Appendices

Handbook of Trauma, Traumatic Loss, and Adversity in Children: Development, Adversity’s Impacts, and Methods of Intervention

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## Risk and Protective Factors for Traumatic Reactions

### Table A1.1 Risk Factors: Pre-Traumatic Event

<table>
<thead>
<tr>
<th>May Reduce Emotional Distance</th>
<th>Linked to Vulnerability</th>
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<tr>
<td>• Previous trauma(s) or loss(es)</td>
<td>• Personal trait difficulties—e.g., difficult temperament, behavioral inhibition, or neuroticism (negative emotionality); surgency or exuberance with low effortful control; tendency toward self-criticism, guilt, and/or shame; low trust; low cognitive skills; specific genetic polymorphisms—e.g., 5-HTTLPR, DRD4; faulty information processing (e.g., attribution biases); reactivity (e.g., impulsivity; HPA dysregulation; genetic sensitivity)</td>
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<tr>
<td>• Parent’s previous trauma or loss</td>
<td>• Child’s impaired sense of self—e.g., low self-esteem; low self-compassion; high self-criticism; specific attachment/interactional styles (e.g., insecure or disorganized attachments); negative body image</td>
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<td>• Stress sensitivity</td>
<td>• Child’s personal history—e.g., previous trauma or loss; pre- and post-natal factors (e.g., parental conflict, premature birth); low levels of success (e.g., academic failure)</td>
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<tr>
<td>• Undesirable or emotional interactions (e.g., unresolved negative encounters before the event) with others (e.g., those who later die or are severely injured during the event)</td>
<td>• Child’s relationship issues—e.g., insecure or disorganized attachment to caregiver(s); poor peer relationships, poor social skills; distress response style that elicits negative response from others; social isolation</td>
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<tr>
<td>• Prior traumas</td>
<td>• Developmental difficulties—e.g., delayed or poor skill development, low IQ, mental health disorders or emotional problems; reduced skills—e.g., poor assessment and problem-solving skills; poor emotional or behavioral self-regulation; inaccurate locus of control; poor or inflexible coping capacities (e.g., poor responses to stress/challenges)</td>
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<tr>
<td>• Other environmental, personal, or experiential factors that reduce emotional distance</td>
<td>• Parental factors—e.g., parental mental illness; poor marital quality or divorce; parent’s previous trauma; insensitivity to the child’s needs; low education level; low sense of efficacy, low resourcefulness; punitive or under-involved parenting</td>
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<td></td>
<td>• Economic and other environmental factors—e.g., relocations; low SES (poverty), poor family or community resources (e.g., poor housing, low opportunities for enrichment); high local crime/violence rates; low social support (e.g., familial, peer, low community connectedness); poor emotional climate; exposure to media violence; family instability</td>
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<td></td>
<td>• School issues—e.g., poor performance; conflict with teachers; rejection by peers; being bullied; poor school climate</td>
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<td></td>
<td>• Other factors that indicate reduced resources, skills, or traits needed to cope with stressful events or their aftermath; gender (especially for older age groups, female gender has been a risk factor—sometimes found to be associated with exposure levels or levels of peri-traumatic emotions)</td>
</tr>
</tbody>
</table>

Sources: Reprinted with permission from Nader K (1999/2000). Psychological first aid for trauma, grief and traumatic grief (3rd ed). Austin, TX: Two Suns. These factors are taken from numerous consultations and a large body of research literature (some corroborating references: Caspi, 1998; Fearon et al., 2010; see Nader, 2008; Osofsky et al., 2015b; Scaramella et al., 2008).
<table>
<thead>
<tr>
<th>With or Without Direct Exposure</th>
<th>During Trauma Exposure</th>
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<tbody>
<tr>
<td>• Witnessing threat or injury to others</td>
<td>• Life threat, threat of or actual personal harm/injury</td>
</tr>
<tr>
<td>• Closeness or other emotional connection to a deceased, endangered, or injured person</td>
<td>• Witnessing threat or harm or other horrors of the event (e.g., mutilation)</td>
</tr>
<tr>
<td>• Guilt for actions or inactions (before, during, or after an event)</td>
<td>• Being trapped (e.g., in disaster-related debris, under snow)</td>
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<td>• Shame (for inabilities, ineffectualness, and/or perceived reduced value)</td>
<td>• Intense emotions such as fear, horror, helplessness, guilt, shame or humiliation, anger, panic, or other strong, distressing emotion</td>
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<td>• Sense of responsibility for something that happened</td>
<td>• Sense of personal damage</td>
</tr>
<tr>
<td>• Unsuccessful attempts to stop or prevent harm or to revive someone</td>
<td>• Separation from trusted adults</td>
</tr>
<tr>
<td></td>
<td>• Nature, duration, severity, and/or cause of event experience</td>
</tr>
<tr>
<td></td>
<td>• Multiple types of trauma exposures</td>
</tr>
</tbody>
</table>

Sources: Reprinted with permission from Nader K (1999/2000). Psychological first aid for trauma, grief and traumatic grief (3rd ed.). Austin, TX: Two Suns (other references, e.g., Freud & Burlingham, 1942; Caspi, 1998; Gordon-Hollingsworth et al., 2018; see Nader, 2008; Osofsky et al., 2015b; Yates et al., 2003).
**Table A1.3 Risk Factors: After a Traumatic Event**

**With or Without Direct Exposure** | **After Direct Exposure**
---|---
**Personal**<br>• Identification with victims<br>• Identification with perpetrators of the event<br>• Perceived guilt or responsibility<br>• Unsuccessful attempts to rescue or revive someone<br>• Viewing deceased or injured victims or bloody scenes (or pictures of same, especially of a close person)<br>• Closeness to deceased, endangered, or injured victims<br>• Isolation<br>• Loss of personal property (e.g., home, toys) and/or of routines | **Personal**<br>• Loss or reduction of resilience factors—e.g., loss of faith in self, others, and/or God; lower self-esteem, negative changes in attachment/interational styles<br>• Low skill levels:<br>  – Reduced assessment, problem-solving, or other skills<br>  – Poor emotional or behavioral self-regulation<br>  – Poor coping capacity—e.g., overuse of coping methods that activate reactions (e.g., active coping methods that serve as traumatic reminders, increase arousal, or trigger other responses) or that prevent processing (e.g., avoidant coping; poor responses to stress/challenges); loss of faith or negative spiritual coping (e.g., feel punished by God)<br>• Reluctance or slow to seek support<br>• Difficulty receiving comfort<br>• After 3 or 4 weeks, difficulty discussing the trauma, loss, or personal emotions<br>• Overuse of avoidance; inability to avoid focus on the trauma<br>• Overgeneralization of signs of threat (e.g., fear of anyone with even a small characteristic of a shooter rather than fear of those who show signs of posing danger)<br>• Traits—e.g., genetics that increase sensitivity to environmental factors or increase vulnerability; that put the child at odds with others (e.g., negative emotionality, introversion, shyness; antisocial behavior or other conduct disturbances)<br>• Symptoms/reactions—e.g., PTSD, persisting anxiety or depression, dissociation, overgeneral memory; irritability; intolerance of closeness<br>**Environmental**<br>• Relocation<br>• Losses: property (e.g., toys, other belongings), home, pets; friends; supporting others<br>• Persistent stressors: economic problems, family conflict: sharing home/location with others<br>• Low support | **Environmental**<br>• Poor family response (e.g., lack of support, demands to “get over it”; alterations in the parent–child relationship)<br>• Lack of social support (e.g., school, community, or peers; cultural)<br>• Overly dependent parents<br>• Traumatized parents<br>• Financial strain; poverty<br>• Parental PTSD<br>• Ongoing stress<br>• Parental mental health problems; divorce<br>• School problems (e.g., poor performance; conflict with teachers; rejection by peers; failure to recognize cultural needs)<br>• Discrimination (e.g., racism, sexism, homophobia)<br>• Too early interventions (e.g., before reasonable abatement of arousal)<br>• Poor congruence between assistance and needs (e.g., from parents or others)<br>

Sources: Reprinted with permission from Nader, K. (1999). (some recent corroborating references: Burke & Neimeyer, 2014; Caspi, 1998; Dujardin et al., 2016; Hansel et al., 2013; McLaughlin et al., 2010; see Nader, 2008; Scaramella et al., 2008; Yates et al., 2003).
### Table A1.4: Protective/Resilience Factors

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<th>Trait/Factor</th>
<th>Definition/Qualities/Associations</th>
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| **Effective Coping**  | • Enlists regulatory processes that reduce negative feelings/distress during or after the experience of stress  
• Coping methods may include, e.g., active coping, avoidant coping, positive coping, and/or flexible coping (see Glossary)  
• Prolonged avoidance may be detrimental to recovery. Use of active coping that serves as traumatic reminder/trigger for personal reactions or is ill timed can exacerbate symptoms  
• Flexible coping includes adjusting to the needs of the situation and the individual                                                                                                                                                                                                                                                                                                                                                                      |
| **Personal Qualities**| Enabling qualities—e.g., (see glossary—resilience)  
• Intelligence  
• Ability to trust  
• Good self-regulation skills  
• Positive self-worth; self-confidence  
• Coping flexibility  
• The capacity to function well in relationships  
• Positive outlook  
• Good problem-solving skills  
• Social and emotional competence  
• Self-compassion; self-reassurance  
• A realistic assessment of one’s ability to control a given situation (locus of control)  
• Protective genetics; positive temperament (e.g., outgoing/extraverted)                                                                                                                                                                                                                                                                                          |
| **Parental Factors**  | Effective parenting—good management, sensitive parenting, child centered parenting; parental warmth  
• Positive family circumstances (e.g., happy marriage, low conflict, good resources)  
• Good parental mental health  
• Parents serve as a good support system  
• Open and well-timed communication                                                                                                                                                                                                                                                                                                                                                 |
| **Positive Environmental Conditions** | Conditions associated with less stress and greater opportunities—e.g.,  
• Available resources (e.g., social, economic); enriched environments and/or socioeconomic advantages  
• A good support system(s)  
• Secure caregiver–child attachments (parents act as a safe haven—provide protection and a safe place to return to; act as secure base for exploration and the development of independence)  
• Academic achievement and opportunities  
• Supportive and protective school environment                                                                                                                                                                                                                                                                                                                     |
| **During the Event Factors** | • Successful self-protective or other positive behaviors (can be perceived rather than actual)  
• Successfully assisting another or others  
• Feeling protected by competent adults or other students                                                                                                                                                                                                                                                                                                                                                       |
| **Posttrauma Factors**| • Reinstatement of safety and of a sense of safety  
• Restoration of hope  
• Appropriately timed and skillfully executed interventions  
• Opportunities for positive actions, when ready (child-tailored)  
• Good social support  
• Being valued (e.g., for actions)  
• Other factors listed in this table                                                                                                                                                                                                                                                                                                                                                   |
### Successful Behaviors
- Successful actions during an event (e.g., protecting self or others)
- For some children, helping others or memorializing deceased victims, after the event
- Success after the event—e.g., speaking out; taking action

### Support/Social Support
- Behaviors or information that suggest that a person is cared for, esteemed, valued, loved, protected
- Provision of needed resources
- Respect for personal needs (e.g., for personal space, comfort; cultural and spiritual needs)
- Being present when needed

### Associations
Resilience and protective factors are linked to better outcomes, e.g.,
- For former Ugandan child soldiers, Klasen et al. (2010) found that posttrauma resilience was associated with fewer guilty cognitions, less desire for revenge, better family socioeconomic status, and greater perceived spiritual support
- Social support is linked to reduced stress; lower traumatic reactions; reduced severity of illness; speedier recovery from ailments; enhanced well-being

### References:
Abu-Kaf & Braun-Lewensohn, 2015; Burton et al., 2012; Cloitre et al., 2012; Dalgard et al., 2006; Deardorff, Gonzales, & Sandler, 2003; Dekeyn & Greenberg, 2018; Fergusson & Horwood, 2003; Greenberg & Riggs, 2015; Gundogar et al., 2014; Hobfoll et al., 2007; Masten & Powell, 2003; see Nader, 1999, 2008; see Nader & Fletcher, 2014; see Plefferbaum et al., 2013.

### Comparison of DSM and ICD PTSD
There are differences in PTSD for DSM-IV, DSM-5, ICD-10, and ICD-11. Across 13 countries, Stein et al. (2014) demonstrated that while 5.6% met full criteria for PTSD in at least one system (DSM-IV, ICD-10, DSM 5, ICD-11), each system identifies populations of PTSD (with only partial overlap), and each system has similar clinical utility for identifying PTSD in proportions of the population (each system identified indicators of clinical significance). Only about a third of respondents met PTSD in all four systems, and a third in only one system (N = 23,936 across all surveys, in-person interviews were used). Findings endorsed four factors (re-experiencing, avoidance, numbing, arousal). (See also Chapter 13—Assessment and Diagnosis.)

Although adults in multiple countries who met full DSM-5 PTSD requirements had the highest problematic outcomes (distress-impairment, suicidality, comorbidity, and PTSD symptom duration), individuals with subthreshold PTSD (i.e., met requirements for two or three PTSD symptom Criteria B–E) also have had significantly elevated scores on most outcomes (N = 23,936 with lifetime trauma exposure, McLaughlin et al., 2015a). In a latent structure analysis of proposed ICD-11 and three proposed for DSM-5 models of PTSD, Hansen et al. (2015) found an excellent model fit for ICD-11 PTSD (in six of seven samples; poor fit for incest sample) and a poor fit for DSM-5 PTSD (N = 3746, ages 18–80, exposed to wide range of traumas; across seven samples). ICD-11 and DSM-5 factors moderately correlated with depression, anxiety, aggression, and dissociation scores. A six-factor Anhedonia model described by Liu et al., 2014 was a better fit than DSM models. Diagnostic rates were lower for ICD-11. In a study of adults with histories of childhood maltreatment (N = 434, ages 18–77, Hyland et al. 2016), a significantly larger number of individuals met DSM-5 PTSD, which was remedied by changing the ICD-11 Reexperiencing-nightmares symptom to recurrent thoughts/memories. Levels of anxiety and thought disorder co-occurring with PTSD were higher for DSM-5.
Adult Humor Styles

Table A2.1 Adult Humor Styles

Adult humor styles

- **affiliative humor**—enhances relationships with others and reduces interpersonal tensions
- **aggressive humor**—enhances self at the expense of others
- **self-defeating humor**—enhances relationships with others at expense of the self
- **self-enhancing humor**—ability to maintain a humorous perspective amidst adversity or stress

Associations across studies:

- **affiliative humor**—extraversion, openness to experience, cheerfulness, self-esteem, well-being, social intimacy, femininity (communion); links negatively to seriousness, depression, anxiety, and bad mood
- **self-enhancing humor**—coping humor scale, cheerfulness, self-esteem, optimism, well-being, satisfaction, social support, extraversion, openness, masculinity (agency); negatively linked to depression/anxiety, bad mood, neuroticism, and femininity (unmitigated communion)
- **affiliative and self-enhancing humor**—negatively related to anxiety, depression, suicidal ideation, and alexithymia; positively related to self-esteem, life satisfaction, and empathy
- **self-defeating humor**—high levels of anxiety, depression, suicidal ideation; lower self-esteem and life satisfaction
- **self-defeating and aggressive humor**—associated positively with hostility and aggression, alexithymia, neuroticism, depression, anxiety, bad mood, psychiatric symptoms, and undesirable masculine traits (unmitigated agency); associated negatively related to agreeableness, conscientiousness, self-esteem, well-being, intimacy, satisfaction with social supports, femininity (communion); is more common in men
- **aggressive humor**—positively associated with neuroticism, hostility, aggression; strongly negatively correlated with social adjustment measures; negatively linked to agreeableness, conscientiousness, seriousness; is more common in men

Young adults (ages 18–23; study of humor styles, shyness, and automatic thoughts—implicit cognitive schemas underlying individuals’ perceptions and thoughts related to self, others and the world)

- **positive humor styles** (affiliative and self-enhancing) negatively correlated with shyness and automatic thoughts
- **negative humor styles** (self-defeating and aggressive)—higher with automatic thoughts; significantly higher in males than females
- **self-defeating humor** positively linked to hopelessness, personal maladaptiveness, and desire for change
  - related to the loneliness and isolation subscales of automatic thoughts
  - predicted by combined: negative feelings and thoughts toward self, personal adjustment, and desire for change
- **aggressive humor** positively linked to 2 subscales of automatic thoughts—negative feelings and thoughts toward oneself; astonishment and escape fantasies
  - predicted by negative feelings and thoughts toward self
- **affiliative humor** predicted by combined shyness, personal adjustment and desire for change
- **self-enhancing humor** predicted by combined shyness and hopelessness

References: Atkinson et al., 2015; Cairncross et al., 2013; Fox et al., 2016; Hampes, 2010; Martin et al., 2003; Tucker et al., 2013b.
Additional Methods

Numerous methods are available for treating trauma or its symptoms, including those that are pre-cursors to some of the methods described in the book. For example, self-regulation has been assisted with yoga and mindfulness meditation and related practices, writing, biofeedback, neuro-feedback, and behavior-based methods (e.g., Yehuda et al., 2015). A number of treatment methods not included in the body of this book are presented here. These methods have some promising components that may enrich treatment, were omitted from the main text because of space constraints, or are methods with results pending.

PTSD as a Memory Consolidation Issue

Researchers have studied PTSD as a failure of traumatic memory consolidation resulting in involuntary intrusion linked to fear (van Marle, 2015). Hence, reduction of PTSD symptoms requires successful transfer (reconsolidation) of traumatic memories to pre-existent, autobiographical cortical memory circuits. After retrieval or reactivation of a trauma-related memory, it is believed to be labile and modifiable. In addition to fear extinction methods to reduce trauma symptoms (e.g., narrative exposure), for rats or human adults, a number of methods have been used toward reconsolidation—e.g., a. administering medication (e.g., Propranolol, e.g., Brunet et al., 2018; Mifepristone—anti-progesterone and glucocorticoid receptor antagonist, Propranolol blocks the Mifepristone effects, Pitman et al., 2010) between 10 min. and 6 hrs. after memory activation, to block noradrenergic action in the brain (e.g., inhibition of NF-kB in the basolateral amygdala, but not amygdala central nucleus, after memory reactivation impairs retention of amygdala-dependent auditory fear conditioning, Si et al., 2012); b. electroconvulsive therapy for depressed patients after memory activation (van Marle, 2015). It is believed that, when reactivated, a memory becomes sensitive to disruption and must undergo new protein synthesis to regain its stabilization (Si et al., 2012). Fear memory is primarily mediated by the amygdala and interventions are aimed at altering fear-memories in the amygdala (Johnson & Casey, 2015). Although exposure-based therapies employ fear extinction and desensitization of an individual to cues that trigger anxiety, some recent evidence suggests an adolescent-specific diminished capacity to extinguish fear responses (e.g., 40–50% of youth fail to fully benefit from such therapies; Walkup et al., 2008). Extinction training during memory reconsolidation has attenuated recovery of fear memory for adults and adolescents (e.g., N = 36 adults; 38 adolescents; safety information provided during post-retrieval extinction was integrated into the original fear memory, altering its affective value, Johnson & Casey, 2015).

Cumulative Traumas

TF-CBT Adapted for Continuous Traumas

Continuous traumas (e.g., domestic violence, frequent shootings in a violent community, abuse, ongoing threat of war attacks) include aspects not included in other traumas. For example, with ongoing threat is a constant need to be aware of and/or to act on the current level of danger as well as to learn to distinguish between real danger and overgeneralized posttrauma reactions (e.g., to reminders; Murray, Cohen, & Mannarino, 2013). Clinicians must attend to ongoing safety issues. Trying to process a trauma when the next trauma may occur at any time is very difficult. Hopelessness may be apparent in such conditions, and clinicians must avoid taking on this hopelessness (i.e., becoming “stuck” in treatment because of it). Modification strategies include (Murray et al., 2013): (1) Early and ongoing validation of youth’s safety concerns (exploring the impact of ongoing safety concerns—e.g., overestimation of danger, risk-taking) and empowering enhancement of safety skills (recognizing age variations: e.g., assist to recognize opportunities to improve safety;
collaborative, concrete, and detailed safety planning—e.g., creating a list for recognizing the signs or circumstances of increased danger and having a safety plan; walking through safety scenarios; knowing when it is safe to practice skills such as relaxation); (2) Engaging helpful adults (e.g., non-perpetrating caregivers, extended family members, church members, friends) and including them in the treatment as well as including proactive strategies for engaging with patients, who might have trust issues (e.g., nonjudgmental treatment of ambivalence such as a parent’s ambivalence about leaving a violent spouse); (3) During trauma narrative phase (typically includes (a) desensitizing youth to feared memories thus, mastering avoidance of memories; (b) identifying and reprocessing maladaptive or unhelpful trauma-related cognitions; (c) contextualizing past traumas into entire life experience; and (d) preparing the caregiver to be supportive to the youth regarding past experiences). During the narrative phase, reviewing the trauma allows the youth to utilize perspective-taking, cognitive processing, and contextualization, which may assist distinguishing between overgeneralized reactions to cues and real dangers. Describing both types of situations (overgeneralized responses and real dangers) may assist the child’s evaluation skills. Permitting the parent to hear the youth’s narrative may assist a parent to acknowledge the danger and its impact on the youth. Although having appropriate vigilance to possible danger is an important protective function, being hypervigilant diminishes protective capabilities (Murray et al., 2013). (4) Being an advocate for the patient (e.g., in session advocacy efforts may teach youth and others self-advocacy—e.g., to write a list of steps to finding a new home).

**Repair of Brain Regions**

Correction of negative effects during critical or sensitive periods may be spontaneous under specific conditions. Neurogenesis (Glossary; nerve cell growth) may continue through the life course; it is most rapid prenatally through the early childhood period of life with a second peak noted in adolescence (Britto, 2013; NIMH, 2011). The pace of developmental growth and repair varies by country and environmental conditions (Schott et al., 2013). For adults with hippocampal disorders, a reduction in the stress hormone, cortisol, has reversed atrophy (Byrnes, 2001). Because of the plasticity of children’s brains, Byrnes suggested that regeneration is likely. However, although the hippocampus can grow new neurons (neurogenesis) even in adulthood (Bremner, 2006), childhood stressors can cause long-term increases in cortisol responses to stress, and stress and/or deprivation inhibits neurogenesis (see Nader & Fletcher, 2014).

For brain regions that do not spontaneously repair, until recently, no interventions were available to reverse the compromising of brain circuitry during critical periods (Hensch & Bilimoria, 2012; see Chap 7, BEIP; Zeanah et al., 2011b). Researchers have proposed that excitatory/inhibitory (E/I) imbalance underlies the pathology of neuro-developmental disorders (e.g., epilepsy, autism, schizophrenia). Data linking E/I imbalance to mental illness suggest that examining the signaling pathways that regulate critical or sensitive period plasticity will have implications far beyond developmental neurobiology (Hensch & Bilimoria, 2012) and may influence future treatments. More study is needed (e.g., for certainty that interventions do not elicit brief improvement and then rapid decline).

Diverse experimental manipulations—ranging from biochemical, genetic, and surgical interventions to environmental changes or electrical stimulation—have induced juvenile-like plasticity in adult brain regions (e.g., visual cortex). Non-chemical methods have influenced change (see Chap 7, 10)—e.g., exercise can replicate antidepressant effects (e.g., for major depressive disorder, Hensch & Bilimoria, 2012); environmental enrichment (e.g., changing variety of toys) is believed to increase exploratory behavior and sensory-motor stimulation (rats, Hensch & Bilimoria, 2012). Even imagining learning to play the piano is associated with neurogenesis in the motor cortex (Garland & Howard, 2009; Pascual-Leone, Amedi, Fregni, & Merabet, 2005). Incremental training is another non-invasive method to engage plasticity beyond a critical period
(Hensch & Bilimoria, 2012; CWMT to follow). Learning (e.g., a labyrinth of streets for a taxi driver; meditation) has produced functional neurobiological changes (Garland & Howard, 2009). Years of meditation have been correlated with increased cortical thickness (in brain areas where attention and self-awareness have been located; see Garland & Howard, 2009), suggesting that mental training may stimulate structural alterations that reflect neuroplasticity. Similarly, a mindfulness-oriented form of cognitive-behavioral therapy (CBT) was followed by functional brain changes (e.g., in the orbital frontal cortex and striatum—found to be overactive in OCD). Other psychotherapy methods are associated with neurobiological changes as well (Garland & Howard, 2009; Chap 7, 10).

Sensory Treatments

Behaviors that are adaptive during threatening experiences (e.g., to avoid provoking abuser) or deprivation (e.g., hoarding food) may become maladaptive after the threat has passed (Atchison, 2007). Brain changes following traumas (e.g., HPA axis dysregulation) may be characterized by hypervigilance—a state of fear-related activation—and a tendency to respond to environmental stressors with a primitive, reflexive, and aggressive reaction that reflects less higher-level function and more of a persistent brainstem-level CNS functioning rather than an effective, cortical-driven response (Atchison, 2007). Somatic interventions have been used for sensory integration or modulation problems, for traumas occurring in the preverbal phase of development, for PTSD, and for complex PTSD (Finn, Warner, Price, & Spinazzola, 2017; see Kaiser et al., 2010).

Sensory Motor Arousal Treatment (SMART)

SMART (Warner et al., 2013) was adapted from Sensory Integration methods and occupational therapy approaches. SMART aims to improve body-awareness and improve somatic/arousal regulation and helps a child befriend the body through full-body/self-engagement via embodied play (Finn et al., 2017). A trained therapist facilitates as child and therapist engage body and mind in embodied and dramatic play. Sessions are videotaped for review by the therapist. Preverbal trauma representations are generally evident (Finn et al., 2017). When the child is engaged, s/he may reach sensory satiation—“…sufficient sensory experiences in intensity, duration, and/or frequency to meet neurological needs, which results in more flexible emotional, cognitive, and motoric responses …” (Finn et al., 2017, p. 5). The child’s entire body is engaged in play. Generally, there is increasing involvement with the therapist, often with increased language and cognitive content (e.g., verbal narratives). Games may include hide-and-seek, dodgeball, monkey-in-the-middle, or therapy-room play in which somatic activity is encouraged (perhaps after a child begins the play with toys, e.g. trampoline, pillows). The caregiver is included after the therapist ascertains the nature of the play. Improved attachment security is sought. Although processing is initially nonverbal, satiation may result in increased trauma-related play with more language and cognitive content. Equipment includes, e.g., crash pads, mini-trampolines, tunnels, and weighted blankets. SMART is potentially effective for reducing internalizing and somatic symptoms, as well as anxiety or depression symptoms, in adolescents with complex trauma histories in residential treatment (Warner et al., 2014).

Finn et al. (2017) presented a case example representative of children receiving SMART treatment at the Trauma Center at Justice Resource Institute. The first nine sessions with latency age Eliot and adoptive parents included individual and family therapy and parent consultation. The goal was to reduce Eliot’s aggression and improve family life. SMART treatment began in the 10th session. After becoming more engaged with the therapist, Eliot started play on cushions and mats using stuffed animals brought from home. His play included threat and deprivation themes. Embodied play included having the stuffed animals jump on the trampoline. Appropriately timed and
introduced (see Finn et al., 2017), the therapist piled pillows onto Eliot and continued as long as he requested more. Eventually Eliot “broke out” and rescued his stuffed animals. Eliot improved in behavioral regulation, verbalization of emotions, and social engagement in response to the initial and subsequent treatment sessions. Eliot’s parents demonstrated that they were able to witness, tolerate, and support him by engaging in the reworking sessions. Eliot appeared to feel less threatened by them and safe enough to accept their support.

Other Methods

Self-Distancing

... asking “why” and attempting to understand one’s feelings are at the heart of both maladaptive rumination and adaptive “working through.”

(Ayduk & Kross, 2009, p. 89)

Self-distancing is a method of viewing things from the perspective of a distanced observer and/or reasoning about a past experience/event in a psychologically removed manner. Ayduk and Kross (2010) suggest that self-distancing leads to adaptive self-reflection. Ayduk and Kross (2009) reanalyzed data (Wimalaweera & Moulds, 2008) on the effects of asking “why” (meaning-making) from a self-distanced perspective (observer perspective) vs from a self-immersed perspective. They found that the distanced-Why group demonstrated a reduction in avoidance (i.e., reduced denial of the meaning of their emotional experiences, lower engagement in suppression and behavioral inhibition, and reduction in blunted emotional reactions). Ayduk and Kross (2010) demonstrated, for adults, that spontaneous self-distancing while reflecting on negative memories was related to lower physiological reactivity (not related to avoidance, across three studies: 1—rejection experience; 2—anger experience; 3—interpersonal behavior diary). In contrast to self-immersion, spontaneous self-distancing appeared to buffer against heightened emotional reactivity and, over time, facilitated emotional processing, for ongoing as well as for past events. Studied individuals high in self-distancing used more constructive problem-solving strategies than those low in self-distancing (whose negative behavior—e.g., hostility, lack of problem-solving—increased linearly with partners’ increases in negative behavior; N = 56 university students; other subject characteristics are unknown).

Ages 3–6

Dimension Change Card Sort Task

The Dimension Change Card Sort task has been used to assess cognitive flexibility. It includes cards that can be sorted along more than one dimension (e.g., color or object/shape—blue boat or red boat, blue rabbit or red rabbit; border). Farrant et al. (2014) found that training children (ages 3–6) in this task improved their performance on the task and improved their ability to inhibit behavioral responses on another task.

Enhanced Milieu Teaching (EMT)

For preschool children, EMT (Kaiser, 1993) teaches parents to use language facilitation strategies—e.g., to notice and respond to child communications, to model language and expand child utterances, to respond synchronously to children’s interests, and to use specific language prompts in response to child requests (Curtis et al., 2017). Consequently, it aims to increase dyadic synchrony, parent responsiveness to child emotional states, parent modeling, and reinforcing use of
language-mediated emotion-regulation strategies. It teaches parents to follow the child’s lead rather than direct play or conversation—e.g., watch and imitate action/play; join and expand child’s play schemes, and talk about child’s focus of interest (see Child’s Game, Chap 7). The methods are similar to the child-directed interaction (CDI) component of PCIT (Chap 10).

EMT has been used with parents of children with language delays or intellectual disabilities. Evidence suggests that implementing EMT using parents and therapists results in parent group-participants increased usage of the EMT strategies at home (vs parents in the therapist only group)—e.g., increased use of responsive interaction, expansions, language modeling, and teaching prompts in play settings (continued more than one year after training; N = 77 ages 2.5–4.5, IQ 50–80, Kaiser & Roberts, 2011). Children’s language, vocabulary, and length of utterances improved. EMT has improved behavior by improving language skills and by improving parent–child relationships/interactions. A 3-month EMT intervention has successfully reduced internalizing, externalizing, and total problem behaviors in children with language delays, 12 months after intervention (N = 97; ages 24–42 months; moderate effect sizes, Curtis et al., 2017).

Ages 6–12

Cogmed Working Memory Training (CWMT)

Working memory (WM) is central to conscious information processing (Glossary; Table 1.1; Nutley & Söderqvist, 2017). It is fundamental to learning (e.g., facts, skills) and to all advanced thinking in that information must first pass through working memory. CWMT (ages 7–12; Söderqvist & Bergman-Nutley, 2015) is a computerized intervention employing 12 different visuospatial and verbal WM span tasks, presented in a rotating schedule and adapting to the trainee’s capacity level. Typically, training spans a period of 5–7 weeks, for 30–40 min/day, 5 days/week, with support from a certified coach (Nutley & Söderqvist, 2017). A number of studies have shown the utility of CWMT with children with cognitive deficits (e.g., ADHD, Green et al., 2012; low WM capacity). CWMT has influenced academic learning and learning capacity (Nutley & Söderqvist, 2017; Söderqvist & Bergman-Nutley, 2015). Medication and comorbidity (subtype of ADHD, van der Donk et al., 2016) and cognitive capacities (Söderqvist et al., 2012) have acted as moderators of outcomes (Nutley & Söderqvist, 2017).

Mentalization-Based Treatment for Children (MBT-C)

MBT (originally developed for BPD; Bateman & Fonagy, 2004) emerged from recognition that difficulties such as emotional lability and unstable personal interactions may be understood as a consequence of deficits in the capacity to mentalize (Table 1.2; Muller & Midgley, 2015). When mentalizing abilities are limited or inhibited, personal behavior and interactions with others may often be experienced as confusing and overwhelming, leading to impairments in affect regulation and in a coherent sense of self (Fonagy et al., 2002). MBT-C aims to enhance mentalization, improve self-regulation, and strengthen a sense of self-agency (see Muller & Midgley, 2015). Time-limited MBT-C includes 12 weekly sessions, which can be prolonged up to three series of 12 sessions. Although children may present with PTS, mood disorders, and externalizing (e.g., ADHD), MBT-C, which is attachment focused, is recommended for at-risk attachment relationships. It has been used with adopted or foster children, often with histories of trauma. Assessment, to develop a mentalizing profile, begins with a family session, followed by three individual child sessions (separate therapist meets with caregivers). It ends with a joint family session. An appropriate focus or metaphor for treatment emerges (one that has meaning for the child). Jointly, they seek a motto that gives meaning to the therapy and permits the child to feel confirmed and recognized. Drawings, stories, and items to use symbolically (e.g. seashells to represent people) are employed. The
metaphor and materials from the assessment phase are used in the ongoing treatment (Muller & Midgley, 2015; see Box 13.3).

“Sit with Us” App

This is a free app created by a young girl who was verbally and physically bullied (Natalie Hampton). The “Sit with Us” app allows school-age youth to connect with other youth who can provide support and a nonjudgmental presence at lunch time. Youth have reported that it is “a way to feel a part of something” and “feel accepted and not judged.” Some youth have created “Come Sit with Us” clubs at their schools in response to the app. The creator said, “I was seen for the first time in 2 years, and it saved my life.” She has become an anti-bullying spokesperson. The app has over 100,000 users in eight countries. Sit with Us (on Facebook) or www.cbs.com/shows/cbs_this_morning/video/N_zTq9j_401IkFSgiuc_W3oLI0Yy6ZTM/-sit-with-us-bullied-teen-creates-app-to-tackle-lunchtime-loneliness or https://itunes.apple.com/us/app/sit-with-us/id1133202101.

Ages 10–18

Trauma and Grief Component Therapy for Adolescents (TGCT-A)

TGCT-A is a manualized grief intervention that includes four modules (Layne et al., 2008; Saltzman et al., 2018: Module 1. Foundational Knowledge and Skills—e.g., treatment planning (group or individual); psychoeducation; building emotion regulation and problem-solving skills, enhancing coping strategies, recruiting social support skills. Module 2. Working Through Traumatic Experiences—selecting traumatic experience(s) of focus; creating a narrative; processing worst moments; traumatic reminders, and hurtful thoughts. Module 3. Working Through Grief Experiences (six sessions)—addressing separation distress, existential/identity distress, and circumstance-related distress; includes psychoeducation (e.g., different reactions, identifying and managing reminders); aims to reduce stress and promote positive adjustment. Module 4. Looking to the Future—identifying developmental disruptions and creating an adaptive progression; setting positive/realistic goals/plans; preparing for future (e.g., reminders, transitions); leave-taking. TGCT-A has shown success in reducing PTSS and maladaptive grief symptoms (e.g., Grassetti et al., 2018) and in reducing PTSS, depression, and anger (not anxiety or sexual concerns; incarcerated youth; Olafson et al., 2016). In a trajectory study, although youth distress ratings of their top problem showed significant improvement across the three treatment phases, adolescents with high baseline internalizing showed significantly more improvement during the narrative phase than during the psychoeducation and skill-building phase of treatment (Herres et al., 2017). For highly anxious individuals, initial escalation of symptoms in anticipation of stress has been documented. In contrast to those with high internalizing, youth with high baseline externalizing showed a trend toward improvements in the first phase (psychoeducation and skill-building) and no decline during narrative sharing.

Attachment

Early childhood experiences with primary caregivers influence reactions to people and situations and shape aspects of relationships into adulthood (Groh & Roisman, 2009)—e.g., expectations about future interactions; interpretations of behaviors/verbalizations; behaviors in new situations (Lyons-Ruth & Jacobvitz, 2018). Children with insecure classifications fall in the middle of a continuum of outcomes between secure and disorganized classifications (Barone & Lionetti, 2012; Fearon et al., 2010; Groh et al., 2012). To follow are findings related to the attachment classifications based on John Bowlby’s work. At least two alternative classifications have been offered, based on traumatized populations (one by Zeanah, Boris, & Lieberman, 2000; another by Crittenden, Robson, Tooby, & Fleming, 2017).
**Table A3.1** Attachment Classification: Secure

**Infant/Child Secure** (linked to sensitive, synchronous care; Bowlby, 1969/1980)

hold internal working models of others as trustworthy and of self as worthy of love and affection

**Expectations**
- expect close others to be accessible, available, and responsive and to help them cope with dangers or stressors
- view self as being acceptable and the sort of person toward whom others are likely to respond in a helpful way
- no need to worry about caregiver availability/responsiveness, permitting them to concentrate on other life tasks
- are support seeking and support giving

**People’s Perceptions of Them** (compared to insecure children)
- Parents—more likely to have positive perceptions of them
- Peers—most likely to be accepted by peers
- more likely to be perceived by adolescent peers as behaving prosocially
- less likely to be perceived by adolescent peers as aggressive, shy/withdrawn, or victimized
- Self—positive self-worth; seek more positive feedback

**Infancy:** Uses the mother as a secure base for exploration and as a safe haven
- misses parent during separation; actively greets parent upon reunion—with gesture, smile, or vocalization
- when upset, signals for or seeks parent; returns to exploration after comforted
- prefers parent to stranger
- uses more mother-oriented regulation strategies in Strange Situation paradigm (SS) (e.g., looking at the mother)

**Early Childhood:** uses parent as secure base for exploration and as a safe haven
- reunions are smooth, positive, warm, open, confident, and relaxed
- interaction and/or conversation are positive and reciprocal
- include relaxed, intimate, direct expression of feelings or desires; able to negotiate conflict or disagreement

**Middle Childhood:** parents remain principal attachment figures; peers take on more salience
- change from proximity-seeking to availability of parent; perceptions of caregiver availability and security may increase at this age; may have stronger reactions but quicker recovery from aversive stimuli than insecure
- greater co-regulation of secure base contact; use parents as safe havens when distressed and as secure base to support exploration

** Adolescence:** the recognition that other relationships may meet attachment needs better than parents may lead to increased openness, flexibility, and objectivity in re-evaluating relationships
- generally, expect minimal disruption to the relationship for a minor transgression
- after a severe breach, are concerned with trust-building to restore the relationship
- tend to turn to parents when very distressed
- show autonomy and relatedness in disagreements and other interactions with parents; more easily balance autonomy and attachment needs than other classifications; tend to engage in productive, problem-solving discussions—even if heated or intense—that balance autonomy with preserving the parent–child relationship
- show coherence in discussing attachment-related experiences and emotions
- generally, are more forgiving of flaws in self and others [compassion and self-compassion]

(e.g., Ainsworth, 1973; Al-Yagon, 2012; Beeney et al., 2016; Bowlby, 1969/1982, 1980; see Cassidy & Shaver, 2018; Ein-Dor et al., 2011; Feeney, Cassidy, & Ramos-Marcuse, 2008; Hesse, 1999; Hesse, Main, Abrams, & Rifkin, 2003; Hill-Soderlund et al., 2008; Kerns & Brumariu, 2018; see Nader, 2008, 2012c; Solomon & George, 2018; van IJzendoorn, 1995)
**Table A3.1 Continued**

**Adult Attachment Classification: Secure or Secure/Autonomous**

- Flexible and balanced structure of relationships
- Has meaningful relationships with little perceived risk to autonomy
- Comfortable alone or with others
- Enjoys being part of close relationships
- Able to depend on others when appropriate
- Others can depend on her/him
- As parents, are more sensitive to and supportive of the needs of their children
  - Fathers and mothers show greater warmth and more appropriate structuring of learning tasks
  - Greater emotional support in a variety of situations, less negativity, and greater awareness of the child’s needs
- Theoretically, IWM—view of positive self and positive others

(Adam, Gunnar, & Tanaka, 2004; Bartholomew & Horowitz, 1991; Beene et al., 2016; Breidenstein et al., 2011; see Cassidy & Shaver, 2018; Ein-Dor et al., 2011; Evraire et al., 2014; Groh et al., 2014; Hesse, 2008; Mikulincer & Shaver, 2007; see Nader, 2008; Simpson & Belsky, 2018)

**Table A3.2 Attachment Classification: Insecure-Resistant/Anguished-Ambivalent**

**Infant/Child Insecure: Resistant/anxious-ambivalent** (unpredictable, negligent caregiver; hyperactivated style)—hold internal working models of others as untrustworthy and/or of self as unworthy of love and affection

- Parents described as providing inconsistent/unpredictable caregiving
  - Parents may have poor or deficient parenting skills; may neglect children
  - Inconsistent or overprotective caregiving may engender vigilance and chronic anxiety related to fears that needs will not be met
- Children appear to hyperactivate the attachment system in a bid to maintain the caregiver’s attention and help, in response to an unpredictable, negligent caregiver
  - Likely to present as needy—readily expressing distress and wishes to be habitually close to caregivers
    - Clinging and overdependence
    - Inconsistent and conflicted attempts to derive comfort and support from caregivers
    - Interchange clingingness with outbursts of anger
- Show “busy” representations in the absence of stressful life events but not in stressful circumstances

**Expectations**

- View others as inconsistently available and self as unworthy or unacceptable
- Believe self the sort of person toward whom others are unlikely to respond in a helpful way
- Believe expressions of distress must be either amplified or expressed in a particular way to receive a desired response

**People’s Perceptions of Them** (compared to secure children)

- Parents—negative perception by parent linked to increased risk of infant’s later insecure attachment status as adult
  - Peers—receive less acceptance than secure youth (more than avoidant and disorganized)
  - Insecurity is related to more hostile behavior toward peers
  - Exhibit less constructive reactions and more intense feelings of rejection, crying, and negative emotions
  - Are more likely to have an expectation of rejection in relationships
  - Exhibit increased support seeking, but demonstrate more negativity/hostility in care-seeking role with a stranger
  - Demonstrate high levels of negativity in response to negative peer behavior and high levels of positivity in response to peer acceptance
- Self-perception—although more rejected by peers than secure children, have perceived themselves as rejected or unwanted by peers to a greater extent than corroborated by actual peer rejection
  - Do not seek more positive feedback than others—may lack the tendency to seek positive feedback
Table A3.2 Continued

**Infancy:** fails or refuses to engage in exploration
- is visibly distressed upon entering a strange room
- frequently fretful or passive
- preoccupied with parent; does not find comfort in the parent
- may alternate seeking contact with angry aggression or tantrums and passivity or being too upset to seek contact
- have physiological distress reactions during SS (e.g., elevated cortisol associated with HPA activation) and are more at risk for psychopathology than secure infants
- high negative reactivity at 4 months predicted a greater incidence of resistant infant behaviors (SSP) at 14 months (e.g., crying, clinging, proximity-seeking), but not overall attachment security
- while 5-HTTLPR short allele(s) was significantly related to infant distress, proximity-seeking, contact maintaining, and reduced exploration with brief separations, neither secure vs insecure attachment classification nor extent of disorganized behavior was related to 5-HTTLPR

**Early childhood:** exhibits heightened intimacy and dependency on parent; strongly protests separation
- reunions characterized by strong proximity-seeking and exaggerated babyish, cute, or coy behavior or by ambivalence and subtle hostility
- is coercive—maximizes psychological involvement with parent, exaggerates conflict and problems, threatens or disarms

**Middle childhood:** linked to internalizing symptoms and anxiety
- have been found to be least efficacious in peer relationships or found to have few peer difficulties

**Adolescent:** The recognition that other relationships may meet attachment needs better than parents may lead to angry preoccupation with the “deficient” parent(s)
- use of passive thought processes reflecting mental entanglement between self and caregiver
- recounts of caregiver’s parenting range from glowing but vague to detailed, negative descriptions

**Adult Attachment Classification: Insecure Preoccupied**

**Adult Insecure Preoccupied**—functional but not optimal structure
- experiences elevated concern related to close relationships—worries about the availability of others
- emphasizes distress, vulnerability, and helplessness with close others
- requires reassurance from others—need others’ approval to experience a sense of self-worth
- chronic dissatisfaction with care in relationships
- may engage in voluminous discussion of attachment relationships and issues
- describe relationships incoherently, conveying intense involvement with poor emotional regulation and difficulty maintaining focus on the topic
- may display oscillations between contradictory appraisals and current internal entanglements with parent figures
- vigilant to danger, react to signs of threat quickly, warn others and become highly distressed in the face of threats
- cope by catastrophizing, directing attention to threat related information, expressing needs and vulnerabilities, and seeking people’s proximity, comfort, and support
- theoretically, IWM—view of negative self and positive others

(e.g., Ainsworth et al., 1978; Allen et al., 2005; Brumariu et al., 2016; Bureau & Moss, 2010; Fearon & Belsky, 2018; Feeney et al., 2008; Granot & Mayseless, 2001; Hill-Soderlund et al., 2008; Simpson & Belsky, 2018; Solomon & George, 2018; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999)

(e.g., Bartholomew & Horowitz, 1991; Beeney et al., 2016; Breidenstein et al., 2011; see Cassidy & Shaver, 2018; Cassidy et al., 2003; Ein-Dor et al., 2011; Evraire et al., 2014; Groh et al., 2014; Hesse, 2008; Mikulincer & Shaver, 2007; see Nader, 2008)
Table A3.3 Attachment Classification: Insecure-Anxious-Avoidant/Dismissive

**Infant/Child: Anxious-Avoidant Insecure** (parental rejection and unavailability; deactivated style)

- **Parents**
  - cold and rejecting; show an unwillingness to invest in the child
  - if maltreated, are more likely to have suffered physical or emotional abuse from their own parents
  - may be belligerent or overwhelmed parents

- **Children**
  - believed to deactivate the attachment system (may disregard cues that would activate the attachment system), resulting in decreased expression of needs and distress in response to a parent who is overwhelmed by, or rejecting of attachment bids
  - may have discovered that expressing anger in response to a caregiver’s unresponsive or intrusive behavior will reduce caregiver proximity in stressful situations
  - learn to redirect anger toward the environment, perhaps resulting in hostile and aggressive behavior
  - may deny attachment needs, distance themselves from attachment figures and from close relationships
  - avoidant infants’ distant, self-reliant behavior may enable them to maintain reasonably close proximity to belligerent or overwhelmed caregivers without driving them away
  - perceive others as unavailable
  - believe that expressions of distress are unacceptable because they have been associated with negative outcomes and that intimacy and closeness are not desirable
  - **Self-regulation:** exhibit less behavioral distress during SS reunion episodes and more self-oriented regulation (e.g., self-comforting and exploration) strategies than securely attached infants
  - **RSA and sAA:** have shown greater RSA withdrawal during separation from caregiver, suggesting greater internal effort during separation, and had greater overall sAA, suggesting greater SNS activity than secure children
  - **Minimize distress:** were more likely to minimize indices of danger and distress in stories (this may reflect a representation of caregivers as unavailable and rejecting)
  - when thinking about a hurtful event, tend to dismiss events, suppress distress, and react hostiley
  - Evolution (may have evolved to …)
    - overcome deficiencies in caregiving provided by highly distressed, hostile, or unmotivated parents
    - increase the likelihood of survival by prematurely becoming independent, opportunistic, and risk-taking

**People’s Perceptions of Them** (compared to secure children)

- **Parents**—their negative perception linked to increased risk of infant’s later insecure attachment status as adult
- **Peers**—less likely to be socially accepted by adolescent peers; highest levels of peer rejection
  - insecurity is related to more hostile behavior toward peers
  - were more likely to be seen as aggressive and shy-withdrawn by peers than secure youth
  - more likely to be perceived as victimized by peers
  - although less frequent, interacted in ways that reflect discomfort with expressions of distress, a desire to mute attachment behaviors, and a generally unresponsive and controlling style of responding to others’ needs
  - did not exhibit negative/hostile affect in response to peers’ provision of instrumental/controlling support, but exhibited less warmth/friendliness in those situations

- **Self-perception**—do not seek more positive feedback than others—may lack the tendency
  - may provide overly positive reports of self

**Infancy:** readily explores; seeks distance from parent; in SS, may stiffen or lean away if picked up

- minimal response to separation from parent and shows little visible distress when being left alone
- little or no proximity-seeking; no distress or anger
- looks away or focuses on toys and actively avoids parent upon reunion
- seemingly unemotional response to parent; show physiological signs of distress but do not express it to caregiver
Early Childhood: interacts but avoids intimacy (physical or psychological)
• subtly minimizes and limits opportunities for interaction
• is defended—acts to reduce emotional involvement or confrontation
• exhibits detached, neutral nonchalance; focuses more on play

Middle Childhood: believed to attain higher status and popularity in middle childhood peer groups
• an avoidant behavioral pattern, characterized by increased aggression, excessive self-reliance, and inflated self-esteem, is more effective for males; anxious patterns utilizing “tend-and-befriend” more effective for girls
• the most isolated from peers of the attachment classifications

Adolescent: The recognition that other relationships may meet attachment needs better than parents may lead to derogatory, dismissive attitudes toward “deficient” parent(s)
• disengagement, dysfunctional anger, or hostility
  – avoids problem-solving and re-negotiation of relationships; low confidence in a relationship
  – recounts of caregiver’s parenting range from glowing but vague to detailed, negative descriptions, both of which steer away from in-depth consideration of negative feelings.

Adults: as parents, avoidant adults report feeling less emotionally close to a first newborn child (as early as 2 weeks after birth); avoidant mothers are less emotionally supportive of their preschoolers (adopt a detached, controlling, or instrumentally focused mode of relating to them).

(e.g., Adams et al., 2005; Ainsworth, 1973; Ainsworth et al., 1978; Al-Yagon, 2012; Beeney et al., 2016; Benenson, 2014; Bureau & Moss, 2010; Cassidy & Shaver, 2018; Cassidy et al., 2003; Del Giudice, 2009; Feeney et al., 2008; Granot & Mayselless, 2001; Hesse et al., 2003; Hill-Soderlund et al., 2008; Main, 1981; see Nader, 2008, 2012c; Simpson & Belsky, 2018; Sroufe & Waters, 1977; Taylor et al., 2000; Taylor, 2002; van Ijzendoorn, 1995)

Adult Attachment Classifications: Dismissive

Adult Insecure Dismissive—functional but not optimal structure
• feels discomfort in close relationships
• focuses on personal definition, self-reliance, and/or superiority
• has idealized representations of attachment figures without supporting examples and/or dismisses attachment relationships as unimportant
• shows persistent inability to recall details of attachment relationships
• dismisses importance of attachment relationship with infants
• minimizes any negative aspects of relationship experiences
• in threat situations, engage in rapid efforts to preserve self (by either fight or flight), without deliberating with, coordinating responses with, or expecting help from others
• are reluctant to seek support during distressing times, keep somewhat distant from and independent of others, suppress distress-related thoughts, and emphasize autonomy and self-efficacy
• theoretically proposed IWM—view of positive self and negative others (Bartholomew & Horowitz, 1991)
(Beeney et al., 2016; Breidenstein et al., 2011; Cassidy & Shaver, 2018; Ein-Dor et al., 2011; Evraire et al., 2014; Groh et al., 2014; Hesse, 2008; Mikulincer & Shaver, 2007; see Nader, 2008)

Table A3.4 Attachment Classification: Disorganized

Infant/Child: Disorganized—(see also separate disorganized categories, below)

• Parents
  – longitudinal literature on disorganized attachment describes parents who consistently show lack of attunement and fail to recognize their infants’ signals
• Children
  – lack a coherent strategy for interacting with caregiver, during times of distress
  – may include highly affective and contradictory behaviors or low affective/disengaged states combined with inhibited behaviors or dissociation
• People’s Perceptions of Them (compared to other classifications)
  – Peers—highest levels of peer rejection (also avoidant youth)
Infancy: Exhibits a variety of odd, inexplicable, conflicted, apprehensive, or apparently not-goal-directed behaviors in the presence of the parent
• have physiological distress reactions during SS paradigm (e.g., elevated cortisol associated with HPA activation) and show greater risk for psychopathology than secure infants
• behaviors may include contradictory, interrupted, incomplete, or stereotypic movement or sequences and may indicate fear, apprehension, confusion, or disorientation
• may freeze with a trancelike expression, may put hands in the air, may rise then fall prone when parent enters and remain huddled on the floor, or may cling while crying hard but while leaning away with averted gaze
• demonstrates a collapse of attention and behavioral strategies

Early Childhood: previously disorganized behaviors are replaced by role reversals and controlling behaviors
• controlling-punitive behaviors (e.g., harshly ordering about, rejecting, or humiliating the parent) OR
• controlling-caregiving such as excessively solicitous behaviors (e.g., cheering, reassuring, falsely positive)

Middle Childhood: remain disorganized with negative life events
• believed to lack a clear strategy to cope with distress
• more likely to use catastrophizing; less likely to use active coping
• profound emotion dysregulation, combined with feelings of helplessness and vulnerability in frightening situations, may lead disorganized children to experience anxiety and depression
• higher externalizing than secure or avoidant; lower prosocial behaviors

Adolescence: increased risk of psychopathology (especially boys, with combined disorganization and BI)
• insecure-disorganized boys at greater risk than girls for social problems, both internalizing and externalizing
• chronic problems of affect regulation, stress management, hostile-aggressive behavior, relational aggression, a number of mental disorders; low self-esteem, depressive, anxiety, dissociative, somatic, externalizing, internalizing, and overall psychopathology in childhood, adolescence, and young adulthood
• risk of being led into acts of violence (e.g., terrorism)

Child: Disorganized Subcategories
Disorganized—controlling-punitive (Bureau & Moss, 2010)
• seek to control their parent through mean, defiant, or humiliating behavior

Disorganized—controlling-caregiving
• attempt to “parent” caregiver by guiding the caregiver, giving emotional support, or providing encouragement
• despite tentative efforts to adopt a controlling strategy to regulate distressful emotions and parental behavior, these children produced stories that were chaotic, violent, and unresolved or constricted during a task; disorganized/controlling profiles significantly predicted internalizing symptoms

Disorganized—high affective (Beeney et al., 2016)
• highly affective states-of-mind coupled with difficult to understand and contradictory behaviors
• contradictory and disoriented behaviors

Disorganized—low affective
• low affective/disengaged states-of-mind coupled with extreme inhibited or dissociated behavior
• respond to maternal reunion with inhibited activity, stilling, freezing, “disorganized” wandering, or apparent “falling asleep”; interact with strangers or other family members with casual, friendly behavior
**Table A3.4 Continued**

**Adult Attachment Classification: Disorganized**

**Unresolved disorganized** (see Lyons-Ruth et al., 2003)

- show striking lapse in metacognitive monitoring—ability to examine one’s own and others’ cognitive processes or reasoning for behaviors—of reasoning or discourses during discussions of loss or trauma
- incompatible ideas; state or time-space shifts
- recurrent catastrophic fantasies—fears of recurrence of bad experiences—not based on experience
- attempts to control others (punitive or overly solicitous)—especially when stressed or fearful of or for a person
- unresolved infant attachments may correspond to insecure adult attachments
- have significant lapses in coherence and monitoring when describing childhood experiences of loss or trauma, often in the form of confusion, disorientation, or affectively unregulated fear or guilt
- may exhibit confusion, eulogistic speech, strange movement, or prolonged silence

**Hostile-helpless disorganized**

- holds globally negative representations of caregivers
- may hold contradictory attitudes toward caregivers (both devaluation and identification)
- may unconsciously identify with either an aggressive or helpless-fearful caregiver
- pervasive indicators of hostile and/or fearful states-of-mind
- may see self as bad or unworthy
- affective numbing may be reflected in laughter at painful anecdotes
- evidence of affectively intense, unstable relationships—e.g., ruptures in contact with family members
- as caregivers—linked to infant disorganization at 18 months of age

**Excessively rigid—Hostile, controlling patterns of relationships** (see Beeney et al., 2016)

- consistent controlling behaviors usually with anger
- frequently constricted emotion, except for anger
- perfectionistic attitudes toward self and others
- appears to reflect the hostile aspect of Hostile-Helpless as well as the child category of disorganized-controlling-punitive—characterized by pervasively contradictory or unintegrated emotional evaluations of a caregiver, often also exhibiting unexamined identification with a hostile caregiver

**Excessively rigid—Compulsive caregiving**

- persistently ignores personal needs in favor of focusing on others’ needs
- chooses romantic partners who are needy and vulnerable
- may resent unequal care in relationships with others

**Disorganized/lack of structure—Generalized incoherence** (Type 1)

- high intensity/high affect with multiple, shifting, mood-dependent states-of-mind
- narrative contains multiple, unmonitored contradictions
- may show evidence of oscillating between extremes of attachment styles
- may oscillate between hostility and helplessness in describing caregivers

**Disorganized/lack of structure—Generalized incoherence** (Type 2)

- low intensity/low affect with diffuse, vague, confusing or inadequate states-of-mind
- has not struggled with or has prematurely foreclosed on career, romantic relationships, and/or social relationships
- lack of concern about impoverished ideas of self or others
- has not pondered minds of self or others

**Disorganized/lack of structure—Unresolved states-of-mind** regarding specific trauma, loss, of other events

- has experienced trauma or loss
- demonstrates lapses in narrative including long pauses, intrusions in speech, or extreme tension and avoidance when discussing loss or trauma

(e.g., Beebe et al., 2016; Beeney et al., 2016; Groh et al., 2014; Lyons-Ruth, Yellin, Melnick, & Atwood, 2003)
Neurobiology

Table A4.1 Neurobiology and Some Associations of Neurochemicals (findings are sometimes mixed)

DNA<sub>m</sub>—DNA methylation
DNA = deoxyribonucleic acid—a self-replicating material found in nearly all living organisms as the main constituent of chromosomes; carries genetic information—its methylation usually corresponds to poorer transcription of a gene (poor neurobiological utilization; Glossary—DNA methylation)

COMT—catechol-O-methyltransferase
• Function: degrades catecholamines like dopamine, epinephrine, and norepinephrine (involved in their inactivation)
• Associated with: positive affect, problem behavior, cognitive functioning
  – number of anticipatory looks at 7 and 18 mo.
  – positive affect including smiling and laughter and high-intensity pleasure at 7 months
• Studied allele variants: e.g. methionine (Met); valine (Val) (related to dopamine metabolism)
  – Val158Met polymorphism exerts effects on cognition via dopamine modulation
• Met/Met (compared to Met/Val heterozygotes and/or Val/Val)
  – low-activity, increased behavior problems (ages 7 and 11 years) with maternal stress in utero
  – ADHD and conduct disturbances
  – IQ scores, on average, 4 points higher (at age 7)
  – prefrontal neural activity and significantly better EF
  – more childhood trauma associated with decreased hippocampal activation
    • high activity in promoter alleles rs2097603 and rs4680 and 2 COMT haplotypes
    – linked to PEs through impaired processing speed, IQ, and attention (N=6,784, ages 8–12)
• Val
  – A-val-G haplotype probabilities modulated antenatal maternal anxiety and cortical thinning in right ventrolateral PFC and right superior parietal cortex and precuneus
  – childhood trauma related to increased hippocampal activation (the latter correlated negatively with PTSD and depression symptoms and positively with resilience)

References: Meyer et al., 2010; Niarchou et al., 2014; Palmason et al., 2010; Posner et al., 2014; Qiu et al., 2015; Rooij et al., 2016; Thompson et al., 2011; Voelker et al., 2009.

DOPAMINE

Studied Variants: DRD2; DRD4; DAT1
meta-analyses findings: general population study of children and adolescents suggests knowledge is unclear; more study is needed
• Associated with: risk-taking, novelty seeking, goal directed behavior, reinforcement of learning
  – in adolescence: lowest levels of dopamine in striatal regions and highest levels in PFC regions, possibly leading to what might be called mini-reward deficiency syndrome and increased risk-taking

DRD2 and DRD4
– impulsive, reward-seeking, and addictive personality characteristics and clinical disorders
– modulates reward, locomotion, and learning
– novelty seeking, which links to exploratory excitability and impulsivity
– addiction, attentional problems, and increased sensitivity to environments
• Short alleles links (low transcription)
  – DRD2 and DRD4—schizophrenia, schizotypal PD, depression, and drug addiction
  – DRD2—trait low self-directedness; higher novelty seeking; higher reward dependence (girls)
  – DRD4—low effortful control; attention; sensation seeking; low self-directedness (males)
• link between secure attachment, empathy, and prosocial behavior
Table A4.1 Continued

- **Long allele associations** (better transcription/functioning)
  - **DRD4**—novelty seeking; poorer EFs (lower sustained attention and planning)
    - poorer social/emotional development, attenuated for 7-repeat carriers vs noncarriers
    - less anger-related NE (struggled less, took longer to react negatively) and were higher in trait activity and lower in interest (at 2 and 12 months)
    - sensation seeking at 18 months
    - reduced sensitivity to reward cues from the environment
  - **DRD4 7**—repeat allele
    - related to effortful control at age 4
      - slowed performance speed; diminished attentional orienting and control (125 boys; ages 8–15)

**DAT1** related to
- elevated brain activity related to inhibitory response and response preparation (ages 8–15)
- more sensory sensitivity (glossary) with no 9-repeat alleles of DAT1
- PTSD in preschoolers

**MAOA**—Monoamine oxidase A
- **Function**—involved in synthesis of dopamine, serotonin, and norepinephrine
  - Key in regulating behavior; anger; externalizing
- **low expression MAOA** related to
  - anger in infants when combined with lower maternal sensitivity (29 weeks and 14 months)
  - antisocial behavior after early life maltreatment
  - psychopathology (e.g., antisocial behavior problems; boys age 7; CD, antisocial PD, adult criminality)
    - when combined with exposure to maltreatment
  - suicidal behavior, bipolar disorder, and alcoholism; monotony avoidance, sensation seeking, impulsiveness, and impulsive aggression; vulnerability to stress
  - smoking has been shown to inhibit MAO
- **high MAOA activity** showed
  - slightly higher global mental health problems plus antisocial behavior and ADHD (boys)

**BDNF**—brain-derived neurotropic factor
- related to a slower rate of fear extinction learning
- both appetitive (reward-related) and aversive emotional learning
- rough and tumble play (R&T) increases BDNF mRNA activation in frontal cortex (motor region, involved in EF), which may facilitate neuronal development (animal studies)
- increased BDNF activation in amygdala during R&T play may represent an affective learning component of play
- val66met polymorphism reduces activity-dependent BDNF release
- **reduced activity-dependent release of BDNF**
  - bipolar and schizophrenia disorders

References: Albrecht et al., 2014; Alcaro et al., 2007; Auerbach et al., 2001; Bakersman-Kranenburg & van IJzendoorn, 2011; Delvecchio et al., 2015; Dmitrieva et al., 2011; Drury et al., 2013; Ellis et al., 2011; Luyten & Fonagy, in press; Nikitopoulos et al., 2014; Oniszczenko & Dragan, 2012; Pappa et al., 2015; see Posner et al., 2014; Propper et al., 2008; Seeger et al., 2004; Sheese et al., 2007; Spear, 2007; Van Gestel et al., 2002.

References: Albrecht et al., 2014; Alcaro et al., 2007; Auerbach et al., 2001; Bakersman-Kranenburg & van IJzendoorn, 2011; Delvecchio et al., 2015; Dmitrieva et al., 2011; Drury et al., 2013; Ellis et al., 2011; Luyten & Fonagy, in press; Nikitopoulos et al., 2014; Oniszczenko & Dragan, 2012; Pappa et al., 2015; see Posner et al., 2014; Propper et al., 2008; Seeger et al., 2004; Sheese et al., 2007; Spear, 2007; Van Gestel et al., 2002.
SEROTONIN

- linked to HPA activation and in mediating fear, anxiety, mood, aggression, and appetite

**Studied Variants: SHTT/5-HTTLPR, HTR2A**

- **SHTT/5-HTTLPR**—biased attention for emotional information; increased amygdala activation to emotional stimuli; neuroticism; wariness, distress-proneness; increased sensitivity to environment; depression, anxiety
  - involved in impulsivity, suicidal ideation, mood and anxiety (internalizing) disorders
  - s-allele related to non-delinquent aggression (ages 7–12); personality traits of low self-transcendence, low self-directedness, low cooperatives
  - distress, proximity-seeking, contact maintaining, resistance to stranger, and reduced exploration with brief separations; not related to attachment security or disorganization
  - neuroticism (NE; mixed findings) and behavioral inhibition (BI)
  - variations by culture for neuroticism and depression
  - maternal anxiety during pregnancy linked to early infancy NE for infants with one or more 5-HTTLPR short alleles (s) but not in infants with long alleles (l) (opposite also found in studies) (see also CRHR, below)

- **HTR2A**—Empathy, Autism, Affiliation; with lower availability/lower activity:
  - impairment of empathy related behaviors
  - impaired prosocial and affiliated orientations
  - less likely to spontaneously adopt point of view of others, more likely to be anxious when observing pain endured by others, and more likely to have communication problems (mediated by perspective taking abilities)
  - predicted greater attachment anxiety

- combined with TPH1 (Tryptophan) dysfunction
  - in older youth: tryptophan hydroxylase 1 gene (TPH1) combined with serotonin dysfunction linked to suicide or self-injury; personality trait of harm avoidance

**References:** Arias et al., 2012; Bakermans-Kranenburg & van IJzendoorn, 2016; Brumariu et al., 2016; Caspi et al., 2010; see De Bellis & Zisk, 2014; Delvecchio et al., 2015; Fraley et al., 2013; Gerrets en et al., 2010; Gorg, 2015; Haberstick, Smolen, & Hewitt, 2006; Murphy et al., 2006; see Nader, 2008; see Nader & Fletcher, 2014; Nyman et al., 2011; Papageorgiou & Ronald, 2013; Pluess et al., 2011; Raby et al. 2012; Taylor-Colls & Fearon, 2015.

**GABA**—gamma-aminobutyric acid

- reduces excitability throughout the nervous system
- has predicted sAA in 12- to 18-month-olds
- Cortisol and sAA are biomarkers of the HPA and sympathetic–adrenal–medullary arms of the stress response

**GABRA2**—gamma-aminobutyric acid receptor sub-unit 2

- for adolescents and young adults (ages 12–26), related to subclinical externalizing
  - adolescent sensation seeking and extraversion
  - some measures: impulsivity; conscientiousness

**References:** Dick et al., 2013; Frigerio et al., 2009.

**OXYTOCIN** (glossary—oxytocin)

- Key in social interaction and in cognitive processing of others’ emotions
  - influences social approach, trust, and bonding (e.g., infant–caregiver attachment)
  - increases ability to recognize differences between self and others
  - shortens latency period for self-other differentiation and increases positive evaluation of others
  - couples with better quality relationships had greater salivary oxytocin

**References:** Colonnello, Chen, Panksepp, & Heinrichs, 2013; Holt-Lunstad, Birmingham, & Light, 2015; see Chapter 5.
Table A4.1 Continued

**FKBP5**—FK506 binding protein 5
- a regulator of glucocorticoid receptor (GR) function and is regulated by the GR
  - a modulator of GR-mediated regulatory feedback on HPA axis, in response to stress
  - involved in immuno-regulation; linked to higher rates of depression
  - interacts with childhood trauma to predict adult PTSD

**CRHR**—corticotropin-releasing hormone receptor
- instigates the release of cortisol
- **Related to childhood trauma**
  - major allele moderates maltreatment effects on cortisol (higher cortisol responses to Dex/CRH test; to depression)
  - adults with childhood maltreatment and the minor allele had attenuated cortisol responses to Dex/CRH test suggesting it is protective
  - anxious temperament plus CRH increases risk for a mood disorder after trauma

**TAT haplotype of CRHR1 gene (2 copies)**
- child physical and sexual abuse (not neglect)—developed internalizing symptoms (e.g., depression)
- abuse in the 1st 5 years of life (not later) had slightly lowered cortisol in a.m. and slightly increased cortisol levels in p.m. (flatter slope; not moderated by 5HTTLPR)
- maltreated children with the 2 copies and the l/l genotype of 5-HTTLPR had higher levels of internalizing symptomatology than no trauma children who had the same combination of gene variants.

References: Cicchetti et al., 2011; Rogers et al., 2013; Tyrka et al., 2009.

**GR**—glucocorticoid receptor
- dysfunction of the HPA axis has been found in PTSD, particularly hypersensitivity of the GR
- glucocorticoid action is regulated by a CRH, arginine vasopressin (AVP)/oxytocin pathway, GR, and regulators—e.g., FKBP5
  - GR SNP Bcll has been linked to hypersensitivity to glucocorticoids and to PTSD symptoms

References: Casto-Vale et al., 2016; Wang et al., 2017.
Additional Sources: Agrati et al., 2015; Brumariu et al., 2016; Papageorgiou & Ronald, 2013; Posner et al., 2014; Propper et al., 2008; Raby et al. 2012; CSA = child sexual abuse; HPA axis = hypothalamic–pituitary–adrenal axis; PE = psychotic episode; SNP = single nucleotide polymorphisms.
Table A4.2 Relevant Brain Regions and Their Functions/Associations (sample of associations; alphabetical regions)

**Total Brain Volume**
- Lower total brain volume and poorer cognitive performance in individuals with complicated grief (Perez et al., 2014)

**Amygdala**
- role in emotional memory and fear; self-referential processing (Pechtel, Lyons-Ruth, Anderson, & Teicher, 2014; Yoshimura et al., 2009)

**Hemisphere**
- negative emotional stimuli on the right
- positive emotional stimuli on the left
- increased left amygdala
  - in adulthood, linked to both maternal and infant disorganized attachment interactions when the infant was 18 months of age (N=18)
  - associated with dissociation and limbic irritability in adulthood
  - mediated the prediction from attachment disturbance in infancy to limbic irritability in adulthood (0–2 to age 29; Lyons-Ruth, Pechtel, et al., 2016)
- increased right amygdala
  - affective dysregulation—risk of mood and anxiety disorders; ages 10–11 are sensitive periods for right amygdala (increased volume linked to maltreatment; up to pre-adolescence; Pechtel et al., 2014)
  - severity of childhood maltreatment experienced contributed to larger right but not left amygdala volume in adulthood (Pechtel et al., 2014)

**Associations**
- aberrant volume and function reported in psychiatric disorders marked by affective dysregulation (Bunge & Crone, 2009; Lange & Irle, 2004; Pechtel et al., 2014; Schmahl, Vermetten, Elzinga, & Bremner, 2003)
- cognitive reappraisal was adaptive for both high and low emotional abuse (EA); individuals with high EA relied on a compensatory mechanism of effortful cognitive control and explicit emotion regulation (Khawli et al., 2018)
- treatment influences brain activation (for a small sample of adults, ages 18–60)
  - with larger treatment-related symptom reductions fMRI showed (1) greater dorsal PFC activation, during emotion reactivity; (2) less left amygdala activation, during emotion reactivity; (3) better inhibition of amygdala related to single TMS pulses to right dorsolateral PFC; and (4) greater ventromedial prefrontal/ventral striatal activation during emotional conflict regulation (Fonzo et al., 2017)
- memory: formation, storage, and consolidation of integrated representation of context
  - individuals with a damaged amygdala exhibit deficits in the emotional enhancement of memory but may have intact declarative memory for neutral material (Bremner, 2003; memory problems for damaged amygdala (Pechtel et al., 2014)

**Response to psychological stressors/traumas**
- has high glucocorticoid receptor density and may be particularly susceptible to excessive glucocorticoid release (Pechtel et al., 2014; Uematsu et al., 2012; Yoshimura et al., 2009)
- the basolateral and medial nuclei of the amygdala have a preferential role in activating the HPA axis (see Hostinar & Gunnar, 2013)
- with trauma exposure at age 11, right amygdala sensitivity was 5.7 times that for all other ages (except 10 years; ages 10–11; Lyons-Ruth et al., 2016)
- 5-HTTLPR short allele carriers have shown amygdala hyper-reactions in response to negative stimuli (3 study meta-analysis; may vary for East Asian cultures; Munafo et al., 2008)
- combined with loss of top-down inhibitory control, amygdala hyper-responsivity promotes vivid trauma recollections and symptoms of hyperarousal (hyperactivation in left amygdala, Patel et al., 2012)
- PTSD-related hyperactivation of the amygdala predicted poor response to CBT (Patel et al., 2012)
Table A4.2 Continued

- increased amygdala-insula connectivity
  - stronger amygdala-anterior insula connectivity found in trauma-exposed youth (e.g., exposed to violence McCrory et al., 2017; and soldiers exposed to combat stress)
  - stronger amygdala-insula functional connectivity (FC) reported for adults with PTSD (Rabinak et al., 2011) and adolescents with GAD (Roy et al., 2013)
  - increased FC indicates greater signal covariance between regions that detect threat and generate fear reactions (i.e., amygdala; LeDoux, 2003) and that process meaning and prediction of aversive bodily states (i.e., insula; Craig, 2011)
  - lower post-treatment PTSD symptoms linked to greater suppression of amygdala-insula FC during reappraisal of negative images, whereas less improvement corresponded to failure to decrease FC (Cisler et al., 2016)
- institutionally raised infants have shown a variety of problems (e.g., increased susceptibility to anxiety may be mediated by changes in amygdala structure and function; Tottenham et al., 2012)

Anterior Cingulate Cortex (ACC)
- recruits areas of cortex to process emotions and urges from limbic system; decides information to pass on to cortex
- implicated in affective processing—e.g., integrates emotion and cognition (Butler et al., 2018)
- detection of personally salient internal and external stimuli to direct behavior to maintain homeostasis
- social pain distress and elicitation; pain processing, arousal, modulation of memory and internal emotional responses and processing social emotions (Butler et al., 2018)
- dorsal ACC (dAC) in cognitive control over attentional resources (impaired in MDD)

Associations
- higher anterior cingulate cortex to posterior cingulate cortex connectivity has been linked to greater rumination over distress (Berman et al., 2011)

Executive Functions (EF)
- between ages 4 and 8, the ability to resolve conflict has related to the size of the anterior cingulate (AC)
- by age 8, the connectivity of AC has correlated with speed of response (Fjell et al., 2012)

- risk and reward
  - more active in 12–17-year-olds than in 8–10-year-olds or 18–25-year-olds when taking high reward risks
  - adults use more dorsal ACC and more ventral lateral PFC—PFC regions important for deliberative processing—when making risky choices, in contrast to adolescents, who show stronger recruitment of vmPFC regions (important for affective processing)

- reflexive systems
  - amygdala, basal ganglia, ventromedial PFC, dorsal ACC, and lateral temporal cortex—related to the Reflexive systems (automatic processes; Satpute & Lieberman, 2006)

- Disorders
  - PTSD
    - hypo-activation of medial PFC (encompassing ACC, ventromedial PFC, subcallosal cortex, and orbitofrontal cortex) results in inability to effectively control attention and response to trauma-related stimuli
    - alterations in anterior cingulate associated with attention (childhood and adolescence; De Bellis, Keshavan, Spencer, & Hall, 2000)
  - depression-related disorders
    - pgACC (affective subdivision of ACC) is hypo-activated (impaired in MDD and with glutamate concentrations)
    - dACC—cognitive control over attentional resources—impaired in MDD
    - smaller ACC volumes with depression (Butler et al., 2018)
  - BPD+
    - ACC volume inversely related to suicide attempts and BPD severity
    - combined MDD and BPD, linked to reduced gray matter in Brodmann Area 24 of ventral anterior cingulate for adolescents (see Courtney-Seidler et al., 2013)
**Cerebral Cortex**
- most brain functions are distributed across left and right hemispheres (contrary to popular belief; e.g., language processing)

**cerebral frontal lobe**—e.g.,
- ability to project future consequences of current actions; conscience (good vs bad; better or best)
- inhibition of undesirable social reactions, determination of similarities between things

**the inferior frontal gyrus (IFG)** is a part of the cerebral frontal lobe
- the left IFG has been associated with cognitive control, language production, and response inhibition (Butler et al., 2018)
- left IFG damage has been linked to cognitive and emotional impairments—e.g., reduced empathy
- longer maturation—i.e., slower loss of gray matter—has been associated with higher cognitive function, while faster maturation (myelination of white matter) has been associated with increased risk-taking and greater alcohol use (Butler et al., 2018)

**lateral cerebellum**—series of individual movements and individual thoughts are processed
- functional activation of the lateral cerebellum increases during the early stage of sequence learning
- difficulties in sequential ordering of actions and thoughts has been found in children with neurodevelopmental problems (Kipping et al., 2018)

**violence exposure** during adolescence may be associated with lower gray matter volume in certain frontal regions (IFG and ACC but not hippocampus or amygdala; may be due to stress or accelerated maturation; Butler et al., 2018)

**Corpus Collosum**
- connects cerebral hemispheres and facilitates communication between right and left brain hemispheres
- greater interhemispheric connectivity for women than men
- greater bulbosity relates to better cognitive performance for women but not for men (n=114; Davatzikos & Resnick)
- reduced volume after trauma exposure, ages 9–10 years (Andersen et al., 2008)

**Hippocampus**
- important to stored memories and learning
- activated by old memories consciously perceived as new, subliminally processed items, and rapid-eye-movement-related implicit memory effects—e.g., cued fear—important in mediating fear responses

**relation to HPA axis**
- is another major limbic structure with inhibitory control of the HPA axis
- plays a crucial role in negative feedback of the HPA axis
- likely due to changes in the activity of these receptors, chronically elevated circulating GCs have been linked to deficits in hippocampal-based abilities (e.g., declarative memory; see Hostinar & Gunnar, 2013)

**may be affected by trauma** (also PFC, amygdala, HPA axis; Bremner, 2006)
- early threat exposure leads to changes in the structure and function of neural circuits underlying emotional learning (hippocampus, amygdala, and vmPFC; McLaughlin et al., 2014a)
- abnormal functioning of hippocampus underlies PTSD-related deficits in learning and memory (e.g., inability to extinguish a fear response); both hypo- and hyperactivation in response to threat stimuli have been reported
- may mediate deficits in identifying safe contexts and difficulties with learning and memory
- acute stressors result in acute increase in firing of neurons in locus coeruleus and increased release of norepinephrine (increases SNS activity) in the hippocampus and mPFC (Kalk et al., 2011)
- chronic stress is linked to potentiated release of norepinephrine in the hippocampus with exposure to subsequent stressors (Kalk et al., 2011)
- severe stress has been linked to hippocampal volume reduction in adults

- DHEA-S (not DHEA) helped to protect hippocampal neurons against glutamate-induced damage in young rats
Table A4.2 Continued

- brain injury (changes in hippocampus and its connectivity to other regions, e.g., PFC), in utero or at birth have been linked to the development of schizophrenia
- elevated neurosteroids (pregnenolone and DHEA in posterior cingulate and parietal cortex) found postmortem in humans with schizophrenia and bipolar disorder
  - reduced volume after trauma exposure(s) linked to:
    - memory deficits (ages 3–5 years, 11–13; Andersen et al., 2008)
    - dissociative symptoms (Bremner, 2003, 2006; Sapolsky, 2000)
    - depression and/or PTSD (hippocampus and dlPFC, Amico et al., 2011; Dackis et al., 2012)
    - atypical hippocampal function (e.g., reduced hippocampal activation during retrieval in verbal declarative memory tasks; confirmed in traumatized children (may not be evident until adulthood, Carrion et al., 2010a)

Hypothalamus
- links nervous system to endocrine system; stimulates or inhibits release of pituitary hormones
- controls attachment behaviors, body temperature, hunger, thirst, fatigue, sleep, and circadian rhythms
- hippocampus is critically involved in setting the day’s tone for responses to psychological stressors and conflicts of interests
- **Hypothalamus-Adrenal-Pituitary Axis** (HPA axis) activation involves a hormonal cascade:
  - corticotrophin-releasing hormone (CRH; secreted in the paraventricular nucleus, PVN, of the hypothalamus) stimulates release of adrenocorticotrophic hormone (ACTH) in the anterior pituitary; ACTH enters the bloodstream and ultimately stimulates release of glucocorticoids (cortisol in human and nonhuman primates; corticosterone in rodents) in the adrenal cortex, which, in turn exerts negative feedback, slowing the release of ACTH and CRH (Fisher et al., 2006)
  - glucocorticoids also stimulate the immune system and metabolism of stored energy
- HPA axis also has positive effects on functioning (e.g., supports positive mood; Hoyt, Zeiders, Ehrlich, & Adam, 2016; Koss & Gunnar, 2018; see Glossary—HPA axis, glucocorticoids, cortisol).
- **SAM, HPA, PVN**
  - sympathetic adrenomedullary (SAM) system and the HPA are intertwined
    - central control of the SAM system is involved in the release of epinephrine (i.e., adrenaline) into the bloodstream and ultimately activates the system in response to stressful challenges (increases heart rate, breaks down fats, dilates arteries; Robertson, Biaggioni, Burnstock, Low, & Paton, 2012; Koss & Gunnar, 2018)
    - hypothalamic paraventricular nucleus (PVN) receives inputs from brainstem nuclei (e.g., nucleus tractus solitarius)—provides information about the body’s physical state and activates the system in response to physical stressors.
    - inputs on psychological stressors that reach the PVN involve regions of the prefrontal cortex, amygdala, and bed nucleus of the stria terminalis (Koss & Gunnar, 2018)

Insula
- involved in human emotion and consciousness
- has a crucial role in processing diverse functions—e.g., self-awareness, cognitive function, interpersonal experience and perception (Peng et al., 2017)
- a crucial node of the salience network (Glossary) for initiating network switching
- dysfunctional insula connectivity and volumes have been found in MDD (e.g., Peng et al., 2017)

Posterior Cingulate Cortex (PCC)
- **Depression**
  - more functional connectivity between PCC and sugenual-cingulate cortex during resting periods for depressed persons
  - stronger neural connectivity between PCC and amPFC—MDD, characterized by NE, mediated link between NE and parental conflict; greater rumination (in infancy; Graham et al., 2015)
  - higher ACC to PCC connectivity—linked to depression, rumination (in infancy, prenatal exposure; Berman et al., 2011; Graham et al., 2015)
Table A4.2 Continued

**Greater connectivity of PCC to amygdala**
- more rumination (passive and repetitive focus on distress; Graham et al., 2015)
- PTSD from child abuse, accidents, or other traumas (Bluhm et al., 2009; Graham et al., 2015; Lanius et al., 2010; Zhou et al., 2012)

**Prefrontal Cortex (PFC)**
- plays a crucial role in executive function—the top-down control of thought and action (e.g., see Hostinar & Gunnar, 2013)
- includes working memory, inhibitory control, shifting, and executive attention
- important to EFs such as conceptual priming; associated with semantic representations
- believed to process and organize information then stored in the hippocampus
- important to development of emotion regulation, compliance with norms, and intelligent planning

**Associations**

**EFs**
- children with poorer planning ability had greater long-range functional connectivity of 2 cerebellar networks (lobules VI and lateral VIIa) with the prefrontal and premotor cortex, suggesting that acquisition of planning ability during childhood is partially achieved through the engagement of the cerebello-cortical functional connectivity (Kipping et al., 2018)

**Regulation**
- PFC with the amygdala regulates emotions (ventral and medial areas with connections to amygdala, nucleus accumbens, and hypothalamus may primarily regulate emotions)
- dorsal and lateral PFC may regulate thoughts, attention, and actions (important projections to sensory and motor areas)
- research has shown reduced resting-state amygdala-vmPFC connectivity in adolescent females abused as children (Herringa et al., 2013)

**Stressors**
- involved in fear extinction (Romeo & McEwen, 2006; Sotres-Bayon et al., 2006)
- involved in regulating HPA axis (see Hostinar & Gunnar, 2013)
- receives inputs (bottom up) and can be impaired by acute or chronic stress
- does not fully mature until late adolescence (Decety & Meyer, 2008; Shaver et al., 2018)
- may be affected by trauma (also hippocampus, amygdala, HPA axis; Bremner, 2006)

**PFC Regions**

**dorsolateral PFC (dlPFC)**—activated with safe choices
- both cognitive flexibility and emotional irritability activate the left dlPFC (Li et al., 2017b)
- children with greater irritability activate both right and left dlPFC during cognitive flexibility tasks
- left dlPFC activation was associated with cognitive flexibility and positively correlated with irritability
- right dlPFC activation was also positively correlated with irritability (Li et al., 2017b)

**medial PFC (mPFC)**—regulates subcortical areas
- influences adolescent risk-taking via functional neural coupling with reward-related regions (ventral striatum)
- increased coupling related to increased risk-taking; decreased coupling to decreased risk-taking (Qu et al., 2015)
- PTS: hypo-activation of medial PFC (contributes to loss of top-down regulation of emotional systems—i.e., amygdala) and other regions (rostral ACC, orbitofrontal cortex)

**dmPFC** involved in self-inspection and emotion regulation; increased activity in depression (Yang et al., 2016)
Table A4.2 Continued

- **ventrolateral PFC (vlPFC)**—involved in cognitive control/regulation and decision-making under uncertainty (Levy & Wagner, 2011); goal directed inhibitory control (Wessel et al., 2013)
  - active during observation and imitation
  - may be specifically related to explicitly identifying an emotional expression and tone (Wessel et al., 2013)
  - left vlPFC related to emotional self-control (Lieberman, 2010—Chapter 5)
  - right vlPFC related to self-control (emotion regulation) and self-awareness
  - greater declines in vlPFC activation linked to decreased experimental and real-life risk-taking (Qu et al., 2015)
  - damage to this region related to mentalizing deficits
- **ventromedial PFC**—important to decision-making, but not to WM; activated when risky choices are made
  - heavily interconnected with the ventral striatum, a connectivity important for reward processing and learning
  - injury to vmPFC linked to emotional temper, anger outbursts, and impulsivity
    - linked to preference for immediate gains
    - have more difficulty considering future consequences
    - have specific difficulties with reversal learning—i.e., difficulty with switching from what was first seen as a good habit
    - adolescents mirror vmPFC injury patients (see Crone et al., 2016)
  - early childhood threat exposure related to reduced vmPFC volume (McLaughlin et al., 2014b)
- **lateral PFC, posterior parietal cortex, medial PFC, rostral ACC, and hippocampus and surrounding medial temporal lobe region**
  - related to the reflective systems (controlled social perception; Satpute & Lieberman, 2006)
- **lateral PFC and dAC**—self-criticism linked to activity in lateral PFC regions and dAC, therefore linking self-critical thinking to error processing and resolution, and to behavioral inhibition
  - self-reassurance was linked to left temporal pole and insula activation, suggesting self-reassuring engages similar regions to expressing compassion and empathy toward others (Longe et al., 2010)
- **frontal, parietal, and striatal regions**—improvements in working memory and cognitive control correspond to increased recruitment of task-related regions in frontal, parietal, and striatal regions; a shift occurs from diffuse to focal activation and from posterior to anterior activation (Durston et al., 2006; Brown et al., 2005; Rubia, 2013)

**Reduced volume after trauma exposure:**
- frontal cortex, ages 14–16 (Andersen et al., 2008)
- vlPFC, superior parietal cortex—right side cortex thickness linked to maternal prenatal anxiety and to different temperament, behavioral reactivity (infants, Qiu et al., 2015)
- dlPFC—depression; PTSD (Amico et al., 2011)
- cerebral gray volume; PFC gray volume
  - inhibition of stress response; self-regulation; attention; organization; planning (controlling for total cerebral gray, PTSS group had decreased left ventral and left inferior PF gray volumes) (age 10–17; Carrion et al., 2010b)
  - related to attention, executive skills, language skills, inhibition, self-monitoring (ages 7–9; Crowe et al., 2012)
  - from institutional deprivation, decreases in gray matter volume and thickness (McLaughlin et al., 2014b)
  - reduced PFC volume for low SES (McLaughlin et al., 2014b)
Table A4.2 Continued

### Ventral Striatum (VS)
VS activation consistently associated with greater reward-seeking and risk-taking behavior
  – shows greater reactivity in adolescents than children or adults
  • Some adolescents show increases in risk-taking and others show decreases—
    – implies increased mPFC to VS connectivity correspond to increased risk-taking vs. decreased
      connectivity in adolescence with decreased risk-taking (Qu et al., 2015)
    – most research related to risky decision-making and probabilistic reward paradigms suggest that
      adolescents are biased to taking risks due to overactive reward-related neuro-circuitry (ventral
      striatum)
  • increases in testosterone and increases in puberty related to increased NAcc (nucleus accumbens)
    response to reward (peak ages 15–17); BAS (behavioral activation) drive, accounted for variation in
    NAcc activity over time (Braams et al., 2015)

### Effects of Trauma
  • infancy to adulthood—a link found between early life adversity (early caregiver deprivation) and
    depression in later life, largely mediated by stress-induced alterations to the ventral striatum (Goff &
    Tottenham, 2014; Pizzagalli, 2014)

### Limbic System—after trauma exposure
  • Increased left amygdala (Infancy to adulthood—0–2 to age 29; Lyons-Ruth, Pechtel, et al., 2016)
    – volume in adulthood linked to both maternal and infant disorganized attachment interactions (18
      months; N = 18)
    – volume associated with dissociation and limbic irritability in adulthood
    – volume mediated the prediction from attachment disturbance in infancy to limbic irritability in
      adulthood
  • Increased right amygdala
    – affective dysregulation—risk of mood and anxiety disorders;
    – ages 10–11 are sensitive periods for right amygdala (increased volume linked to maltreatment; up to
      pre-adolescence; Pechtel et al., 2014)
    – exposure at age 11—right amygdala sensitivity was 5.7 times that for all other ages (except 10 years;
      Lyons-Ruth et al., 2016)
  • Increased right insula cortical thickness
    – meditators have shown greater gray matter thickness of the insula (vs non-meditators)
    – right insula cortical thickness correlated with decreased alexithymia
      (Holzel et al., 2011; see Lanius et al., 2015; Santarnecchi et al., 2014)

### Other Effects of Trauma
  • Depression, PTS (Aas et al., 2012; Baker et al., 2013; Bremner, 2006)
  • prolonged, stress-induced stimulation of limbic areas during development may cause kindling, which is
    evidenced by seizure-like neuronal activity and changes in affected neurons’ excitability and behavior
    (Botterill et al., 2014; Dackis et al., 2012)
  • amygdala damage results in lack of the prototypical autonomic response associated with fear-
    conditioning and in attenuated fear expression (fear-conditioned rats; decreased freezing behavior;
    Pattwell et al., 2013)

Resources: Bunge & Wright, 2007; Crone et al., 2016; Fanselow, 2000; Lanius et al., 2015; Lange et al., 2010; Patel et al., 2012; Pattwell et al., 2013; Pechtel et al., 2014; Stein & Kendall, 2004; Thomason et al., 2015; Yang et al., 2016; Yehuda et al., 2015 Abbreviations: dACC = dorsal ACC; IPL = inferior parietal lobe; pgACC = pregenual anterior cingulate cortex; RSFC = resting-state functional connectivities; TPJ = temporal junction; with genetic and brain studies, findings have been
mixed and larger studies are needed.
Personality/Temperament

More than one set of traits has been organized into personality types (see Nader, 2008). For example, although Chess and Thomas (1991) identified nine dimensions of temperament, they identified three types (difficult, easy, and slow to warm; A5.2). Studies of adults have suggested that traits of hardiness, self-enhancement, and repressive coping are associated with better posttrauma or post-loss outcomes (Glossary; Bonanno, 2008; Bonanno, Field, Kovacevic, & Kaltman, 2002; Bonanno et al., 2003; Nader, 2008). However, repressive coping—a kind of emotional dissociation—is associated with autonomic arousal and may have long-term health costs (Bonanno, 2008).

Table A5.1 Individual Temperament Traits (sample of findings)

<table>
<thead>
<tr>
<th>TEMPERAMENT TRAIT</th>
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<td>• early, enduring behavioral phenotypes with biological basis (Zentner &amp; Shiner, 2012)</td>
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**ACTIVITY**

**Relationship of High Activity in Preschool to School Age and Older**

• high externalizing at age 4 and 8–9
• negatively associated with internalizing, age 4, 8–9 (Hagekull & Bohlin, 2003)
• high social competence, extraversion, and openness, age 8–9 (Bohlin et al., 2005; Hagekull & Bohlin, 2003)
• high activity, distractibility, + low persistence have predicted peer rejection (Walker et al., 2001)

**AGREEABLENESS**—Interpersonal nature (continuum from warmth and compassionate to antagonistic)

**Preschool**

• predicted negatively by activity, positively by SI (Hagekull & Bohlin, 2003)
• correlated negatively with anger (Rothbart & Bates, 2008)
• effortful control, manageability, and agreeableness have moderated the effects of adverse environments (ibid.)

**School-Age Children**

• agreeable individuals are empathic, altruistic, helpful, and trusting (see Shiner & Caspi, 2008)
• high-agreeable children may negotiate conflict better than other children (see Shiner & Caspi, 2008)
• does not predict submissiveness (ibid.)

**Adults** (ages 18–71)

• those above average in use of all 4 humor styles (Table 11.2, A2.1) were high in agreeableness and conscientiousness; they are outgoing and open to new experience (Galloway, 2010)
• agreeableness correlated with self-enhancing humor style (Galloway, 2010)
• high-agreeable adults are more distressed than others with interpersonal conflict (see Shiner & Caspi, 2008)

**CONSCIENCIOUSNESS**—Extent and strength of impulse control (effortful control) in task focused domains; diligence; active engagement in tasks; conscientiousness, agreeableness, and emotional stability have loaded together on a single higher-order factor (meta-trait; del Giudice, 2014; the 3 increase from adulthood onward, a maturity factor, de Haan et al., 2017)

**High Conscientiousness Related to High:**

• self-control; inhibitory control (Glossary); willpower; impulsivity (negatively), under-control (negatively)
• delay of gratification; sensory sensitivity (Glossary) (Zentner & Shiner, 2012)
• perpetual sensitivity, threshold of sensitivity, high sensitivity, sensory defensiveness; empathy/affiliativeness (glossary—temperament—dimensions—empathy/affiliativeness) (Zentner & Shiner, 2012)
Preschool
• predicted by high SI
• not fully expressed until about age 3 (Zentner & Shiner, 2012)
• over-controlled types are high in conscientiousness and agreeableness (Block & Block, 1980)
• developmental changes result in better conscientiousness, agreeableness, and emotional stability

School Age
• as children orient more toward peers, they may increase in conscientiousness and agreeableness but may decrease in emotional stability (de Haan et al., 2017)
• conscientiousness, agreeableness, and emotional stability reduce in early adolescence (along with lower benevolence) and increase in middle or later adolescence (de Haan et al., 2017)
• effortful control (EC) includes components of attention regulation, emotion regulation, and inhibitory control (ages 4–18; Baer et al., 2015)
• EC positively associated with children's constructive social interactions with peers, social skills, and popularity (Eisenberg et al., 2000)
• predicted increases in perfectionism over time (ages 14–18; Affrunti & Woodruff-Borden, 2014)
• high conscious children described as attentive and able to concentrate; responsible, attentive, persistent, orderly and neat; planful; have high standards, and think before acting; orderliness and dependability in older youth (Big 5; Shiner & Caspi, 2008)

EXTRAVERSION*—extent to which a person is actively, surgently, or vigorously engaged in the world (vs avoids intense social experience) (see Table A5.2)

Infancy
• predicted by high activity, high sociability, and low NE
• infant differences in positive emotionality predict later extraversion (in childhood)

Preschool
• predicted by high activity, high sociability, and low SI

School Age
• prefers to be with others rather than alone; sociable (Shiner & Caspi, 2008)
• described as sociable, expressive, high-spirited, lively, socially potent, physically active, and energetic (Big 5; in contrast to introverts who are described as quiet, inhibited, and lethargic)
• high positive affect, energy and zestful engagement, and eager anticipation of enjoyable events; more talkative, more dominant, more involved and engaged (Shiner & Caspi, 2008)
• extraversion reduces from early/middle childhood to early adolescence but may stabilize from middle adolescence onward (de Haan et al., 2017)

EXUBERANCE (NOVELTY SEEKING)
• enhanced behavioral approach in novel social situations, high positive affect, sensation seeking, and heightened reward sensitivity (Dennis et al., 2010; Morales et al., 2015); see surgency

Preschool
• 24–42 months—for girls, high exuberance plus greater RSA baseline and greater RSA reactivity predicted externalizing (Morales et al., 2015)
• ages 3–5—EC supports effective emotion regulation, and in some contexts, particularly for children showing low exuberance (Dennis et al., 2010)
  – while highly exuberant children, regardless of EC, may be at risk for emotion regulation problems,
  exuberance may support organized on-task behaviors during an emotional challenge (Dennis et al., 2010)
Table A5.1  Continued

FLEXIBILITY
• flexibility and the resourceful ability to adapt to change or circumstances in preschool and elementary school predicts adaptive functioning at ages 19 and 26 (low-income youth study; Causadias et al., 2012)

HARM AVOIDANCE (HA)
Ages 4–18
• high HA linked to internalizing (Baer et al., 2015) or internalizing + disruptive behavior disorders (Rettew et al., 2004)
  – linked to poorer social functioning (Baer et al., 2015)
• higher levels of Novelty Seeking and HA and lower levels of Persistence significantly associated with poorer social functioning (Baer et al., 2015)
• higher HA combined with extreme maternal positive parenting (perhaps overprotection) related to lower social functioning; temperamentally fearful children may elicit protective parenting or parental over-involvement (Baer et al., 2015)

Adults—some genetic links to HA
• tryptophan hydroxylase (TPH1) (Andre et al., 2013)
• T1521C polymorphism, GABRA6 gene (Arias et al., 2012)
• interaction of 5-HTTLPR and Val66Met polymorphisms (Arias et al., 2012)

OPENNESS TO EXPERIENCE/INTELLECT†
Preschool
• had same temperament basis as Extraversion (Hagekull & Bohlin, 2003)

School-Age Children
• described as eager, quick to learn, clever, knowledgeable, perceptive, imaginative, curious, original; active fantasy life (see Shiner & Caspi, 2008)
• intellectual skills and an appreciation for art, adventure, curiosity, and variety of experience (Vreeke & Muris, 2012)
• motivated to pursue new experiences
• original, perceptive; curious and exploring; knowledgeable (see Shiner & Caspi, 2008)
• clinically anxious children rated as high on NE and BI but low on openness/intellect, conscientiousness, and extraversion (parent-report; Vreeke & Muris, 2012)
• may increase until early adolescence and decrease after (de Haan et al., 2017)

Adults
• more differentiated self-reports of emotions; less likely to screen out previously irrelevant stimuli; greater access to inner experience (has predicted both heightened self-esteem and increased depression; Shiner & Caspi, 2008)
• access more thoughts, feelings, impulses, perhaps simultaneously
• tend to be politically more liberal, less authoritarian, and less traditional in beliefs
• motivation to pursue new, complex experiences (Shiner & Caspi, 2008)

SHYNESS/INHIBITION (SI)
BEHAVIORAL INHIBITION (BI)—shy, reluctant to explore or approach new people, places, activities (Vreeke & Muris, 2012); high negative reactivity toward novelty; high social withdrawal, particularly to unfamiliar persons; sometimes includes fear, anxiety, shyness, and anxious isolation (Morales et al., 2015)
• BI children show hyper-sensitive monitoring of their behavior, performance, and the environment (see Buzzell et al., 2018)
  – increased monitoring increases risk for later anxiety (see Buzzell et al., 2018; Glossary—monitoring)
• in some ways similar to but not the same as NE (to follow next)
  – also refers to the extent to which individuals experience the world as distressing or threatening
Table A5.1  Continued

**General**
- neuroticism makes a small but unique contribution to BI in nonclinical children (Vreeke & Muris, 2012)

**Infancy and Preschool**
- found in infancy and has persisted (Rankin et al., 2009)
- shyness/inhibition in infancy has related to later social anxiety (Bohlin & Hagekull, 2009)
- reactivity in infancy related to but distinct from BI (Buzzell et al., 2018)
- BI toddlers have higher and more stable heart rates, larger pupillary dilation, higher levels of morning salivary cortisol and urinary norepinephrine than uninhibited counterparts (Chronis-Tuscano et al., 2015)
- BI in toddlers is related to later social reticence in early school years (see Buzzell et al., 2018)
- BI preschoolers use fewer words during a speech task (Muris, Hendriks, & Bot, 2016a)
- ages 24–42 months—fearful temperament predicted more internalizing (Morales et al., 2015)

**School Age and Older**
- SI (and NE) negatively related to school-age social competence
- high SI relates to low social competence at age 21, mitigated by secure attachment
- SI correlated with social anxiety and had low, significant correlation with depressive symptoms at age 21
- for primary school children (380), BI was positively related to high conscientiousness and to low extraversion (Vreeke & Muris, 2012)
- BI predicted internalizing problems, low social competence, low extraversion, low openness, in 8–9-year-olds (n = 96 at age 9, N = 85, Bohlin & Hagekull, 2009)
- for 6–9-year-olds (N = 43; Babkirk et al., 2015), normally developing children high in temperamental fear (BI) were more likely to deceive (cover up or deny a transgression) than other normally developing children, only if they also were high in working memory capacity
- BI related to social reticence, characterized by avoidance of peer interactions while maintaining vigilance and attention toward peers (see Buzzell et al., 2018)
- children with increased BI have shown a tendency not to proactively deploy control in an effort to prevent mistakes; they appear to rely on employing control in a reactive and “just-in-time” manner (see Buzzell et al., 2018)

**4–18- or 19-year-olds**
- temperamentally inhibited or socially withdrawn infants or toddlers displayed stable continuation of these traits, and had worse social outcomes, into middle childhood, with high parental negativity and intrusiveness (Baer et al., 2015)
- adolescents with BI had significantly larger error-related negativity (ERN) (glossary), suggesting increased monitoring (see Buzzell et al., 2018)
  - increases in ERN under social observation were highest for BI
  - increased ERN is also found in increased anxiety in adolescents and adults
  - increased monitoring has amplified (moderated) the link between BI and anxiety
  - increased ERN magnitude has mediated the link between BI and social anxiety
  - for 2 longitudinal cohorts, BI predicted later anxiety only for children with relatively larger ERN
- for children and adults without histories of BI, increased levels of inhibitory control are typically linked to reduced anxiety symptoms (see Buzzell et al., 2018)
  - evidence suggests that greater inhibitory control is related to greater social anxiety only for children with steeper slopes of BI (faster increases in BI ages 5–9; perhaps relates to over-control and reduced flexibility)
  - the increased social anxiety occurred for BI youth who used a reactive control pattern (inhibitory control)
Adolescent
• can be divided into its components (Schofield, Coles, & Gibb, 2009)
  – social—reticent to approach or interact with strangers or unfamiliar people
  • more strongly related to social anxiety than to other symptoms
  – nonsocial—e.g., reticent to explore unfamiliar surroundings and fearful when faced with novel or potentially threatening situations (a dark room)
  • linked to depression and anxious arousal
• BI linked to:
  – social phobias or anxiety
  – social anxiety moderately related to anxious arousal and, in turn, to depression (Schofield et al., 2009)
  – BI adolescents who rapidly increased in BI from ages 5–9
    • do not plan ahead and do not flexibly adapt behavior
    • may excessively monitor own behavior and use reactive control strategies (just-in-time or after the conflict occurs rather than anticipatory efforts—e.g., might not pay extra attention to their veering on a bike to prevent veering into the street, but correct after veering into the street (Buzzell, Troller-Renfree, Morales, & Fox, 2018)
NEGATIVE EMOTIONALITY or NEUROTICISM (NE)*—tendency to easily experience negative emotions such as anger, anxiety, depression, or discontent (Vreeke & Muris, 2012)
  – extent to which individuals experience the world as distressing or threatening
• NE negatively related to school-age social competence (Bohlin & Hagekull, 2009)
• NE positively related to neuroticism
• NE did not predict social anxiety or depressive symptoms (in some studies)
• irritability has been a consistent trait across childhood (de Haan et al., 2017)
• preschool NE positively related to picky eating, somatic complaints, and internalizing (Bohlin & Hagekull, 2009)

Ages 4–18
• NE related to social anxiety (Hyde, Mezulis & Abrahamson, 2008)
• high NE, low effortful control, high reactivity, low attention regulation, and “difficult” temperament are implicated in externalizing problems (Baer et al., 2015; Zhou et al. 2010)
• high NE is inversely related to social functioning in adolescents (Murphy et al., 2004)
• infant temperament (poor manageability, high irritability) has been linked to later externalizing and psychosomatic problems; from toddlerhood to early preschool period has been linked to outcomes for middle childhood (e.g., shyness/inhibition [BI; negative emotionality], Rothbart & Bates, 2006)
• non-suicidal self-injury was linked to high NE and low effortful control (Baetens et al., 2011); also linked to NE, low conscientiousness and low agreeableness (see Baetens et al., 2011)
• for undergraduates (freshman and sophomores, N=402), 80% had experienced a traumatic event; trauma intensity + total number of events explained 31% of PTSD severity; neuroticism was related to severity of PTSD symptoms (also for NE, a strong relationship between trauma intensity and PTSD severity) (Lauterbach & Vrana, 2001); low NE has buffered people from developing PTSD even with trauma severity

SOCIABILITY
Preschool
• negatively associated with internalizing, age 4, 8–9 (Hagekull & Bohlin, 2004)
• positively correlated with social competence in school age (Hagekull & Bohlin, 2003)
• low but not high sociability combined with negative events relates to neuroticism (Hagekull & Bohlin, 1998)
• combined with low NE, predicts extraversion (Bohlin & Hagekull, 2009)
• negatively related to social anxiety (Bohlin & Hagekull, 2009)
• low sociability positively related to depression in the context of stress (Bohlin & Hagekull, 2009)
SURGENCY

– seek stimulation and novelty, are impulsive, and are high in activity; are not shy (Derryberry & Rothbart, 1997)
– affinity for engaging with others, sociability, high activity level, vocal reactivity, perceptual sensitivity, and pleasure derived from high-intensity activities (Buil et al., 2017; Rothbart & Bates, 2008)
– lower-order traits include, e.g., a tendency to approach novel situations and unfamiliar people (behavioral disinhibition), tendency to be attracted to adventurous activities, and tendency to easily smile and laugh
– among 3 temperamental characteristics found by many for children: effortful control; positive emotionality/surgency (also referred to as extraversion/surgency); negative emotionality (Buil et al., 2017)
– children with high surgency may value social status, have higher social dominance among peers, may have more prosocial cooperative strategies, can regulate impulses, are highly impulsive, can read social cues, and are motivated by instrumental goals (Anderson, Qiu, & Wheeler, 2017)

Preschool 4–6

• a study of body mass index (BMI): higher surgency predicted more food responsiveness and enjoyment, which in turn was linked to higher concurrent BMI (independent of effortful control, negative lability and home chaos; Leung et al., 2015)
• under-controlled children with surgency, negative affect, and low attentional control at age 3 showed neurotic and alienated tendencies at age 26 (Caspi et al., 2003b; reactive temperament—see Pappa et al., 2015)

Middle Childhood (with high surgency)

• easily acquire prosocial strategies (Anderson et al., 2017)
• if highly impulsive combined with negative affect and low effortful control, may use persistently aggressive strategies and may elicit authoritarian parenting (Chinese children; Anderson et al., 2017)

GENDER

• In Western cultures, while the genders have shown equal endurance and activity,
  – females have had more perseveration, sensory sensitivity, and emotional reactivity and less briskness than males (ages 18+, Oniszczenko & Dragan, 2012; glossary)
  – female adolescents have scored higher on neuroticism, agreeableness, and conscientiousness than males (older females scored higher than older male adolescents on conscientiousness, younger females scored lower than younger males; Gullone & Moore, 2000)
• BI has been associated with adolescent social and separation anxiety specifically for males with early insecure-resistant attachments (Lewis-Morrarty et al., 2015)
• in a meta-analysis of personality over time, at all ages after age 10, girls were more altruistic, compliant (Benevolence), and orderly (Conscientiousness) than boys, and more self-disciplined (Conscientiousness) than boys by early adulthood (de Haan et al., 2017)
• levels of anxiety, depression (Emotional Stability), assertiveness, and activity (Extraversion) were similar across gender at age 10 years; older girls scored increasingly higher than boys on these levels (see de Haan et al., 2017)
• boys remained the same in altruism from middle childhood; girls increased until early adolescence and then decreased (de Haan et al., 2017)

Notes:

* Of Big 5 traits, these 4 were found in preschoolers to adolescents
† (e.g., curiosity, intellect, creativity, imagination) found in some studies of school-age children and adolescents
CBCL dysregulation profile = high novelty seeking, high harm avoidance, low persistence, and low reward dependence
BI = behavioral inhibition; EC = effortful control; NE = negative emotionality; RSA = respiratory sinus arrhythmia; SI = shyness/inhibition. Sources: Bohlin, Hagekull, & Andersson, 2005; Caspi et al., 2003b; Hagekull & Bohlin, 2003, 2004; Hyde, Mezulis, & Abrahamson, 2008; other articles referenced within.
Table A5.2 Personality Types with Characteristics in Common

Easy-Going
- **Easy** (New York Longitudinal Study, NYLS; Chess & Thomas, 1991)—regular, approaching, adaptable, mild, and predominantly positive in mood
- **Ego-resilient** (Block’s Q-Sort)—well-functioning cognitively, emotionally, and interpersonally
- **Securely attached** (Table A3.1)

Behavioral Inhibition System (BIS) or Introversion
- **BIS** (Gray, 1991)—introverts; are high in fear and shyness, more sensitive to punishment; have a neuroanatomical system that is sensitive to cues of punishment and non-reward; includes orbital frontal cortex, medial septal area, hippocampus, and Ascending Reticular Activating System; involves the neurotransmitters norepinephrine and serotonin
- **Introvert** (see Berens, 2013; Murphy, 2008)—inward turning (e.g., process internally); think first, then share; are energized by alone time; like longer “wait time” before responding; difficulty expressing emotion; enjoy quiet but can focus and concentrate when need to
- **Slow-to-Warm** and **Difficult temperaments** (NYLS)—
  - **Slow-to-warm**: slow initial response (or initial withdrawal); low adaptability initially, but tend to adapt with increased exposure; lower energy levels of response (low intensity); low activity; a more negative mood
  - **Difficult temperament**: initially timid (withdraw in novel situations); low adaptability; high intensity; predominantly negative mood; low regularity (has been related to young adult maladjustment—e.g., internalizing, externalizing (Guerin et al., 2003; Chess & Thomas, 1991)
- Negative emotionality (glossary; Big 5 traits—shyness, fear, distress, frustration, irritability, sadness, discomfort, resistance to control)—includes trait anxiety, behavioral inhibition (inhibition of responses to novel situations or people), and anger (aggressive or irritated behavior in response to painful or frustrating stimuli) (Zentner & Shiner, 2012)
- **Related to**
  - fearfulness, harm avoidance and anxious temperament (Zentner & Shiner, 2012; HA, age 26, Caspi et al., 2003b)
  - neurobiologically, to SHT and CRH (Zentner & Shiner, 2012)
  - adolescent/adult trait anxiety (Kagan et al., 2007; amygdala hyper-responsiveness, age 21)
  - social anxiety, depression (age 21, Bohlin & Hagekull, 2009)
- **vulnerable over-controllers** or **over-controllers** (Block’s Q-sort; Block & Block, 2006)—few interpersonal skills; shy, inward; low temperamental extraversion and emotional stability; average temperamental agreeableness, conscientiousness, and openness

Behavioral Activation System (BAS) or Extraversion
- **BAS** (Gray, 1972; 1991)—extraverts; high in positive affect and approach
  - neuroanatomical system that is sensitive to cues of reward and controls behaviors such as exploration and approach responses
  - includes medial forebrain bundle, lateral hypothalamus; involves the neurotransmitters dopamine and norepinephrine
- **Extravert** (Jungian Types; Alcock & Murphy, 1998; Berens & Nardi, 2004; Murphy, 2008)—outward turning (e.g., think out loud; seek outward interests, stimulation); social; find talking helps thinking; energized by doing; like short “wait time” before responding (self and others); inclined to express emotion; when work is difficult, require quiet to concentrate
- **Extraversion/Surgency** (Big 5 traits—approach, vocal reactivity, high-intensity pleasure, smiling and laughter, activity level, perceptual sensitivity, sociability, positive anticipation; e.g., Rothbart & Bates, 2008)—infant smiling, vocalization, and motor cycling of limbs in response to social and nonsocial stimuli; infant smiling and laughter; tendency to positive affectivity may persist into adolescence and beyond
• **Positive emotionality** (extraversion)—high-intensity pleasure (propensity to positive emotions, e.g.,
pleasure, positive anticipation, and excitement in social situations) (Zentner & Shiner, 2012)
  – related to temperamental traits of exuberance, hyperthymia, sensation seeking, high-intensity
  pleasure; low-intensity pleasure (able to experience delight in response to comfort and sensuous
  gratification)
  – related to temperamental traits of consummatory hedonia, low-intensity pleasure; activity level
  (frequency, briskness, and vigor of motor movement; intolerance of enforced idleness)
  – related to temperamental briskness and tempo

• **Unsettled under-controllers or under-controllers** (Block’s Q-sort; Block & Block, 2006)—hostile,
disagreeable, show little concern for others, extraverted; average stability and openness; low
conscientiousness
  – related to under-control at ages 14, 18, and 23 and to narcissism at age 23 (Block & Block, 2006)
  – related to alienation, hostility, criminality, substance dependence at ages 18, 26, 32 (Caspi et al.,
2003b; Moffitt et al., 2011)

**Notes:**

Theoretical systems do not overlap perfectly. Generally, combinations of genes (and neurobiological tendencies) influence
traits, and traits combine in particular ways (e.g., with or without good self-regulation). Some children are responsive to
both reward and punishment (Rothbart, Ahadi, & Hershey, 1994). See also INSIGHTS, Chap 10 (McClowry, 2002).

**Traumatic Reminders**

To follow are some possible reminders of any event or a specific kind of traumatic event. Some of
these same things may show up in a child’s play or activities as indicators of the intrusion of the
trauma into the child’s life.

**Table A6.1 Traumatic Reminders**

**GENERAL REMINDERS OF TRAUMATIC EVENTS**

**Emotions**—those felt during the event; any negative emotion

**Experiences**—talking about what happened; atmospheric conditions; being touched in certain ways;
potentially dangerous situations; certain behaviors (e.g., hurting someone; feeling endangered; falling
down; hiding; running away); injuries (e.g., broken limbs, wounds); being separated from caretakers or
other persons whose presence feels important to the child (for some children or young children,
separation during stress)

**Images**—that resemble some aspect of the event

**Media**—media images (e.g., of violence, weapons, crumbling buildings, strong winds, images that
resemble some aspect of the event); certain foods (e.g., what the child was eating during the event); news
stories; video games; television shows or commercials with sounds or images that resemble aspects of the
traumatic experience

**Locations**—where there was harm, destruction, or blood; the place the child was during the event;
places where other traumas have occurred

**People**—who look, act, dress, carry themselves, or talk a certain way; who were there during the event;
with a certain look (e.g., paleness; anger; wide eyes); reminders of people from the event (e.g., injured,
dead, those who endangered others or rescued someone); someone dying

**Sensations**—stickiness; light-headedness; tension in the stomach; headaches; other pain; pressure to the
body; certain kinds of touch; fast heartbeat; prickly or itchy skin; sensations from the experience; of stress
hormones
Smells—like those from the event; smells that may suggest such an experience may be ready to occur; what was cooking during the experience; like the breath of the offender

Sounds—sounds that mimic sounds that occurred during the trauma; sounds made by a dying person; sounds expected for or specific to the type of event experienced; screaming, yelling for help, moaning; things people said during the event

Things—concrete items present at the site of a horrible experience; blood or specific red liquids; bleeding; vehicles like the ones near the event; clothes (e.g., those worn during the event by self or others; look like event-related clothes)

REMINdERS FOR SPECIFIC EVENTS

BOMBING

People—who resemble the assailant in some way; people or pictures of people who were there during the bombing; people of a certain culture or look; hostile youth or hostile-looking youth

Sounds—such as exploding sounds; loud bangs; rumbling, crashing noises, air sounds; screams; moans

Sights—weapons (e.g., if assailant carried bomb and weapons); places or media images (e.g., demolished buildings); wounds (e.g., burns, broken bones, crushing injuries); burnt things

Smells—burning smells; smells from right before the explosion

BULLYING

People—individuals who aggressively bully, cyberbully, relationally bully or stand by and watch; or people who look at the child in a certain way or who themselves look a certain way

Behaviors—people’s acts of rejection or exclusion (may be perceived when not intended), disrespectful or degrading comments, aggressive behaviors (e.g., pushing, hitting, spitting, throwing things); perceived but not necessarily actual rejection or diminishing remarks; facial looks; a raised arm; email/internet

Items—things that might be thrown; something used to harm them in the past; clothes worn during a particularly bad experience; foods thrown at them

Feelings and expectations—experiences that feel like failure; expectations of being judged in a situation; stress

EARTHQUAKE

Experiences—animals acting a certain way or abnormally, if youth has heard that they act a certain way before an earthquake

Sensations—shaking or rattling buildings (e.g., when truck passes or wind makes things rattle); things falling or crashing; crashing or rumbling sounds; dust flying; certain sensations of motion (e.g., sense of things bouncing, rocking, or swirling); enclosed spaces; being hit with something; specific or general debris; demolished buildings or buildings falling

Sounds—crashing, banging; rumbling; the sounds from before or after it happened

FIRE

Sensations—heat; sunburn; burning; feeling like it’s difficult to breathe; feeling trapped

Sights—fire/flame; smoke; crowds running or shoving

Smells—burning smells

Sounds—things crashing or crackling; hiss and pop sounds; rumbling like a fire
**SEXUAL ASSAULT/MOLESTATION**

**Emotions**—feeling betrayed; feeling other emotions experienced during the event (e.g., fear; physical pleasure, sadness, helplessness)

**People**—the offender; those in some way act like or resemble the assaulter/molester; a specific gender

**Sensations**—touch or specific types of touch; sensations experienced during the assault; slippery liquids with a certain consistency; a feeling inside the body

**Sights**—of the assaulter/molester or someone who resembles him/her; clothes, characteristics, places, or other things that remind of or resemble the assaulter/molester, someone who watched or permitted the experience, or the location of the assault

**Smells**—the assaulter/molester’s breath, body odor, cologne, or other characteristic smells; smells in the room/location, during the experience; foods the assaulter/molester smelled of or had with him/her

**Sounds**—sexual sounds; certain breathing noises; grunts, moans; other sounds the assaulter/molester made; noises that resemble the background noises of the experience (e.g., if he played music; noise outside or in the room)

**SHOOTING OR KNIFING**

**Locations**—places that seem unsafe or resemble the location of the violence

**People**—those who resemble the assailant in some way; see general

**Sounds**—after gun violence, popping noises, loud bangs, a car backfiring; after a knifing, scrape of a blade in person or in TV or movie media; things the assailant said or noises the shooter/knife-wielder made

**Sights**—weapons; places (e.g., with bullet holes or holes that resemble bullet holes; that look like where the violence occurred); wounds or injuries; clothing (e.g., uniforms for war; assailant’s clothes)

**TORNADO**

**Sensations**—being hit with something; building shaking sensations

**Sights**—specific or general debris; flying objects; media images such as flying window glass or other objects, broken or breaking glass; tornadoes (in the media or actual); the aftermath of disasters; funnel motions in liquid or dust; things written about a disaster (e.g., on a test); animals acting a certain way, if youth has heard that they act a certain way before a tornado

**Sounds**—rattling windows or shaking buildings; things falling or flying (sights or sounds of falling/flying items); sounds of tornado and winds (e.g., train sounds; wind whistling or blowing through trees or buildings)

**Weather conditions**—rain, wind, gray skies; a green or other haze like that seen during the tornado; wind (especially that combines sights and sensations like those during the tornado)

**WAR**

War may include multiple and repeated types of traumatic experiences for youths. Many of the reminders listed above may occur in war. For example, the sights and sounds of bombings (including some sounds like those during or after tornadoes or earthquakes because of crashing and flying objects) and shootings all occur during war. Knife or sexual assaults may occur. Deaths and images of death are common.