins, 1962).

Surprise also appears in the first 6 months of life. Children show surprise when there are violations of expected events; for example, when infants see a midget (a small adult) walking toward them, they are reported to show interest and surprise rather than fear or joy (Brooks & Lewis, 1976). Surprise can be seen either when

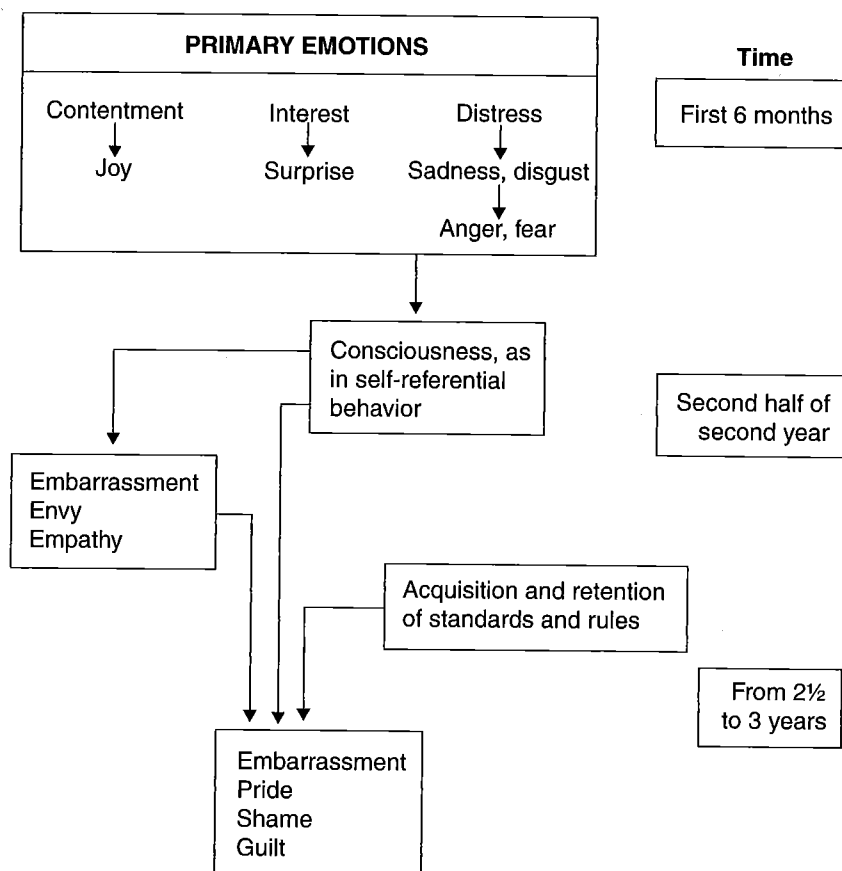


FIGURE 18.1. Development of emotions over the first 3 years of life.

there is violation of expectancy or as a response to discovery, as in an "Aha!" experience. We (Lewis, Sullivan, & Michalson, 1984) showed that when children were taught an instrumental arm-pulling response, they showed surprise at the point when they discovered that the arm pull could turn on a slide. Surprise can reflect either a violation or a confirmation of expectancy. Cognitive processes play an important role in the emergence of these early emotions, even though the cognitive processes are limited; this is not so for the next class of emotions.

Figure 18.1 indicates that a new cognitive capacity emerges somewhere in the second half of the second year of life. The emergence of consciousness or objective self-awareness (self-referential behavior) gives rise to a new class of emotions. These have been called "self-conscious emotions" and include embarrassment, empathy, and envy. Although little work exists in the development of these emotions,

several studies support the emergence of embarrassment at this point in development. We (Lewis et al., 1989) have shown that the emergence of embarrassment only takes place after consciousness or self-recognition occurs. Empathy, too, emerges in relation to self-recognition (Bischof-Köhler, 1991).

Two points are to be noticed about this class of emotions. First, the observation of these emotions requires measuring not only facial expressions, but also bodily and vocal behaviors. Whereas the earlier emotions can be observed readily in specific facial configurations, these new emotions require measurement of bodily behaviors. Embarrassment, for example, is best measured by nervous touching, smiling, gaze aversion, and return behaviors. The second important point related to the emergence of these emotions is that while they reflect self-consciousness, they do not require self-evaluation. The emergence of these self-

conscious emotion is a cognitive milestone in itself. This topic is treated in another chapter (see Volume 2).

Figure 18.1 also shows a second milestone, which occurs between 2 and 3 years of age, and is related to children's capacity to evaluate behavior against a standard, whether external, as in the case of teacher sanction or internal, as in the case of children's standards. This capacity for behavior in relation to a standard is the third year of life milestone. The set of emotions that emerge at this time—pride, shame, and guilt—are self-conscious emotions that require self-evaluation. These emotions require a child to evaluate behavior against a standard, à-vis the standard. The child can feel pride, guilt, or regret. If a child is able to feel pride (Lewis, 1989), note that pride arises from happiness and a sense of achievement. A child can win a lottery, winning the money, and feel pride, because of the winning of the lottery. The child's behavior, with our behavior, we might feel sad about something, but if we would not feel sad about something, we would not feel shame. The social-evaluative nature of these emotions emerges at about 3 years of age (Stipek et al., 1990).

Thus, by 3 years of age, a child has become a social being. The original tripartite system of emotions comes within 3 years of age, and complex emotional life of the child is being elaborated and various features necessary for social life have been formed. No longer is the child's meaning, and motivation will all serve the child's emotional life. At this age, the child also begins to understand that Darwin (1859) was unique to our species, self-consciousness. The mental activity has

conscious emotions is related uniquely to the cognitive milestone of paying attention to the self. This topic is taken up in more detail in another chapter (see Lewis, Chapter 46, this volume).

Figure 18.1 also shows a second cognitive milestone, which occurs sometime between 2 and 3 years of age. This ability is characterized by children's capacity to evaluate their behavior against a standard; the standard can be either external, as in the case of parental or teacher sanction or praise, or internal, as in the case of children's developing their own standards. This capacity to evaluate personal behavior in relation to a standard develops in the third year of life, and it gives rise to another set of emotions. We have called these "self-conscious evaluative emotions"; they include pride, shame, and guilt, among others. These emotions require that children have a sense of self and be capable of comparing their own behavior against standards. If children fail vis-à-vis the standard, they are likely to feel shame, guilt, or regret. If they succeed, they are likely to feel pride (Lewis, 1992a). It is important to note that pride and shame are quite different from happiness and sadness. For example, we can win a lottery and feel quite happy about winning the money; however, we would not feel pride, because we would not view the winning of the lottery as having anything to do with our behavior. The same is true for failure; we might feel sad if we were not able to do something, but if it was not our fault, then we would not feel shame or guilt. These complex social-evaluative emotions make their appearance at about 3 years of age (see Lewis, 1992b; Stipek et al., 1992).

Thus, by 3 years of age, the emotional life of a child has become highly differentiated. From the original tripartite set of emotions, the child comes within 3 years to possess an elaborate and complex emotional system. While the emotional life of the 3-year-old will continue to be elaborated and will expand, the basic structures necessary for this expansion have already been formed. New experiences, additional meaning, and more elaborate cognitive capacities will all serve to enhance and elaborate the child's emotional life. However, by 3 years of age, the child already shows those emotions that Darwin (1872/1965) characterized as unique to our species—the emotions of self-consciousness. With these, the major developmental activity has been achieved.

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