

## Chapter 3-1

# Cognitive Development\*

The impetus for this chapter was research showing that the more parents talk to a child, even infant children, the faster the growth of neural connections in the brain and in cognitive performance (Blakeslee, 1995; Dawson & Fischer, 1994). That research led us to theorize about the effect of spanking or slapping a child's hand on children's cognitive development. The process linking corporal punishment with cognitive development is indicated by parents who defend corporal punishment (CP) as necessary because, as one frustrated mother told us, "you can't reason with a two-year old." For these parents, CP often replaces reasoning and explaining. That is, when parents use CP, they are less likely to engage in verbal methods of behavior control such as explaining to the child. Conversely, the less CP used by a parent, the more verbal interaction is needed to teach and correct the child, and the increased level of verbal interaction may enhance the growth of neural connections in the brain, and with it the child's cognitive development.

In addition to restricted verbal interaction, CP could adversely effect cognitive development through other processes. When children are hit by parents to teach and correct them, the experience is frightening and highly stressful (Turner & Finkelhor, 1996). For some parents this is an explicit part of their discipline strategy. A father recently told us that he wants his son to fear him so that he will obey. "Respect will come later" he said. Relatively few parents are this explicit about fear. But regardless of whether it is intentional, when parents use CP, they are using fright as a means of teaching. Unfortunately and also ironically, fear, fright, and stress increase the probability of cognitive deficits such as erroneous or limited

coding of events and diminished elaboration (Heuer & Reisberg, 1992).

CP also increases the risk of more fundamentally damaging mental consequences. Like the severe attacks by parents that we condemn as physical abuse, spanking a child is a frightening and threatening stressful event. Moreover, like physical abuse, CP is a stress which typically continues for several years. The two main differences between physical abuse and CP are that CP, to be legal, must not cause physical injury, and that the increased probability of harmful psychological effects is lower than the increased probability experienced by physically abused children (see Chapter ??). Consequently, the results of studies showing that “maltreatment at an early age can have enduring negative effects on a child’s brain development and function” (Craig, 19??; Teicher, 2002??) (Kinard, 1999) can also apply to children who experience CP, but with a lower probability of it happening.

An possibly tragic aspect of cultural beliefs about CP is reflected in the advice given to parents by many professionals such as pediatricians and child psychologists. It is the idea that CP is appropriate if restricted to early childhood . For example, a “consensus statement” drawn up at the conclusion of a conference on corporal punishment sponsored by the American Academy of Pediatrics, recommended limiting CP to children between 2 and 6 years old (Friedman, Schonberg, & Sharkey, 1996). However, there is no research evidence for that recommendation. It is a part of folk beliefs about CP, even though put forth by professionals. Contrary to this folk belief, the risk of psychological damage from CP may be greatest in early childhood. One reason is that neural connects in the brain are being formed more rapidly by younger children. Another reason why hitting young children may be the worst possible age is that this is when attachment bonds to the parent are being developed. Chapter ?? shows that use of CP is associated with a weakened bond to the mother. The weakened bond may reduce a child’s motivation to learn from the parent who is hitting them. Whatever the intervening processes, if CP influences cognitive development, it has broad implications because, as shown

---

\* Mallie J. Paschall is coauthor of this chapter.

in Chapter ??, at least a third of American children experience CP as infants, 94% as toddlers, and for a third it continues into the early teen years.

## **PREVIOUS RESEARCH**

We found two studies that examined the relation of CP to cognitive ability. Smith & Brooks-Gunn (Smith & Brooks-Gunn, 1997) studied 715 low birth weight children. They used a measure of “harsh discipline” of children age 12 and 36 months. The Stanford Binet intelligence test was administered at 36 months. They found that the children who experienced "harsh discipline" had the lowest IQ, even after controlling for birth weight, neonatal health status, ethnic group, mothers age, family structure, mother's education, and family income. A limitation of this study is that the harsh discipline measure included scolding the child, and therefore confounds verbal aggression by the parent with CP. Another limitation is that there was no Time 1 measure of cognitive ability. Consequently, it is not possible to tell whether these results reflect the effect of the harsh discipline or whether the harsh discipline was used in response to dealing with a “slow” child.

Fower and Chapieski (Fower & Chapieski, 1986) compared 14-month-old children of upper middle class mothers who “relied on CP” with children whose mothers rarely or never used CP. Cognitive development was measured by the child’s score on the Bayley infant development scale at 21 months. The children whose mothers relied on CP had Bayley test scores that were exactly at the average for the US (100), which is consistent with the fact shown in Chapter 1-1 that almost all parents hit children this age. On the other hand, the cognitive development of the small proportion of children whose mothers rarely or never used CP, averaged 20 points higher than the US average. A limitation of this study is that the adverse effect was shown for children of mothers who “relied on” CP. Consequently, it does not provide information on whether using CP as only a rare back up has an adverse effect on cognitive development. Although these two studies have limitations, both provide evidence that CP is associated with lower cognitive development.

There are two other studies that, at least indirectly, are consistent with the proposition that CP interferes with cognitive development. A study of a large and nationally representative sample of U.S. adults described in Chapter ?? asked the respondents whether and how often they had experienced CP when they were 13 years old. Fifty eight percent of the men and 44 percent of the women reported having been hit at that age. The study found that, even after controlling for the education and occupation of the respondent's parents and other potential confounds, the more CP experienced, the lower the percentage who graduated from college. Another similar study, but using a different national sample with similar controls, found that the more CP, the lower the probability of the respondent being in the top fifth of the occupational and income distribution for the U.S. (Straus & Gimpel, 2001).

The findings of the four studies just reviewed and the results of the research on the relation to brain development of talking to children, led to the following hypotheses about :

*1. The more CP children experience, the lower their average cognitive ability compared to children of the same age whose mothers used CP less often.*

It needs to be pointed out that, even if this hypothesis is supported, it does not demonstrate that CP causes a slowdown in cognitive development because “slow” children may be more likely to be hit by parents. Consequently, to help establish which is cause and which is effect we examined how much the cognitive ability of the children *changed* subsequent to spanking and tested a second hypothesis:

*2. The more CP parents used in the first year of the study, the less the increase in cognitive ability by the time they were tested again four years latter.*

*3. The adverse effect of CP is greater for children age 2-4 than for children age 5-9.*

This hypothesis is based on the fact that the development of neural connections is greatest among young children.

## **METHODS**

### ***Sample***

To test these hypotheses, we studied the children of women who were first interviewed in 1979 as part of the National Longitudinal Survey of Youth or NLSY (see Appendix 4). By 1986 many of these women had children, and those who did were interviewed periodically from then on about child rearing practices and child behavior and their children's cognitive ability was tested.

Two groups of children were studied: Group 1 was the 806 children who were 2-4 years old in 1986 when testing the children began (called "Time 1" from here on). Group 2 was the 704 children who were 5-9 years old at Time 1. These 1,510 children were all the children in these two age groups. One of the reasons for choosing children as young as 2-4 was because, on average, they would have had fewer non-family experiences that might affect their cognitive ability (e.g., elementary school) than older children. We also wanted to minimize the number of children born to very young mothers. By choosing children age 2 to 4, the average age of the mothers at the birth of the child was 21 (SD 2.6). However, the main reason for the younger children was to be able to compare the effect of CP on the cognitive development of younger and older children. Two to four year old children are in the age range for which CP is most often said to be acceptable. Children age 5-9 were included to see if the effects of CP are worse for older children, as implied by the "consensus statement" recommendation to confine hitting to younger children (Friedman & Schonberg, 1996). Our theory, as explained earlier, is the opposite: that the adverse effect is greater for younger children.

### **Measures**

**Cognitive ability.** For the 2-4 year olds, cognitive ability was measured at Time 1 (1986) using scores from as many of the following tests as were available for each child: Body Parts Recognition, Memory for Locations, and Motor and Social Development. The Time 2 (four years later) cognitive ability measure for the younger children was the Peabody Individual Achievement Tests (PIAT) for Math and Reading Recognition (See Baker, Keck, Mott *et al.*, 1993) for information on these tests). For children 5-9 years old cognitive ability was measured

by the PIAT for Math and Reading Recognition at both Time1 and Time 2.

The raw scores were transformed to scores with a mean of 100 and a standard deviation of 15. This creates scores that are consistent with the conventions for scoring many cognitive development and intelligence tests. Scores over 100 indicate a child with above average cognitive ability compared to other children of his or her age and scores below 100 identify children who are below the average of children their age.

**Corporal Punishment.** CP was measured for two sample weeks, one in 1986 and one in 1988. Two types of data were used. The first was whether the interviewer observed the mother spanking or hitting the child during the one and a half hour interview. The second was the mother's answer to the questions on whether she found it necessary to spank the child in the past week, and if so how often she spanked that week. Children were grouped into four categories: those who experienced no CP in either of the two weeks were given a score of zero, and those who experienced one, two, or three or more instances were given scores of 1, 2, or 3.

We measured CP during two sample weeks in order to identify children who experienced as close to no-CP as is possible with this data. The fact that a score of zero identifies children who were not spanked in either of the two sample weeks over a two-year time span, makes it plausible to consider the zero group as children for whom CP was extremely rare or in some cases, nonexistent. Nevertheless, in the light of the extremely high intervention rates needed to properly supervise toddlers (once every 6 to 10 minutes; there were innumerable opportunities for the mothers to use CP as one of the disciplinary tactics, and about 94% of parents use that tactic with toddlers (Straus & Stewart, 1999). Thus, the CP scale used for this study does not eliminate the possibility that the children in the zero category experienced CP on rare occasions.

**Maternal cognitive stimulation and emotional support.** The measures of maternal cognitive stimulation and emotional support in the NLSY data set are subscales from the

HOME-SF (Home Observation for Measurement of the Environment -- Short Form) inventory, which includes age appropriate subscales for children of different ages (Caldwell & Bradley, 1984). The raw scores for each age group were standardized so that each child's score was relative to the other children within their age group.

***Mother's Education.*** The highest school grade completed by the mother was included in the analysis as a proxy for family socioeconomic status and because it is known to be related to child's cognitive ability (Neisser, Boodoo, Bouchard *et al.*, 1996).

***Other variables.*** The available data permitted analysis of 7 other child, mother, and family characteristics that need to be controlled because they are likely to be associated with both CP and cognitive ability. These are child's birth weight, child's age, child's ethnicity, child's gender, number of children of the mother in the home, mother's age at child's birth, and father presence in the home at Time 1. Descriptive statistics for these variables are given in Appendix 5.

## **PREVALENCE AND CORRELATES OF CORPORAL PUNISHMENT**

### **How Much Were These Children Hit?**

At the start of the study, 71.3% of the mothers of the 2-4 year old children and 58.2% of the mothers of the 5 to 9 year old children reported spanking the child in the previous seven days. When the children were two years older in 1988, the percentage had decreased for both groups but remained high.

Mothers of children age 2-4 years who had spanked in the past week, did this an average of 3.6 times that week (see Appendix 5). A third of the mothers spanked 4 or more times, and 12.8% spanked 7 or more times that week. The mothers of children age 5-9 who had spanked in the past week reported doing so an average of 2.5 times that week.

Only 6.7% of the 2-4 year old children were not hit at all in either of the two sample weeks, i.e. 93% were hit at least once in those two weeks. This is very similar to the 94% of parents who reported hitting children in this age group in our 1995 national survey of American

children (see Chapter ??). Moreover, almost half of the children were hit three or more times in those two weeks. Among the 5-9 year old children, the percent who hit in those two weeks was much lower (58.2%) but still a majority were hit in just that one week. As explained in Chapter ??; because CP is such a taken-for-granted event, parents do not realize how often they do it and these numbers are almost certainly underestimates. One indication of the taken-for-granted nature of spanking children is that among the children who were 26 months old at the Time 1 of this study, 18% hit the child during the course of the interview.

### ***CP and other parent and child characteristics***

The table of correlations in Appendix 5 shows that, among children age 2-4, CP is associated with less cognitive stimulation, less emotional support, and younger age of child. All of these correlations are consistent with theory and previous empirical research. For children age 5-9, we found that CP is associated with less emotional support, children at the younger end of that age category, male children, African American children, and a greater number of children in the home.

These correlates of CP, such the tendency for CP to be associated with less maternal cognitive stimulation, are consistent with the theory that one of the processes which might explain why CP is associated with limited cognitive development is that parents who use CP are less likely to engage in verbal methods of behavior control such as explaining to the child.

### **Other Characteristics of the Parents And The Children and Their Interrelationships**

For children ages 2-4, female children and African American children had a lower weight at birth; and children of older mothers and children with a father in the home had a higher birthweight. At Time 1, the Hispanic American children and children with more siblings in this sample tended to be older, and children with a father present tended to be younger. Finally, mothers of the older children in the sample were younger.

For children ages 5-9, older children, female children and African American children tended to have lower birthweights. While children with older mothers, better educated mothers

and children with father's present tended to have higher birthweights. African American children, and children with more siblings tended to be older, while older children were likely to have younger mothers, less educated mothers, and to have an absent father.

### ***A FIRST LOOK AT CP AND COGNITIVE ABILITY***

The correlations in Appendix 5 are consistent with the hypothesis that "The more CP children experience, the lower their average cognitive ability compared to children of the same age whose mothers used CP less often." For children age 2-4 the relationship was relatively weak At Time 1. At Time 2, the relationship between CP and Time 2 cognitive ability was stronger. CP was also associated with lower cognitive ability scores for the 5-9 year old children, at both Time 1 and Time 2. As with the younger children the correlation was stronger at Time 2 than at Time 1. The higher correlation of CP for the 5-9 year old children and the higher correlation at Time 1 for both the 2-4 year old and the 5-9 year old children probably occurred because measures of cognitive ability are more accurate for older (Neisser et al., 1996).

### ***Other correlates of cognitive ability***

In addition to being related to CP, cognitive ability is also associated with many other characteristics of children and parents. In this sample we found that, for the 2-4 year old children, cognitive ability was related to more cognitive stimulation and emotional support by the mother. Cognitive ability was also associated with higher birthweight, a female child, older age of mother at the birth of the child, mothers with more education, presence of the father in the household, and children in families with fewer children. Children of African American and Hispanic American mothers in this study, as in many others, had lower cognitive ability test scores.

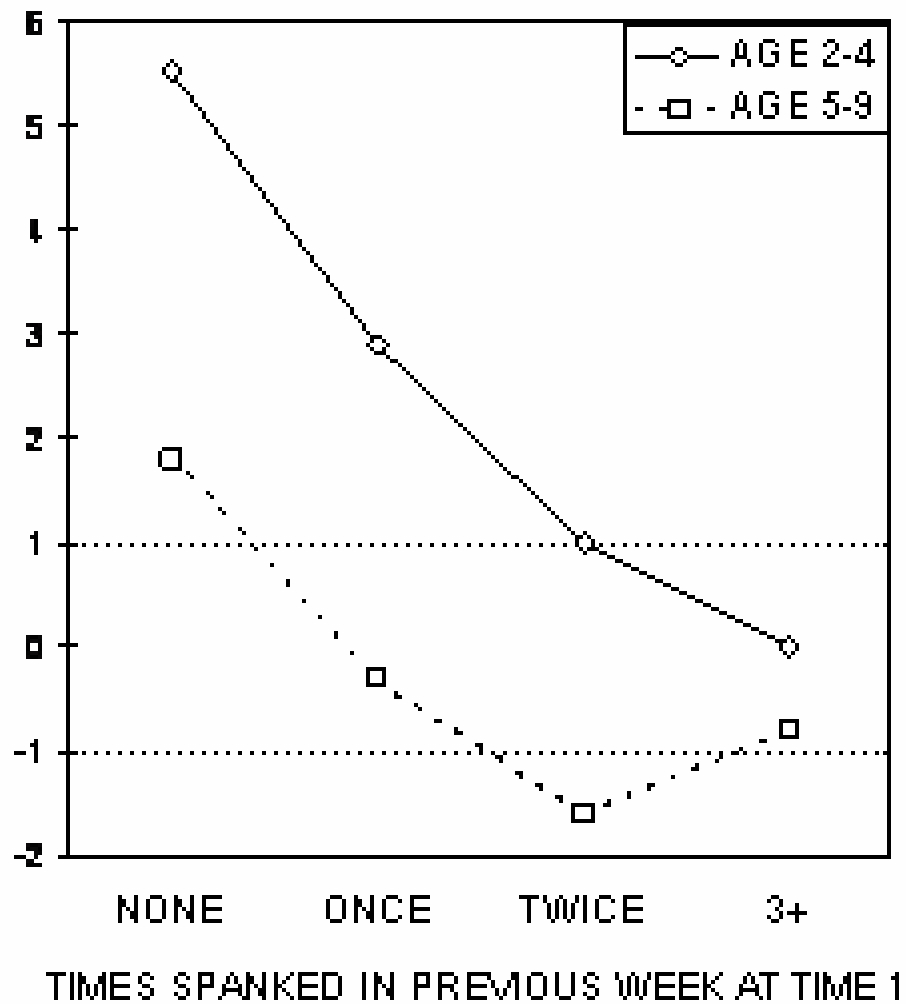
For children in the 5-9 age group, cognitive ability was associated with greater maternal cognitive stimulation, greater maternal emotional support, higher birth weight, fewer siblings, older age of mother at child's birth, higher educational attainment of mother, and presence of

father in the home were all associated with higher cognitive ability. Children of African American and Hispanic American mothers in this study, had lower cognitive ability scores at both age 2-4 and 5-9.

### **CORPORAL PUNISHMENT AND CHANGE IN COGNITIVE ABILITY**

Because the results in the previous sections show that CP and cognitive ability are associated with many other variables, such as the amount of cognitive stimulation that that is provided to the child, these variables need to be held constant when analyzing the relation of CP to cognitive ability. In addition, there is the problem of causal direction. As pointed out earlier, low cognitive ability (i.e., a “slow” child) could lead parents to use more CP. So just showing that the CP and cognitive ability are related, leaves the question of which is cause and which is effect

CHART 3-1.1 CHILDREN WHO WERE NOT SPANKED IMPROVED IN COGNITIVE ABILITY, AND THOSE WHO WERE SPANKED LOST GROUND



unanswered. We think it works both ways. Parents can be more likely to hit cognitively impaired children than children with average or higher ability out of frustration in dealing with such children or out of disappointment and resentment of the child. But, when they do that, we believe the effect is to further slow down the rate of further cognitive development, with the result that four years down the road, the children who were hit by their parents will have fallen behind the average even more.

(Insert Chart 1 about here)

The results in Chart 1 deal are based on procedures that took these alternative explanations into account when testing the theory that CP results in a slowdown in cognitive development. These procedures controlled for eleven other child and family characteristics that could be the “real cause” of the link between CP and lower cognitive ability, and because they measured the link between CP and change in cognitive ability four years later. Was spanking harmless? In that case, there would be no change from Time 1 to Time 2 in cognitive ability. Did spanking interfere with cognitive development? If that case there would be a decrease in cognitive ability scores from Time 1 to Time 2.

Chart 1 shows that the children whose parents did not use CP in the two sample weeks (the “None” group at the left side of the chart) gained in cognitive ability compared to children to the children whose parents used CP. The 2-4 year old children who were not hit in either week gained an average of five and half points, and the 5-9 year old children gained an average of the almost two points.

At the other extreme of the CP categories, the 2-4 year old children who were hit three or more times in the two sample weeks neither gained nor lost relative to the norm for children their age. This is consistent with the fact that they are the typical child in this age group (48% of the sample were hit three or more times – see Appendix 5). Thus, the children who experienced three or more instances of CP were, in effect, the statistical norm, and their cognitive development also followed the statistical norm, i.e. it stayed at the US average cognitive ability score of 100.

For children age 5-9, the statistical norm for CP was almost the opposite, i.e. instead of most children that age being hit in those two weeks as was true of the younger children, “only” 15 percent of the 5-9 year old children were hit three or more times in those two weeks. Still, the majority of children in the 5-9 year age group (58%) were hit at least once in those two weeks. However, the relation of CP to cognitive development was similar to the results for the 2-4 year old children: The cognitive development of the children whose parents did use CP in either of the two sample weeks was greater than the children who were hit even once in those two weeks. They gained an average of almost two points. On the other hand the 5-9 year old children who were hit once neither fell behind nor gained compared to other children, i.e., their score stayed at about 100. The 5-9 year old children who were hit two or more times in those two weeks fell slightly behind the average child in cognitive development in the four years following the initial testing.

***Other Child And Family Characteristics Linked To Change In Cognitive Ability.*** As expected, higher cognitive ability at Time 1 was related to a more than average increases in child cognitive ability during the years from Time 1 to Time 2. For children in the 2-4 age group it was also related to older mothers, mothers who provided more cognitive stimulation, and fewer siblings. Among the children in the 5-9 year old age group, as with the 2-4 age group, cognitive stimulation by the mother and having fewer brothers and sisters at home was associated with increased cognitive ability. Additionally, African American children, on average, fell behind the average cognitive development from Time 1 to Time 2. These results are important from a methodological standpoint because they are consistent with much other research on cognitive development and therefore provide support for the validity of our measures of cognitive ability and of cognitive stimulation.

***Does The Harmful Effect Of CP Depend The Social Context?*** As noted earlier, there are theoretical and empirical grounds for expecting that the effect of CP depends on the presence or absence of other variables; or as it is sometimes put, the effects of CP may be

"context specific." We have already seen that the age of the child makes a difference. CP seems to interfere with the cognitive development of toddlers more than of school age children. We examined each of the twelve child and family characteristics, such as the race of the child and the level of emotional support by the mother, to see if they moderated or exacerbated the harmful effect of CP. No such "interactions" were found. Thus, none of these characteristics moderated the tendency for CP to be associated with slower cognitive development.

***Is "Just Once" OK?*** Defenders of CP believe that CP is harmless if done only rarely. They do not indicate how often "rarely" is, so their belief cannot be tested exactly. For this study, the best approximation to "only rarely" was CP only once in the two sample weeks. We compared the children who were not hit at all during the two sample weeks with those that were hit only once, and also with those hit twice, and three or more times. The cognitive development of children of mothers who hit them even once in these two weeks was slower than for than the development of children whose mothers did not hit them at all. However, the difference was not quite statistically reliable. The difference between Once and Twice was significant for both age groups. The difference between Twice and Three or more times was significant for the 2-4 year old children, but not for the 5-9 year old children. (See Appendix 5 for the details.)

### **SUMMARY AND CONCLUSIONS**

We studied a nationally representative sample of 806 children age 2 to 4 and 704 children age 5 to 9 to test the theory that CP interferes with the cognitive development of children. This led to the hypothesis that the more often children were hit at the time their cognitive ability was first test, the more likely they were to fall behind other children when they were tested again four years later.

The 1,510 children in this sample typically experienced a great deal of CP, i.e. most were hit, and hit often, in the name of discipline. Despite the extremely high percentage of children who were hit, and the high frequency with which this happened, there is still enough

variation to permit studying the effects of CP. For example, the fact that 73% of 2-4 year old children were hit during the two sample weeks covered by this study, also means that 27% of children were not hit in those two weeks. This makes it possible to compare the cognitive development of children who were and were not hit. In addition, among those who were hit, the frequency varied a great deal. This made it possible to examine the effect of how often children are hit.

### ***Corporal Punishment Slows Cognitive Development***

The results of this study are consistent with the hypothesis that the more CP experienced by a child, the slower the child's cognitive development. We found that 2-4 year old children who experienced no CP in either of the two sample weeks gained an average of 5.5 cognitive ability points on a scale with a average score of 100, and children in the 5-9 year age group, whose mothers did not use CP in either week, gained an average of about 2 points relative to other children CP. This corresponds to the study by Fowler and Chapieski (Fowler & Chapieski, 1986) which found that the children of mothers who rarely used CP had a substantially higher IQ than the children of similar socioeconomic level mothers who relied on CP. For the 5-9 year old children, CP was associated with a decrease from Time 1 to Time 2 in cognitive ability test score.

The results showing a decrease in cognitive ability scores of children whose parents used CP needs are not quite what they may seem. The average cognitive ability of all the children, including the ones who were hit the most, grew tremendously during the four years between the first and second cognitive assessment. The key to understanding this seeming contradiction, is that cognitive ability was measured relative to the performance of other children of the same age. A cognitive ability score of 100 indicates a score at the average for children of the same age. To maintain a score of 100 from, for example, age 5 to 9, the child's cognitive development must keep up with the average pattern. Thus, the results in Chart 1 do not indicate an absolute

reduction in cognitive ability, only that CP is associated with failing to keep up with the average pattern of cognitive development, whereas absence of CP is associated with a greater than average growth in cognitive ability.

**Contextual effects.** The question of whether there are circumstances or contexts that make the use of CP appropriate has been the subject of much debate. Given the debate and theoretical importance of contextual effects, we examined 13 variables that can be considered contextual effects, such as the age of the child, mothers supportiveness, cognitive stimulation, and education, and African American ethnic group and found that none eliminated the adverse effect of CP on cognitive development.

CP is widely believed to be sometimes necessary and acceptable when administered as part of an appropriate parent-child relationship, including such things as emotional supportiveness and cognitive stimulation. The finding that the harmful effect of CP occurs regardless of the level of maternal supportiveness or cognitive stimulation indicates that the adverse effect of CP on cognitive ability may apply even when done by loving and attentive parents. However, there are many other aspects of parent-child relationships and mode of discipline that were not part of this study and which need to be considered in future research. For example, none of the conditions that Baumrind believes are needed for CP to be appropriate were tested, i.e. that, CP must be "controlled and contingent on the child's behavior; the child is forewarned; the parent uses more positive than negative incentives; spanking is carried out in conjunction with reasoning, with the intention to correct, not retaliate, and does not escalate to abuse" (Baumrind, 1996: 857). These and other limitations of the study that are given in Appendix 5 needed to be covered in future research.

Some studies have tested the hypothesis that, in the context of African American culture and life circumstances, CP is acceptable or beneficial and have found the hypothesized significant interaction (Deater-Deckard, Bates, Dodge *et al.*, 1996; Gunnoe & Mariner, 1997). By contrast, the current study, like the longitudinal analysis of the relation of CP to antisocial

behavior of children in chapter 2-1, did not find that the relation of CP to cognitive development was significantly different for African American children.

Part of the theoretical basis for expecting "never-spanked" children to have the highest cognitive development is the assumption that parents who use little or no CP are more likely to use reasoning and explanation to secure compliance. The negative correlation between CP and cognitive stimulation (see Appendix 5) is consistent with this theory, but a direct test using measures of reasoning and explanation is needed.

### ***Implications for National Levels of Cognitive Performance***

A review of research on cognitive ability found an increase in scores on many different intelligence tests, and that this applies to a number of countries (Neisser, 1997). The evidence compiled by Neisser leaves little doubt that intelligence test scores have been increasing, and that it is not an artifact of the tests used. What is in doubt is why this has occurred. Neisser identifies a number of plausible contributing factors. For example, there is abundant evidence that children of educated parents obtain higher scores on intelligence tests (Neisser et al., 1996). Since the level of education of parents has been increasing world-wide, this is likely to be an important part of the explanation. Another strong possibility is that nutrition levels have been improving because better nutrition is associated with greater cognitive ability (Rizzo, Metzger, Dooley *et al.*, 1997).

These examples become more plausible if the concept of environmental effects on cognitive ability is not restricted to learning as conventionally conceived. There are also environmental effects on the neural structure of the brain, such as those produced by nutrition and increased cognitive stimulation by better-educated parents (Dawson & Fischer, 1994; Elman, Bates, Johnson *et al.*, 1996). The same process may occur as a result of changes in parental expectations and parent behavior that tend to occur when parents shift from the idea that children should be seen and not heard to encouraging independent exploration, and emphasizing reasoning and explanation rather than the fear of being hit as the reason the child

should engage in socially appropriate behavior. If this theoretical argument is correct, and if reliance on disciplinary strategies other than CP is associated with more verbal interaction with children, it suggests another possible contributor to the world-wide increase in intelligence test scores -- less reliance on CP by parents.

Taking this line of reasoning a step further, if as we believe is the case, there has been a world-wide decrease in spanking and other forms of CP, and if this decrease in CP continues, countries where this is occurring can look forward to an increasingly smart population and to the many benefits that follow from a population with a higher level of cognitive ability.

### **Appendix for Chapter 3-1**

#### ***Cognitive Development***

#### **SAMPLE**

For details on the National Longitudinal Study of Youth (NLSY) sample, see the section in appendix 4 on the NLSY.

The present study was originally based on data for 806 children who were age 2 to 4 (24 to 46 months) at the time of the 1986 NLSY survey and for whom all the relevant data was available. We studied children age 2-4 because use of CP is often recommended only for young children, for example ages 2 to 6 (Friedman & Schonberg, 1996). In addition, the theory underlying this study is most applicable to young children because development of neural connections is greatest for infants and toddlers at the youngest ages. We also chose children this young because, on average, they would have had fewer non-family experiences that could be related to cognitive ability (e.g., elementary school) than older children. Finally, we wanted to minimize the number of children born to very young mothers. By choosing children age 2 to 4, the average age of the mothers at the birth of the child was 21 (SD 2.6). However, after presenting a preliminary paper on the younger children we decided to also study the 704 children who were age 5 to 9 at the Time 1 year in order to be able to replicate the test of the hypotheses with a second age cohort, and because most parents continue CP into this age range (Straus & Stewart, 1999).

The 1,510 children in the study were those with no missing data on any of the variables needed for this study. To assess potential selection biases, we compared these 1,510 cases with the 1,890 who did not have complete data 12 background characteristics that might be confound with CP and cognitive ability. Table 3-1A shows that there were significant differences for four

variables. The cases with complete data included slightly fewer white children, fewer mothers who had not completed high school, fewer single-parent families, and a had a higher mean birthweight. In view of the fact that the NLSY oversampled minority and low-income mothers, this comparison suggests that, except for race, our study sample is demographically more similar to the general population of 2- to 9-year-old children than the original NLSY sample. To the extent that this is correct, the findings of this study may be more representative of the population of 2- to 4-year-old children than they would with the original NLSY sample.

#### MEASURE OF CORPORAL PUNISHMENT

**For purposes of this study, CP was measured for two sample weeks in 1986 and 1988 using two types of data. The first is observation by the interviewer of whether the mother spanked or hit the child during the course of the one and half hour interview. The second was two interview questions: "Did you find it necessary to spank your child in the past week?" and for those who said they had: "About how many times, if any, have you had to spank your child in the past week?" We used these data to create a CP scale that combined the observed and the interview measures for 1986 and 1988. First, we combined the observed and interview data. If the mother was observed spanking the child, this was counted as one instance of spanking in addition to any that the mother reported as having occurred in the past week. Next, we grouped the children into four categories: those who experienced no CP in either of the two weeks, and those who experienced either one, two, or three or more instances.**

#### OTHER MEASURES

*Cognitive Ability.* For children ages 2-4 the cognitive ability measures were age-normed and standardized by (1) separating out subsamples of children in all possible 3-month age bands,

(2) transforming the raw scores for each 3-month age group into z scores, and (3) transforming the z-score for children in the middle month of each 3-month age band into standard scores with a mean of 100 and a standard deviation of 15. This creates scores that are consistent with the conventions for scoring many cognitive development and intelligence tests. These standardized scores were averaged for children who completed more than one cognitive assessment. The resulting scores indicate how far above or below the mean level of cognitive ability each child is relative to other children of approximately the same age. As result of these procedures, the mean cognitive ability scores were approximately 100, for 2-4 year olds, in both 1986 (100.5, SD=14.6) and 1990 (100.6, SD=14.8). For 5-9 year olds they were also approximately 100 at both Time 1 (102.9, SD=14.6) and Time 2 (102.6, SD=14.8).

Cognitive ability scores for children ages 5-9 were normed and standardized by (1) separating out subsamples of children in all possible 5-month age bands and (2) computing a standardized z-score for children in the middle month of each age band and (3) transforming the z-score for children into standard scores with a mean of 100 and a standard deviation of 15. The two scores (Math and Reading Recognition) were then averaged for each child.

*Maternal cognitive stimulation and emotional support.* The measures of maternal cognitive stimulation and emotional support in the NLSY data set are subscales from the HOME-SF (Home Observation for Measurement of the Environment -- Short Form) inventory, which includes age appropriate subscales for children of different ages (Caldwell & Bradley, 1984). A review by Baker et al (Baker et al., 1993) the extensive methodological analyses of these scales as applied to the NLSY (including confirmatory factor analyses, item analyses, and repeated measurements analyses), indicates that the cognitive stimulation and emotional support scales are internally consistent, temporally stable, and predictive of a variety of child outcomes, including cognitive development.

The cognitive stimulation subscales included 9 items for children age 0-2 years, 15 items for children 3-5, and 14 items for 6-10 year olds. Examples of cognitive stimulation items are: whether the mother read to the child, whether the mother helped the child learn colors, numbers, shapes or the alphabet; and how many books the child had of his or her own. The emotional support subscales included 9 items for children 0-2 year and 12 items for children 3-5 and 13 items for 6-10 year olds. Examples of emotional support items are: how often the child had dinner with both parents, whether the mother caressed or kissed the child, and whether the mother's voice showed positive feeling toward the child. The cognitive stimulation and emotional support items were scored by the NLSY as dichotomous indicators (0=absent, 1=present). Raw scores for the two scales were computed by summing across the items.

We modified these scales in two ways. First, the emotional support scale provided by the NLSY included the CP variables. We therefore recomputed the emotional support raw score without the CP items. Second, the raw scores for each age group were standardized as ZP scores (a ZP score is a version of a Z score with a mean of 50, a standard deviation of 20, and a range of zero to 100. (See Straus, 1980.) (Straus, 1980)

***Mother's Education.*** The highest school grade completed by the mother was included in the analysis as a proxy for family socioeconomic status and because it is known to be related to child's cognitive ability (Neisser et al., 1996). We originally considered creating a composite scale to measure SES that would include mother's occupation and net family income. We decided against this because mother's occupation was so strongly associated with mother's education that it appeared to be a redundant measure, and because net family income was not associated with either mother's education or occupation, perhaps as a result of over sampling families of low income and non-white ethnicity.

## **DATA ANALYSIS**

*Preliminary explorations and analyses.* We examined the frequency distributions of the cognitive ability measures for deviation from normality and outliers. Both the Time 1 (1986) and Time 2 (1990) distributions were approximately normal, but there were a few outliers (defined as cases more than 3 standard deviations above or below the mean and discontinuous). These cases were recoded to values just higher than the closest non-outliers case.

*Tests for other interaction effects.* An important issue in research on CP is the role of contextual factors such as the extent to which parents provide emotional support and cognitive stimulation; and the socioeconomic characteristics of the family such educational level, ethnic group. There is evidence, for example, suggesting that in the context of African American culture and life circumstances, CP may have beneficial effects, or at least no adverse effect (Belsky, 1991; Deater-Deckard et al., 1996; Gunnoe & Mariner, 1997). We therefore computed two-way ANCOVAs to test for interactions of each of the 11 family and child characteristic variables with CP. Each two-way analysis included the other ten family and child characteristics as covariates.

## **RESULTS**

*Cognitive ability at Time 1 and Time 2.* Table 3-1C shows that cognitive ability at Time 1 is correlated with cognitive ability at Time 2 for both age groups. Table 3-1B also shows that cognitive ability at Time 1 is correlated with maternal emotional support and cognitive stimulation. From a methodological perspective these correlations indicate that, despite the presumed low reliability of early cognitive assessments, our Time 1 cognitive ability measure is associated with other variables in a theoretically expected pattern. These correlations can therefore be taken as evidence of construct validity.

*Categorical analysis.* In addition to the average relationship of CP to cognitive development shown by the regression analysis, we also computed pairwise contrasts. The

difference between the None and the Once categories is not significant, but comes close (contrast estimate  $-2.48$ ,  $p .062$ ). Separate tests for the two age groups found similar results for 5-9 year old children (contrast estimate  $-2.135$ ,  $p .057$ ), but a  $p$  of  $.267$  for the 2-4 year old children. The lack of significance among the 2-4 year old children despite the large difference between the None and the Once group probably reflects the small  $n$  in the None category -- only 57 of the 806 children that age experienced no CP in those two weeks. The difference between Once and Twice was significant for both age groups ( $-3.154$ ,  $p .03$  for 2-4s;  $-2.270$ ,  $p .023$  for 5-9's). The difference between Twice and Three or more times was significant for the 2-4 year old children ( $-2.429$ ,  $p .041$ ), but not for the 5-9 year old children.

## **TABLES**

Insert the following tables about here:

Table 3-1A = Sample Characteristics

Table 3-1B = Corporal Punishment Descriptive Statistics

Table 3-1C = Zero-Order Correlations Among Study Variables, by Age Group

Table 3-1D = Multivariate Analyses to Assess the Effect of Corporal Punishment on  
Child Cognitive Ability (Time 2), by Age Group

Table 3-1A. Sample Characteristics

Variable	Study Sample (N=1510)	NLSY 2-9 Year Olds (N=3481)
Child's birthweight (mean ounces)	115.7 (20.0)	114.6 (20.9)
Child's age (mean years)	4.6 (2.0)	4.7 (2.1)
Female children	49.5%	49.6%
Euro-American children	44.6%	47.6%
African-American children	36.9%	32.7%
Hispanic children	18.5%	19.7%
Number of children in home	2.3 (1.1)	2.2 (1.1)
Mother's age at birth of child (mean years)	20.2 (2.5)	20.1 (2.5)
Mother's education:		
<high school	33.5%	41.9%
high school	47.9%	42.0%
> high school	18.6%	16.0%
Father living with mother	58.2%	53.8%

Table 3-1B. Corporal Punishment Descriptive Statistics

Corporal Punishment Category	2-4 Year Olds (n=806)	5-9 Year Olds (n=704)
No CP in either week	6.6%	41.8%
Once	10.5%	19.2%
Twice	35.2%	23.9%
Three or more times	47.6%	15.2%







## REFERENCES

- Baker, P. C., Keck, C. K., Mott, F. L., & Quinlan, S. V. (1993). *Nlsy child handbook: A guide to the 1986-1990 national longitudinal survey of youth child data* (Revised ed.). Columbus, Ohio: The Ohio State University, Center for Human Resource Research.
- Baumrind, D. (1996). Personal statement. *Pediatrics*, *98*(4), 857.
- Belsky, J. (1991). Psychological maltreatment: Definitional limitations and unstated assumptions. *Development and Psychopathology*, *3*(1), 31-36.
- Blakeslee, S. (1995, Tuesday, August 29). In brain's early growth, timetable may be crucial. *The New York Times*, p. C1.
- Caldwell, B., & Bradley, R. (1984). *Home observation for measurement of the environment*. Little Rock: University of Arkansas.
- Dawson, G., & Fischer, K. W. (Eds.). (1994). *Human behavior and the developing brain*. New York: Guilford Press.
- Deater-Deckard, K., Bates, J. E., Dodge, K. A., & Pettit, G. S. (1996). Physical discipline among african american and european american mothers: Links to children's externalizing behaviors. *Developmental Psychology*, *32*(6), 1065-1072.
- Elman, J. L., Bates, E. A., Johnson, M. H., Karmiloff-Smith, A., Parisi, D., & Plunkett, K. (1996). *Rethinking innateness: A connectionist perspective on development*. Cambridge, MA: MIT Press.
- Fower, T. G., & Chapieski, M. L. (1986). Childrearing and impulse control in toddlers: A naturalistic investigation. *Developmental Psychology*, *22*(2), 271-275.
- Friedman, S. B., Schonberg, K., & Sharkey, M. (1996). Introduction. *Pediatrics. The short- and long-term consequences of corporal punishment*, *98*(4, Part 2), VI.
- Friedman, S. B., & Schonberg, S. K. (1996). Consensus statements. In S. B. Friedman & S. K. Schonberg (Eds.), *The short- and long-term consequences of corporal punishment* (Vol. 98, pp. 853-856). American Academy of Pediatrics.
- Gunnoe, M. L., & Mariner, C. L. (1997). Toward a developmental-contextual model of the effects of parental spanking on children's aggression. *Archives of Pediatric and Adolescent Medicine*, *151*, 768-775.
- Heuer, F., & Reisberg, D. (1992). Emotion, arousal, and memory for detail. In S. A. Christianson (Ed.), *The handbook of emotion and memory: Research and theory* (pp. 151-180). NJ: Lawrence Erlbaum.
- Kinard, E. M. (1999). Psychosocial resources and academic performance in abused children. *Children and Youth Services review*, *21*(5), 351-376.
- Neisser, U. (1997). Rising scores on intelligence tests: Test scores are certainly going up all over the world, but whether intelligence itself has risen remains controversial. *American Scientist*, *85*, 440-447.
- Neisser, U., Boodoo, G., Bouchard, T. J., Jr., Boykin, A. W., Brody, N., Ceci, S. J., et al. (1996). Intelligence: Knowns and unknowns. *American Psychologist*, *51*(2), 77-101.
- Rizzo, T. A., Metzger, B. E., Dooley, S. L., & Cho, N. H. (1997). Early malnutrition and child neurobehavioral development: Insights from the study of children of diabetic mothers. *Child Development*, *68*(1), 26-38.
- Smith, J. R., & Brooks-Gunn, J. (1997). Correlates and consequences of harsh discipline for young children. *Archives of Pediatric Adolescent Medicine*, *151*(August), 777-786.
- Straus, M. A. (1980). The zp scale: A percentages z-score. Durham, NH: University of New Hampshire, Family Research Laboratory. Available in: <http://pubpages.unh.edu/~mas2/>.
- Straus, M. A., & Gimpel, H. (2001). Alienation and reduced income. In M. A. Straus (Ed.),

- Beating the devil out of them: Corporal punishment in american families and its effects on children* (pp. 137-146). New Brunswick, NJ: Transaction Publication.
- Straus, M. A., & Stewart, J. H. (1999). Corporal punishment by american parents: National data on prevalence, chronicity, severity, and duration, in relation to child, and family characteristics. *Clinical Child and Family Psychology Review*, 2(2), 55-70. Also as "Prevalence, chronicity, and severity" 2006, In Press, in Murray A. Straus, *The primordial violence: Corporal punishment by parents, cognitive development, and crime*. Walnut Creek, CA: AltaMira Press.
- Turner, H., & Finkelhor, D. (1996). Corporal punishment as a stressor among youth. *Journal of Marriage and the Family*, 58(Feb), 155-166.