

## Intellectual Functioning and Aggression

L. Rowell Huesmann, Leonard D. Eron, and Patty Warnick Yarmel  
University of Illinois at Chicago

In a 22-year study, data were collected on aggressiveness and intellectual functioning in more than 600 subjects, their parents, and their children. Both aggression and intellectual functioning are reasonably stable in a subject's lifetime and perpetuate themselves across generations and within marriage pairs. Aggression in childhood was shown to interfere with the development of intellectual functioning and to be predictive of poorer intellectual achievement as an adult. Early IQ was related to early subject aggression but did not predict changes in aggression after age 8. On the other hand, differences between early IQ and intellectual achievement in middle adulthood were predictable from early aggressive behavior. A dual-process model was offered to explain the relation between intellectual functioning and aggressive behavior. We hypothesized that low intelligence makes the learning of aggressive responses more likely at an early age, and this aggressive behavior makes continued intellectual development more difficult.

Aggression has been demonstrated to be a reasonably stable characteristic from childhood to middle adulthood (Eron, Huesmann, Dubow, Romanoff, & Yarmel, 1987; Huesmann, Eron, Lefkowitz, & Walder, 1984; Olweus, 1979). Furthermore, aggression is a characteristic that perpetuates itself within a family system. Aggressive people are more likely to marry aggressive spouses and raise aggressive children (Huesmann et al., 1984). However, aggression cannot be considered in isolation from other developing behaviors and characteristics (Eron, 1982). In particular, one must consider the relation between aggression and intellectual functioning.

A number of studies have revealed a relation between aggression and poor performance on standardized tests of intellectual ability (Burt, 1925; Caplan, 1965; Glueck & Glueck, 1950; Gordon, 1975; Merrill, 1947; Siebert, 1962). The level of intellectual functioning in delinquents generally falls within the lower half of the IQ distribution, with the average IQ of court-involved delinquents 10-12 points below the mean IQ of non-delinquents. This relation, however, may be somewhat inflated because bright delinquents may not be apprehended as often as delinquents of lower intellectual functioning. When the genders are examined separately, one usually finds the same degree of relation between intellectual functioning and delinquency in boys and girls (Jensen, 1980), though boys are much more aggressive on the average.

Although socioeconomic factors affect both intellectual abilities and aggressiveness in a child, it has been shown that, inde-

pendent of socioeconomic status, IQ is a significant predictor of delinquency (Gibson & West, 1970; Gordon, 1975; Hindelang, Hirschi, & Weis, 1981; Hirschi & Hindelang, 1977; Lowenstein, 1977). For example, in several studies of siblings (Healy & Bronner, 1936; Shulman, 1929, 1951), it has been found that the delinquent sibling had a lower IQ than a same-sex sibling raised in the same environment.

The extent to which the relation between aggression and intellectual functioning is due to performance failure in school instead of intellectual incompetence per se is difficult to assess. The majority of studies on this topic have related achievement test scores rather than IQ test scores to aggression. Lowenstein (1977) and Olweus (1978) have shown that bullies in school are generally below average in academic skills. Much evidence also exists relating poor academic achievement to delinquency (Andrew, 1981; Hogenson, 1974; Loeber & Dishion, 1983; Wadsworth, 1979). Furthermore, in one study specifically directed at disentangling the effects of IQ and achievement, Feshbach and Price (1984) found only a negligible relation between IQ and aggression.

The nature of the relation between aggression, poor academic performance, and low IQ test scores is not yet clear. Nor do we understand the processes responsible for it. However, several psychological models have been offered to explain the relation between intellectual deficits and aggression. Berman (1978) claimed that delinquency is often a reaction to a learning disability in school. Whereas Hirschi and Hindelang (1977) suggested that the child's school experience mediates the relation between IQ and delinquency; that is, lower intellectual ability makes success in school more difficult and leads to poorer achievement. Poorer achievement in turn probably reduces self-esteem and frustrates the child. When faced with difficult social situations, the frustrated child with lower self-esteem may be more likely to respond aggressively. In addition, the child with diminished intellectual abilities probably finds it more difficult to devise alternative, less direct strategies to obtain his or her goals. Regardless of the success or lack of success that the low-IQ child has had with aggressive behavior, that behavior will

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Correspondence concerning this article should be addressed to L. Rowell Huesmann, Department of Psychology, University of Illinois at Chicago, Box 4348, Chicago, Illinois 60680.

tend to be repeated if the child cannot learn and retain alternative strategies.

Although no one explanation for the relation between aggression and intellectual functioning has emerged as a dominant theory, most researchers have adopted implicitly the assumption that the direction of the effect is mostly from intellectual incompetence or achievement failure to aggression. Yet it is also possible that aggression is a cause of poor intellectual achievement and that the relation between the two is bidirectional. This becomes particularly plausible if one recognizes that the relation between aggression and intellectual functioning is mostly a relation between aggression and academic achievement. Aggressive responding may interfere with the social interactions with teachers and peers that are necessary for intellectual advancement. Thus, the continual emission of aggressive responses may make school achievement even less likely and lead to a more intellectually sterile environment in which academic achievement is even further reduced.

The relation between aggression and intellectual functioning cannot be adequately explored without also investigating the stability of their development from childhood to adulthood. Numerous studies have revealed that intellectual functioning is predictable from middle childhood to adulthood (Jensen, 1980). Recent research has demonstrated (Huesmann et al., 1984; Olweus, 1979) that aggression is similarly stable. In light of the similarity, are changes in aggressive behavior from childhood to adulthood more predictable from early intellectual functioning than changes in intellectual functioning are predictable from early aggression?

To answer these questions, we examined the stability of intellectual competence and its relation to aggressive behavior over 22 years (from age 8 to age 30) in a sample that included more than 600 subjects.

## Method

The longitudinal data were collected as part of a larger 22-year study that has been described in detail elsewhere (Eron, Walder, & Lefkowitz, 1971; Huesmann et al., 1984; Lefkowitz, Eron, Walder, & Huesmann, 1977).

## Subjects

The initial subjects comprised the entire population of youngsters enrolled in the third grade in a semirural county in New York State (Columbia County) in 1960. This included approximately 870 youngsters whose modal age at the time was 8 years. These children were tested in their classrooms with a variety of procedures. We also interviewed personally approximately 75% of their mothers and fathers. Ten years later, we reinterviewed 427 of the original subjects. These subjects were located by asking the district superintendents of the county's schools to supply addresses and other information about the former third graders. With this approach, more than 400 addresses were obtained. Additional subjects were located through high school yearbooks, old and current telephone directories, voter lists, tax lists, a county directory, and through interviewees who did appear. Letters were sent to 735 of the original 875 subjects, or 84% of the original sample. Four hundred sixty (63%) of the subjects contacted indicated a willingness to be interviewed. The subjects who did not consent to be reinterviewed fell into the following classifications: post office returns, 6%; definite refusals, 11%; in military service, 5%; deceased, .5%; in prison, .2%; no

replies, 14%. The final 427-person sample was composed of 211 men and 216 women. The modal age of the sample was 19 years, and the mean number of school years completed was 12.57. Current IQ scores were available for 103 cases, and the mean score for these cases was 109.12. As determined by the subjects' report of their fathers' occupational status, the final sample was primarily middle class.

In 1981, we again relocated as many of the original subjects as possible through local directories, a network of informants, newspaper stories, and newspaper advertisements. A total of 409 subjects were reinterviewed (198 men, 211 women; 96% white). Two hundred ninety-five of these interviews were conducted in person and another 114 were conducted by mail and telephone. We also obtained interviews with spouses of 165 of the interviewed subjects and with 82 of the subjects' children. Children under the age of 5 were not interviewed, and only the oldest child of each family was interviewed.

In addition to the interview, data were obtained from the New York State Division of Criminal Justice Services, the Division of Motor Vehicles, and the Departments of Mental Hygiene and Health. From these sources, at least some data were obtained on 542 of the original subjects. In combination with the interview data, some 1981 follow-up data were obtained on 632 of the original subjects (358 men, 274 women).

Although we have age-8 aggression scores and age-8 IQ scores for all the later 632 subjects, longitudinal analyses will involve somewhat smaller numbers. We had obtained age = 19 IQ scores on only 86 of the 632 subjects. Also, at age 30, the achievement measure (Wide Range Achievement Test or WRAT; Jastak & Jastak, 1978) was administered only during the in-person interviews and therefore was available for only 294 of the 409 subjects. Furthermore, we had interviewed both parents of only 107 of these subjects in 1960. These factors make the samples available for some multivariate analyses much smaller than the total, but all samples are large enough to provide reasonable statistical power.

## Measures

The measures have been described in detail elsewhere (Eron et al., 1971; Huesmann et al., 1984; Lefkowitz et al., 1977). The measures of particular concern for this article are the subject's age-8 IQ, which was measured by the California Test of Mental Maturity (Sullivan, Clark, & Tieg, 1957); the subject's age-19 IQ, which was obtained from school records; and the subject's reading, spelling, and arithmetic achievement at age 30, which was measured by the WRAT. Scores on this test were also combined to yield a WRAT verbal score (spelling and reading) and a WRAT total score (spelling, reading, and arithmetic). The children of the age-30 subjects were also given the WRAT (their scores were standardized by age to represent deviations from age norms) as well as the Goodenough-Harris Draw-a-Person Test (Harris, 1963). The WRAT manual reports split-half reliabilities ranging from .94 to .98 for the three subtests at both the child and adult levels. Standard errors of measurement range from 1.05 to 1.70 for reading, from 0.86 to 1.34 for spelling, and from 0.88 to 1.42 for arithmetic. The Goodenough-Harris Draw-a-Person Test yields test-retest reliabilities from .50 to .70. Interrater reliabilities have ranged from .80 to .90. Two other measures of intellectual functioning used with the age-30 subjects were Reitan's trail-making test (Reitan, 1979), in which the subject connects numbers and lines as rapidly as possible, and a video car race game, in which the subject must keep a simulated car on the road as long as possible.

The 1960 measure of aggression was based on a peer-nomination technique described in detail elsewhere (Eron et al., 1971; Walder, Abelson, Eron, Banta, & Laulicht, 1961). In this procedure, all the children in the sample name as many other children as possible who behave in a certain way; for example, "Who pushes or shoves children?" The aggression score is the percentage of times a child is nominated on 10 aggressive items out of the potential number of times he or she could have been nominated. The reliability and validity of this measure have been

extensively documented (Eron, Huesmann, Brice, Fischer, & Mermelstein, 1983; Eron, Huesmann, Lefkowitz, & Walder, 1972; Lefkowitz et al., 1977). In a recent study with 748 children, the scale's internal consistency was found to be .96 and its 1-month test-retest reliability was .91. Its criterion validity has been established by numerous studies relating children's peer-nomination scores to their scores on other measures of aggression (Eron et al., 1971). Its construct validity has been established by its ability to predict the gender, age, and other differences that most theories of aggression predict (Eron et al., 1971; Huesmann et al., 1984; Lefkowitz et al., 1977). Over the course of 25 years, the peer-nomination measure has been used in at least 10 countries in more than 50 studies with consistent success (e.g., Feshbach & Singer, 1971; Olweus, 1979; Pitkanen-Pulkkinen, 1979; Sand et al., 1975).

Other early measures included variables related to the subject's birth, that is, birth order, the mother's age at the time of the subject's birth, the length of pregnancy, and the use of instruments during the birth. These data were obtained from New York State Health Department records. Early data were also obtained from parent interviews. The variables relevant for this article were father's occupation, parents' education, number of children in the family, and child-rearing practices, including punishment, rejection, and restrictiveness. A parent who scored high on punishment would be one who rated himself or herself as likely to use harsher physical and psychological punishments with the child. A parent who scored high on rejection would be one who rated himself or herself as disapproving of the child's behavior and accomplishments in specifically named areas. A highly restrictive parent would have admitted to curtailing the child's activities and independence in a number of ways. Another early measure, identification, was obtained from both the parent and child. The identification score used in this article is the negative of the discrepancy between the child's and the parent's self-ratings of expressive behavior on a number of modalities.

Later measures of aggression and intellectual functioning were derived from interviews with the subject, the subject's spouse, and records of the New York State Divisions of Criminal Justice and Traffic. The subject's aggression was measured by the sum of Minnesota Multiphasic Personality Inventory (MMPI) scales F, 4, and 9, which previous research (Huesmann, Lefkowitz, & Eron, 1978) has indicated is a reliable and valid measure of overt aggression (retest reliability = .87). For example, the sum of MMPI scales F, 4, and 9 has been shown to distinguish significantly between delinquent and nondelinquent teenagers. The subject's aggression was also measured by the subject's self-reported acts of physical aggression against others and the severity of the subject's self-reported punishments of his or her child. In addition, spouses of subjects completed the Straus Home Violence Questionnaire (Straus, Giles, & Steinmetz, 1979), in which they rated aggressive behavior directed toward themselves by the subject. The subject's criminal behavior was measured by the total number of convictions in New York State and ratings of the seriousness of these offenses (Rossi, Bose, & Berk, 1974). Two other measures of the subjects' aggression were the total number of moving-traffic violations and the number of convictions for driving while intoxicated, also obtained from state records.

### Procedure

The procedures used have been reported in detail elsewhere (Eron et al., 1971; Huesmann et al., 1984; Lefkowitz et al., 1977). Therefore, we will summarize here only the procedures used during the last data collection in 1981.

Subjects were contacted by mail and telephone and were paid \$40 for a 1- to 2-hr interview. The interview was administered in our field office on a microcomputer. The questions were displayed on a TV-type monitor and answered by the respondent's typing into the computer keyboard. With this procedure, the subjects' responses were immediately punched into the computer and stored on floppy disks, which were then

read by more powerful computers. Spouses and children were interviewed in the same way. Subjects unable to come to the field office for interviews were interviewed by telephone and asked to complete a mail questionnaire; however, these subjects did not take the WRAT, and no measure of intellectual functioning is available for them at age 30. They were paid \$40 if they returned the questionnaire within 2 weeks. Spouses and children were not interviewed by mail.

## Results

### Subject Attrition

To examine the effect of attrition during the 10-year follow-up, the number of subjects in the upper and lower quartile of aggression in the third grade was examined. Of the boys in the lower quartile of aggression at age 8, 57% consented to be interviewed during the follow-up at age 19. However, only 27% of the boys in the upper quartile of aggression at age 8 consented to be reinterviewed at age 19. Similarly, 63% of the girls from the lower aggression quartile consented to be interviewed at age 19, but only 33% of those in the upper quartile consented. In sum, approximately two times as many high- as compared to low-aggressive subjects of both sexes were unavailable for interviews at age 19.

The effect of attrition over 22 years on the composition of the sample was evaluated by examining the mean 1960 peer-nominated aggression scores for those subjects who were interviewed either personally or by mail in 1981 and for those who were not interviewed at all in 1981. Male subjects who were not interviewed in 1981 had a significantly higher mean aggression score in 1960 than male subjects who were interviewed (17.3 vs. 12.9),  $F(1, 294) = 6.6, p < .01$ . For female subjects, there was no significant difference in 1960 aggression between those subjects who were and were not interviewed in 1981. For both men and women, there was no difference between personal and postal interviews, although men were significantly more aggressive than women.

The same analysis was done for IQ scores of those subjects interviewed and not interviewed in 1981. For both men and women, subjects who were not interviewed in 1981 had significantly lower IQ scores than those who were interviewed. There was no difference between personal and postal interviews as well as no difference in IQ between men and women.

### Correlations Over 22 Years

The correlations of age-8 IQ with age-19 and age-30 measures of intellectual functioning are shown in Table 1. As one would expect, age-8 IQ is significantly related to school achievement and IQ at age 19 and to achievement levels measured by the WRAT at age 30. The relation over 22 years is slightly higher for men than for women. These results replicate what many others have found (Bloom, 1964; Jensen, 1980). More original are the correlations in Table 1 showing that age-8 IQ predicts video-game performance and trail-making time 22 years later. Apparently the visual-motor coordination component of age-8 IQ is predictive of lifelong performance.

In Table 2 the data are presented showing the stability of intellectual competence across three generations. The higher the

Table 1  
Correlations of Age-8 IQ With Intellectual  
Functioning at Age 19 and Age 30

Measures of intellectual competence	Men		Women		Overall	
	Age-8 IQ	N	Age-8 IQ	N	Age-8 IQ	N
Age 19						
IQ	.55*	46	.62**	40	.58**	86
Achievement	.47**	52	.66**	53	.55**	105
Age 30						
WRAT verbal	.56**	136	.47**	158	.51**	294
WRAT quantitative	.55**	136	.42**	158	.48**	294
Education	.33**	198	.29**	210	.31**	408
Trail-making time	-.40**	136	-.23**	158	-.27**	294
Race Game Score	.25*	133	.28**	157	.25**	290

Note. WRAT = Wide Range Achievement Test.  
\*  $p < .01$ . \*\*  $p < .001$ .

parents' education, the higher was the subject's IQ at age 8 and both achievement test scores and education at age 30, and the higher these scores were, the higher were the subject's child's WRAT scores. These effects produce a weak but positive relation from grandparents' education to grandchild's WRAT score in the small sample ( $N = 67$ ) on which these data are available.

Although the stability of intellectual functioning within subjects and across generations undoubtedly has genetic and physiological as well as environmental causes (Jensen, 1980), Table 3 reveals a consistency within subject families that cannot possibly be attributed to genetic or physiological factors. Subjects tended to marry people with similar educational backgrounds and comparable intellectual skills.

Taken together, the data presented thus far can be interpreted in one of two ways. They show that a person's intellectual functioning as an adult can be predicted to a significant extent from IQ as a child, family's intellectual functioning, and spouse's intellectual competence. However, the percentages of variance left unexplained are large, so it is also fair to say that a substantial portion of intellectual functioning is not predicted by these factors. These results are not dissimilar to those obtained for the stability of aggression in this study (Huesmann et al., 1984). We found that aggression was stable over the 22 years, though not as stable as intellectual functioning (see Table 5). Similarly, significant stability coefficients were obtained across generations for aggression, and significant correlations were found between husband and wife. Thus, both intellectual functioning and aggression have similar patterns of stability.

Let us now examine what other factors predict intellectual functioning. Table 4 shows the correlations between the measures of intellectual functioning at each age and several potential predictors. The sample sizes for the correlations vary as the different significance levels suggest. A number of results are as one would expect, but several are notable. Although the number of children in the family was negatively related to the child's intellectual functioning, birth order was not related. Of all the paranatal variables investigated (including additional variables

not listed in the table), only mother's age was a significant predictor of intelligence. Older mothers had more intelligent children, suggesting a social-class effect, with more poorly educated women having their children at a younger age. Similarly, the obtained correlation of intelligence with number of children in the family might also be a function of social class.

Probably the most important results revealed in this table are the strong relations between the subject's intellectual functioning and his or her early aggression, identification with parents, and prosocial behavior. The more intellectually competent adult was a child who identified more with parents, was less aggressive, and was more popular. The more competent adult also had been rejected and punished less by both parents and was restricted less by the mother. However, it is difficult to know the extent to which these parental behaviors represent different child-rearing styles or are simply responses to difficult child behaviors.

In Table 5 the correlations between early intellectual functioning and adult aggression are directly compared with the correlations between early aggression and adult intellectual functioning. It is apparent that for both men and women, early aggression is a much better predictor of adult intellectual achievement than early intellectual functioning is of adult aggression. The magnitudes of the correlations between peer-nominated aggression at age 8 and WRAT scores at age 30 are about the same as those between age-8 peer-nominated aggression and adult aggression. However, the correlations between age-8 IQ and adult aggression are much lower than the correlations between early IQ and adult WRAT. The relations between aggression and intellectual functioning over 22 years are illustrated graphically in Figure 1. For these bar graphs the 8-year-old subjects were divided into three groups on the basis of their scores on aggression: upper 25%, middle 50%, and lower 25%.

These results suggest that childhood aggression is a more important contributor to adult intellectual failure than has usually been hypothesized: a more important contributor, for example, than early IQ is to adult aggression. Perhaps the best analyses to test this hypothesis are multiple regressions in which adult aggression and academic achievement are predicted from early factors, including early aggression and IQ. However, let us first examine how well early aggression and intelligence are predictable from birth and socioeconomic factors.

In Table 6, age-8 IQ and peer-nominated aggression are first predicted from birth and socioeconomic factors. Both intelligence and aggression are significantly influenced by such factors, though intelligence is influenced somewhat more. Surprisingly, when the effects of education and number of children are taken into consideration, social class relates slightly positively to age-8 aggression. The second regression equation for predicting each criterion variable (age-8 IQ and age-8 aggression) shows the effect of adding the other criterion variable as a predictor. Such additions improved prediction substantially, demonstrating that the relation between IQ and aggression at age 8 cannot be attributed solely to birth or socioeconomic factors.

Given this background, we can now compare how well early aggression predicts later intellectual functioning with how well early IQ predicts later aggression. In Table 7, adult WRAT scores are first regressed on IQ, birth, and socioeconomic fac-

Table 2  
Correlations of Intellectual Functioning Across Generations

Intellectual achievements	Subjects' parents: education	Measures of intellectual competence		
		Draw-a-person IQ	Subjects' children	
			WRAT verbal	WRAT quantitative
Subjects' parents				
Age 30—Education		—	—	.16
<i>r</i>		—	—	67
<i>N</i>				
Subjects				
Age 8—IQ		—	.17	.28***
<i>r</i>	.32****	—	82	82
<i>N</i>	535	—		
Age 30—Education		.17	.31***	.48****
<i>r</i>	.31****	.17	81	81
<i>N</i>	341	75		
Age 30—WRAT verbal		.19	.29***	.45****
<i>r</i>	.28****	.19	80	80
<i>N</i>	240	74		
Age 30—WRAT quantitative		.21*	.34***	.51****
<i>r</i>	.18****	.21*	80	80
<i>N</i>	240	74		

Note. WRAT = Wide Range Achievement Test. Parents' education was reverse coded, so the signs of its correlations have been reversed for consistency with the other variables.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.

tors. Then aggression is added as a predictor, and finally the parents' child-rearing behaviors are inserted. Although early IQ is, of course, the best predictor of adult WRAT scores, early aggression adds a significant contribution even when parental child-rearing styles are partialled out. On the other hand, when the procedure is reversed, as on the right side of the table, and adult aggression is predicted, early IQ does not make any significant contribution to predicting later aggression. In other words, the subject's change in intellectual functioning from age 8 to age 30 is partially predictable from the subject's age-8 aggression, but the subject's change in aggression from age 8 to 30 is not at all predictable from the subject's age-8 IQ.

Table 3  
Correlations Between Subjects' and Spouses' Intellectual Functioning

Spouse's intellectual competence at about age 30	Subject's intellectual competence			
	Age 8: IQ ( <i>N</i> = 165)	Age 30		
		Education ( <i>N</i> = 164)	WRAT verbal ( <i>N</i> = 163)	WRAT quantitative ( <i>N</i> = 163)
Education	.28****	.52****	.27****	.24****
WRAT verbal	.22***	.36****	.18**	.20**
WRAT quantitative	—	.26****	.21***	.16*

Note. WRAT = Wide Range Achievement Test.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.

The regressions in Table 7 suggest that, at least between age 8 and age 30, it is more likely that aggressive behavior is interfering with intellectual development than that diminished intellectual functioning is stimulating aggression. Although, of course, one cannot infer causation from a survey study such as this, the most plausible explanation of these results is that early aggression is the precursor of diminished intellectual functioning.

## Discussion

The results of this longitudinal study suggest that aggression interferes with the development of intellectual functioning. Although diminished intellectual abilities and academic failure may well stimulate aggressive responses in the young child, whatever effect intelligence has on aggressive behavior, it appears to have occurred by age 8. Subsequent changes in aggressive behavior are not affected by early IQ. Of course, this does not mean that changes in academic performance between childhood and adulthood might not affect aggression. The role of academic success and failure should be important, according to most theories of aggression. These data do demonstrate, however, that regardless of a young child's IQ, intellectual achievements, both concurrently and up to middle adulthood, are adversely affected by aggressive behavior. Furthermore, these data demonstrate that both aggression and intellectual functioning are perpetuated across three generations and within marriage pairs.

In developing a model to explain the relation between intellectual functioning and aggression, one must distinguish between IQ and intellectual achievement. Researchers who have concentrated on only one of these variables have assumed with-

Table 4  
Correlations of Subjects' Intellectual Functioning With Early Family Variables

Age-8 measures	Age 30 intellectual competence						
	Age 8: IQ (N = 632)	Age 19: IQ (N = 86)	WRAT verbal (N = 294)	WRAT quantitative (N = 294)	Educa- tion (N = 408)	Trail- making time (N = 294)	Race game score (N = 290)
<b>Socioeconomic factors</b>							
Parent's education	.32****	.39****	.28****	.18***	.31****	-.13**	.18***
Father's occupational status	.09*	.14	—	—	.17****	—	—
Number of children in family	-.17****	-.11	-.15**	—	-.10*	.11*	—
<b>Birth factors</b>							
Birth order	—	—	—	—	—	—	—
Birth instruments used	-.14	-.19	—	—	—	—	—
Mother's age at birth of subject	.11**	.21*	.13*	.13*	.12**	—	.12*
Length of pregnancy	—	-.16	—	—	—	—	—
<b>Child identification and behaviors</b>							
Identification with mother	.35****	.22*	.25****	.15**	.30****	—	.13*
Identification with father	.23****	.32**	.29****	.22***	.32****	—	.25***
Peer-nominated aggression	-.29****	-.25**	-.33****	-.22****	-.24****	.30****	—
Peer-nominated popularity	.29****	.34****	.33****	.30****	.20****	-.19****	.15**
<b>Parent child-rearing practices</b>							
Punishment	-.27****	-.18	-.25****	-.22****	-.18****	.20***	-.14**
Rejection	-.11***	—	-.23****	-.17***	-.14**	.15**	—
Restrictiveness of mother	—	-.22*	-.20***	—	-.14**	—	—
Restrictiveness of father	—	—	—	—	.11*	—	—

Note. WRAT = Wide Range Achievement Test. Parents' education and occupational status and the identification variables were originally reverse coded, so the signs of their correlations with other variables were reversed in this table for consistency with the labels.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.

Table 5  
Correlations of Peer-Nominated Aggression and IQ at Age 8 With Aggression and Intellectual Functioning at Age 30

Age-30 measures	Men			Women		
	N	Age-8 aggression R	Age-8 IQ R	N	Age-8 aggression R	Age-8 IQ R
<b>Aggression</b>						
MMPI scales F + 4 + 9	190	.30****	-.19***	209	.16** (.20****)	—
Spouse abuse	88	.27***	—	74	—	—
Punishment of child by subject	63	.24**	—	96	.24***	.21***
Criminal justice convictions	335	.24****	-.15***	207	— (.11)	—
Seriousness of criminal act	332	.21****	-.14***	207	— (.17****)	—
Moving-traffic violations	322	.21****	—	201	—	—
Driving while intoxicated	322	.29****	—	201	—	—
Self-rating of physical aggression	193	.25**** (.29****)	—	209	—	—
<b>Intellectual competence</b>						
WRAT spelling	136	-.30****	.54****	158	-.35****	.44****
WRAT reading	136	-.20**	.56****	158	-.37****	.47****
WRAT arithmetic	136	-.20**	.55****	158	-.35****	.42****

Note. MMPI = Minnesota Multiphasic Personality Inventory. WRAT = Wide Range Achievement Test. The correlations in parentheses are those that changed  $> .03$  with a skew-correcting transformation.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.

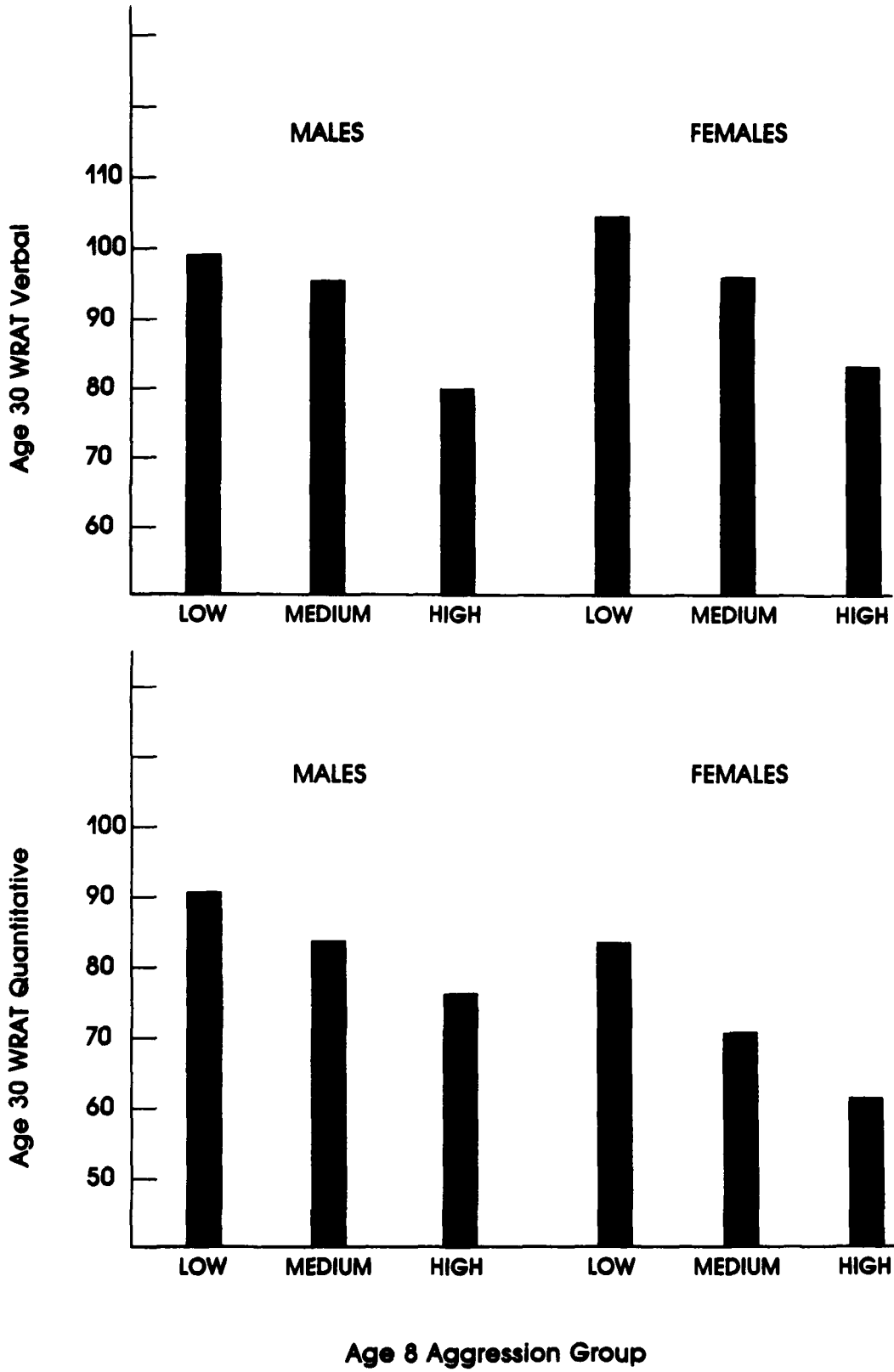


Figure 1. Age-30 intellectual achievement as a function of age-8 aggression.

Table 6  
Standardized Regression Coefficients for Regressions  
Predicting Age-8 Aggression and Intellectual Functioning

Predictors	Age-8 IQ		Age-8 aggression	
	First regress	Second regress	First regress	Second regress
Birth & socioeconomic factors				
Parent's education	.38****	.35****	-.15**	—
Father's occupational status	—	—	.14**	.13*
Number of children in family	-.11*	—	.14**	.11*
Mother's age at birth of subject	.19****	.20****	—	.11*
Age-8 child factors				
IQ				-.28****
Aggression		-.25****		
$R^2$	.165	.223	.057	.123
$df$	4, 235	5, 234	4, 235	5, 234
$F$	11.60****	13.45****	3.58***	6.59****

Note.  $N = 240$ . Parent's education and occupational status and the identification variables were originally reverse coded, so the signs of their correlations with other variables were reversed in this table for consistency with the labels. The results of these regressions remained virtually unchanged when gender was also included as a predictor variable.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.

out much evidence that the direction of effect is from low IQ or academic failure to aggression. However, a different model becomes plausible when IQ and achievement are considered to have independent relations.

Even before age 8, the lower IQ child seems to be at a greater risk for developing aggressive behaviors. The process responsible is not clear, but it may be that lower IQ children do not possess the cognitive skills necessary to learn the more complex nonaggressive social problem-solving skills. A number of studies have shown that aggressiveness of most toddlers decreases as they grow and learn alternate coping strategies (Patterson, 1983, Note 1). However, the lower the child's IQ, the harder it may be to learn such skills. In addition, a lower IQ may make success at any endeavor more difficult for the child, resulting in increased frustration, lower self-esteem, and stimulated aggression. Regardless of the exact process, low IQ must exert most of its effect on aggression before age 8, as it does not predict changes in aggression after that time.

Aggressiveness, on the other hand, may not affect IQ but it appears to have a continuing effect on intellectual achievement into young adulthood. Aggressive children may be so obstreperous that teachers and classmates avoid them, seriously limiting their learning opportunities. When they do perform adequately, they may not be reinforced for that performance because of the generalized negative attitude the teacher holds toward them. Furthermore, aggressive behavior may be indicative of attentional deficits. The child who is constantly involved in aggressive social interactions is probably attending to social cues much more than academic learning cues.

Table 7  
Standardized Regression Coefficients for Regressions Predicting Age-30 Aggression and Intellectual Functioning

Predictors	Age-30 intellectual achievement (WRAT)			Age-30 aggression (MMPI F + 4 + 9)		
	First regress	Second regress	Third regress	First regress	Second regress	Third regress
Birth & socioeconomic factors						
Parent's education	—	—	—	—	—	-.19*
Father's occupational status	—	—	—	—	—	—
Number of children in family	—	—	—	—	—	—
Mother's age at birth of subject	—	—	—	—	—	—
Age-8 child factors						
IQ	.54****	.49****	.48****	—	—	—
Aggression		-.21****	-.16*	.30****	.30****	.34***
Age-8 child-rearing factors						
Child's identification with mother			—			—
Child's identification with father			.17*			—
Parental punishment of child			—			—
Parental rejection of child			-.17**			—
Mother's restrictiveness			-.17**			—
$R^2$	.257	.372	.454	.105	.105	.139
$df$	4, 101	5, 100	10, 95	4, 142	5, 141	10, 136
$F$	10.03****	9.90****	7.18****	3.32***	2.75**	2.00**

Note. WRAT = Wide Range Achievement Test. MMPI = Minnesota Multiphasic Personality Inventory. Parent's education and occupational status and the identification variables were originally reverse coded, so the signs of their correlations with other variables were reversed in this table for consistency with the labels. The results of these regressions remained virtually unchanged when gender was also included as a predictor variable.

\*  $p < .10$ , two-tailed. \*\*  $p < .05$ , two-tailed. \*\*\*  $p < .01$ , two-tailed. \*\*\*\*  $p < .001$ , two-tailed.



An important implication of this dual process model is that the strategy for intervention should change as a function of a child's age. At a very early age, interventions directed at improving a child's cognitive skills could also be expected to decrease the likelihood of aggressive behavior in the child. However, by age 8, intervention should be targeted directly at teaching nonaggressive strategies for behavior, as most children will already have developed a reasonably stable pattern of aggressive or nonaggressive behavior. However, these interventions targeted at aggression should also promote the development of intellectual skills by reducing the interfering effects of aggressive behavior.

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