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# The Emotion Systems and the Development of Emotional Intelligence

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**Summary**

The starting point for considering the development of emotional intelligence is this: Emotions themselves are intelligent. Much of what some call *emotional intelligence* (EI) reflects direct functioning of the emotion systems. Other aspects of EI are shaped over time by a person's emotion experiences. In the present chapter we examine this last hypothesis by considering children's abilities to recognize how others' feel. We believe that those aspects of EI that influence children's social and behavioral adjustment most strongly will be aspects most closely associated with emotion systems functioning.

## 3.1 THE EMOTION SYSTEMS AND THE DEVELOPMENT OF EMOTIONAL INTELLIGENCE

The starting point for considering the development of emotional intelligence (EI) is this: Emotions themselves are intelligent. In a sense, the development of EI began with the genesis and evolution of the emotion systems (e.g., the amygdala, the hippocampal-entorhinal complex, the hypothalamic-pituitary-adrenal axis). The emotion systems seem to have functioned and continue to function, at least in part, to promote species survival (cf. Damasio, 1994; Darwin, 1872/1965; Ekman, 1999; Izard, 1971). Clearly, emotion responses are not adaptive at all times or in all situations. Almost everyone wishes that anger had not motivated her or him to say or do something at one point in time. We often overlook, however, that throughout our daily lives our emotion responses—including anger—help us to respond intelligently and adaptively to our world. The adaptive function of emotions includes:

1. focusing attention on important aspects of our environment (e.g., threatening messages and approaching vehicles),
2. provision of internal cues about our current or future status with our environments (e.g., angry feelings tell us when someone has infringed upon us; anticipatory feelings of fear inform us that we should not say something critical to our bosses),
3. priming of certain parts of our bodies to respond (e.g., anger at a bully sends internal signals to increase blood flow to appendages), and
4. motivation of facial and bodily expressions that communicate important information to others (e.g., smiles that tell others how much we appreciate their friendships).

In general, emotions serve us well. Many authors have raised concerns about the cohesiveness of the construct of EI (Zeidner, Roberts, & Matthews, 2002). Many components of EI seem to overlap with established dimensions of temperament and intelligence and, overall, do not seem to cohere into a single, measurable construct. We share these concerns. We believe that many of the components of what is being called emotional "intelligence" actually reflect functioning of the emotion systems.

In this chapter, we will discuss ways in which the emotion systems influence one component common to many models of EI, emotion recognition. Recognition of others' emotions refers to the ability to identify how others feel based on facial expressions, knowledge of situational triggers, observed behaviors, vocal tones, and other signals. It represents a basic emotion ability that has received much empirical attention and that lays a foundation for other components of EI, as many theorists suggest. We distinguish between declarative emotion (recognition) knowledge and emotion (recognition) processing patterns.

Declarative emotion knowledge has been researched extensively. Investigators typically assess it by examining how often children can associate expres-

sions, situations, behaviors, or vocal tones with the emotion label that a consensus of other people do (e.g., Jill's cat ran away, how do you think Jill feels?). Emotion processing patterns have received increased attention in recent years and refer to tendencies some children have to attribute particular discrete emotion states to others. For example, we have found that some children tend to attribute anger to others more often than do other children (Schultz, Izard, & Bear, 2004). Declarative emotion knowledge and emotion processing patterns overlap conceptually to some extent. If children have strong processing tendencies toward a particular emotion, for example, they may perform less well on declarative knowledge tasks. As we will present and discuss later, they seem to differ somewhat in their antecedents, however, and processing patterns exhibit unique variance in the prediction of social outcomes even after controlling for declarative emotion knowledge.

In this chapter, we first present a brief overview of the emotion systems and emotionality. We then provide an overview of developmental transitions that occur in emotion recognition in infancy and childhood. We then review and discuss literature that suggests ways in which the emotion systems influence the development of emotion recognition. The emotion systems play an influential role in the development of declarative emotion knowledge (Abe & Izard, 1999a). We believe that the individual differences in emotion recognition that are most meaningful for social interactions, however, reflect differences not in declarative knowledge but in emotion processing patterns. These processing patterns are strongly influenced by previous interpersonal emotion experiences and current emotion states. In different sections of the current chapter, we review the literature for these claims. We believe the distinction we draw between declarative emotion knowledge and emotion processing patterns applies not only to emotion recognition but also to many other components of EI. To the extent that emotion processing patterns—influenced by emotion traits and experiences—influence social interactions strongly, a central role for the emotion systems is implied by the term emotional *intelligence*.

## 3.2 THE EMOTION SYSTEMS

Emotions "contain the wisdom of the ages" (Lazarus, 1991, p. 820). One important function of the evolution of emotions is to allow rapid processing of, and organized response to, external and internal stimuli. For example, we do not have to decide consciously if a quickly approaching bus deserves our attention. Our emotion systems will likely focus our gaze on the bus and motivate the central nervous system to prepare a bodily response before we can consciously think to ourselves, "That bus sure is big". We may (or may not) process our behavioral response consciously (e.g., "Step back onto the sidewalk!"), but the emotion systems have already prepared us to make that decision and to enact it. In this way, we may consider our discrete emotions evolutionary "best guesses" as to how we should respond when certain categories of events (e.g., object loss, object gain, goal blocking) occur (Tooby & Cosmides, 1990).

Knowledge of specific brain mechanisms involved in emotions has been described as "bleak" (LeDoux, 2000, p. 159). Although brain imaging techniques have identified specific areas of the brain that are activated when emotion perception or arousal occurs, an understanding of the roles many of these neural connections play within emotion experiences remains unknown. At least five anatomically distinct networks exist in the human brain (for a review, see Mesulam, 1998). One of these is considered the emotion/memory network and contains epicenters in the anterior cingulated cortex, hippocampal-entorhinal complex, and the amygdala. This network plays a critical role in the development of conditioned associations between various stimuli and emotions. Many people with amygdala damage have deficits in understanding the emotional signals in facial expressions (Adolphs, Tranel, Damasio, & Damasio, 1995; Calder et al., 1996) and tones of voice (Scott et al., 1997). Lesions within this network, in both humans and other primates, have led to a failure to react emotionally to typically arousing stimuli, including Playboy photographs (Bauer, 1982), and a blunted ability to learn new conditioned responses, especially fear responses (Bechara et al., 1995; Downer, 1962; Gloor, Olivier, Quesney, Andermann, & Horowitz, 1982; Rosen & Schulkin, 1998).

Throughout this chapter, we will refer to the emotion systems. When we do, we refer to the preceding neural complex and others (e.g., the hypothalamic-pituitary-adrenal axis) that have been linked closely with emotion functioning.

## 3.3 EMOTIONALITY/TEMPERAMENT

People differ in the frequency and intensity with which they experience different discrete emotions. Some of the most reliably measured temperament traits include behavioral inhibition or shyness (Kagan, Reznick, & Snidman, 1987), negative affectivity, extraversion, and effortful control (Rothbart, Ahadi, Hershey, & Fisher, 2001). Most of these dimensions reflect emotion systems functioning. For example, inhibited infants and children are shy- or fear-prone as exhibited by wariness when presented with strangers or other novel stimuli. Children with negative affectivity are sad- and anger-prone as shown by frequent distress in response to environmental events (Abe & Izard, 1999b). Extraverted children are happy- and interest-prone (Abe & Izard, 1999b), approaching novel stimuli with positive affect.

Emotionality has shown moderate stability across time and predicts behavioral and social functioning. Distinct patterns of emotion expressions at 18 months of age, for example, have predicted maternal ratings of children's personality at three and a half years (Abe & Izard, 1999b). Negative emotion expressions at 18 months correlated robustly with neuroticism at three and a half years, and intense positive expressions at 18 months predicted Extraversion. In other work, infant negative emotionality (i.e., irritability) predicted aggression at 7 years of age (Rothbart, Ahadi, & Hershey, 1994).

Twin studies have suggested that temperament traits exhibit considerable heritability. Estimates typically suggest genes account for around half of the

variation in temperament (Davis, Luce, & Kraus, 1994; DiLalla & Jones, 2000; Plomin & Stocker, 1989). For the development of positive emotionality, however, shared environmental experiences seem very important (Goldsmith & Campos, 1986; Goldsmith, Lemery, Buss, & Campos, 1999; Lytton, 1990). In one study with adult twins, shared environment accounted for 22% of the variance in positive affectivity (Tellegen et al., 1988).

In addition to genetic constraints, early emotion experiences, even within the womb, seem to play a critical role in determining levels of emotionality. Pregnant monkeys exposed to repeated but unpredictable noise in the dark, for example, have produced offspring who exhibit heightened levels of anxious behavior. Compared to offspring not exposed to prenatal stress, these offspring clung to other monkeys and self-stimulated more often, and displayed less exploratory behaviors (Schneider, 1992). Similar results have been found in rats (Fameli, Kitraki, & Stylianopoulou, 1994). In both of these examples, prenatal stress seems to have affected the level of negative emotionality and/or inhibition in offspring.

Early postnatal experiences also impact the development of emotionality. Experimental studies with rats suggest that maternal behavior during this period affects levels of emotionality not only in infancy but also adulthood. For example, infant rats separated from, or deprived of, their mothers have, in adulthood, exhibited elevated adrenocorticotropin hormone levels (i.e., the hormone associated with stress) both at baseline and during stressful conditions (Ladd, Owens, & Nemeroff, 1996; Plotsky & Meaney, 1993).

Non-experimental studies involving humans suggest that both maternal separation and/or deprivation and, generally, chronic stress can produce similar outcomes. Children who had been institutionalized in Romanian orphanages for more than 8 months as infants and young children displayed, six years later, elevated hypothalamic-pituitary-adrenal (HPA) axis activation compared to matched controls and other children, who had only experienced 4 or less months of institutionalization (Gunnar, Morison, & Chisholm, 2001). Moreover, other forms of chronic stress exposure have been associated with increased levels of physiological reactivity (Fleming, Baum, Davidson, Rectanus, & McArdle, 1987; Kaufman et al., 1997; Ockenfels et al., 1995). These studies suggest that recurring stressors, such as maternal deprivation, seem to have a potentially profound effect on levels of negative emotionality across the life span.

## 3.4 DEVELOPMENT OF EMOTION RECOGNITION

A rudimentary ability to recognize others' emotions appears soon after birth, if not at birth (Izard, 1971). Studies with infant monkeys, for example, suggest that emotion perception skills develop rapidly following birth. Some cells in the temporal cortex, an area implicated in facial recognition, appear mature as early as 6 weeks into the postnatal period (Rodman, Skelly, & Gross, 1991), and other areas of the temporal cortex associated with facial recognition com-

plete maturation at 6 months of postnatal age (Rodman, 1994). One study with human infants exhibited their ability to distinguish between happiness, sadness, and anger at 10 weeks of age (Haviland & Lelwica, 1987). When mothers posed happy expressions, for example, infants tended to gaze forward happily. When mothers posed sad expressions, infants tended to look down. Interestingly, high levels of testosterone, more common in males, may impede the development of temporal cortical areas, leaving infant males slightly less able on average to recognize facial expressions than females (Bachevalier, Hagger, & Bercu, 1989; Hagger, Bachevalier, & Bercu, 1987).

In addition to innate and/or rapidly unfolding capacities, through modeling and exposure, the socialization of emotion recognition occurs immediately following birth. Infants imitate facial expressions and gestures from the first few days of life (Field, Woodson, Greenberg, & Cohen, 1982; Meltzoff & Moore, 1983). At three months, mothers who more often encouraged infants to attend to their facial expressions had infants that exhibited greater abilities to discriminate between subtle variations in facial expressions (Kuchuk, Vibbert, & Bornstein, 1986).

A classic study exhibited not only the ability of infants to recognize emotion expressions and interpret their meanings but also the power of caregiver emotion expressions to influence infant behaviors. One-year-old infants were placed on a platform that contained a plexiglass floor and a visible floor immediately below. Mothers stood on the opposite end of the platform and encouraged infants to come toward them. Halfway across the platform, however, the visible floor dropped several feet (the actual plexiglass floor continued). When infants reached this visual cliff, if mothers posed smiling faces, a majority of the infants continued to crawl. When mothers posed fearful facial expressions, however, no infant ventured forward (Sorce, Emde, Campos, & Klinnert, 1985).

The development of language in the second and third years of life changes the nature of the emotion socialization landscape. By 3 years of age, approximately 93% of children use the primary emotion labels of happy, sad, angry, and scared regularly (Ridgeway, Waters, & Kuczaj, 1985). At this age, verbally mediated socialization of emotion recognition, through such processes as coaching and induction, become important components of parental socialization. Through discussions with their sons and daughters, parents help children develop and strengthen associations between environmental events, emotion experiences, and emotion labels. This discourse seems helpful to children's development beyond the effects of cognitive development. In one study, parental emotion discourse predicted children's emotion recognition even after controlling for their age and cognitive ability (Denham, Zoller, & Couchoud, 1994).

In early grade school children develop a more complex understanding of how others feel. For one, they begin to appreciate that others may feel multiple and conflicting emotion responses to a single event. Early studies of mixed emotions focused on charting normative age-related changes and emphasized the role of cognitive development in children's appreciation of mixed emotions (e.g., Donaldson & Westerman, 1986; Harris, Olthof, & Terwogt, 1981). These studies typically found that not until well into middle-childhood do children

readily acknowledge that the same event or person can evoke contradictory and conflicting emotions. More recent research has revealed, however, that by early school years children demonstrate at least a rudimentary or partial understanding of mixed emotions (Kestenbaum & Gelman, 1995; Peng, Johnson, Pollock, Glasspool, & Harris, 1992).

An important socializing agent for understanding mixed emotions seems to be parents and other family members who fit the description of good emotion coaches (Gottman, Katz, & Hooven, 1996). Whereas some parents view negative emotions as harmful to children and in need of extinction as quickly as possible, other parents identify and accept these expressions and view them as opportunities for discussion. Studies that examine the early correlates of mixed emotion understanding suggest the beneficial effects of expression and discussion of emotion experiences within the family. Positive affective bonds between family members seem to lay a critical foundation for these expressions and discussions. Family discussions about the causes of behavior and positive interactions with older siblings, measured when children were 3 years of age, predicted their appreciation of mixed emotions 3 years later, even after controlling for verbal ability (Brown & Dunn, 1996). Strikingly, in another study, the affective bond between 1-year-old infants and their mothers—as measured by security of attachments—predicted understanding of mixed emotions by children 5 years later (Steele, Steele, Croft, & Fonagy, 1999). Mothers of secure infants exhibited greater flexibility in communicating a wide range of feelings than mothers of insecurely attached dyads. This communicative flexibility related to emotions may have played a mediating role in the development of mixed emotion understanding.

Finally, several theorists have asserted that emotion recognition provides a foundation for the development of other components of EI. A couple of studies support this theory. In one, children's accurate labeling of discrete emotions in experimental tasks at age 3 predicted their understanding of more complex emotion experiences, including mixed emotion reactions, at age 6 (Dunn, Brown, & Maguire, 1995). In another, declarative emotion knowledge assessed following kindergarten predicted aggression in third-grade. Importantly, however, the data fit a model in which early declarative emotion knowledge had both a direct effect on later aggression and an indirect effect mediated by other, more complex aspects of emotion processing. These more complex aspects, assessed following second-grade, included attributions of hostile intent, production of maladaptive responses, positive evaluations of aggression, and holding instrumental goals (Dodge, Laird, Lochman, & Zelli, 2002).

The preceding data are correlational and therefore cannot establish causality. Future experimental studies will need to establish with certainty whether other emotion-related abilities indeed build upon emotion recognition or whether all of these skills simply share a similar lineage. Along with others (e.g., Fox, 2003), we believe that children's declarative emotion knowledge and, especially, emotion processing patterns—influenced by their past and current emotion experiences—will prove to have great influence upon their future social cognitive development.

## 3.5 THE EMOTION SYSTEMS INFLUENCE ON DECLARATIVE EMOTION KNOWLEDGE

Over time, positive emotionality may have a beneficial influence on the development of declarative emotion knowledge. Happiness is known to foster creativity and the ability to make associations between stimuli (Isen, 1999). Furthermore, children with positive affect who approach new and different situations eagerly may expose themselves more often to learning moments for understanding the causes and nuances of emotion experience. Conversely, negative emotion experiences may impede the development of declarative emotion knowledge. Negative emotion arousal often motivates a focus on the self and alleviation of arousal (Eisenberg et al., 1996). Because of this, children in negative emotion states may miss opportunities to learn from emotion-eliciting events.

Only recently have researchers begun to examine the relationship between emotionality and declarative emotion knowledge. These studies have established initial support that higher levels of positive emotionality and extraversion are associated with greater declarative emotion knowledge, albeit weakly (Matsumoto et al., 2000; Schultz et al., 2004; cf. Arsenio, Cooperman, & Lover, 2000). It also appears that children's anger-proneness and/or neuroticism correlate with lower levels of declarative emotion knowledge (Arsenio et al., 2000; Matsumoto et al., 2000).

## 3.6 THE EMOTION SYSTEMS AND EMOTION PROCESSING PATTERNS

As stated at the outset, in addition to examining children's declarative emotion knowledge, several researchers have recently focused on specific patterns in children's emotion attributions (Barth & Bastiani, 1997; Pollak, Cicchetti, Hornung, & Reed, 2000; Schultz et al., 2004). Initial findings suggest that emotion experiences strongly influence the development of these patterns. In our work, we have shown that some young children have a tendency to interpret emotion cues as representing anger more often than other children (Schultz, Izard, & Ackerman, 2000; Schultz et al., 2004). Studies examining the origins of these tendencies implicate hostile and chaotic family environments, such as homes characterized by abuse (Pollak et al., 2000; Pollak, Klorman, Thatcher, & Cicchetti, 2001), instability (Schultz et al., 2000), and maternal depression (Schultz et al., 2000). Some evidence suggests that anger-prone children also tend to attribute anger to others' emotion states (Schultz et al., 2004). Researchers have suggested that this atypical processing pattern may serve adaptive purposes for children within certain family environments (Pollak & Sinha, 2002; Schultz et al., 2004). Failure to interpret parental cues as hostile may sometimes lead to severe consequences for some children. Abusive experiences or other experiences characterized by threat or pain to the child will likely elicit intense fear in them. These fear experiences may condition the emotion systems both

to respond to threatening cues more quickly and to associate a variety of cues that are loosely related to anger or hostility (e.g., ambiguous facial expressions) with threat.

We believe that idiosyncratic appraisal tendencies associated with intense negative emotion experiences may influence social interactions more greatly than whether or not children have developed general declarative knowledge of typical emotion reactions. Three published studies have included assessments of both declarative emotion knowledge and the frequency with which children attribute anger to others. In two of these, children's anger attribution tendencies predicted social functioning after controlling for declarative emotion knowledge, but declarative emotion knowledge failed to predict functioning after controlling for anger expectancy tendencies (Barth & Bastiani, 1997; Schultz et al., 2000). In the third study, declarative emotion knowledge and anger attribution tendencies predicted aggression equally strongly, though the researchers did not analyze the predictive ability of each component after controlling for the other (Schultz et al., 2004). In daily interactions, people do not pose prototypic facial expressions a majority of the time, and dynamics within social events are often complex. Because of this, expressions and situations rarely have a single emotion that necessarily corresponds with them. Children, influenced by their past emotion experiences and their emotion systems responses to these experiences, are constantly left to fill in the blanks to interpret how others feel. Their emotion processing tendencies, influenced by the emotion systems, may influence these interpretations in more meaningful ways than declarative emotion knowledge.

## 3.7 THE EMOTION SYSTEMS, EMOTION STATES, AND EMOTION PERCEPTIONS

Children with negative emotionality will likely exhibit particular patterns of emotion processing. A large body of research documents that arousal of negative emotions will influence interpretations of social stimuli (for a review, see Rusting, 1998). Several studies provide direct evidence that emotion arousal influences patterns of emotion attributions. College students who previously heard an irritating noise attributed more negative emotions to others; those who previously heard a disgusting tape attributed more disgust to others; and those who previously heard a comedy tape attributed more positive emotions to others (Schiffenbauer, 1974; cf. Carlson, Felleman, & Masters, 1983). When induced to feel anxious, children tend to attribute hostility toward hypothetical peers in vignettes (Dodge & Somberg, 1987). Anger induced through role play tends to cause participants to perceive expressions of anger when exposed stereoscopically to expressions of anger and joy (Izard, Wehmer, Livsey, & Jennings, 1965). Finally, emotion arousal speeds the perception and judgment of emotion-congruent cues (e.g., facial expressions, words) (Niedenthal, Setterlund, & Jones, 1994). Because of their greater frequency of experiencing cer-

tain discrete emotions, in their actual peer interactions children with negative emotionality will attend to and attribute particular emotions to others.

## 3.8 THE EMOTION SYSTEMS AND THE VALUE OF EMOTION RECOGNITION

Finally, a key ingredient to effective social adjustment is not just having declarative knowledge of emotions but also consistently applying this knowledge to one's interactions. Individual differences in emotionality and reinforcement histories mediated by the emotion systems likely play an important role in the application of declarative emotion knowledge. Many theorists predict that lower levels of declarative emotion knowledge will lead to conflicted social interactions. For example, failing to recognize anger in others may lead to contextually inappropriate behaviors toward them, leading to conflict. In our own research, however, we have found inconsistent and weak associations between assessments of declarative emotion knowledge and how frequently children fight. Many aggressive children may know how others feel when forced to consider the question on an experimental task but may not value and/or spontaneously apply this knowledge in their social interactions. Levels of empathy and reinforcement histories for applying declarative emotion knowledge probably combine to influence whether or not children actually use their declarative emotion knowledge. The extent to which children value and/or use their declarative emotion knowledge is probably as critical an element in predicting social interactions as the level of declarative knowledge itself. Some evidence suggests that individual differences in emotionality may influence this valuation. Positive emotionality has been related to empathy, for example, and certain negative emotion experiences such as sadness and anger are often characterized by focus on the self (Eisenberg, Fabes, & Bernzweig, 1993; Eisenberg et al., 1996; Young, Fox, & Zahn-Waxler, 1999).

## 3.9 ADDITIONAL COMMENTS ON THE DEVELOPMENT OF EMOTION RECOGNITION

Several writers have pointed out that some aspects of EI may reflect goodness of fit between children and their environments (Chess & Thomas, 1999; Zeidner, Matthews, Roberts, & MacCann, 2003). The tendency to attribute anger to others is a good example of this. Although the development of appraisal processes conditioned toward assuming anger and hostility may serve adaptive purposes within certain family environments, multiple correlational studies suggest that this processing tendency may lead to greater numbers of aggressive encounters with peers and dislike by them (Barth & Bastiani, 1997; Schultz et al., 2000, 2004).

Second, although we have focused almost exclusively on the influence of the emotion systems, we certainly do not mean to suggest that individual differences in emotion recognition, especially declarative emotion knowledge, can

be completely accounted for by different aspects of emotion systems functioning. Declarative emotion knowledge varies depending upon an individual's level of intelligence; children who can process information more quickly will tend to have developed more associations between emotion cues, labels, and situational events. We consistently find moderate correlations (i.e., *r*'s ranging from .16 to .63 but typically from .30 to .50) between declarative emotion knowledge scores and verbal ability. The contribution of verbal ability to declarative emotion knowledge seems independent of effects of certain temperamental traits. First-grade children's verbal ability predicted both emotion expression knowledge and emotion situation knowledge even after controlling for attentional persistence and behavioral control (Schultz, Izard, Ackerman, & Youngstrom, 2001). In contrast to the associations between intelligence and declarative emotion knowledge, in our work children's tendencies to attribute anger to others fails to correspond with their verbal ability.

Emotion recognition is one of the few components of EI that has shown a capacity to predict social and behavioral adjustment after controlling for both specific temperamental traits and intelligence. Individual differences in a composite of emotion expression and situation knowledge predicted first-grade children's social problems and social withdrawal after controlling for preschool attentional persistence, behavioral control, and verbal ability (see Schultz et al., 2001). In the same sample of children, preschool facial expression knowledge predicted teacher ratings of social skills, behavior problems, and academic competence in third-grade after controlling for difficult temperament and verbal ability in preschool (Izard et al., 2001). Other investigators have confirmed these findings. Children's anger-proneness and happiness both predicted aggression and peer acceptance in predicted directions, after which declarative emotion knowledge added significantly to the prediction of both aggression and peer acceptance (Arsenio et al., 2000). Emotion recognition seems to be a construct shaped in part by temperament and intelligence but which also retains independence both as a construct and as a predictor of social and behavioral functioning. As outlined in this chapter, we believe this independence is largely influenced by emotion experiences and subsequent emotion processing patterns mediated by the emotion systems.

Finally, it is noteworthy that many schools now take a more deliberate and active role in the development of their students' EI. Psychologists and educators have developed a variety of curricula available to principals and teachers that focus on the promotion of children's emotion and social skills (e.g., recognizing emotions, anger regulation, taking turns). One of the most research-based of these programs is entitled Promoting Alternative Thinking Strategies (PATHS; Greenberg & Kusche, 1998). Randomized trials have found the PATHS program to promote many individual aspects of EI, such as the size of children's emotion vocabularies and understanding of others' abilities to hide feelings (Greenberg, Kusche, Cook, & Quamma, 1995), to enhance classroom atmospheres (Conduct Problems Prevention Research Group, 1999), and to reduce student levels of externalizing behaviors such as aggression (Greenberg & Kusche, 1998). We do not yet know, however, what the active ingredients

are within these programs that promote change in children's behaviors. Do children's newly acquired thinking skills by themselves cause changes in their behavior? Through the process of learning and delivering the lessons, many teachers also likely experience growth, becoming more skilled coaches and managers of their students' emotions. These teacher changes may play as critical a role in promoting adaptive behaviors in children as changes in children's thinking skills.

## 3.10 CONCLUSIONS

We have seen that we can conceptualize individual differences in emotion recognition in at least two overlapping ways: (a) declarative emotion knowledge, and (b) emotion processing patterns. The emotion systems influence the development of both of these components, especially the latter. Emotion experiences and emotionality may facilitate or impede the acquisition of declarative emotion knowledge (Abe & Izard, 1999a), and emotion processing patterns reflect emotion experiences and dispositional traits more directly.

We believe the distinctions we have outlined between declarative emotion knowledge and emotion processing patterns apply to other components of EI. For example, much research attention has focused on children's abilities to generate response options to social situations. A child who responds to peer teasing by calling the teaser a bad name, however, likely knows that she could ignore the teaser, ask the teaser to stop, or tell the teacher. These responses probably have not been sufficiently reinforced in the child to cause her emotion systems to motivate her to use them. Possibly, through seeing respected siblings or peers call others' bad names, she may in fact have been reinforced to use name calling as a strategy. She may have a tendency toward generating angry and hostile responses, especially when scared or angry, rather than a deficit in declarative knowledge related to social responses. Future research on EI should delineate between these aspects, as they likely have somewhat distinct antecedents and may predict social functioning differentially.

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