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Child Abuse and Neglect: Effects on Bayley Scale Scores[1]

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Compared to controls, children who were diagnosed as victims of Nonaccidental Trauma or Failure to Thrive had depressed Bayley Scale Mental Index scores, $p < .002$ *and* $p < .0001$, *respecitvely. Failure-to-Thrive children also had depressed Bayley Scale Motor Index scores,* $p < .0001$. *Nonaccidental-Trauma children had Mental and Motor Scale range scores, as determined by differences between basal and ceiling items on the Mental and Motor scales, that were a function of measured Mental and Motor Index Scores. Specifically, Nonaccidental-Trauma children with lower Mental Index scores had higher Mental Scale range scores than Nonaccidental-Trauma children with higher Mental Index scores,* $p < .003$. *Control children had Mental Scale range scores that did not differ between the high-low Mental Index score conditions. On the Motor Scale, range scores of Nonaccidental-Trauma children in the high-low Motor Index score conditions did not differ. However, children with higher Motor Index scores had higher Motor Scale range scores than control children with lower Motor Index scores,* $p < .02$. *In addition, the Infant Behavior Record of the Bayley Scales revealed behavior ratings of Nonaccidental-Trauma and Failure-to-Thrive children that differed from Mental and Motor Scale scores on several dimensions. These differences may reflect differential effects of the Nonaccidental-Trauma and Failure-to-Thrive conditions.*

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Certain salient characteristics of a child's environment and a child's relationships with caretakers exert a strong influence on concurrent and subsequent mental test performance. Assessment of the characteristics (i.e., relationship with mother, punishment, and so on) of a young child's home environment that are related to mental functioning are significantly related to later mental test scores (Elardo, Bradley, & Caldwell, 1975; Hanson, 1975). Bayley (1969) reported significant but moderate relationships between early Bayley Mental Index scores and later Stanford-Binet IQ scores suggesting that the function of infant tests and IQ tests are somewhat different. However, when the environment of the child is held constant, the strength of the relation between early Bayley Mental Index scores and later Stanford-Binet IQ scores is increased (Ramey, Campbell, & Nicholson, 1973).

It seems evident that developmental test results would reflect caretaker behaviors toward the child and the condition of his primary environment. Evidence of the depressing effects on mental functioning due to the maternal deprivation syndrome or Failure to Thrive (FTT) was presented by Ramey, Starr, Pallas, Whitten, and Reed (1975). They reported a mean Mental Development Index (MDI) score as measured by the Bayley Scales of Infant Development (BSID) for FTT children to be 60 at the time of initial assessement. The concurrent mean of Psychomotor Development Index (PDI) scores was 61. Evidence for the effects of physical abuse of children was presented by Kempe and Helfer (1972). They found, in a follow-up study of 42 abused children, that one-third were functioning in the retarded range (below 80 in IQ or developmental quotient scores). Elmer and Gregg (1967), in a study of 50 physically abused children, included a history of assault or gross neglect in the diagnostic criterion for abuse. Physical abuse of a child or Nonaccidental Trauma (NAT) is usually preceded by a history of neglect. Kempe and Helfer (1972) in their description of the "battered child" consider physical abuse and neglect in the same category. Physical abuse and neglect may be described as child battering, but the distinction is worth maintaining for investigative purposes.

It also seems evident that a child's test-taking behaviors would reflect the condition of his primary environment and caretaker behaviors. Matheny, Dolan, and Wilson (1974) identified four primary cognitive behaviors (object orientation, goal directedness, attention span, and reactivity to test materials) on the Infant Behavior Record (IBR) of the BSID that were strongly related to concurrent and predictive of subsequent mental test scores. They identified IBR extraversion behaviors (responsiveness to examiner, cooperativeness, and general emotional tone) that were related to concurrent mental test scores for girls but not for boys. But how does a pathological environment affect test-taking behaviors? How do the abnormal behaviors of the caretaker toward the child in the child's primary environment affect test-taking behaviors? How does caretaker response, nonresponse, or inconsistent response affect the childs test-taking behaviors?

In this study we examined test results, a test characteristic, and specific test-taking behaviors obtained from the scales of the BSID for NAT, FTT, and normal control children. The test characteristic examined was a range score obtained from the MDI and PDI Scales. The range score is obtained by subtracting the basal score from the ceiling score. The basal score is the highest item at which all items are passed before the first failure. The ceiling score is the highest passed item before several consecutive failures. Studies of range scores have not appeared in the literature; however, range scores indicate that the amount of spread in test-taking performance is not unlike Wechsler Scale "scatter" described by Wechsler (1944) and Rappaport (1945). The assumption underlying the concept of scatter is that performance on different subtests is differentially affected by pathological conditions (Anastasi, 1968).

The Bayley Scales do not consist of subscales but are composed of individual items that reflect development of fine motor manipulative skills, gross motor abilities, and abstract thinking (Bayley, 1969). The successful completion of an item reflects a certain degree of development. The items on the Bayley Scales are arranged according to degrees of difficulty. The more items passed beyond the basal score will be reflected in the child's Index score. The hypothesis tested is that a child with greater mental abilities as measured by the Bayley Scales would have a wider spread between basal and ceiling scores. In an average child's primary social environment (that environment provided by the family of the child) he will not be inhibited and may even be encouraged to develop certain innate advanced abilities. A child with greater mental abilities would probably have an inflated range between basal and ceiling scores on the Bayley Scales. Considering normal parent concern for normal intellectual capabilities in their children, parents of children whose abilities in certain areas are not obviously advanced (i.e., lower Index scores) would probably encourage development of those skills that seem delayed. Such a parent may produce advances in those skills needing attention, thereby reducing the range between basal and ceiling scores on the Bayley Scales.

If a child's primary social environment can be classified as abusive or neglectful, he will probably not be encouraged and may even be inhibited from developing certain specific advanced abilities, thereby deflating the range between basal and ceiling scores on the Bayley Scales. Children in an abusive or neglectful social environment with less obviously advanced abilities (i.e., lower Index scores) will probably not be encouraged to develop normal levels of intellectual functioning, and may even be discouraged from making developmental advancements. Some specific characteristics (i.e., memory, object constancy) are going to be less responsive to an abusive or neglectful environment, thereby inflating the range between basal and ceiling scores on the Bayley Scales.

Specifically, the hypothesis being tested is that children in physically abusive or neglectful social situations with higher measurable Index scores will have a more restricted range between basal and ceiling scores than children with

lower measurable Index scores. Conversely, children in normal social situations with higher measurable Index scores have higher range scores than normal children with lower measurable Index scores.

There is also the likelihood that the test-taking behaviors of children who have been subjected to an abusive or neglectful social environment should be reflected in behaviors rated on the IBR of the Bayley Scales. Matheny et al. (1974) reported that some test-taking behaviors are differentially related to MDI scores. In this study we are examining the relationships between specific observed behaviors (reflecting cognitive and extraversion dimensions) and concurrent MDI and PDI test scores for NAT, FTT, and normal control children. The relationships of ratings of behaviors more cognitive in nature could differ from MDI test scores within NAT, FTT, and normal control conditions. Also, the pathological characteristics of the NAT and FTT child's environment could be reflected in the ratings of behaviors relating to introversion-extroversion dimensions.

In summary, the purpose of the present study was threefold: (1) to examine the differential effects of NAT and FTT on developmental Index scores, (2) to examine the relationship of MDI and PDI range scores with Index scores for NAT and FTT children, and (3) to find an association between specific behaviors rated on the IBR and the NAT and FTT conditions.

METHOD

Subjects

All of the 46 NAT and 38 FTT subjects were referred by the staff of Denver General Hospital. Diagnosis of the NAT condition consisted of injury characteristics that were not reasonably explained. The NAT condition is similar to the "battered child syndrome" described by Kempe, Silverman, Steele, Droegemueller, and Silver (1962). Criteria for the diagnosis of the FTT condition included recording a significant weight gain (as determined by the hospital staff) in the first 3 days in the hospital, the presence of growth retardation, no organic evidence for the FTT condition, and observation of apathy and developmental lags. Most NAT and FTT children had family social histories suggesting abuse or neglect. Only NAT and FTT children of an age (2 through 30 months) at which the Bayley Scales could be used as an evaluation instrument were included in this study. All of the 38 control subjects were recruited from the Well Baby Clinics in the Denver area. The children served by the Well Baby Clinics were living in social, cultural, economic, and familial conditions that were similar to those conditions of children served by Denver General Hospital, a population considered to be disadvantaged.

Procedure

NAT and FTT subjects were administered the standardized Bayley Scales either in the hospital pediatric ward or at the Developmental Evaluation Center of the hospital (located a short physical distance from the hospital). Normal control subjects had the Bayley Scales administered at the Developmental Evaluation Center or in the child's home.[3] The Mental and Motor Scales were administered and scored according to the procedures outlined in the BSID manual. The IBR ratings were based upon behaviors observed during testing. The IBR consists of ratings of 25 areas of behavior. Only those behaviors reflecting a cognitive or introversion-extroversion dimension were analyzed. Bayley Scales were periodically administered to all subjects, but for the purposes of this study only initial results were examined.

RESULTS

The simultaneous consideration of MDI and PDI scores in a 3 X 2 (group by sex) multivariate analysis of variance resulted in a significant main effect for group, F (4,224) = 9.16, $p < .0001$. NAT subjects had significantly lower MDI scores than control subjects, F (1,113) = 5.32, $p < .002$. PDI scores did not differ between NAT and control subjects. FTT subjects had significantly lower MDI and PDI scores than control subjects, F (1,113) = 27.86, $p < .0001$ and F (1,113) = 22.72, $p < .0001$, respectively. The mean MDIs and PDIs for NAT, FTT, and control groups, as well as the percent of subjects below an Index of 80 for each scale in each condition are shown in Table I.

For the analysis of range scores, 30 cases in each group (NAT and FTT) were examined because control groups had to be constructed to match age characteristics of the NAT and FTT groups. Control groups were constructed by a random age-matching procedure, since the mean age of subjects in each group differed considerably. The mean age of the 30 NAT subjects was 12.9 months. The mean age of the 30 FTT subjects was 6.3 months. The mean age of the 36 control subjects, from which range scores were available, was 10.4 months. For construction of the control group (C-NAT) for analysis of NAT range scores, the 6 lowest aged subjects were eliminated from the control group sample, except control subjects were randomly retained at the lowest age levels to match NAT subjects at that age level. For example, two 2-month-old control subjects were randomly picked to remain in the control group to match the two 2-month-old

[3] Seitz, Abelson, Levine, and Ziegler (1975) found that disadvantaged children performed more poorly when tested in the home. This finding along with the Matheny et al. (1974) report of a positive association between IBR behaviors and test scores would suggest that testing of some normal children in their homes would minimize differences between groups examined in this study.

Table I. Mean MDI and PDI Scores for NAT, FFT, and Control Groups and Percent of Subjects Below an Index of 80

Group[a]	MDI[b]	MDI < 80	PDI[b]	PDI < 80
NAT	87.80 (16.96)	33%	90.05 (18.18)	19%
FTT	87.34 (15.63)	21%	86.39 (16.74)	34%
Control	107.37 (17.22)	8%	105.79 (18.75)	8%

[a]NAT N = 46 MDI scores, 43 PDI scores; FTT N = 38; Control N = 38.
[b]Numbers in parentheses below mean MDI and PDI indicate standard deviations.

NAT subjects. The remaining 30 subjects in the C-NAT group had a mean age of 12.0 months. For construction of the control group (C-FTT) for analysis of FTT range scores, the 6 highest aged subjects were eliminated from the control group sample of 36, except control subjects were randomly retained at the highest age levels to match FTT subjects at those age levels. The remaining 30 subjects in the C-FTT group had a mean age of 8.0 months. The difference between ages of subjects in the FTT and C-FTT groups was not significant.

In a 2 X 2 X 2 (group by high-low MDI split by sex) factorial analysis of variance of Mental Scale range scores for the NAT group, there was a significant main effect for high-low MDI condition, F (1,52) = 6.07, $p < .017$. A median split in MDI scores of subjects in NAT and C-NAT groups resulted in higher range scores in the low MDI condition. All of the difference was due to the significant difference in range scores between the high and low MDI conditions of the NAT group, F (1,28) = 10.59, $p < .0003$. In the analysis of Motor Scale range scores for the NAT group, a 2 X 2 X 2 factorial analysis of variance revealed a significant interaction between group and MDI condition, F (1,52) = 5.00, $p < .03$. Aside from the the interaction, the difference can be explained by the signifi-

Table II. Mean Mental and Motor Scale Range Scores in the NAT Analysis

	Mental scale		Motor scale	
Group	High MDI	Low MDI	High PDI	Low PDI
NAT	13.67 (5.65)[a]	21.73 (7.78)	5.00 (3.27)	6.67 (5.49)
C-NAT	16.07 (6.24)	17.33 (9.43)	6.47 (2.95)	3.73 (3.10)

[a]Standard deviations in parentheses.

cant difference between range scores in the high and low MDI conditions of the C-NAT group, F (1,28) = 6.11, $p < .02$. Mean range scores for NAT and C-NAT groups are shown in Table II.

There were no significant main or interaction effects in the analysis of Mental and Motor Scale range scores in the FTT group.

Table III. Rank-Order Correlations of Selected Behaviors on the Infant Behavior Record (IBR) with Age, Raw MDI, and Raw PDI Scores of the Bayley Scales of Infant Development (BSID)

	NAT males			NAT females		
IBR behavior	Age	Raw MDI	Raw PDI	Age	Raw MDI	Raw PDI
Social examiner	−.06 (28)[a]	−.17 (28)	−.21 (25)	−.07 (15)	−.07 (15)	−.05 (15)
Cooperation	−.46[b] (29)	−.50[b] (29)	−.48[b] (26)	.00 (14)	−.04 (14)	.00 (14)
Emotional tone	−.07 (29)	−.16 (29)	−.11 (26)	−.21 (15)	−.23 (15)	−.19 (15)
Object orientation	.66[b] (28)	.65[b] (28)	.62[b] (25)	.48[b]	.48[b]	.51[b]
Goal-directedness	63[b]	63[b]	.56[b]	.58[b]	.58[b]	.60[b]
Attention span	.49[b]	.50[b]	.37[b]	−.05	.02	.08
Reactivity	.38[b]	.40[b]	.34	.68[b] (14)	.72[b] (14)	.65[b] (14)
	FTT males			FTT females		
Social examiner	.17 (20)	.12 (20)	.09 (20)	.20 (13)	.24 (13)	.31 (13)
Cooperation	−.06 (21)	.09 (21)	.04 (21)	.14	.45	.38
Emotional tone	−.14	.02	.02	.04	.37	.31
Object orientation	.61[b]	.74[b]	.71[b]	.64[b]	.73[b]	.62[b]
Goal-directedness	.55[b]	.68[b]	.63[b]	.40	.50[b]	.37
Attention span	.57[b]	.63[b]	.58[b]	.48[b]	.55[b]	.53[b]
Reactivity	.57[b]	.64[b]	.67[b]	.23	.49[b]	.43
	Control males			Control females		
Social examiner	−.10 (19)	−.03 (19)	−.02 (19)	−.30 (13)	−.34 (13)	−.26 (13)
Cooperation	.24	.27	.32	−.26	−.17	−.13
Emotional tone	.24	.38	.29	−.39	−.36	−.29
Object orientation	.65[b] (22)	.55[b]	.68[b]	.69[b]	.75[b]	.76[b]
Goal-directedness	.80[b]	.66[b]	.78[b]	.52[b]	.69[b]	.67[b]
Attention span	.70[b] (21)	.60[b]	.66[b]	.30	.43	.43
Reactivity	.60[b] (22)	.43[b]	.56[b]	.60[b]	.63[b]	.69[b]

[a] Numbers in parentheses indicate number of paired scores. Number of pairs given for the highest entry in a column applies to the remaining entries in the column.
[b] $p < .05$, one-tailed.

Only those IBR behaviors relating to cognitive or extraversion dimensions were examined. The IBR behaviors more cognitive in nature are object orientation, goal-directedness, attention span, and reactivity. The IBR behaviors that reflect an extraversion dimension are social orientation to the examiner, cooperation, and general emotional tone. These behaviors are scored on a 9-point scale. Since there were not enough subjects to analyze IBR behaviors in highly restricted age groups, scores for a selected IBR behavior were analyzed in a group with heterogeneous ages. Many behaviors rated on the IBR develop with age. Spearman rank-order correlations (corrected for ties) were computed for ratings of the selected behaviors with age of the subjects in each condition. Spearman rank-order correlations (corrected for ties) were also computed for these behaviors with raw MDI and raw PDI scores. Raw MDI and raw PDI scores more directly reflect level of development. Rank-order correlations for ratings of selected IBR behaviors with age, raw MDI, and raw PDI scores are shown in Table III. Ratings of behaviors more cognitive in nature correlate consistently with age, raw MDI, and raw PDI scores. One exception was attention span in NAT females

Table IV. Rank-Order Correlations of Extraversion Behaviors Rated on the Infant Behavior Record (IBR) with MDI and PDI Scores of the Bayley Scales of Infant Development (BSID)

	NAT males		NAT females	
IBR behavior	MDI	PDI	MDI	PDI
Social examiner	−.59[a]	−.34[a]	.00	.07
	(28)[b]	(25)	(15)	(15)
Cooperation	−.39[a]	−.26	.10	.01
	(29)	(26)	(14)	(14)
Emotional tone	−.46[a]	−.28	−.02	.20
			(15)	(15)
	FTT males		FTT females	
Social examiner	−.17	−.21	.33	.22
	(20)	(20)	(13)	(13)
Cooperation	.45[a]	.35	.75[a]	.67[a]
	(21)	(21)		
Emotional tone	.43[a]	.29	.82[a]	.65[a]
	Control males		Control females	
Social examiner	−.05	.20	.18	.62[a]
	(19)	(19)	(13)	(13)
Cooperation	−.22	−.13	.24	.60[a]
Emotional tone	−.14	.09	−.11	−.12

[a] $p < .05$, one-tailed.

[b] Numbers in parentheses indicate number of paired scores. Number of pairs given for the highest entry in a column applies to the remaining entries in the column.

Table V. Pearson Correlations Between Age and MDI and PDI Scores

Group	MDI	PDI
NAT		
Males	.20 (29)[a]	.06 (26)
Females	.06 (16)	−.09 (16)
FTT		
Males	−.67[b] (21)	−.52[b] (21)
Females	−.24 (13)	−.61[b] (13)
Control		
Males	−.38 (22)	−.42 (22)
Females	−.17 (13)	−.04 (13)

[a] Numbers in parentheses indicate number of paired scores.
[b] $p < .05$, two-tailed.

and control females. The rank-order correlation for attention span with age, raw MDI, and raw PDI scores in NAT females indicates that ratings of attention span in NAT females does not increase with age. The rank-order correlation for attention span with age, raw MDI, and raw PDI scores for control females does not reach the customary level of significance. There were no correlations of any of the extraversion behaviors with age, raw MDI, and raw PDI scores except for cooperation in NAT males. As the age of NAT males increased they were rated as being less cooperative. Thus, in general, extraversion behaviors do not appear to increase with age (except for the decrease in cooperation with age in NAT males).

Spearman rank-order correlations (corrected for ties) were computed for ratings of extraversion behaviors with MDI and PDI scores. Table IV indicates that ratings of all extraversion behaviors correlate negatively with MDI for NAT males. Also, social orientation to the examiner correlates negatively with PDI for NAT males. There were no significant correlations of extraversion behaviors with MDI and PDI scores for NAT females. Moderate but significant correlations existed for ratings of cooperation and emotional tone with MDI for FTT females. A strong correlation existed for cooperation and emotional tone with PDI for FTT females. For control subjects only the correlation of social orientation and cooperation with PDI were significant for females.

The only primary cognitive behavior that correlated with Index score was reactivity. For FTT females, reactivity correlated with MDI and PDI, r_s (12) =

.78, $p < .001$ and r_s (12) = .59, $p < .02$, respectively. For NAT males there was a significant negative correlation between Mental Scale range scores and MDI, r (15) = −.77, $p < .001$. This relationship did not exist for NAT females, r (12) = .00, $p > .99$.

In Table V Pearson correlations are given for age with MDI and PDI scores for males and females of each group. Significant differences in age-MDI correlations exist between NAT males and FTT males and between NAT males and control males, $z = 3.31$, $p < .005$ and $z = 2.0$, $p < .05$, respectively. Significant differences in age-PDI correlations existed between NAT males and FTT males and between FTT females and control females, $z = 2.21$, $p < .02$ and $z = 1.67$, $p < .05$, respectively.

DISCUSSION

The results of this study corroborate the finding of Kempe and Helfer (1972) that one-third of physically abused children function in the retarded range. However, motor functioning was not significantly depressed. It may be that a physically abusive situation allows continued development of motor abilities while severely depressing mental functioning, considering such findings as those of McGraw (1941) and Kagan and Klein (1973), suggesting that motor functioning may be more difficult to depress. The functioning of FTT children in this study does not match the results of Ramey et al. (1975), which may be due to the younger ages of children in this study. The strong negative correlation of age with MDI and PDI of FTT males and the strong negative correlation between age and PDI of FTT females suggest that a later diagnosis of FTT would have resulted in more severely depressed Index scores.

Our range score hypotheses were only partially supported in this study. Range scores were not affected by the FTT condition. Mental and Motor Scales range scores were differentially affected by the NAT and control conditions. The median split in MDI resulted in Mental Scale range score differences for NAT children, but not for control children. However, range score differences between high and low MDI conditions were reflected only in a significant negative correlation between Mental Scale range scores and MDI for NAT males. The NAT male with a higher MDI may be inhibited from developing his more advanced innate abilities. Conversely, the NAT male with a lower MDI is probably not encouraged to make developmental advancements. Another explanation might be that the NAT male with a higher MDI has learned to restrict his activities. Indeed, the negative association between extraversion behaviors and MDI for NAT males lends support to this hypothesis. The NAT male may learn that he must not interact with the adults in his environment and he has greater survival chances displaying negative behaviors. Control children who scored higher on the Motor Scale also had higher Motor Scale range scores. These children seemed to take

more chances with their physical environment. For example, during the testing period it was easier to coax such a child to jump from a higher stair (items 63, 69, 70, 76, and 78 on the motor scale). Confidence in their abilities to function in the environment and confidence in the adults in their environment may have, along with less fear of retaliation for their behaviors, contributed to higher PDI scores and higher range scores on the Motor Scale. Control children scoring lower on the Motor Scale may have no reason to lack confidence in the adults in their environment but may not have the ability to perform items much higher than their basal score on the Motor Scale. On the other hand, NAT children have no reason to trust the adults in their environment. Moreover, NAT males reflect a negative association between PDI scale scores and social orientation to the examiner.

Generally, behaviors rated on the IBR increase with age. One exception was attention span of females. We found ratings of attention span to increase with age for FTT females but not for NAT and control females. For control females the lack of a significant increase in ratings of attention span with age cannot be attributed to sample size, since the magnitude of the correlations shown are about one-half of those shown for control males. They are even less than those shown for NAT and FTT males. The computation of the significance of differences is not possible with rank-order correlations. In this population, females, more so than males, may need activities (game sessions, being read to, and so on) that develop attention span. The absence of such activities, as may be the case for NAT females, may result in serious consequences. It may also indicate that these activities are lacking for females in this population.

From the nature of their diagnosis (physical abuse), the negative association between personality variables and MDI and PDI scores, and the linear relationship between Mental Scale range score and MDI, it appears that NAT males have constructed a negative pattern of functioning in their environment. The consistent negative association between level of development and cooperation may indicate that conditions for NAT males prior to diagnosis were different from those for NAT females. A consistent physically abusive situation could account for the increase in lack of cooperation over time. The negative association between personality variables and MDI also suggests NAT males learn not to trust or cooperate with the adults in their environment.

Contrary to the conclusions of Matheny et al. (1974), the inclusion of social items in infant tests is an important part of infant assessment. Matheny et al. found that social variables were not associated with concurrent or subsequent mental test scores for males. In this study, we found a consistent negative association between social variables and mental test scores for physically abused males. If infant tests are exclusively for the assessment of infant abilities in normal populations, then social-personality variables are of little use. But if infant tests of abnormal populations are to be considered useful, the inclusion of social-personality variables is crucial.

SUMMARY

Physical abuse of children is detrimental to mental functioning but not to motor functioning. Neglect is detrimental to both mental and motor functioning. Physical abuse and neglect differentially affect males and females. Physically abused males who have higher levels of development and higher intellectual abilities exhibit deteriorated social relationships at the time of testing. No such social relationship problems were apparent in physically abused females. However, it appears that physically abused females do not exhibit attention span behaviors commensurate with their level of development. As the age of neglected males that were tested increased, there appeared to be a deterioration in intellectual functioning. Neglected females showed no such mental deterioration. Neglected males and females both exhibited deteriorated motor functioning with age at initial testing. The association of social-personality variables with MDI and PDI scores suggests that physically abused males had a different pattern of abuse in their environment prior to testing from that of physically abused females.

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