Effects of Early Maltreatment on Development: A Descriptive Study Using the Vineland Adaptive Behavior Scales-II

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Children with histories of chronic early maltreatment within a caregiving relationship may develop complex trauma or developmental trauma and suffer from a variety of deficits in many domains. This study explored the effects of complex trauma on the development of 57 children, as measured by the Vineland Adaptive Behavior Scales-II. This is the first descriptive study to report on the significant discrepancies between chronological and developmental ages in adopted and foster children. This study found that adopted and foster children with a psychiatric diagnosis of reactive attachment disorder show developmental delay in the domains of communication, daily living skills, and socialization. The average adaptive behavior composite score for the children in this study yielded a developmental age (age equivalency) of 4.4 years, while the average chronological age was 9.9 years.

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The purpose of this article is to describe the effects of complex trauma (also called developmental trauma), which is defined as chronic early maltreatment within a caregiving relationship, on several domains of development, as measured by the Vineland Adaptive Behavior Scales-II (the Vineland; Sparrow, Cicchetti, & Balla, 2005).

The term *complex trauma* describes the dual problem of children's exposure to traumatic events and the impact of this exposure on immediate and long-term outcomes. *Complex traumatic exposure* is a child's experience of multiple traumatic events that occur within the caregiving system—the social environment that is supposed to be the source of safety and stability in a child's life. Typically, complex trauma exposure refers to simultaneous or sequential occurrences of child maltreatment—including emotional abuse, neglect, sexual abuse, physical abuse, and witnessing domestic violence—that are chronic and begin in early childhood. Moreover, the initial traumatic experiences (e.g., parental neglect and emotional abuse) and the resulting emotional dysregulation, loss of a safe base, loss of direction, and inability to detect or respond to danger cues, often lead to subsequent trauma exposure (e.g., physical and sexual abuse or community violence; Cook, Blaustein, Spinazzola, & Van der Kolk, 2003, p. 5).

The clinical formulation of complex trauma or developmental trauma (Cook, Spinazzola, Ford, Lanktree, Blaustein, Cloitre, DeRosa, Hubbard, Kagan, Liautaud, Mallah, Olafson, & Van der Kolk, 2005; Van der Kolk, 2005) describes seven domains of impairment affected by chronic early relational maltreatment: (1) attachment, (2) biology, (3) affect regulation, (4) dissociation, (5) behavioral control, (6) cognition, and (7) self-concept. The Vineland provides one measure of some of these impairments by measuring

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adaptive functioning in the following domains: communication, daily living skills, socialization, and motor skills (motor skills are measured only in children up to age 6), as well as an overall measure of adaptive functioning, and a maladaptive behavior index rating. The Vineland-II has been the norm for people from birth through age 90. Within each domain are several subdomains. Adaptive behavior is defined as "the performance of daily activities required for personal and social sufficiency . . . as age related . . . by the expectations or standards of others . . . is modifiable . . . by typical performance, not ability" (Sparrow et al., 2005, p. 6).

There is a large body of literature describing the effects of early maltreatment on later child development, behavior, and functioning. Children reared in orphanages show a significant cognitive delay of eight IQ points when compared with similar children who are placed in foster care or raised with their biological parents. "These results point to the negative sequelae of early institutionalization" (Nelson, Zeanah, Fox, Marshall, Smyke, & Guthrie, 2007, p. 1937). Children with histories of maltreatment, such as physical and psychological neglect, or physical and sexual abuse, are at risk of developing severe psychiatric problems (Gauthier, Stollak, Messe, & Arnoff, 1996; Malinosky-Rummell & Hansen, 1993). These children are likely to develop reactive attachment disorder (Greenberg, 1999; Lyons-Ruth & Jacobvitz, 1999) and may be described as experiencing complex trauma. When the trauma experienced is caused by the abuse or neglect inflicted by a primary caregiver, the normal development of secure attachment is disrupted. Such children are at risk of developing a disorganized pattern of attachment (Lyons-Ruth & Jacobvitz, 1999; Main & Hesse, 1990; Solomon & George, 1999). Disorganized attachment is associated with a number of developmental problems including dissociative symptoms

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Note: *The author was a Coordinator and Examiner in the revision of the Vineland-II (Sparrow, Cicchetti, & Balla, 2005, p. 176) and the Center for Family Development was a participating facility (p. 178).*

(Carlson, Cicchetti, Barnett, & Braunwald, 1995), depression, anxiety, and acting-out symptoms (Lyons-Ruth, 1996; Lyons-Ruth, Alpern, & Repacholi, 1993).

Children who have experienced chronic early maltreatment and resulting complex trauma are at significant risk for a variety of other behavioral, neuropsychological, cognitive, emotional, interpersonal, and psychobiological disorders (Cook et al., 2005; Van der Kolk, 2005). Many children with histories of maltreatment are violent (Robins, 1978) and aggressive (Prino & Peyrot, 1994) and, as adults, are at risk of developing a variety of psychological problems (Schreiber & Lyddon, 1998) and personality disorders, including antisocial personality disorder (Finzi, Cohen, Sapir, & Weizman, 2000), narcissistic personality disorder, borderline personality disorder, and psychopathic personality disorder (Dozier, Stovall, & Albus, 1999). Neglected children are at increased risk of social withdrawal and rejection, and have pervasive feelings of incompetence (Finzi et al., 2000). Children who have histories of abuse and neglect are at significantly higher risk of developing posttraumatic stress disorder as adults (Allan, 2001; Andrews, Varewin, Rose, & Kirk, 2000). Sexually abused children are at significant risk of developing anxiety disorders (2 times the average), major depressive disorders (3.4 times the average), alcohol abuse (2.5 times the average), drug abuse (3.8 times the average), and antisocial behavior (4.3 times the average; MacMillian, 2001). Adverse childhood experiences have profound effects on later development, physical health, psychological development, and on a variety of other domains (Edwards, Holden, Felitti, & Anda, 2003). Providing for the effective treatment of such children is a public health concern (Felitti, 2002; Walker, Goodwin, & Warren, 1992).

Early interpersonal experiences have a profound impact on the brain because the brain pathways responsible for social perception are the same pathways that integrate such functions as the creation of meaning, the regulation of body states, the regulation of emotion, the organization of memory, and the capacity for interpersonal communication and empathy (Siegel, 2002). Stressful experiences that are overtly traumatizing may cause chronic elevated

levels of neuroendocrine hormones such as cortisol (Siegel, 2002). High levels of these hormones can cause permanent damage to the hippocampus, which is critical for memory (McEwen, 1999). Maltreatment during early childhood can cause vital regions of the brain to develop improperly, leading to a variety of physical, emotional, cognitive, and mental health problems (U.S. Department of Health and Human Services [DHHS], 2001). In 2005, out of 74 million children in the United States, there were over 900,000 substantiated and indicted cases of child maltreatment (DHHS, 2007). It is primarily children younger than 4 years of age that are at greatest risk, accounting for 79% of child maltreatment-related fatalities (DHHS, 2007). Of 16 million U.S. children under 4 years old, 267,479 were victims of maltreatment in 2005 alone (DHHS, 2007).

The previously mentioned implications become profound when it is considered that over 900,000 children in the United States were confirmed by child protective service agencies to be maltreated, and this figure is considered an underestimate (DHHS, 2005). Nearly three-quarters of these children had no reported history of prior victimization (DHHS 2005, 2007). It is essential that we understand the pervasive effects of child maltreatment so that appropriate interventions, based on the child's strengths and weaknesses, can be implemented. This article is an attempt to shed some light on the effects of child maltreatment on certain aspects of child development and the delays that result.

Method

This study is a descriptive study. The data were collected from the Center for Family Development's data center and identifying information regarding the children and families was removed to ensure confidentiality in the analysis and reporting. All identifying information was kept in a locked cabinet separate from research data.

All families that come to the Center for Family Development have as one component of their comprehensive assessment the administration of the Vineland-II prior to beginning treatment.

Subjects

To be included in this study, the child had to meet the following criteria:

- The child had to complete a Vineland-II in 2007.
- The child had to meet the DSM-IV-R (American Psychiatric Association, 1994) criteria for reactive attachment disorder.
- The child had to meet the clinical criteria for complex trauma as described by Cook et al. (2005). Briefly, this clinical construct refers to the observed sequelae of chronic early maltreatment within a caregiving relationship. These children are described has having impairment in the seven domains: (1) attachment, (2) biology, (3) affect regulation, (4) dissociation, (5) behavioral control, (6) cognition, and (7) self-concept (p. 392).
- The child had to be either adopted or in foster care within the child welfare system.

Of the subjects, 57 met these criteria and were included in the study. No potential subjects met the second, third, and fourth criteria who did not also meet the first criterion. No potential subjects who met all the criteria were excluded from this study.

The diagnosis of reactive attachment disorder and adherence to the clinical criteria of complex trauma were assigned by experienced mental health professionals at the center on the basis of information obtained during a comprehensive, multidisciplinary assessment. All children in the study had been referred with a provisional diagnosis of reactive attachment disorder by other mental health providers, child welfare staff, or pediatricians who practiced in other locations not affiliated with the clinic.

The data was collected from 57 Vineland-IIs. The subjects consisted of 27 boys and 30 girls; 19 were in foster care, and 38 were in adoptive families. The subjects consisted of 1 Asian, 4 Hispanics, 15 African Americans, and 37 Caucasians. Their ages ranged from 2 to 18 years with a mean of 9.9 years and a standard deviation of 4.8 years. Subject characteristics are presented in Table 1.

TABLE 1

Characteristics of Participating Youth

CHARACTERISTIC (*N*)	%
Age[a]	
2–6 (16)	28.1
6.1–10 (10)	17.5
10.1–14 (17)	29.8
14.1–18 (14)	24.6
Gender	
Male (27)	47.4
Female (30)	52.6
Race	
Asian (1)	1.8
Hispanic (4)	7.0
African American (15)	26.3
Caucasian (37)	64.9
Placement	
Adoptive home (38)	66.7
Foster home (19)	33.3

[a]*The age range was 2.3–18 years.* M = *9.9 and* SD = *4.5.*

Measure

The Vineland-II is a reliable and valid instrument for assessing adaptive behavior for people from birth to 90 years of age in the following domains: communication (receptive, expressive, and written subdomains), daily living skills (personal, domestic, and community subdomains), socialization (interpersonal relationships, play and leisure time, and coping skills), and motor skills (fine and gross motor skills for children up to 6 years of age), additionally it provides a maladaptive behavior index score that includes

externalizing, internalizing, and other scales. The maladaptive behavior index is "a composite of internalizing, externalizing, and other types of undesirable behavior that may interfere with the individual's adaptive functioning" (Sparrow et al., 2005, p. 3). It is scored as average (less than 18), elevated (18 to 20), or clinically significant (21 to 24). A level of *average* indicates that the person displays about the same number of maladaptive behaviors as most others. An *elevated* level indicates that the person exhibits more maladaptive behaviors than 84% of those the same age in the standardization sample. A *clinically significant* level indicates that the person exhibits more maladaptive behaviors than 98% of those the same age in the standardization sample. The data for this study came from the Vineland-II survey forms (the survey interview and the parent/caregiver rating form). The two forms differ only in the method of administration (Sparrow et al., 2005).

The survey interview form was administered by the author during the first of three evaluation interviews and prior to making a clinical diagnosis. The parent/caregiver rating form was given to the parent during the first interview and returned by the parent before the second interview. The returned form was reviewed with the parent to clarify any questions or uncertainties. The survey form was used for 11 subjects and the parent/caregiver rating from was used for 46 subjects. The decision to use the survey form or the parent/caregiver rating form was based on the parent's reading level and preference (i.e., would the parent prefer to take the instrument home or have it completed in the office?). In each instance the author read the instructions and further clarified by completing the first section of the Vineland in the office with the parent.

Extensive details regarding the reliability and validity of the Vineland-II instrument are found in the manual (Sparrow et al., 2005). Internal consistency as measured by split-half method yields coefficients in upper 0.80s to low 0.90s. Test-retest reliability falls in the good-to-excellent range. Inter-interviewer reliability is also very good. Interrater reliability is judged excellent.

Results

The results of this study may be found in Table 2, which presents average raw scores, standard scores, percentile rank, adaptive level, and age equivalent levels. All children from this study are presented here. The use of standard scores allows comparison across a wide range of ages.

As can be seen, while the average age of the children in this study was 9.9 years, the average age-equivalent level is moderately low to low, with an overall age-equivalent level of 4.4 years.

TABLE 2

Score Summary Data (n = 57, average age = 9.9)

Subdomain/Domain	Raw Score	Standard Score	Percentile Rank	Adaptive Level	Age Equivalent[a]
Receptive	28			Mod. Low	2:11
Expressive	22			Low	1:3
Written	27			Mod. Low	7
Communication		**64**	**1**	**Low**	**3:9**
Personal	57			Low	4:6
Domestic	17			Mod. Low	6:5
Community	38			Mod. Low	6:6
Daily Living Skills		**73**	**4**	**Mod Low**	**5:10**
Interpersonal Relations	44			Low	3:2
Play and Leisure Time	32			Low	3:6
Coping Skills	23			Mod. Low	3:11
Socialization		**69**	**2**	**Low**	**3:6**
Adaptive Behavior Composite		**68**	**2**	**Low**	**4:4**
Internalizing	8			Elevated	
Externalizing	12			Clinically Significant	
Maladaptive Behavior Index	**28**			**Clinically Significant**	

[a]*Age equivalent scores are presented in the years:months format.*

The average maladaptive behavior index is clinically significant as is the externalizing scale, while the internalizing scale is elevated.

Tables 3 and 4 present the data divided into the upper and lower halves based on age. As can be seen, the older children (mean age 14) have a mean adaptive composite standard score of 67.7, while the children in the younger group (mean age 5.75) have a mean adaptive composite score of 78.8. A *t*-test (two-tailed) results in $t = 3.667$, $p \leq 0.0007$, showing that the older children are statistically significantly more disturbed than the younger group. If we compare the maladaptive behavior indices for each group, we observe similar findings ($t = -2.03$, $p \leq 0.05$).

TABLE 3

Score Summary Data—Younger Half ($n = 28$, average age = 5.75)

Subdomain/Domain	Raw Score	Standard Score	*SD*	Age Equivalent	*SD*
Receptive	25.18		7.7	3.3	3.3
Expressive	72.7		26.1	4.6	3.9
Written	14.4		14.0	4.8	2.9
Communication		**81.6**	**16.7**	**4.25**	**3.4**
Personal	46.3		19.1	4.3	4.0
Domestic	10.4		8.7	3.6	2.8
Community	22.3		18.6	4.5	3.0
Daily Living Skills		**81.8**	**15.7**	**4.1**	**3.3**
Interpersonal Relations	39.4		13.3	3.0	1.9
Play and Leisure Time	25.4		11.4	2.8	1.5
Coping Skills	17.4		12.4	3.3	2.5
Socialization		**76.9**	**12.3**	**3.0**	**2.0**
Adaptive Behavior Composite		**78.8**	**14.5**	**3.8**	**2.9**
Internalizing	7		4.5	Elevated	
Externalizing	11.4		4.8	Clinically Significant	
Maladaptive Behavior Index	**25.4**		**11.0**	**Clinically Significant**	

TABLE 4

Score Summary Data—Older Half (n = 29, average age = 14)

Subdomain/Domain	Raw Score	Standard Score	*SD*	Age Equivalent	*SD*
Receptive	31.3		5.2	5.4	3.6
Expressive	96.6		7.2	7.4	3.5
Written	37.7		8.3	10.4	3.5
Communication		**73.5**	**9.5**	**7.7**	**3.5**
Personal	67.0		7.3	8.3	3.5
Domestic	24.1		10.6	8.2	3.4
Community	53.0		13.6	9.5	3.2
Daily Living Skills		**71.7**	**11.6**	**8.7**	**3.4**
Interpersonal Relations	47.6		11.4	4.5	2.8
Play and Leisure Time	38.7		8.8	5.1	2.4
Coping Skills	28.8		11.1	5.7	3.0
Socialization		**63.2**	**7.9**	**5.1**	**2.7**
Adaptive Behavior Composite		**67.7**	**7.5**	**7.2**	**3.2**
Internalizing	9.1		4.3	Clinically Significant	
Externalizing	13.3		4.6	Clinically Significant	
Maladaptive Behavior Index	**32.5**		**8.5**	**Clinically Significant**	

When comparing the standard scores for the older and younger groups, we find the data shown in Table 5.

The data indicate that the older group has statistically significantly more difficulties (greater delay/lower standard score relative to age) than the younger group in the area of socialization, and overall adaptive behavioral functioning. In addition, the older group's maladaptive behavior index score is statistically significantly higher than that of the younger group. The difference in the communications skills domain is not statistically significant and the difference in daily living skills approaches statistical significance. With a larger sample, more differences may emerge. While

TABLE 5

Comparison of Older and Younger Group Domain Standard Scores

VARIABLE DOMAIN	*T*-VALUE	*P*-VALUE
Communications Skills	1.41	.17
Daily Living Skills	1.83	.07
Socialization	3.29	.002
Adaptive Behavior Composite	2.37	.02
Maladaptive Behavior Index	−2.4	.02

TABLE 6

Comparison of Ethnic Minority and Caucasian Children Domain Standard Scores and Maladaptive Behavior Index Scores

VARIABLE DOMAIN	*T*-VALUE	*P*-VALUE
Communications Skills	−0.1	.94
Daily Living Skills	−1.0	.60
Socialization	0.18	.85
Adaptive Behavior Composite	0.0	1.0
Maladaptive Behavior Index	0.4	.70

there were no differences between the two groups in mental health services history or severity of maltreatment, other mediating variables, such as a longer length of stay in foster care for the older group, may also be factors influencing the observed differences between the two groups.

The data presented in Table 6 indicate that there are no statistically significant differences between Caucasian children and ethnic minority children (African American, Hispanic, and Asian) on their domain standard scores or maladaptive behavior index score.

By comparing the raw and standard scores for each subdomain and each domain, we see no statistically significant difference between the males and females in this study; *t*-test *p*-values ranged from 0.99 to 0.32.

Figure 1 shows the score profile plotted on a normal curve distribution.

The children in this study show significant impairment in all domains and subdomains. By way of comparison, this group of children is notably more impaired than the group of children described in the Vineland-II manual as the "emotional/behavioral disturbance sample." These data are reproduced in Table 7.

Discussion

Understanding how a child's previous history of maltreatment affects the child's everyday functioning is very important for treatment planning, parenting, and school placement and services. This is the first study to report on the discrepancies between chronological and developmental ages in adopted and foster children and while this is a preliminary descriptive study, these data have several important implications.

Limitations

Some limitations to this study bear mentioning:

- While the data show marked discrepancies between chronological and developmental ages in adopted and foster children, the data were collected from only one clinic. It would be useful to replicate this study at other clinics.
- The Vineland data is collected from parent reports. Since there is a teacher version of the Vineland-II, it would also be informative to collect data from both teachers and parents on these children. The ratings of children's behavior by parents and teachers using the two versions of the Vineland show only a modest relationship (Sparrow, Cicchetti, & Balla, 2006, p. 122). This should not be surprising since parents and teachers experience different facets of the child's functioning

FIGURE 1

Score Profile for Study Sample ($n = 57$)

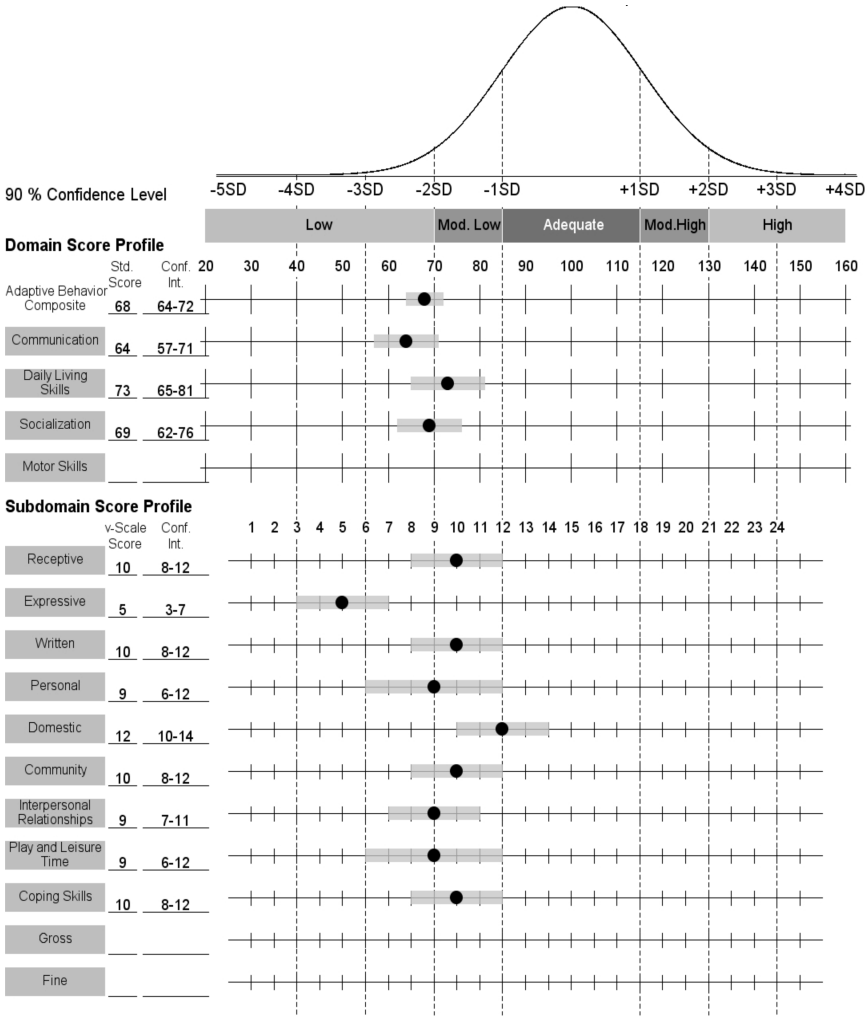

TABLE 7

Comparison of Study Group Scores with Vineland's Emotional/Behavioral Disturbance Sample

	Vineland Sample[1]			Study Sample		
Subdomain/Domain	Mean	*SD*	Difference[2] from Nonclinical Reference Group	Mean	*SD*	Difference from Vineland Clinical Group
Receptive	12.1	2.7	−2.7*	10.0	2.7	−2.1*
Expressive	13.4	2.6	−2.0*	11.3	2.7	−2.1*
Written	12.8	2.9	−2.2*	11.9	3.4	−0.9
Communication	**87.2**	**12.3**	**−14.5***	**77.5**	**14**	**−9.7***
Personal	14.3	2.7	−9.0*	10.8	2.9	−3.5*
Domestic	13.7	3.3	−1.4*	10.9	3.2	−2.8*
Community	13.1	2.8	−2.2*	11.3	3.2	−1.8*
Daily Living Skills	**92.3**	**14.1**	**−9.0***	**76.7**	**14.5**	**−15.6***
Interpersonal Relations	11.7	2.5	−3.4*	9.2	2.7	−2.5*
Play and Leisure Time	11.9	3.8	−3.2*	8.8	2.5	−3.1*
Coping Skills	12.0	2.6	−3.3*	10.5	2.9	−1.5*
Socialization	**82.4**	**13.1**	**−19.0***	**69.9**	**12.3**	**−12.5***
Adaptive Behavior Composite	**85.7**	**11.7**	**−15.4***	**73.1**	**12.7**	**−12.6***

[1] *(Sparrow et al., 2005, p. 153) n = 34.*
[2] *Controlling for sex, race/ethnicity, and education level, and matched by age range with clinical group.*

in two different environments. The use of both parent and teacher instruments may provide a more robust picture of the adaptive behavior functioning of adopted and foster children.

- Another limitation is the sample size of 57. However, even with this relatively small sample size, some findings were striking. More subjects would allow for an analysis of different age groups, which would expand the information gained and would be a valuable extension of this study.

Implications for Treatment and Parenting

It is obvious from these data that these children have significant delays of over five years in adaptive behavior in all domains and most subdomains. This level of impairment is even more substantial than that of the Vineland normative group identified as the emotional/behavioral disturbance sample (see Table 7). This finding suggests that the effects of complex trauma are quite pervasive and serious. For most people, chronological age and developmental age are largely in sync, so treatment and parenting decisions based on chronological age largely match the developmental capabilities of the child. However, with the children in this study, that is not the case, and there are important implications for treatment and parenting. The children in this study had histories of chronic early maltreatment within a caregiving relationship, resulting in complex trauma or developmental trauma, and met the diagnostic criteria for reactive attachment disorder. They showed substantial delays in adaptive functioning. Treatment and parenting decisions must be made in light of those delays.

It is not surprising that the older children (mean age 14 years) are more disturbed than the younger children (mean age 5.75 years). The older group has a lower mean adaptive behavior composite standard score and lower mean communication, daily living skills, and socialization domain standard scores, as well as a higher mean maladaptive behavior index and higher mean internalizing and externalizing scores. We know that multiple foster placements increase the risk of placement disruption (Fisher, Burraston, & Pears, 2005), and foster placement instability is associated with poor child outcomes (Rubin, O'Reilly, Luan, & Localio, 2007). The older children in this study had been in care longer and had more placements than the younger children. One implication for treatment is that it is vital to begin treatment as early as possible and with approaches that show some evidence of effectiveness, such as dyadic developmental psychotherapy, which is an evidence-based and effective treatment for such disorders (Becker-Weidman, 2006a, 2006b;

Becker-Weidman & Hughes, 2008; Hughes, 2007). As described elsewhere (Becker-Weidman & Hughes, 2008; Becker-Weidman & Shell, 2005), this evidence-based and effective treatment is grounded in attachment theory and addresses the various domains of impairment found in complex trauma. Dyadic developmental psychotherapy relies on a variety of well-founded elements of treatment such as affect arousal and regulation, gradual exposure to trauma, parent education, and consultation, explaining how the past may be continuing to affect present behavior, forming, and maintaining a therapeutic relationship through therapist acceptance, affirmation, empathy, and various other dimensions (Lambert, 2004).

The language delays in the receptive and expressive domains suggest that parents, teachers, and providers must be particularly careful to find out whether the child actually understands what is being discussed. In addition, since expressive language delays are especially large, asking the child to further elaborate on a situation, experience, or feeling may lead to frustration for the child and parent since the child may not be able to articulate as clearly as the parent would expect based on the child's chronological age.

The delays in daily living skills suggest that parenting the child based on the developmental age may be most helpful. It may reduce the parents' and child's frustration. When a parent asks a child to "act your age,"—meaning their chronological age—this may not be possible for a child showing this level of delay. Parenting the child at the child's adaptive behavioral level may allow the child and parent to develop a relationship with less stress and conflict, enabling the normal developmental processes to become engaged and allowing the child to progress and "catch up."

Many of these children have poor hygiene; note the low average personal subdomain age equivalent score of 4.6 years for the nearly 10-year-old average child in this study). Expecting such a child to be able to properly wash or brush teeth often leads to frequent battles between parent and child. The parents often feel frustrated with the child's perceived lack of compliance and the child may feel frustrated by being asked to do something which is beyond his

or her ability at that moment in time. Having the parent engage in the task with the child, making it an enjoyable, mutually shared experience, can be therapeutic by reducing conflict and stress and by improving the quality of the parent-child relationship. The shift from "compliance" to "teaching/helping" can have a very positive effect on the relationship and the child's functioning.

The adaptive behavior delays in the socialization domain are especially significant (an age equivalent score of 3.6 years). For the child in school, a regular socialization group in which the school social worker, counselor, or psychologist can observe and coach may be particularly helpful. Merely telling the child how to act or play may be ineffective for several reasons. First, the age equivalent score is so low that such a cognitive intervention may not be effective. Instead, focusing on practicing pro-social behaviors in vivo may be much more effective in making the skill an implicit memory-based and muscle-based skill. Second, the language delays may make talk-based interventions ineffective. Close supervision in social situations allows the parent, teacher, or counselor to intervene before a negative behavior has escalated too far. In addition, the "teaching" that can occur in vivo in the moment may be more effective for longer term learning. Many of these children did not receive such in vivo age-appropriate supervision and teaching at earlier ages, and cannot make use of cognitively based suggestions until they have incorporated skills that are learned in emotional and interpersonal contexts.

Because reactive attachment disorder and complex trauma are relationship difficulties, it is not surprising that the area in which the greatest difference between chronological and developmental age is found is in the socialization domain. The older children had been without effective treatment for a longer period than the younger children and so their delays and difficulties may have worsened over time. One clinical implication of this may be that relationship-based treatments, such as family therapy, and those grounded in attachment therapy may be more effective in remediating these deficits than individual therapies.

Early intervention with effective treatment is very important. One treatment outcome study followed children receiving dyadic developmental psychotherapy for four years after treatment ended and compared that group to a control group that did not receive dyadic developmental psychotherapy (Becker-Weidman, 2006b). The two groups were matched on a variety of demographic variables and the two groups' pretest scores had no statistically significant differences. That study found that the children who received dyadic developmental psychotherapy had statistically and clinically significantly lower scores on the child behavior checklist after treatment, while children in the control group had scores that remained in the clinical range and actually became worse to a statistically significant degree on four scales (anxious/depressed, attention problems, rule-breaking behavior, and aggressive behavior). The findings of this study suggest that without effective treatment, children with reactive attachment disorder and complex trauma become more symptomatic.

The previously mentioned are just a few of the possible implications for parenting and therapy given the adaptive behavioral delays exhibited by these children. The general principle suggested is to treat the child at his or her developmental level or age equivalent level and, as the child's functioning improves, adjust accordingly. Broadly speaking, this is what parents do when their child's chronological and developmental age match; increasing responsibilities and expectations as the child's performance and behavior progresses. However, with these children, cognitive and adaptive functioning may be extremely discrepant, compromising a parent's intuitive judgment of the child's abilities, and causing frustration for both parent and child.

Implications for Schools and Child Welfare

Educators may benefit from understanding that many of the problem behaviors they see at school with children such as those in this study are the result of complex trauma and the delays in adaptive behavior that may result from it. Recognizing the student's actual

level of adaptive functioning, instead of merely the child's chronological age, can help the teacher adapt the lesson plan, level of material, and how this material is communicated (based on the child's receptive language level and cognitive development). For example, it is interesting to note that for older children (see Table 4), the mean receptive subdomain score is two years below their expressive subdomain score. Since we usually communicate with people at the "level" they communicate with us, it may be that at times the child's "oppositional and defiant" behaviors may actually be indicate a lack of understanding. If the teacher, or parent, is speaking to the child at the child's higher expressive level, but the child's understanding (receptive subdomain) is much lower, then the child may appear defiant, but simply may not understand the request. It would then be useful to ask the child what he or she understood the request to be, rather than assume that non-compliance is a sign of defiance.

Children who have reactive attachment disorder or complex trauma often require special education services. Under the Individuals with Disabilities Education Improvement Act of 2004, (a reauthorization of Public Law 94-142), states are required to provide a free and appropriate public education for all children regardless of disability. The guidelines for assessing children with disabilities include measuring adaptive behavior. The present study provides data indicating the extent of delay and impairment such children experience. Children in the child welfare system may require special education services to address these delays. Child welfare workers and school personnel should be aware of these factors and consider adaptive delays when making placement decisions for such children. Smaller class size, longer time to complete work, and recognizing the child's developmental age and ensuring that expectations match the developmental age are other recommendations for educators.

Foster parents require adequate training to understand the nature, extent, and implications of their child's adaptive behavior impairments. Too often, foster and adoptive parents report not being adequately trained or not being made aware of the adaptive

functioning of their children and how this may affect the child's functioning in their home, with peers, and in school. Adding a unit on adaptive functioning, and how it is negatively affected by chronic early maltreatment in a caregiving relationship, to model approach to partnerships in parenting (MAPP) and group preparation and selection (GPS) training for foster and adoptive parents, would be helpful. Such training might help parents better understand and help their children, and could lead to fewer placement disruptions.

Implications for Further Research

This descriptive study suggests a number of intriguing findings. Is developmental functioning affected by treatment? Administering the Vineland before and after treatment could point toward an answer. Since adaptive functioning appears to be related to behavior and functioning in a variety of domains, such as school performance, peer relationships, and overall functioning, it would be important to determine if and how treatment might impact adaptive functioning as measured by the Vineland. Anecdotal data from families in this study indicate that children's adaptive functioning improves after treatment. For example, we find that many of these children had no friends in school, but that after treatment, peer relationships improved, as reported by the child and the child's parents. It would be useful to measure this to determine to what extent this finding is statistically significant.

The literature indicates that chronic early maltreatment within a caregiving relationship, complex trauma, has pervasive negative effects on developmental functioning and developmental age. The findings of this study indicate that these negative effects worsen over time; older children have a large gap between chronological and developmental age. Further research to explore the mechanism by which this occurs and to evaluate moderating variables such as IQ, length of time in a stable setting, and other variables would add to our understanding of this complex phenomenon.

The children in this study were all adopted or in foster care and had significant symptomatic behaviors that brought them to

the attention of a mental health facility. How does this group of adopted and foster children compare with a matched group who do not have significant behavioral, emotional, or psychological problems? It would be helpful to administer the Vineland to a group of adopted and foster children who are not presenting with significant behavioral, emotional, and psychological problems. Such a study might allow us better understand the factors that are contributing to the significant adaptive behavioral delays observed in this group of children. Is it a function of the severity of their early maltreatment, a function of being in the child welfare system, or a function of other factors?

A larger sample size would provide additional power to these findings. A larger sample size might help determine whether some of the findings of this study that were nearly statistically significant, such as the difference in the daily living skills standard scores between the older and younger groups, become significant.

In conclusion, this descriptive study is the first of its kind to demonstrate the notable discrepancies between chronological and developmental ages in adopted and foster children. These delays have a number of very important implications for treatment, further research, effective parenting, parent training, and the education and child welfare systems. Understanding these implications could have a profoundly positive effect on adopted children and children in the child welfare system. Better treatment, increased understanding of the child by parents and others, and better educational placements may all yield improving functioning and reduced placement and adoptive disruptions.

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