

## Communicating Love or Fear: The Role of Attachment Styles in Pathways to Giftedness

Mimi Wellisch

Although both giftedness and secure attachment are associated with advanced language and good socioemotional adjustment, not all gifted children are well adjusted. This article explores the consequences of attachment style on gifted development and examines whether early trauma can be rectified. The dearth of research on giftedness and attachment has necessitated the review of less direct evidence, including brain research and maternal depression. A partly empirical, partly conceptual picture is drawn to demonstrate that attachment styles can support, reduce, and even prevent giftedness. This is further illustrated by an experiment involving IQ scores that mimics the expected effects of early trauma and insecure attachment on test performance. The article concludes by suggesting that attachment style may contribute to a gifted spectrum.

Keywords: brain research, gifted, gifted spectrum, insecure attachment, IQ tests, maternal depression, neuropsychology, secure attachment, socioemotional adjustment

There is little research on the interaction between attachment style and giftedness (Karrass & Braungart-Rieker, 2004). However, a variety of positive developmental outcomes have been associated with secure attachment, such as advanced language development (Prior & Glaser, 2006; Van IJzendoorn, Dijkstra, & Bus, 1995), indicating that there may be a connection. The term *attachment* normally implies strong liking or love for a person, but in the study of psychology the term refers to the special reciprocal relationship best characterized by the child–mother relationship (Fonagy, Steele, & Steele, 1991; Perry, 2002; Sutton, 2005). Accordingly, the term mother is used when referring to the *attachment figure* through this article in order to best express the concept. Organized attachment involves proximity seeking to the attachment figure and includes secure attachment, and insecure ambivalent/resistant and avoidant attachments. Disorganized attachment occurs when the mother elicits fear in the child. These will be the subject of more detailed examination later in this article.

Whereas attachment has benefited from scientifically rigorous studies, research on giftedness reflects the fragmentation that defines the field (Ziegler & Raul, 2000). The concept of giftedness has therefore been difficult to define, quantify, and harness into scientifically coherent predictability, despite much effort (Mayer, 2005). Indeed, the concept of giftedness has been the subject of endless controversy and it has spawned

around 100 definitions (Freeman, 2005) and numerous theories (Gagne, 1985; Gardner, 1983; Renzulli, 1986; Sternberg & Davidson, 2005). In broad terms it is defined as a genetically inherited potential or the ability to reach high levels of achievement in a variety of pursuits, preceded by early characteristic signs (Howe, Davidson, & Sloboda, 1998). These characteristics have been variously identified, depending on the stance of the writer, and factors such as socioeconomic and cultural backgrounds as well as those associated with particular gifts (Clark, 2008; Frasier & Passow, 1994; Marek-Schroer & Schroer, 1993; Rogers & Silverman, 1997; Rotigel & Pello, 2004).

Beliefs about gifted characteristics in relation to social and emotional health have been quite divergent. During the 1920s, it was assumed that gifted children were borderline neurotic or even psychotic (Clark, 2008), a myth dispelled by Terman's study (1925). Terman found that these children were often more popular than their classmates, at least during their primary school years. Since then findings have indicated problems in the socioemotional area for gifted teenagers, creative individuals affected by bipolar disorder (Winner, 2000), and increased levels of giftedness (Lovecky, 1993). Most studies, however, have been relatively supportive of Terman, finding that gifted children have a high social status and are preferred companions are better emotionally adjusted, more independent, often show leadership ability, and tend to be precociously aware of morality and justice issues (Clark; Lovecky; Silverman, 1993). Nevertheless, although it appears that many gifted children are socially and emotionally well adjusted, there is still no consensus on this subject.

---

Received 12 October 2007; accepted 26 September 2008.

Address correspondence to Mimi Wellisch, 11 Marguerite Avenue, Mt. Riverview NSW 2774, Australia. E-mail: mimiwellisch@bigpond.com

Social-emotional adjustment is linked to attachment. However, the dearth of studies on attachment and giftedness mentioned earlier has necessitated a review in this article of available information from less direct research. Evidence from areas such as gifted education, neuropsychology, and attachment theory has been used to draw a partly empirical, partly conceptual picture of the way attachment can support—or may even reduce or prevent—the development of giftedness.

The process of attachment occurs between birth and approximately 3 years of age. The first 3 years of life are an immensely important time: a baby is born with 25% of its adult brain capacity, which will develop to 85% by the time the child is 3 years old (Perry & Szalavitz, 2006). A lot is at stake during this period of rapid learning and brain growth. Incidents of repeated traumatic events may lead to permanent effects, with repercussions for all areas of development (Perry, Pollard, Blakley, Baker, & Vigilante, 1995; Perry & Szalavitz)—and therefore, unavoidably, for giftedness.

Attachment is the focus of this article, with comparisons made between the various attachment style outcomes and characteristics and problems associated with giftedness. Consequences of insecure attachment on early development are a particular focus, and the subject of brain plasticity is reviewed in order to examine whether early trauma can be rectified. Consideration of how IQ scores may be affected by attachment in some gifted children are explored, and the article concludes by suggesting how attachment styles can contribute to a gifted spectrum.

## ATTACHMENT

Psychologist John Bowlby (1969) was the first to observe the attachment relationship, which he likened to a bio-evolutionary instinct. He noted that babies and young children sought out their mothers when they felt threatened or uncomfortable. Depending on the mother's typical response, children would then either become securely or insecurely attached. Secure attachment has been linked with the mother's state of mind in interpreting her baby's communication and her sensitive responsiveness to her baby (Prior & Glaser, 2006). Insecure, or organized, attachment in children is the frequent outcome of inconsistent, angry, or dismissive care-giving, misinterpretations, and miscommunications—behaviors that are linked to neglect and abuse (Perry & Szalavitz, 2006; Prior & Glaser).

### Seeing the World Through Love: Secure Attachment

Children learn to feel safe enough to explore both relationships and the environment when they experience consistent, sensitive, and responsive care-giving. The mother's reliability and repeated ability to ease pain, fear, and discomfort informs the increasing pleasure felt by the child in her company and establishes the foundation for the regulation of

emotions. The baby's brain is designed to respond to facial expression, touch, and scent, and the activation of the *mirror neurons* in the baby's brain enables synchrony of responses, such as returning a smile. This positive connection promotes feelings of pleasure, which again are closely linked to systems that oversee emotional relationships (Perry & Szalavitz, 2006). Research findings indicate that secure attachment occurs in approximately two thirds of the population and that it has a statistically significant association with later good functioning: trust, confidence, well-regulated emotions, self-reliance, resilience, self-efficacy, better ability to relate intimately, a buffer to stress, and interpersonal/social competence (Prior & Glaser, 2006).

Coincidentally, the development of attachment and trust occurs during particular sensitive developmental periods (Hall, 2005), when the brain is *experience expectant* (Greenough, Black, & Wallace, 1987), requiring certain types of environmental experiences for continued healthy development. Appropriate interaction between nature and nurture must take place simultaneously during these periods, because timing can mean the difference between naturally evolving development or the lack of development in a particular area (Perry, 2002). In the case of trust, the sensitive period takes place in the first 4 to 8 months of life (Schiller, 2000), corresponding with the establishment of attachment by 9 months of age (Prior & Glaser, 2006).

### Secure Attachment, Emotional Intelligence, and Giftedness

Research has shown that securely attached children can be significantly distinguished by their level of concern for others and can be expected to be empathetic at preschool age (Weinfield, Sroufe, England, & Carlson, 1999). Empathy, or compassion for others, was also identified by 93.5% of parents in a large sample of exceptionally and profoundly gifted children (Rogers & Silverman, 1997). Empathy is essential to relating well and is an aspect of emotional intelligence (EQ; Bar-On, 2006). Emotional giftedness, then, would include some typical characteristics associated with secure attachment. According to Schore (2001), "emotional or social intelligence relies heavily upon right brain function, and ... this capacity is an outcome of a secure attachment ..." (p. 48). It therefore seems that exceptional and profound giftedness, a good EQ, and secure attachment are interrelated. We will return to secure attachment and exceptionally and profoundly gifted children later.

Although there is little research on the role of intelligence in attachment, informed suggestions have been made about its possible impact. For example, it has been listed as a protective factor for babies whose mothers suffer from maternal depression (Johnson & Flake, 2007). It has also been observed that intelligence may enable and accelerate recovery from poor care-taking, once the environment improves (Perry & Szalavitz, 2006). Perry and Szalavitz

posited that intelligent children may learn more quickly to associate pleasure with their mothers' responses, even when pleasurable interaction is in short supply. The baby's positive and less demanding responses in turn reassure the mother and reinforce her self-efficacy, increasing her sensitive responses to her child's needs (Greenberg, 1999). Greenberg speculated that a secure bond may help develop a positive mental model of the child in the mother, increasing her confidence and sensitive responses. Perhaps, then, certain genetically inherited patterns of intelligence may act as an attachment buffer, reducing adverse environmental effects by either ensuring greater probability of secure attachment or reducing the level of insecure attachment. There is presently insufficient data in this area, and more research is needed.

### Secure Attachment Outcomes and Some Gifted Characteristics

Attachment is a form of communication (Pearson & Jeffrey, 2007). Interestingly, one of the identifying characteristics of many gifted children is their high level of language development and verbal ability (Clark, 2008; Frasier & Passow, 1994; Liu, Hui, Lien, Kafka, & Stein, 2005; Rogers & Silverman, 1997). A meta-analysis of secure attachment has also been linked to language competence (Van IJzendoorn et al., 1995).

Two other important characteristics of both secure attachment and giftedness are curiosity and persistence. Studies have found less curious and exploratory behavior in humans and animals under adverse and deprived environments (Joseph, 1999). Secure attachment calls forth a positive attitude (Greenberg, 1999), which in turn leads to higher levels of engagement and persistence (Blair, 2002). Attachment security, therefore, not only paves the way for emotional and social well-being but may influence the child's self-confidence through the feedback loop of repeated maternal responsiveness to his or her needs and increase competence (Ainsworth & Bell, 1974) in areas such as exploration or cognition (Prior & Glaser, 2006).

When a baby's needs are rarely met, *learned helplessness* is the result, with the child eventually giving up and withdrawing rather than persisting (Seligman, 1990). A baby who is successful in having his or her needs met, however, learns to persist on occasions when his or her needs are not met. Persistence is an essential characteristic in the manifestation of potential and a factor in enduring practice to ensure achievement (Ericsson, Prietula, & Cokely, 2007). Task commitment requires persistence and is one of three defining identifiers of gifted children, according to Renzulli (2005). Recent findings on persistence have been supportive of Renzulli's assertion (Duckworth, Peterson, Matthews, & Kelly, 2007). A classical longitudinal study on gifted children found just two factors separating the most and least successful gifted individuals. Terman and Oden (1959)

found that drive to achieve—requiring persistence—and all-around social and emotional adjustment were the two factors. As we have seen, these are both associated with secure attachment.

Although secure attachment is found in two thirds of the population, it is not possible to simply assign giftedness to the entire securely attached population. Clearly there are fewer gifted individuals even if we estimate that intellectual giftedness commences at IQ115, or 25% of the population (Feldhusen as cited in Gross, 2000; Sheely & Silverman, 2000). If we take the more common starting point at IQ130 (Winner, 2000), it would reduce intellectual giftedness to just 2.2% of the population. Additionally, research has identified insecurely attached gifted children (Karrass & Braungart-Rieker, 2004). The conclusion must therefore be that gifted children can be both securely and insecurely attached. If that is the case, how do children become insecurely attached?

### MATERNAL DEPRESSION AND INSECURE ATTACHMENT

Maternal depression has been linked with disorders in attachment leading to less than optimal cognitive development at a key time in the baby's development (Cicchetti, Rogosch, & Toth, 1998). Studies have found that maternal depression is affected by intergenerational family problems, the mother's childhood experiences, and the maternal state of mind (McMahon, Barnett, Kowalenko, & Tennant, 2006); social disadvantage (Heckman, 2006); children's behavioral problems (Gartstein, & Sheeber, 2004); and relationship problems (Nagata et al., 2000).

One in five women are affected by depression, especially during the child-bearing years (Johnson & Flake, 2007), with one study finding that 74% of chronically depressed mothers had insecurely attached babies (McMahon et al., 2006). Children's negative traits (Perry & Szalavitz, 2006), in fact, are likely to stem from maternal depression and insecure attachment (McMahon et al.) and may even have their beginning before birth. Irritability, for instance, previously thought to be a heritable personality trait, appears to be caused or called forth by stress in pregnancy (Prior & Glaser, 2006; Rice, Jones, & Thapar, 2007). The baby's temperament, incidentally, has been ruled out as a determining factor in attachment style, except where mothers are already struggling with sensitive care-giving (Prior & Glaser).

Maternal depression has also been associated with poor school performance and underachievement (Leschied, Chiodo, Whitehead, & Hurley, 2005), subjects often linked with gifted children. An underachieving child may present as lazy, lacking in work ethic, lacking in (or masking) skills, rebellious, exhibiting problem behaviors, and having a short attention span. He or she may also suffer psychosomatic and psychological symptoms such as stomach and headaches,

depression, mental confusion, self-harm, poor self-esteem, sleep disorders, nightmares, eczema caused by stress, and attention deficit hyperactivity disorder (ADHD)-type behaviors (Commonwealth Government Publishing Service, 2001). A number of the same symptoms can be found in insecurely attached children.

### Effects of Maternal Depression on Brain Development

The baby's brain development is informed by two types of learning, and both may be compromised by angry, intrusive, and other inappropriate responses due to factors such as maternal depression (Cornish et al., 2006). Experience expectant learning (W. T. Greenough, Black, & Wallace, 1987), mentioned earlier, is connected to sensitive periods of development (Hall, 2005), such as the development of language. Other such windows of opportunity include hearing (first 4–8 months), vision and motor development (first 24 months), and cognitive development (first 48 months; Schiller, 2000). Sensitive socioemotional development also takes place during the first 3 years, and the effects of early and ongoing attachment problems have proven difficult to remedy due to the initial malorganization of neural functions in the developing brain (Davidson, 1994; Joseph, 1999; Perry, 2002; Perry & Szalavitz, 2006).

In addition to essential experiences needed for healthy development, the brain requires frequent repetition, known as the *use-dependent* development of the brain (Perry, 2002; Perry & Szalavitz, 2006). When there is insufficient repetition, synaptic connections between neurons “will literally dissolve” (Perry, p. 85). As an example, profoundly deaf children cease their vocalizing in later infancy, presumably due to lack of auditory experiences required for the development of language (Scarr, 1993). In terms of socioemotional development, babies can become socially and emotionally “deaf” or “blind” when there is a lack of opportunity for repeated healthy experiences. This is particularly the case during the first 12 months of life, when babies cannot yet regulate their own emotions, and the deficit can continue even after “normal” experiences are available (Joseph, 1999); for instance, after the recovery of the mother. The same holds for intellectual patterns and pathways that are genetically inherited—they will only develop if children receive appropriate environmental experiences at the time they are required (Perry & Szalavitz).

The second type of learning has been named “experience dependent” (Greenough & Black, 1992, p. 539). These learning opportunities are culture bound (e.g., learning to play the piano). Although there are no identified sensitive periods for experience dependent learning (Hall, 2005), there may be a need for prior skills, acquired through experience expectant learning opportunities.

The most important experience expectant opportunity connected with survival is the child's first close relationship, resulting in the formation of attachment (Perry, 2007). Its importance relates to the way early socioemotional influences can significantly affect the organization of the brain, as well as shape and mold perception and intellectual functioning (Joseph, 1999). It may also impact on some gifted characteristics: A recent article by Wellisch (2008) reviewed studies on attachment and perfectionism, including a study on gifted characteristics, where perfectionism was selected by 9 out of 10 parents of exceptionally and profoundly gifted children (Rogers & Silverman, 1997).

Perfectionism is often mentioned in relation to gifted children, and the article outlined the difference between adaptive and maladaptive perfectionism and how these in turn were related to secure and insecure attachment. Speirs Neumeister and Finch (2006) also concluded in their study that some forms of perfectionism were associated with insecure attachment. Frequently repeated states of fear through traumatic events, then, may not only become bad memories but will result in actual traits or characteristics (Perry & Szalavitz, 2006). Healthy development, therefore, depends on sensitive responses to babies' needs, particularly during the first year of life.

Insecure and disorganized attachment develops when the mother is frightened or frightening. These are linked to a variety of psychological disorders seen in children (Joseph, 1999; Perry, 2007; Piechowski, 1997; Prior & Glaser, 2006; Steele, 2002). We will now look at insecure ambivalent/resistant attachment, insecure avoidant attachment, and disorganized attachment.

### Ambivalent/Resistant Attachment

Babies with this attachment style tend to cry more and are immediately and intensely distressed when mothers leave but are not particularly comforted upon their return (Prior & Glaser, 2006). When older, these children are more anxious, less forceful, less confident, more withdrawn, more passive, and more hesitant in relation to new experience than both the securely attached and the avoidantly attached children. It is believed that these children turn their attention inwards toward their distress at the unavailability of their attachment figure and are more likely to be diagnosed with internalizing disorders such as anxiety and depression.

Although ambivalently/resistantly attached children may have been born with intellectual potential, their learned reluctance to attempt new experiences and the anxiety and tendency to depression brought about by their insecure attachment style are likely to hamper both intellectual and all other potential. Cognitive performance (Hall, 2005) and IQ scores—used to predict performance at school, in the workplace (Giles, 2006), and one of the tools used in gifted identification—are affected by fear and anxiety (Blair, 2002). A recent study has provided some insight into the

biological events flowing from fear states in the daily lives of extremely inhibited children (Gunnar & Quevedo, 2007). It was found that they were highly vigilant with higher heart rates and greater right frontal electroencephalograph activity than other children. Clearly not all gifted children are extremely inhibited. However, such studies can help explain how frequent fear states early in life can become the “default option” in new experiences through biological repetition of fear states and thereby prevent optimum academic performance.

As mentioned, there is a dearth of studies on giftedness and attachment style. In fact, only one longitudinal study was found of 63 infants who were recruited from White middle-class homes in the Midwestern United States (Karrass & Braungart-Rieker, 2004). The study involved both mothers and babies and included several test situations and an IQ test. The authors found that insecure babies, who had reacted with higher distress to novelty than others, had higher IQs at 3 years of age than other child participants. The authors, whose research population was a “low risk group” (p. 223), were unable to explain these results. They may not have considered that children with high IQ can also be characterized by behavioral inhibition (Blair, 2002), found in ambivalent/resistant insecurely attached children. The children’s high IQ would have afforded them a more efficient brain neural system (Passingham, 2006), resulting in quicker learning, including learning to avoid painful experiences such as inconsistent care-giving. Painful experiences and novel events are both stressors (Schore, 2001), especially once trauma has generalized (e.g., “defaulted”) to any unexpected event. Such high or persistent levels of fear appear to activate an automatic fear response, preventing any prior cognitive assessment (LeDoux as cited in Blair, 2006). For intelligent and highly sensitized children, therefore, even minor stressors, such as the introduction of a new toy, are likely to result in heightened vigilance and distress.

### Avoidant Attachment

Avoidantly attached babies explore equally well in the mother’s absence or presence, seek little contact with mothers, and are rarely distressed when they leave (Prior & Glaser, 2006). When older, these children are more hostile, angry, and aggressive, have more antisocial behaviors and more negative feelings, and are more likely to scapegoat and victimize other children as early as the preschool years. They are usually more demanding and commanding and are more likely to have poor peer relationships and suffer from depression (Lyons-Ruth, Easterbrooks, & Cibelli, 1997) and are more likely to display angry, aggressive behavior than those who are securely attached and who therefore approach and readily use parents and other adults to ease their distress (Prior & Glaser).

An explanation for this behavior is that avoidant and insecure children use a strategy of turning their attention

away from themselves, because they have experienced minimal opportunity for expression of their needs. Because they are not in touch with their real feeling state they are prone to act out and are more likely to be diagnosed with externalizing disorders such as oppositional defiant disorder. Although they are more open to experiences than ambivalent/resistant children, this very characteristic combined with angry energy is likely to lead them down less helpful risk-taking pathways.

Additionally, their antisocial behaviors will not win them many friends, and they are less likely to elicit positive adult attention. Their attachment style has not taught them to expect a strong association between social interaction and pleasure. For these children, then, the adults’ important influence on successful socialization and the imparting of knowledge is therefore diminished.

Perfectionism in this attachment style is thought to be informed by a negative view of others while at the same time striving to seem perfect in their eyes, possibly to mask emotional wounds incurred through unresponsive care-taking (Wei, Mallinckrodt, Russell, & Abraham, 2004). Although this may be an adaptive response when it is first established, it later becomes a liability, often leading to depression and feelings of hopelessness (Wei et al.), interfering with cognitive functioning. Additionally, gifted individuals with this attachment style may be less inclined to try out new skills and experiences in case they fail and are likely to procrastinate due to fear of failure, possibly passing up chances to achieve their potential.

### Disorganised Attachment

These children display confusion in connection with their mother, sometimes approaching and sometimes distancing themselves. Abuse, hostility, and domestic violence are causative factors in disorganized attachment. Researchers have observed clumsy, stumbling movements in the presence of parents, as well as fearful (e.g., hunched) body language. The children appear disoriented and have rapid mood changes. They also show more hostility and insecurity and are more likely to have a depressed mother and to continue their aggressive behaviors if their parents have perceived them to have a difficult temperament at age 2 (Greenberg, 1999). One study found that among 7-year-old children identified by teachers as aggressive, 83% were disorganized in their attachment behavior in infancy and were below the American national mean in mental development scores at 18 months (Lyons-Ruth et al., 1997).

An interesting observation by one researcher has uncovered the possibility of a split between the verbal and the physical communication from the mother to the disorganized child: although the words used were appropriate, the tone and body language were at the same time threatening (Newton, 2006). Research on language development in maltreated toddlers has also revealed a pattern of shorter sentences and

less descriptive and less relevant speech, especially in reference to children's own activities and feelings (Coster, Gersten, Beeghly, & Cicchetti, 1989). The researchers outlined several findings that indicated how advances and lags in one domain (e.g., socioemotional) have consequences for the emergence and development of functions in another domain (e.g., language). In terms of behavior, children with disorganized attachment are more likely to be controlling, angry, hostile, and oppositional, with low self-confidence and poor social competence, struggling in academic performance, perceiving themselves and others as both frightened and frightening. Very young children and girls tend to dissociate when faced with painful experiences, because they cannot flee or fight (Perry & Szalavitz, 2006). These children, too, are likely to be diagnosed with oppositional defiance disorder, and from late adolescence with dissociative disorders.

Neither insecure-avoidant nor disorganized children are likely to experience remorse at displeasing others through disobedience, aggression, and violence, behaviors that arise from abuse and neglect. As an example, a Canadian study of Romanian orphans found that the longer the children had spent in the orphanages, the higher they scored on the externalizing behaviors such as aggression and to a lesser degree on withdrawn, somatic problems, and anxious/depressed behavior (Ames, 1990). Without the important social motivator mentioned above, parents and teachers are left with few tools to direct the child toward either learning experiences or positive behaviors. These children are more likely to enter a feedback loop of using aggression and power over others when they are unmotivated by social acceptance in exchange for positive behavior. Their inevitable rejection by disaffected peers and adults reinforces their association with others who have similar histories and behaviors as their own. As they grow older they may seek violent media entertainment to further anchor and legitimize their worldviews (American Psychological Association, n.d.). Although the characteristics of most highly and profoundly gifted children include being concerned with justice and fairness (Rogers & Silverman, 1997), history has demonstrated that giftedness does not prevent criminal behavior (Oleson, 2004), including nonviolent white collar crimes (Wong, 2005).

To sum up, giftedness is likely to be adversely affected by insecure and disorganized attachment. Whereas ambivalent/resistant attachment would affect gifted children's confidence, children with avoidant and disorganized attachment styles and associated behavior problems are likely to confront, test, and defy social boundaries. Although they appear more confident, they are more likely than others to suffer from depression, attended by an inhibiting effect on areas such as planning and learning. Children with disorganized attachment are likely to have been abused and/or neglected, and these stressors, if they occur early and frequently, can have a devastating effect on all aspects of development, including damaged and reduced brain size and poor functioning of the

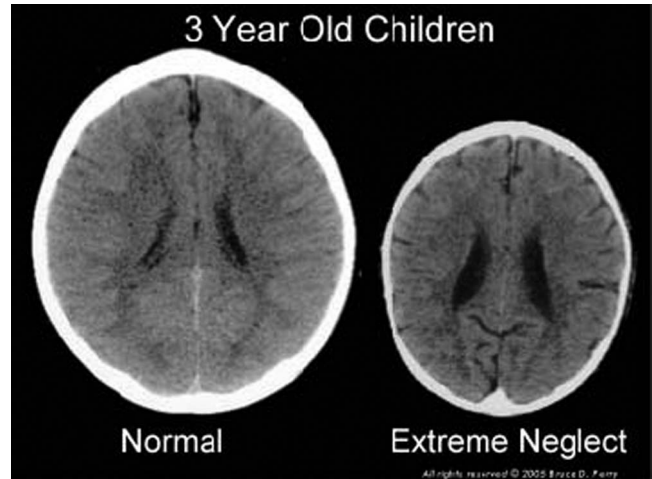


FIGURE 1 Effect of total global neglect during early childhood. These images illustrate the impact of neglect on the developing brain. The CT scan on the left is from a healthy 3-year-old child with an average head size (50th percentile). The image on the right is from a 3-year-old child following total global neglect during early childhood. The brain is significantly smaller than average and has abnormal development of cortical, limbic and midbrain structures. *Note.* From studies by Bruce D. Perry, M.D., Ph.D. at The Child Trauma Academy ([www.ChildTrauma.org](http://www.ChildTrauma.org)). Perry, B.D. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind*, 3, 79-100. Reprinted with permission.

frontal area of the brain associated with attention, working memory, and intelligence (Perry, 2002; Perry & Szalavitz, 2006; see Figure 1).

#### BRAIN PLASTICITY AND SENSITIVE PERIODS FOR SOCIOEMOTIONAL DEVELOPMENT

Figure 1 is not a stand-alone example: One study found that 85% of abused and neglected children had developmental delay (Perry, 2002), presumably including those who had been born with genetically inherited intellectual potential among their number. The question has to be asked: How plastic is the brain? Can damage be healed, at least in cases where conditions improve? It is now known that new neurons do form in the adult hippocampus, an area associated with memory (Sutton, 2005). According to Fernandez-Ballesteros, Zamarron, Tarraga, Moya, and Iniguez (2003), cognitive plasticity and learning and rehabilitation potential are new constructs. Their study found that mild cognitive impairment and Alzheimer's disease can improve in the areas of visual memory, verbal learning, and executive function. Hall (2005) also cited research demonstrating greater brain plasticity beyond childhood than previously thought. As examples, Hall referred to repair after injury and to taxi drivers with adult-acquired enlargement of posterior hippocampi, an area associated with spatial representation.

These findings are hardly new, however. Howe et al. (1998) cited findings of violinists and other string players with enlarged brain areas where the digits of the left hand are represented, presumably from frequent use. Ericsson et al. (2007) used these findings to support the claim that gifted eminence or mastery is the result of long-term tenacity and commitment, rather than the result of innate ability. They argued that at least 10,000 hours of dedicated and “deliberate practice”—involving continual improvement through ever more refinement and perfection—is required for mastery in any field. However, Winner (2000) argued for the unusual tenacity typically displayed by many gifted children and cited other findings indicating that deliberate practice does not in itself rule out innate ability.

We have seen how plasticity can affect adult brains. Can this also apply to early damage? In particular, can the problems of gifted and learning disabled children, or gifted children’s behavior problems, be successfully addressed to ensure their improved development? Blackman (2002) reviewed the benefits of early intervention and conceded that we do not yet know how to fully capitalize on brain plasticity.

We know from studies of Romanian orphans found after the overthrow of Romania’s leader Ceausescu, that brain organization caused by early emotional deprivation may be more difficult to change, especially if intervention takes place after 6 months of age (Croft et al., 2007). This is because the brain matures from the bottom up, and the amygdala, a brain area associated with socializing, begins to mature around 6 months of age (Joseph, 1999). Maternal depression during early development, an issue also pertinent to mothers of gifted children, has resulted in later and ongoing problematic effects in children’s behaviors (Essex, Klein, Cho, & Kraemer, 2003). The above evidence points to a sensitive period in connection with attachment that appears to be resistant to change. It can therefore be concluded that in terms of neglect and abuse, “the earlier it starts, the more difficult it is to treat and the greater the damage is likely to be” (Perry & Szalavitz, 2006, p. 152).

There have, however, been some successes that can give heart to parents of gifted children who have learning or behavior problems. Findings indicate that positive changes are possible until about 5 years of age if maternal sensitivity improves as a result of changed family circumstances (Sroufe, Egeland, Carlson, & Collins, 2005). Additionally, early intervention has held some promise (Heckman, 2006); for instance, through parenting programs (Hoffman, Marvin, Cooper, & Powell, 2006; Scott, 2003). However, these will only succeed if parents are willing and prepared to invest ongoing time and effort. For children whose circumstances have improved, perhaps as a result of their mothers receiving treatment for maternal depression (Weissman et al., 2006), there is a promising approach now emerging. This approach is aimed at addressing the original

unanswered needs of the brain areas affected at the time of the child’s trauma (Perry, 2006). However, such processes are long, require patience, and are currently unable to guarantee that treatment programs can address all problems equally precisely (Pollak, 2005).

The future holds more promise: Targeted treatments are expected to be much more successful once fine-grained brain research uncovers the exact connections between development, behavior, and the brain (Blackman, 2002). Drug therapy, too, is becoming increasingly sophisticated and better able to target deficits (Farah et al., 2004). LeDoux, a neuroscientist, is currently trialing drugs that may “eliminate” the memory of particular fear memories associated with earlier traumas (as cited in Behar, 2008).

## AN EXPERIMENT WITH IQ SCORES

Recall the earlier mention of IQ tests, and that IQ tests are one of a number of ways to identify intellectually gifted children (Van Tassel-Baska, 2005). They are also often used in research, traditionally measuring verbal and performance factors. More recently they have been used in connection with brain research, with findings linking IQ to the frontal and prefrontal cortex (Duncan et al., 2000; Shaw et al., 2006).

One study of traumatized children found that higher verbal IQ was significantly associated with fewer traumatic experiences and symptoms in children (Saltzman, Weems, & Carrion, 2006). Similarly, Perry (2001) has found that chronically traumatic environments result in a prominent verbal–performance split on IQ testing ( $n=108$  WISC Verbal=8.2; WISC Performance=10.4). Observations have also been made that verbal IQ of abused and neglected children are often in the low to normal range, whereas the performance IQ may be quite high:

This split between verbal and performance scores is often seen in abused or traumatized children and can indicate that the developmental needs of certain brain regions, particularly those cortical areas involved in modulation the lower, more reactive regions have been not been met [*sic*]. In the general population about 5 percent of people show this pattern, but in prisons and juvenile treatment centers that proportion rises to over 35 percent. It reflects the use-dependent development of the brain: with more developmental chaos and threat the brain’s stress response system and those areas of the brain responsible for reading threat-related social cues will grow, while less affection and nurturing will result in underdevelopment of the systems that code for compassion and self-control. (Perry & Szalavitz, 2006, pp. 104–105)

Similar observations of a split between verbal and performance scores have been made in the case of some gifted children. The IQ scores of gifted children are thought to range

from IQ115, mildly gifted, to IQ175+, profoundly gifted (Feldhusen as cited in Gross, 2000; Sheely & Silverman, 2000). Studies cited by Silverman (2002) have found that approximately one third of students in a number of schools had a *visual-spatial* learning style, which appears to be associated with overdevelopment of the right brain. The children Silverman called *visual-spatial learners* also often had large discrepancies between verbal and performance scores in IQ tests. The verbal and performance scores are no longer available in the latest Wechsler Intelligence Scale for Children—Fourth Edition (WISC-IV; Wechsler, 2003), although a large discrepancy can still be found between the new Verbal Comprehension and the other three indices.

I hypothesized that advanced language skills—linked with secure attachment—are essential for obtaining the highest possible IQ scores, and carried out the following experiment: A WISC-IV (Australian) test was contrived for a mythical 7-year-old insecurely attached gifted child. An average Verbal Comprehension IQ was “scored” (= IQ100), along with maximum scores in Perceptual Reasoning, Working Memory, and Processing Speed (Table 1). Although the Full Scale IQ (FSIQ) is not normally calculated when there is a large discrepancy between indices, because it makes overall intellectual functioning difficult to summarize by a single score, it was calculated in this case for the sake of the experiment (= FSIQ148). The score clearly shows that this mythical child would not be able to obtain a Full Scale IQ score in the Exceptionally Gifted (= IQ160–179) or Profoundly Gifted ranges (IQ180+; Feldhusen as cited in Gross, 2000).

Because the highest possible scores were utilized for nonverbal indices, the scenario did not calculate for typical scores expected from a child with severe early difficulties (Table 2). In reality, such high scores would be unlikely, especially in Working Memory. This is because ongoing stress shuts down the prefrontal cortex, favoring the lower brain systems where the fight-or-flight states originate (Perry & Szalavitz, 2006).

Were we to reduce the Working Memory score to the more likely average score, then the Full Scale IQ (= IQ135) would only be just within the Moderately Gifted category (= IQ130–144). As can be seen, children who are gifted and insecurely attached may well obtain a low to normal verbal IQ, a high IQ in Perceptual Reasoning, and quite low scores in Working Memory, as well as in Processing Speed (a

TABLE 2  
Subtest Results of Mythical 7-Year-Old's IQ Score

	<i>Test age equivalence</i>	<i>Percentile rank</i>
Verbal comprehension subtests		
Similarities	6:10	50
Vocabulary	7:10	63
Comprehension	7:2	50
Perceptual reasoning subtests		
Block Design	>16:10	99.9
Picture Concepts	>16:10	99.9
Matrix Reasoning	>16:10	99.9
Working memory subtests		
Digit Span	>16:10	99.9
Letter-Number Sequencing	>16:10	99.9
Processing speed subtests		
Coding		99.9
Symbol Search		99.9

weakness seen in many gifted children), significantly reducing their Full Scale IQ. Our mythical intellectually gifted, insecurely attached, neglected or abused child could therefore only be expected to score in either the Mildly Gifted (= IQ115–129) or Moderately Gifted range (= IQ130–144).

### THE CONNECTION BETWEEN ATTACHMENT STYLES AND GIFTEDNESS

Silverman (2002) noted that the gifted visual-spatial learners with large discrepancies between their verbal and performance IQ often had attention and learning problems. Others have also noted that large discrepancies in IQ scores are signs of learning difficulties (Blair, 2006; Munro, 2002). We saw earlier that approximately one third of students have a visual-spatial learning style in some schools that were surveyed and that this learning style is apparently associated with overdevelopment of the right brain (Silverman). Interestingly, recent figures indicate that over 20% of mothers with young children are depressed (Johnson & Flake, 2007) and that others are affected by an unresolved insecure attachment style. We have already learned that approximately one third of children are insecurely attached, and together with the one third of some school populations with a visual-spatial orientation, the figures and problems appear to be so similar that there is a temptation to speculate whether they could represent overlapping populations. It could be argued that maternal depression, insecure attachment, overdevelopment of the right brain, learning difficulties, and gifted visual-spatial children are all connected, and only future research will be able to test this notion.

The inconsistent research findings on the social adjustment of gifted children mentioned earlier can be partially understood in the light of attachment styles: We could expect securely attached gifted children to be socially well

TABLE 1  
Score Summary of Mythical 7-Year-Old's IQ Score

<i>WISC-IV Australian composite</i>	<i>Score</i>
Verbal Comprehension Index (VCI)	100
Perceptual Reasoning Index (PRI)	155
Working Memory Index (WMI)	150
Processing Speed Index (PSI)	150
Full Scale IQ (FSIQ)	148



adjusted and insecurely gifted children less so, with attachment style accounting for level of adjustment and affecting level of intellectual giftedness. The influence of attachment style on giftedness creates a very different view from the traditional gifted models, research, and scholarly articles where the emphasis has been squarely on the differentness of gifted children. It is the notion of differentness that has thus far blinded us to the fact that both gifted and nongifted children share many similarities, including some insecure and depressed mothers as well as some characteristics arising from various attachment styles.

Although there is a need for research on the percentage of securely and insecurely attached children within the gifted population, it is argued here that some problems currently associated with giftedness may arise from insecure attachment and parenting issues. Literature dealing with a variety of gifted issues can give a false impression that gifted children come complete with problems associated with their giftedness, yet we have no up-to-date data on problems within the gifted population. Nor have any consistent and specific pathways been available to address these “gifted” problems. It seems, therefore, that there is a need for a gifted model that clearly sets out the developmental realities of gifted development that involves attachment and fleshes out a gifted spectrum. This model would be helpful for parents, educators, and psychologists alike and would provide an inclusive road map for educational, psychological, and research purposes.

In summary, although the impact of attachment is hardly new, and although the link between IQ and parenting has long been established, the mutual influence between giftedness and attachment style and the impact of insecure attachment on giftedness has not been previously examined. Having made that link here, it can now be argued that, because a number of insecurely attached children will have learning difficulties, gifted children could be among their number—an argument that provides the rationale for a gifted spectrum. Such a spectrum would include the securely attached gifted child, a gifted spectrum of children with a variety of learning and other difficulties and disabilities arising from insecure attachment, as well as children with problems caused by other environmental and biological factors.

## CONCLUSION

The pathways to giftedness are many and arduous but never as arduous as during the period when attachment takes place. Secure attachment may be the gatekeeper to unlimited possibilities for those children who have a genetically inherited intellectual potential. It can pave the way to giftedness in a variety of areas, including emotional and intellectual giftedness. Gifted children who are insecurely attached,

however, will possibly struggle with a variety of learning and psychological difficulties and may find that their attachment style can be a limiting factor in reaching their full potential.

## REFERENCES

- Ainsworth, M., & Bell, S. (1974). Mother–infant interaction and the development of competence. In K. Connolly & J. Brunner (Eds.), *The growth of competence* (pp. 97–118). London: Academic Press.
- American Psychological Association. (n.d.). *Resolution on Violence in Video Games and Interactive Media*. Retrieved January 3, 2010, from <http://search.apa.org/search?query=Resolution%20on%20Violence%20in%20Video%20Games%20and%20Interactive%20Media>
- Ames, E. W. (1990). Spitz revisited: A trip to Romanian orphanages. *Canadian Psychological Association Developmental Psychology Section Newsletter*, 9(2), 8–11.
- Bar-On, R. (2006). The Bar-On model of emotional-social intelligence (ESI). *Psycothema*, 18, 13–25.
- Behar, M. (2008). Paging Dr. Fear. *Popular Science*, 272(1), 50–55, 82, 84, 86.
- Blackman, J. A. (2002). Early intervention: A global perspective. *Infants and Young Children*, 15(2), 11–19.
- Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children’s functioning at school entry. *American Psychologist*, 57, 111–127.
- Blair, C. (2006). How similar are fluid cognition and general intelligence? A developmental neuroscience perspective on fluid cognition as an aspect of human cognitive ability. *Behavioral and Brain Sciences*, 29, 109–160.
- Bowlby, J. (1969). *Attachment and loss: Vol. 1. Attachment*. London: Hogarth Press and the Institute of Psycho-Analysis.
- Cicchetti, D., Rogosch, F. A., & Toth, S. L. (1998). Maternal depressive disorder and contextual risk: Contributions to the development of attachment insecurity and behavior problems in toddlerhood. *Developmental Psychopathology*, 10, 283–300.
- Clark, B. (2008). *Growing up gifted: Developing the potential of children at home and at school* (7th ed.). Saddle River, NJ: Merrill/Prentice Hall/Pearson.
- Commonwealth Government Publishing Service. (2001). *The Report of the Senate Select Committee on the Education of Gifted and Talented Children*. Canberra, Australia: Author.
- Cornish, A. M., McMahon, C. A., Ungerer, J. A. Barnett, B., Kowalenko, N., & Tennant, C. (2006). Maternal depression and the experience of parenting in the second post natal year. *Journal of Reproductive and Infant Psychology*, 24, 121–132.
- Coster, W. J., Gersten, M. S., Beeghly, M., & Cicchetti, D. (1989). Communicative functioning in maltreated toddlers. *Developmental Psychology*, 25, 1020–1029.
- Croft, C., Beckett, C., Rutter, M., Castle, J., Colvert, E., Groothues, C., et al. (2007). Early adolescent outcomes of institutionally-deprived and non-deprived adoptees. II: Language as a protective factor and a vulnerable outcome. *Journal of Child Psychology and Psychiatry*, 48(1), 31–44.
- Davidson, R. (1994). Asymmetric brain function, affective style and psychopathology: The role of early experience and plasticity. *Development and Psychopathology*, 6, 741–758.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality & Social Psychology*, 92, 1087–1101.
- Duncan, J., Seitz, R. J., Kolodny, J., Bor, D., Herzog, H., Ahmed, A., et al. (2000). A neural basis for general intelligence. *Science*, 289, 457–460.

- Ericsson, K. A., Prietula, M. J., & Cokely, E. T. (2007). The making of an expert. *Harvard Business Review*, 85, 115–121.
- Essex, M. J., Klein, M. H., Cho, E., & Kraemer, H. C. (2003). Exposure to maternal depression and marital conflict: Gender difference in children's later mental health symptoms. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42, 728–737.
- Farah, M. J., Illes, J., Cook-Deegan, R., Gardner, H., Kandel, E., King, P., et al. (2004). Neurocognitive enhancement: What can we do and what should we do? *Nature Reviews Neuroscience*, 5, 421–425.
- Fernandez-Ballesteros, R., Zamarron, M. D., Tarraga, L., Moya, R., & Iniguez, J. (2003). Cognitive plasticity in healthy, mild cognitive impairment (mci) subjects and Alzheimer's disease patients: A research project in Spain. *European Psychologist*, 8, 148–159.
- Fonagy, P., Steele, H., & Steele, M. (1991). Maternal representations of attachment during pregnancy predict the organization of infant–mother attachment at one year of age. *Child Development*, 62, 891–905.
- Frasier, M. M., & Passow, A. H. (1994). *Toward a new paradigm for identifying talent potential* (Research Monograph No. 94112). New York: Columbia University, Teachers College, the National Research Center on the Gifted and Talented.
- Freeman, J. (2005). Permission to be gifted. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (2nd ed., pp. 80–97). New York: Cambridge University Press.
- Gagne, F. (1985). Giftedness and talent: Reexamining a reexamination of the definitions. *Gifted Child Quarterly*, 29, 103–112.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.
- Gartstein, M. A., & Sheeber, L. (2004). Child behavior problems and maternal symptoms of depression: A mediational model. *Journal of Child and Adolescent Psychiatric Nursing*, 17, 141–150.
- Giles, J. (2006). Scans suggest IQ scores reflect brain structure. *Nature*, 440, 588–589.
- Greenberg, M. (1999). Attachment and psychopathology in childhood. In J. Cassidy & P. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical applications* (pp. 469–496). New York: Guilford.
- Greenough, W., & Black, J. (1992). Induction of brain structure by experience: Substrate for cognitive development. In M. R. Gunnar & C. A. Nelson (Eds.), *Minnesota symposia on child psychology 24: Developmental behavioral neuroscience* (pp. 155–200). Hillsdale, NJ: Lawrence Erlbaum.
- Greenough, W. T., Black, J. E., & Wallace, C. S. (1987). Experience and brain development. *Child Development*, 58, 539–559.
- Gross, M. U. M. (2000). Issues in the cognitive development of exceptionally and profoundly gifted individuals. In K. A. Heller, F. J. Mönks, R. J. Sternberg, & R. F. Subotnik (Eds.), *International handbook of research and development of giftedness and talent* (2nd ed., pp. 179–192). New York: Pergamon.
- Gunnar, M., & Quevedo, K. (2007). The neurobiology of stress and development. *Annual Review of Psychology*, 58, 145–173.
- Hall, J. (2005). *Neuroscience and education* (SCRE Research Report No. 121). Glasgow, Scotland: University of Glasgow, the Scottish Council for Research in Education Centre.
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312, 1900–1902.
- Hoffman, K. T., Marvin, R. S., Cooper, G., & Powell, B. (2006). Changing toddlers' and preschoolers' attachment classifications: The circle of security intervention. *Journal of Consulting & Clinical Psychology*, 74, 1017–1026.
- Howe, M. J. A., Davidson, J. W., & Sloboda, J. A. (1998). Innate talents: Reality or myth. *Behavioural and Brain Sciences*, 21, 399–442.
- Johnson, P. L., & Flake, E. M. (2007). Maternal depression and child outcomes. *Psychiatric Annals*, 37, 404–410.
- Joseph, R. (1999). Environmental influences on neural plasticity, the limbic system, emotional development and attachment: A review. *Child Psychiatry and Human Development*, 29, 189–208.
- Karrass, J., & Braungart-Rieker, J. M. (2004). Infant negative emotionality and attachment: Implications for preschool intelligence. *International Journal of Behavioral Development*, 28, 221–229.
- Leschied, A. W., Chiodo, D., Whitehead, P. C., & Hurley, D. (2005). The relationship between maternal depression and child outcomes in a child welfare sample: Implications for treatment and policy. *Child and Family Social Work*, 10, 281–291.
- Liu, Y. H., Hui, M. P., Lien, J., Kafka, T., & Stein, M. T. (2005). Discovering gifted children in pediatric practice. *Journal of Developmental & Behavioral Pediatrics*, 26, 366–369.
- Lovecky, D. V. (1993). The quest for meaning: Counseling issues with gifted children and adolescents. In L. K. Silverman (Ed.), *Counseling the gifted and talented* (pp. 29–50). Denver, CO: Love.
- Lyons-Ruth, K., Easterbrooks, M. A., & Cibelli, C. D. (1997). Infant attachment strategies, infant mental lag, and maternal depressive symptoms: Predictors of internalizing and externalizing problems at age 7. *Developmental Psychology*, 33, 681–692.
- Marek-Schroer, M. F., & Schroer, N. A. (1993). Identifying and providing for musically gifted young children. *Roeper Review*, 16, 33–36.
- Mayer, R. E. (2005). The scientific study of giftedness. In R. J. Sternberg & J. E. Davidson (Eds.), *Conceptions of giftedness* (2nd ed., pp. 437–448). New York: Cambridge University Press.
- McMahon, C. A., Barnett, B., Kowalenko, N. M., & Tennant, C. C. (2006). Maternal attachment state of mind moderates the impact of postnatal depression on infant attachment. *Journal of Child Psychology and Psychiatry*, 47, 660–669.
- Munro, J. (2002). Understanding & identifying gifted learning disabled students. *Australian Journal of Learning Disabilities*, 7(2), 20–30.
- Nagata, M., Nagai, Y., Sobajirna, H., Ando, T., Nishide Y., & Honjo, S. (2000). Maternity blues and attachment to children in mothers of full-term normal infants. *Acta Psychiatrica Scandinavica*, 101, 209–217.
- Newton, R. P. (2006). Speaking out of both sides of the mouth: The unnoticed road to childhood disorganization. *Psychologist-Psychoanalyst*, 26(2), 17–21.
- Oleson, J. C. (2004). Sipping coffee with a serial killer: On conducting life history interviews with a criminal genius. *The Qualitative Report*, 9(2), 192–215.
- Passingham, R. (2006). Brain development and IQ. *Nature*, 440, 619–620.
- Pearson, J. C., & Jeffrey, T. C. (2007). A cross-cultural comparison of parental and peer attachment styles among adult children from the United States, Puerto Rico, and India. *Journal of Intercultural Communication Research*, 36, 15–32.
- Perry, B. D. (2001). The neuroarcheology of childhood maltreatment: The neurodevelopmental costs of adverse childhood events. In B. Geffner (Ed.) *The cost of child maltreatment: Who pays? We all do* (pp. 15–37). San Diego, CA: Family Violence and Sexual Assault Institute.
- Perry, B. D. (2002). Childhood experience and the expression of genetic potential: What childhood neglect tells us about nature and nurture. *Brain and Mind*, 3, 79–100.
- Perry, B. D. (2006). Applying principles of neurodevelopment to clinical work with maltreated and traumatized children: The neurosequential model of therapeutics. In N. B. Webb (Ed.), *Working with traumatized youth in child welfare* (pp. 27–52). New York: Guilford.
- Perry, B. D. (2007). Attachment, the first core strength. *Early Childhood Today Scholastic*. Retrieved February 3, 2010, from <http://teacher.scholastic.com/professional/bruceperry/attachment.htm>
- Perry, B. D., Pollard, R. A., Blakley, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and “use-dependent” development of the brain: How “states” become “traits.” *Infant Mental Health Journal*, 16, 271–291.
- Perry, B. D., & Szalavitz, M. (2006). *The boy who was raised as a dog: And other stories from a child psychiatrist's notebook: What traumatized children can teach us about loss, love, and healing*. New York: Basic Books.
- Piechowski, M. M. (1997, July/August). *Emotional giftedness: An expanded view*. Paper presented at the 12th World Conference of the World Council for Gifted and Talented Children, Seattle, WA.

- Pollak, S. D. (2005). Early adversity and mechanisms of plasticity: Integrating affective neuroscience with developmental approaches to psychopathology. *Development and Psychopathology*, *17*, 735–752.
- Prior, V., & Glaser, D. (2006). *Understanding attachment and attachment disorders: Theory, evidence and practice*. London: Jessica Kingsley.
- Renzulli, J. S. (1986). The three-ring conception of giftedness: A developmental model for creative productivity. In R. J. Sternberg & J. E. Davidson (Eds.), *Conception of giftedness* (pp. 53–92). New York: Cambridge University Press.
- Renzulli, J. S. (2005). The three-ring conception of giftedness. In R. J. Sternberg & J. E. Davison (Eds.), *Conceptions of giftedness* (2nd ed., pp. 246–279). New York: Cambridge University Press.
- Rice, F., Jones, I., & Thapar, A. (2007). The impact of gestational stress and prenatal growth on emotional problems in offspring: A review. *Acta Psychiatrica Scandinavica*, *115*(3), 171–183.
- Rogers, K., & Silverman, L. (1997, November). *Exceptionally and profoundly gifted children*. Paper presented at the National Association for Gifted Children Annual Convention, Little Rock, AR.
- Rotigel, J. V., & Pello, S. (2004). Mathematically gifted students: How can we meet their needs? *Gifted Child Today*, *27*(4), 46–65.
- Saltzman, K. M., Weems, C. F., & Carrion, V. G. (2006). IQ and posttraumatic stress symptoms in children exposed to interpersonal violence. *Child Psychiatry and Human Development*, *36*, 261–272.
- Scarr, S. (1993). Biological and cultural diversity: The legacy of Darwin for development. *Child Development*, *64*, 1333–1353.
- Schiller, P. (2000, June). *Key findings of brain research for early childhood education*. Paper presented at the Country Children's Services Association Annual Conference, Dubbo, NSW, Australia.
- Schore, A. N. (2001). Effects of a secure attachment relationship on right brain development, affect regulation, and infant mental health. *Infant Mental Health Journal*, *22*(1–2), 7–66.
- Scott, S. (2003). Integrating attachment theory with other approaches to developmental psychopathology. *Attachment & Human Development*, *5*, 307–312.
- Seligman, M. E. P. (1990). *Learned optimism*. Milson's Point, Australia: Random House.
- Shaw, P., Greenstein, D., Lerch, J., Clasen, L., Lenroot, R., Gogtay, N., et al. (2006). Intellectual ability and cortical development in children and adolescents. *Nature*, *440*(7084), 676–679.
- Sheely, A. R., & Silverman, L. K. (2000). Defining the few. *Communicator*, *31*(3), 36–37.
- Silverman, L. K. (Ed.). (1993). *Counseling the gifted & talented*. Denver, CO: Love.
- Silverman, L. K. (2002). *Upside-down brilliance: The visual-spatial learner*. Denver, CO: DeLeon.
- Speirs Neumeister, K. L., & Finch, H. (2006). Perfectionism in high-ability students: Relational precursors and influences on achievement motivation. *Gifted Child Quarterly*, *50*, 238–251.
- Sroufe, A., Egeland, B., Carlson, E. A., & Collins, W. A. (2005). *The development of the person: The Minnesota Study of Risk and Adaptation From Birth to Adulthood*. New York: Guilford.
- Steele, H. (2002). State of the art: Attachment. *The Psychologist*, *15*, 518–522.
- Sternberg, R. J., & Davidson, J. E. (Eds.). (2005). *Conceptions of giftedness* (2nd ed.). New York: Cambridge University Press.
- Sutton, B. J. (2005). Scientific foundations for the social brain concept. *Psychiatric Annals*, *35*(10), 793–802.
- Terman, L. M. (1925). *Genetic studies of genius*. Palo Alto, CA: Stanford University.
- Terman, L. M., & Oden, M. H. (1959). *Genetic studies of genius: The gifted group at mid-life*. Stanford, CA: Stanford University Press.
- Van IJzendoorn, M. H., Dijkstra, J., & Bus, A. G. (1995). Attachment, intelligence, and language: A meta-analysis. *Social Development*, *4*, 117–126.
- Van Tassel-Baska, J. (2005). Domain-specific giftedness. In R. J. Sternberg & J. E. Davidson, (Eds.), *Conceptions of giftedness* (2nd ed., pp. 358–376). New York: Cambridge University Press.
- Wechsler, D. (2003). *Wechsler Intelligence Scale for Children* (4th ed.). San Antonio, TX: Harcourt Assessment.
- Wei, M., Mallinckrodt, B., Russell, D. W., & Abraham, W. T. (2004). Maladaptive perfectionism as a mediator and moderator between adult attachment and depressive mood. *Journal of Counseling Psychology*, *51*, 201–212.
- Weinfeld, N., Sroufe, A., England, B., & Carlson, E. (1999). The nature of individual differences in infant-caregiver attachment. In J. Cassidy & P. Shaver (Eds.), *Handbook of attachment: Theory, research and clinical application* (pp. 68–88). New York: Guilford.
- Weissman, M. M., Pilowsky, D. J., Wickramaratne, P. J., Talati, A., Wisniewski, S. R., Fava, M., et al. (2006). Remissions in maternal depression and child psychopathology. *The Journal of the American Medical Association*, *295*, 22–29.
- Wellisch, M. (2008). Perfectionism, attachment and giftedness. *Tall Poppies*, *33*, 23–27.
- Winner, E. (2000). The origins and ends of giftedness. *American Psychologist*, *55*, 159–169.
- Wong, K. C. (2005). From white-collar crime to organizational crime: An intellectual history. *Murdoch University Electronic Journal of Law*, *14*. Retrieved August 18, 2008, from <http://www.austlii.edu.au/au/journals/MurUEJL/2005/14.html>
- Ziegler, A., & Raul, T. (2000). Myth and reality: A review of empirical studies on giftedness. *High Ability Studies*, *11*, 127–131.

## AUTHOR BIO



**Mimi Wellisch** is an early childhood educator and a psychologist. She is the author of a number of books, papers, and articles and is Director of Clever Kids Consultancy, a service for gifted children and their families. Mimi is currently enrolled in PhD studies at Macquarie University, Australia. E-mail: [mimiwellisch@bigpond.com](mailto:mimiwellisch@bigpond.com)

Copyright of Roper Review is the property of Routledge and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.