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ABSTRACT

Using data from a broader longitudinal study, this investigation explores within-subject and cross-generational stability of intellectual competence and the relationship of such stability to aggressive behavior. Data were gathered three times (when subjects' modal age was 8, 19, and 30 years). Initially, subjects included the entire population enrolled in the third grade in Columbia County, New York. While aggression and IQ scores were obtained for 632 subjects 8 years of age, samples available for multivariate analyses were much smaller. All, however, were sufficiently large to provide reasonable statistical power. Additional measures of IQ or achievement were made when subjects were 19 and 30 years old. When subjects were 8 years old, mothers and fathers were interviewed; when 30 years of age, data were gathered from the spouses and children. Measures relevant to this study were the California Test of Mental Maturity, school records of IQ, the Wide Range Achievement Test, Reitan's trail-making test, and a video car race game. Results suggested that aggression and intellectual competence are strongly related and that this strong relationship is due partially to the interference of aggressive behavior patterns with the development of intellectual competence. Intellectual competence and aggressive behavior showed similar patterns of stability across generations and marriage-pairs and within subjects. Early IQ did not predict change in aggression from childhood to adulthood. (RH)

Intellectual Competence and Aggression

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In the first presentation in this symposium, Eron argued compellingly that aggressiveness is a reasonably stable characteristic over the 20 years from childhood to middle adulthood. 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. However, aggression cannot be considered in isolation from other developing behaviors and characteristics. In particular, one must consider the relation between aggressiveness and intellectual competence.

While a number of studies have revealed a correlation between aggression and poor academic performance or poor performance on standardized tests of intellectual ability, the extent of this relation and the processes responsible for it are not yet clear. There are several psychological models that have been offered to explain the relation between intellectual deficits and aggression. Lower intellectual ability undoubtedly 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 is more likely to respond aggressively. In addition, the child with diminished intellectual abilities would find it more difficult to divise alternative less direct strategies to obtain his/her goals. Regardless of the success or lack of success that the low IQ child has had with aggressive behavior, the child will tend to

repeat the behavior if the child cannot learn and retain alternative strategies.

While socioeconomic factors affect both intellectual abilities and a child's aggressiveness, a number of studies have shown that, independently of socioeconomic status, IQ is a significant predictor of delinquency (Gibson & West,1970; Lowenstein,1977; Hirschi & Hindelang, 1977; Hindelang, Hirschi, & Weis, 1981). This relation may be somewhat inflated because bright delinquents may not be apprehended as often. Also, the extent to which the relation with IQ 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 actually related achievement rather than competence to aggression. Lowenstein (1977) and Olweus (1978), have shown that bullies in school are generally below average in academic skills. A large quantity of recent evidence also exists relating poor academic achievement to delinquency (Hogenson,1974; Loeber & Dishion,1983; Wadsworth,1979; Andrew,1981). However, in one study specifically directed at separating out the effects of IQ and achievement, Feshback & Price (1983) found only a negligible relation between IQ and aggression.

While no one explanation for the relation between aggression and intellectual competence has emerged as a dominant theory, most researchers have implicitly adopted the assumption that the direction of the effect is mostly from intellectual incompetence or achievement failure to aggression. Yet, once one concedes that the relation is at least partially due to the performance failure that stems from low IQ, one must also consider the possibility that aggression is a cause of poor achievement and that the relation between intellectual competence and aggression is bidirectional.

The relation between the development of aggression and the development of intellectual competence cannot be adequately explored without also investigating the relative stability of these characteristics from childhood to adulthood. Numerous studies have revealed that adult intellectual competence is predictable from middle childhood intellectual competence (Jensen, 1980). Similarly, as Eron argued in the first presentation, and as recent research has shown (Huesmann, Eron, Lefkowitz & Walder,1983; Olweus, 1979), aggression is also stable. But how do these variables' stabilities compare in the same sample? More importantly, assuming similar stabilities, are changes in a child's aggressive behavior from childhood to adulthood more predictable from the child's intellectual competence than changes in the child's intellectual competence are predictable from the child's aggression?

To answer these questions, we will examine the stability of intellectual competence and its relation to aggressive behavior over 22 years from age 8 to age 30 in a sample of over 600 subjects.

Method

The longitudinal data were collected as part of a larger 22 year study that has been described in the first presentation by Eron and in detail elsewhere (Eron, Lefkowitz, & Walder,1973; Lefkowitz, Eron, Walder, & Huesmann,1977; Huesmann et al., 1983).

Subjects

The intial subjects comprised the entire population of youngsters enrolled in the third grade in a semi-rural county in New York State.

(Columbia County). This included approximately 870 youngsters whose modal age at the time was 8 years. These youngsters 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 (211 boys, 216 girls; modal age, 19). Finally, in 1981 we obtained some data on 632 of the subjects, their spouses, and children.

While we have age 8 aggression scores and age 8 IQ scores for all 632 of these subjects, longitudinal analyses will involve somewhat smaller numbers. At age 19 we were able to obtain IQ data for only 86 subjects, while at age 30 we obtained achievement scores for 294 subjects. Furthermore, we had interviewed both parents of only 107 of these subjects in 1960. While these factors make the samples available for some multivariate analyses much smaller than the total, all important samples are large enough to provide reasonable statistical power.

Procedure and Measures

The procedures employed and measures have been described in detail elsewhere (Huesmann et al., 1983; Lefkowitz et al., 1977). The measures of particular concern for this paper are the subjects' age 8 IQ which was measured by the California Test of Mental Maturity (Sullivan, Clark & Tiegs, 1961), the subjects' age 19 IQ which was obtained from school records, and the subjects' reading, spelling, and arithmetic achievement at age 30 which was measured by Jastak & Jastaks' (1978) Wide Range Achievement Test (WRAT). Scores on these tests were also combined to yield a WRAT verbal score

(spelling+reading) and a WRAT total score (spelling+reading+arithmetic). The children of the subjects were also given WRAT's, but their scores were standardized by age to represent deviations from age norms. Two other measures of intellectual functioning used with the age 30 subjects were Reitan's trail-making test 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.

Results

The correlations of age 8 IQ with age 19 and age 30 measures of intellectual competence 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 22-year relation is slightly higher for males than for females. These results replicate in our sample what many others have found. More unique are the correlations in Table 1 showing that age 8 IQ predicts video game performance and trailmaking time 22 years later. Apparently the visual-motor coordination component of age 8 IQ is predictive of lifelong performance. Figure 1 illustrates the longitudinal relations from age 8 to age 30 graphically. The mean scores represented by these bar graphs were significantly different substantiating the stability of intellectual competence over time.

In Table 2 the data are presented showing the stability of intellectual competence across 3 generations in our subjects' families. The greater was the subject's parents' education, the higher the subject's IQ at age 8, and the higher the subject's

achievement test scores and education at age 30. The greater are these scores for a subject, the higher are 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.

While the stability of intellectual competence within subjects and across generations undoubtedly has genetic, physiological and environmental causes (Jensen, 1980), Table 3 reveals a stability within families that cannot be attributed to genetic or physiological factors. People tend 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 competence as an adult can be predicted to a significant extent from his IQ as a child, his family's intellectual competence and his spouse's competence. However, the percentages of variance left unexplained are large; so it is also fair to say that a substantial portion of one's intellectual competence is not predicted by these factors. Let us now examine what other factors do predict competence.

Table 4 shows the correlations between the measures of intellectual competence 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. While the number of children in the family was negatively related to the child's intellectual competence, birth order was not. Of all the birth related variables investigated (including additional variables not listed in the table), only mother's age was a significant predictor of intellect. Older mothers

had more intelligent children, suggesting that a social class effect may be occurring, with poorer educated women having their children at a younger age.

Probably the most important results revealed in this table are the strong relations between the child's identification with his/her parents, the child's social behaviors and the child's intellectual competence both at age 8 and as an adult. The more intellectually competent adult was a child who identified more with his/her parents, who was less aggressive and who was more popular. The more competent adult also was rejected and punished less by his/her parents and was restricted less by his/her mother. However, it is difficult to know the extent to which these parent behaviors represent different child rearing styles or simply reflect child behaviors.

In Table 5 the correlations of early intellectual competence with adult aggression are directly compared to the correlations of early aggression with adult intellectual competence. One can see that for both males and females early aggression is a much better predictor of adult intellectual achievement than early intellectual competence is of adult aggression. The magnitude of the correlations from peer-nominated aggression at age 8 to WRAT scores at age 30 is about the same as the magnitude from age 8 peer-nominated aggression to adult aggression. However, the correlations from age 8 IQ to adult aggression are much lower than the correlations to adult WRAT. Furthermore, as the partial correlations in Table 6 indicate, the relation from early to later aggression cannot be ascribed to the stability of intellect over that time since the partial correlations are about as high as the raw correlations.

These results suggest that childhood aggression is a more

important contributor to adult intellectual failure than has usually been hypothesized -- a more important contributor than early IQ is to adult aggression. Perhaps the best analyses to test this theory are multiple regressions in which adult aggression and academic achievement are predicted from early factors including aggression and IQ. Such regressions are shown in Tables 7 and 8.

In Table 7 age 8 IQ and peer-nominated aggression are predicted from early socioeconomic and birth factors, then from these plus age 8 IQ or aggression, and then from these plus relevant child rearing factors. The regressions show that independently of socioeconomic, birth and child rearing factors, IQ and aggression predict each other at that time. Adding IQ or aggression to the regression equations produces significant increments in the multiple correlation. One must conclude that either a common factor not represented in these equations is causing the development of both aggressive behavior styles and diminished intellectual competence prior to age 8 or that one or both of these variables affects the other.

The regressions in Table 8 suggest that, at least between age 8 and age 30, it is aggressive behavior patterns that are interfering with intellectual development more than it is diminished intellectual competence that is stimulating aggression. In this table adult WRAT scores are first regressed on IQ, birth and socioeconomic factors. Then, aggression is added as a predictor, and finally the parents' child rearing behaviors are inserted. While early IQ is, of course, the best predictor of adult WRAT scores, early aggression adds a very significant contribution even when parental child rearing styles are partialed out. On the other hand, when the procedure is reversed on the right side of the table and adult aggression is predicted, early

IQ does not make any significant contribution beyond what was predicted by early aggression.

Summary and Conclusions

The results from this longitudinal study suggest that aggression and intellectual competence are strongly related at least partially because aggression interferes with the developmenat of intellectual competence. Intellectual competence and aggressive behavior bear strikingly similar patterns of stability from childhood to middle-adulthood. In addition, both appear to perpetuate themselves from grandparent, to parent, to child; and both perpetuate themselves within marriage pairs. While diminished intellectual abilities and academic failure may well stimulate aggressive responses in the young child, our data did not reveal any contribution of early IQ to predicting change in aggression from childhood to adulthood. 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. Our data do demonstrate, however, that regardless of a young child's IQ, his intellectual achievements concurrently and in young adulthood are adversely affected if he consistently behaves aggressively.

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Table 1

Correlations of Age 8 IQ with Intellectual Competence at Age 19 and Age 30

Measures of Intellectual Competence	Age 8 IQ		
	Males	Females	Overall
Age 19			
Subject IQ age 19	.55**	.62***	.58***
Subject Achievement age 19	.47***	.66***	.55***
Number of Books in House	.33***	---	.19***
Age 30			
Subject WRAT Verbal	.56***	.47***	.51***
Subject WRAT Quantitative	.55***	.42***	.48***
Subject Education	.33***	.29***	.31***
Subject Trailmaking Time	-.40***	-.23**	-.27***
Subject Race Game Score	.25**	.28***	.25***

+p<.10 *p<.05 **p<.01 ***p<.001

Table 2

Correlations of Intellectual Competence Across Generations

	PARENT'S INTELLECTUAL COMPETENCE	SUBJECTS INTELLECTUAL COMPETENCE			
	AGE 30?	AGE 8	AGE 30		
	EDUCATION	IQ	EDUCATION	WRAT VERBAL	WRAT QUANTITATIVE
PARENT'S INTELLECT					
EDUCATION		.32***	.31***	.28***	.18**
CHILD'S INTELLECT					
DRAW A PERSON IQ	---	---	.17	.19	.21+
WRAT VERBAL	---	.17	.31**	.29**	.34**
WRAT QUANTITATIVE	.16	.28**	.48***	.45***	.51***

+p<.10 *p<.05 **p<.01 ***p<.001

Parents' education was reverse coded; so the signs of its correlations have been reversed for consistency with the other variables.

Table 3

Correlations Between Subject's and Spouse's Intellectual Competence

SPOUSE INTELLECTUAL COMPETENCE AT ABOUT AGE 30	SUBJECTS' INTELLECTUAL COMPETENCE			
	AGE 8	AGE 30		
	IQ	EDUCATION	WRAT VERBAL	WRAT QUANTITATIVE
EDUCATION	.28***	.52***	.27***	.24***
WRAT VERBAL	.22**	.36***	.18*	.20*
WRAT QUANTITATIVE	---	.26***	.21**	.16+

+p<.10 *p<.05 **p<.01 ***p<.001

Table 4

Correlations of Subject's Intellectual Competence at Age 30
with Early Variables

	AGE 8	AGE 19	AGE 30 INTELLECTUAL COMPETENCE				
			WRAT	WRAT		TRAILMAKING	RACE
	IQ	IQ	VERBAL	QUANTITATIVE	EDUCATION	TIME	GAME SCORE
AGE 8 MEASURES							
SOCIOECONOMIC FACTORS							
PARENTS' 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+	---
BIRTH FACTORS							
BIRTH ORDER	---	---	---	---	---	---	---
BIRTH INSTRUMENTS USED	-.14	-.19	---	---	---	---	---
MOTHERS AGE AT BIRTH OF SUBJECT	.11*	.21+	.13+	.13+	.12*	---	.12+
LENGTH OF PREGNANCY	---	-.16	---	---	---	---	---
CHILD IDENTIFICATION AND BEHAVIORS							
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*
PARENT CHILD REARING PRACTICES							
PUNISHMENT	-.27***	-.18	-.25***	-.22***	-.18***	.20**	-.14*
REJECTION	-.11**	---	-.23***	-.17**	-.14*	.15*	---
RESTRICTIVENESS OF MOTHER	---	-.22+	-.20**	---	-.14*	---	---
RESTRICTIVENESS OF FATHER	---	---	---	---	.11+	---	---

+p<.10 *p<.05 **p<.01 ***p<.001

Parents' education was reverse coded; so the signs of its correlations have been reversed for consistency with the other variables.

Table 5

Correlations of Peer-nominated Aggression and IQ at Age 8
With Aggression and Intellectual Competence at Age 30

	MALES			FEMALES		
AGE 30 MEASURES	N	AGE 8 AGGRESSION R	AGE 8 IQ R	N	AGE 8 AGGRESSION R	AGE 8 IQ R
AGGRESSION						
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	---	---
INTELLECTUAL COMPETENCE						
WRAT SPELLING	136	-.30***	.54***	158	-.35***	.44***
WRAT READING	136	-.20*	.56***	158	-.37***	.47***
WRAT ARITHMETIC	136	-.20*	.55***	158	-.35***	.42***

+p<.10 *p<.05 **p<.01 ***p<.001

The correlations in parentheses are those that changed >.03 with a skew-correcting transformation.

Table 6

Partial Correlations of Age 8 Aggression and Age 30 Aggression with Age 8 IQ Partialed Out

	AGE 8 PEER NOMINATED AGGRESSION	
AGE 30 MEASURES	MALES	FEMALES
MMPI SCALES F+4+9	.27***	.15*
SPOUSE ABUSE	.24*	---
PUNISHMENT OF CHILD BY SUBJECT	.27*	.19*
CRIMINAL JUSTICE CONVICTIONS	.21***	---
SERIOUSNESS OF CRIMINAL OFFENSES	.19***	.13
MOVING TRAFFIC VIOLATIONS	.19***	---
DRIVING WHILE INTOXICATED	.30***	---
SELF-RATING OF PHYSICAL AGGRESSION	.24***	---

+p<.10 *p<.05 **p<.01 ***p<.001

Table 7

Regressions Predicting Age 8 Aggression and Intellectual Competence

PREDICTORS	AGE 8 IQ STANDARDIZED REGRESSION COEFFICIENTS			AGE 8 AGGRESSION STANDARDIZED REGRESSION COEFFICIENTS		
BIRTH & SOCIOECONOMIC FACTORS						
PARENTS' EDUCATION	.38***	.35***	.27***	-.15*	---	---
FATHER'S OCCUPATIONAL STATUS	---	---	---	-.14*	-.13+	-.15*
NUMBER OF CHILDREN IN FAMILY	-.11+	---	---	.14*	.11+	.10+
MOTHER'S AGE AT BIRTH OF SUBJECT	.19**	.20***	.20***	---	.11+	---
AGE 8 CHILD FACTORS						
IQ					-.28***	-.17**
AGGRESSION		-.25***	-.17**			
AGE 8 CHILD REARING FACTORS						
CHILD IDENTIFICATION WITH MOTHER			.25***			-.16*
CHILD IDENTIFICATION WITH FATHER			---			---
PARENTAL PUNISHMENT OF CHILD			---			.20**
PARENTAL REJECTION OF CHILD			---			.25***
MOTHER'S RESTRICTIVENESS			---			---
Multiple Correlation Squared	.165	.223	.283	.057	.123	.257
Degrees of Freedom	4,235	5,234	10,229	4,235	5,234	10,229
F-value	11.60***	13.45***	9.02***	3.58**	6.59***	7.92***

+p<.10 *p<.05 **p<.01 ***p<.001

signs of the coefficients for parents' education were reversed to reflect its reverse coding.

Table 8

Regressions Predicting Age 30 Aggression and Intellectual Competence

PREDICTORS	AGE 30 INTELLECTUAL COMPETENCE (WRAT) STANDARDIZED REGRESSION COEFFICIENTS			AGE 30 AGGRESSION (MMPI F+4+9) STANDARDIZED REGRESSION COEFFICIENTS		
BIRTH & SOCIOECONOMIC FACTORS						
PARENTS' 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 IDENTIFICATION WITH MOTHER			---			---
CHILD IDENTIFICATION WITH FATHER			.17+			---
PARENTAL PUNISHMENT OF CHILD			---			---
PARENTAL REJECTION OF CHILD			-.17*			---
MOTHER'S RESTRICTIVENESS			-.17*			---
MULTIPLE CORRELATION SQUARED	.257	.372	.454	.105	.105	.139
DEGREES OF FREEDOM	4,101	5,100	10,95	4,142	5,141	10,136
F-VALUE	10.03***	9.90***	7.18***	3.32**	2.75*	2.00*

+p<.10 *p<.05 **p<.01 ***p<.001

signs of the coefficients for parents' education were reversed to reflect its reverse coding.