

Afterword: What develops in emotional development?

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In contrast to the first edition of *The Nature of Emotion*, which mostly focused on infancy, the contributors to the second edition considered the entire lifespan, including early childhood (Goldsmith, Cataldo & Nelson, and Shiner), adolescence (Shiner, Somerville & McLaughlin, and Crone & Pfeifer), adulthood (Shiner), and the transition from mid-life to older age (Hogan Sims & Carstensen, and Ryff).

Childhood

Within the first year of life, Cataldo & Nelson note that emotional-expression identification ability undergoes considerable development. For instance, the ability to discriminate between a happy and a fearful face emerges between 5-7 months as indexed by both behavioral and electrophysiological measures. This perceptual ability appears to be shaped by experience, as evidenced by several findings suggesting that children who have suffered early-life neglect display altered sensitivity for negative facial expressions (e.g., Pollak & Kistler, 2002). Cataldo & Nelson point out that a key challenge for the future is to understand *whether* and *how* the optimal development of this emotional-expression perceptual apparatus relates to the actual experience and expression of emotion.

Goldsmith and Shiner agree that the development of *the self* as well as of *cognitive abilities* during early childhood imbue core emotional states and traits with increasing complexity. The expression of the most 'basic' or 'primary' emotions—including joy, fear, anger, and sadness—come on-line early in infancy, but continue to unfold over time. Shiner highlights work demonstrating that joy and fear emerge in the first year, with the expression of anger gradually increasing over the first several years, peaking around age 3. Of course, children differ in their propensity to express each of these emotions, and Shiner tells us that individual differences in these emotional traits are moderately stable by the preschool years. By middle childhood, children's emotional range broadens to encompass sophisticated emotions—like shame, envy,

and empathy— that may require a comparatively more advanced and mature representation of the self and an increasingly nuanced view of others.

Cognitive processes important for self-regulation, including attention and cognitive control, develop rapidly in early childhood. As a consequence, Goldsmith notes, the expression and experience of emotions become less tied to their immediate eliciting stimulus—and are instead increasingly regulated by context and goals (see also Question 7). Children gradually adopt ‘display rules’ (Ekman, 1972; Safdar et al., 2009) and their reliance on behavioral strategies for emotion management and regulation (e.g., escape) decreases across middle childhood, giving rise to more sophisticated coping mechanisms, such as problem solving.

Adolescence

Crone & Pfeifer and Somerville & McLaughlin agree that adolescents are prone to more intense and labile feelings, relative to both younger and older individuals. In particular, peak emotional reactivity rises, and emotional experiences fluctuate more rapidly. Shiner highlights evidence that Agreeableness and Conscientiousness decline, whereas dispositional negative affect, or what she terms Neuroticism (see Question 3), peaks in adolescence, particularly among girls. Somerville & McLaughlin tell us that, as adolescents’ social groups grow in complexity, interpersonal context exerts a particularly powerful influence on emotional responses. In particular, socially meaningful stimuli (both positive and negative) *exacerbate* emotional reactivity, as indexed by hormonal, physiological and subjective experience measures. Crone & Pfeifer adopt a broadly similar perspective, highlighting evidence that adolescence is marked by exaggerated reactivity in approach and reward circuits (e.g., ventral striatum) in response to social risk-taking tasks, particularly when performed in the presence of friends.

Several authors argue that adolescence is a period of complex changes not only in measures of emotional reactivity, but also of *emotion regulation*. Somerville & McLaughlin describe work showing that adolescents become progressively better at using cognitive reappraisal strategies to regulate negative affect in the laboratory (see Question 7). But they also highlight important exceptions to this trend. For example, adolescents are selectively *worse* than older and younger individuals in voluntarily reappraising negative images if they depict social interactions or social suffering (e.g. Silvers et al. 2012). Somerville & McLaughlin also highlight evidence that adolescents differ in their motivation to regulate emotion in their daily lives. Adolescents seem to make less frequent use of adaptive regulatory strategies (e.g., cognitive reappraisal) relative to adults. And, compared to children, they show a greater propensity to ruminate on stressors. Somerville & McLaughlin hypothesize that these shifts in regulatory style may play an important role in facilitating other age-appropriate developmental tasks, such as establishing autonomy from caregivers, and forging intimate relationships with peers. As an example, they raise the possibility that co-rumination, common during this time of development, may have functional advantages, such as enhancing self-knowledge, strengthening social bonds, and deepening friendship quality. Therefore, an important challenge for future work will be to disentangle whether adolescents are *less capable* or simply *less motivated* to down-regulate negative affect, particularly in social contexts.

Crone & Pfeifer hypothesize that adolescents' heightened emotionality reflects the asynchronous development of neural circuits supporting emotional reactivity and emotion regulation, noting that, "On the one hand, limbic regions, such as the ventral striatum and amygdala, frequently show elevated reactivity in adolescence...On the other hand, brain regions that allow us to control our thoughts and actions, such as the prefrontal cortex, show a protracted developmental trajectory...reaching ceiling levels approximately between 14 and 20 years of age."

An exciting avenue for future research will be to clarify the relevance of this asynchronous neural development to emotional reactivity and regulation in the real world and in the clinic. Addressing this challenge and delineating specific aspects of neural development that increase vulnerability to psychopathology is particularly important because, as number of authors emphasize, a range of neuropsychiatric disorders have their roots in adolescence (Lee et al., 2014).

Adulthood and Older Age

In an interesting contrast with the trajectory into adolescence summarized above, Hogan Sims & Carstensen note that older adults report greater *stability* of emotional experiences, higher quality of daily interactions, and more positive emotional experiences. They argue that these trends cannot be explained by cognitive decline, neurodegeneration, or even aging *per se*. Instead, these trends reflect changes in the management of emotion. In particular, Hogan Sims & Carstensen highlight evidence suggesting that older individuals are more adept at using proactive social strategies to manage and regulate emotional experience. Older adults generate more adaptive solutions to interpersonal conflicts (e.g., marital strife) than younger adults. Further, they report less distress while encountering everyday hassles or social conflicts, fewer negative interactions in general, and a greater tendency to avoid situations and individuals associated with potential conflict.

In the transition from adulthood into old age, Hogan, Sims & Carstensen argue that *goals* and *perspectives* prominently change, as described by their Socioemotional Selectivity Theory (SST). Goals are set within a temporal context: When time is perceived as limited, as with older age or the onset of terminal disease, social selection occurs, and emotional goals shift to prioritize the most positive and meaningful experiences and partners. Consistent with this perspective, older individuals' emotional preferences and priorities resemble those of younger individuals when they are asked to imagine living much longer.

Conversely, younger individuals' preferences were indistinguishable from older individuals in the months following the September 11, 2001 terrorist attacks: both the young and the old placed greater emphasis on finding emotional meaning in their daily lives.

Ideal Emotional Development

Ryff draws on classical philosophy, the arts, and contemporary social science research while embracing the contribution of emotions and their development to well-being and optimal psychological functioning across the lifespan. In a shift of perspective from viewing emotions as something to be “controlled” to viewing them as goals in and of themselves enabling the living of a passionate life, Ryff focuses on ideal emotional functioning and highlights her *ideal ends* in emotional development. Those ideal ends include awareness of one's own emotions (“know thyself”) as well as awareness of others' emotions (“where awareness turns outwards”); increased usage of *acceptance* as a coping mechanism; increased range of emotional experiences as well as their complexity (“the joining of profound positives and negatives”), combined with flexibility and context attunement. She beautifully illustrates this idea by describing “kintukuroi”, the Japanese tradition of fixing broken pottery where “breakage is viewed as part of the history of the object” (rather than something to disguise). Finally, these ideal ends embrace emotions as “compelling and constructive forces for good”, and the possession of “deep emotional investments”. As Ryff reminds us, passions “are what commit and bind us to other people and to life causes that infuse our journeys with meaning and purpose.”

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