

Cognitive Processes and the Persistence of Aggressive Behavior

L. Rowell Huesmann and Leonard D. Eron

Department of Psychology, University of Illinois at Chicago

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Recent data from several longitudinal studies including one spanning 22 years suggest that aggression is quite stable over time and situation. Early measures of intellectual competence predicted concurrent and later aggression, but early aggression was independently a good predictor of reduced intellectual achievement as an adult. Over a shorter period of years cognitive rehearsal of aggressive behaviors predicted overt aggression, was predicted by overt aggression, and correlated with the child's TV viewing. In combination, these data suggest a circular process in which scripts for aggressive behavior are learned at an early age and become more firmly entrenched as the child develops, so that aggression becomes self-perpetuating in children with certain cognitive characteristics.

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INTRODUCTION

Aggression as a characteristic way of solving social problems usually emerges early in life. Genetic, physiological, and other constitutional factors undoubtedly play a role in many cases but the presence of the "appropriate learning conditions" is probably more important in most cases [Eron et al, 1971; Lefkowitz et al, 1977]. The "appropriate learning conditions" seem to be those in which the child has many opportunities to observe aggression, in which the child is reinforced for his/her own aggression, and in which the child is the object of aggression. Nevertheless, in such situations only some children become seriously aggressive, and by themselves, simple observational learning and reinforcement models do not seem to be adequate explanations. An extensive array of environmental, familial, and child characteristics have been shown to be weakly predictive of which child will be more aggressive; yet, none could be called a sufficient or necessary condition for antisocial aggression. Severe

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Address reprint requests to L. Rowell Huesmann, Department of Psychology, University of Illinois at Chicago, Box 4348, Chicago, IL 60680.

antisocial, aggressive behavior seems to occur only when there is a convergence of a number of these factors during a child's development [Eron, 1982].

Recently, we have begun to examine the development of characteristic styles of aggressive behavior from a more cognitive, information-processing perspective. We have hypothesized that social behavior is controlled to a great extent by cognitive scripts, schemas, and strategies that have been stored in memory and are used as guides for behavior. These strategies must be encoded, rehearsed, stored, and retrieved in much the same way as are other strategies for intellectual behaviors. These strategies might be closely associated with specific cues in the encoding context, or, might be abstractions unconnected to specific cues. By encoding we mean the "formation of a representation of an external stimulus in the memory system" [Kintsch, 1977, p #485]. Under this view an aggressive strategy must be encoded, retained in memory, and retrieved later on in order to influence the child's behavior. A number of situational and interpersonal factors could influence each of these three processes. To encode an aggressive response a child must attend to the behavior and must not reject the behavior as completely inappropriate. To maintain the encoded strategy in memory, the child must rehearse it. Through "elaborative" rehearsal the child may develop abstractions of the aggressive strategies. Finally, to retrieve the strategy, the child must be able to access it in memory. According to the encoding specificity principle, the presence of cues that were also present at encoding time facilitates such retrieval.

Several predictions are suggested from this perspective. First, we would expect each child to develop a characteristic style of aggressive or nonaggressive behavior which would become relatively stable across time and situations as the child matures. This does not mean that situational factors would be unimportant. The stability would be a stability of relative position in the population. Situational factors would be important in cueing the retrieval of certain strategies and in continuing the learning process. However, once a schema of strategies for social behavior had been firmly established, it would probably be very resistant to change. Further, the information-processing styles that facilitated the acquisition of aggressive strategies originally are likely to persist. Thus, the more aggressive child becomes the more aggressive adult. According to this model aggression can become self-perpetuating despite severe negative reinforcements that accrue to the child. The more the child behaves aggressively, the more the child is exposed to aggressive scenarios to be encoded. The more scenarios the child has encoded, the more are available to be rehearsed. The more scenarios are rehearsed, the more likely are they to be retrieved when a social problem arises. The more likely aggressive strategies are to be retrieved, the less likely are other strategies to be retrieved. The child behaves aggressively, and the cycle continues.

In this paper we investigate the role of two cognitive variables in the aggression cycle: intellectual functioning and fantasizing. A number of studies have revealed a relation between aggression and poor performance on standardized tests of intellectual ability [Caplan, 1965; Huesmann et al, in press]. However, the nature of the relation between aggression, poor academic performance, and low IQ test scores is not yet clear [Feshbach and Price, 1984]. Reduced intellectual competence is undoubtedly a frustrator that is likely to raise the child's arousal level and prevent the child from obtaining positive reinforcements for the prosocial types of school behaviors that compete with aggressive responses. However, the child with lower intellectual com-

petence may also be less able to foresee the eventual inappropriateness of aggressive behavior, and, therefore, may be more likely to encode aggressive strategies. The intended lesson of punishment in response to aggression may be lost on the lower-IQ child. By rehearsing the aggressive strategies the child may be able to obtain vicariously the rewards that are unobtainable in his/her environment, but this rehearsal only makes aggressive responding more likely by establishing the strategy more firmly in memory. In addition, the lower-IQ child may be less facile at searching memory for alternative response strategies to the dominant aggressive strategy that is first retrieved. The previous reasoning suggests that diminished intellectual functioning would be a precursor of heightened aggressiveness. However, there are also reasons to believe that the emission of aggressive behavior would lead to decreased intellectual functioning. Aggressive responding may interfere with positive 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 intellectual competence is even further reduced.

A second variable that should be important in this hypothesized aggressive cycle is the child's use of aggressive fantasy. From an information-processing perspective fantasizing about aggressive behavior is a form of rehearsal. Thus, the more a child fantasizes about aggressing, the more readily the child will retrieve aggressive strategies and the more the child will aggress. Of course, the more the child behaves aggressively or observes others behaving aggressively, the more material the child obtains for his/her aggressive fantasy. So the cycle again continues.

In the remainder of this paper we will report some data in support of the role of reduced intellectual competence and increased aggressive fantasizing in maintaining aggressive responding. The data are taken from two different longitudinal studies of aggressive behavior. One is a three-year study of primary-school children undertaken in the midwestern region of the United States and several other countries. The other is a 22-year study following over 600 children from age 8 to age 30 in New York State.

THE 22-YEAR STUDY

The subjects of this study originally comprised the entire population of youngsters enrolled in the third grade in a semirural county in New York State (Columbia County). Included were 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). In 1981 we again tracked down as many of the original subjects as possible. Their modal age was now 30. We were able to locate and interview 295 of the original subjects in person and another 114 by mail and telephone for a total of 409 (198 males, 211 females). We were also successful in obtaining interviews with the spouses of 165 of the interviewed subjects and with 82 of the subjects' own children who at the time were approximately the same age as the subjects when first seen in 1960. Children under 5 were not interviewed, and only one child (the oldest) from each family was interviewed. Nevertheless, the 82 children interviewed represent over half of those reinterviewed subjects who had children. Thus, there are

substantial samples of data on aggression about and from three generations within the subject's family: the subject and the subject's spouse, the subject's parents, and the subject's child.

In addition to the interview, we obtained data from the New York State Divisions of Criminal Justice Services and Motor Vehicles about the subjects who were interviewed and any other subjects who were in the original sample, but whom we were unable to see for followup interviews. We obtained at least some data from these archives on 542 of our original subjects. Coupled with the interview data, this gives us some 1981 followup data on 632 of our original subjects (358 males, 274 females). Of these, 366 had also been interviewed after the ten-year lag in 1970.

Correlations between the early and later measures of aggression are shown in Table I. As reported elsewhere [Huesmann et al, in press], it is apparent that over 22 years there is good predictability from early aggression to later aggression, especially in the case of males. Also in this table are the correlations between the early IQ measure, the California Test of Mental Maturity, and the spelling, reading, and arithmetic scores of the Wide Range Achievement Test (WRAT) 22 years later. It is apparent that the stability of aggression holds up across method, informant, and situation as well as time. Especially impressive is the correlation between aggression at age 8 and later encounters with the law as indicated by driving and criminal offenses. Structural models developed from these data to estimate the disattenuated stability of aggression revealed that the age 8 to age 30 stability for boys was about .50 and for girls was about .35 [Huesmann et al, in press]. Taken together these data convincingly indicate that aggressive behavior is reasonably stable across time and situations and that peer-nominations of aggression at age 8 are predictive of serious antisocial behavior as an adult. These stability data are consistent with the concept that acquired schemas for aggressive responding produce characteristic styles of aggression, but, of course, the data are also consistent with many other models. What do they indicate more specifically about cognitive processing?

TABLE I. Correlations of Peer-Nominated Aggression and IQ at Age 8 With Aggression and Intellectual Competence at Age 30 in the 22-Year New York State Study

	Males			Females		
	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**) ^a	—
Punishment of child by subject	63	.24*	—	96	.24**	.21**
Seriousness of criminal convictions	332	.21***	-.14**	207	— (.17**) ^a	—
Driving while intoxicated	322	.29***	—	201	—	—
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***

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

+ p < .10.

*p < .05.

**p < .01.

***p < .001.

It is interesting to note from Table I that intellectual competence is not nearly as good a predictor of later aggression as aggression is of later intellectual incompetence. Yet at age 8 IQ was correlated $-.27$ with boys aggression and $-.32$ with girls aggression. Partial correlations from early to later aggression controlling for early IQ were computed and are as high as the original correlations. Multiple regressions comparing the prediction of intellectual functioning from aggression with the prediction of aggression from intellectual functioning are shown in Table II. One can see that aggression is a highly significant predictor of age 30 intellectual achievement even after the effects of age 8 IQ are removed. On the other hand, age 8 IQ is not a significant predictor of age 30 aggression after the effects of age 8 aggression are removed.

The data are consistent with the concept that emitted aggression perpetuates both itself and intellectual incompetence, making it difficult for aggressive styles to change. Aggression was found to be a significant predictor of later intellectual achievement in multiple regressions even when early IQ was partialled out. For females, independently of early IQ, early aggression was a significant predictor of lower adult achievement test scores and of lower educational attainment. For males, the effects were not as great (perhaps because aggression is more socially acceptable for males) and were only significant for educational attainment. At the same time, these results do not rule out an effect of early intellectual incompetence on later aggressiveness. However, such an effect must be occurring primarily before age 8 because subsequent changes in aggression are not longer affected much by IQ. Such a hypothesis is consistent with the model of IQ as a relatively stable marker of deficient information

TABLE II. Regression Predicting Age 30 Aggression and Intellectual Competence in the 22-Year New York Study^a

Predictors	Age 30 intellectual competence (WRAT)—standardized regression coefficients			Age 30 aggression (MMPI F + 4 + 9) —standardized regression coefficients		
Birth and socioeconomic factors						
Parent's education	—	—	—	—	—	-.19+
Father's occupational status	—	—	—	—	—	—
Number of children in family	—	—	—	—	—	—
Mother's age at birth of subject	—	—	—	—	—	—
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*

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

+ $p < .10$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

processing that leads to the early adoption of aggressive strategies. Once the aggressive strategies have been firmly encoded, diminished intellectual functioning seems to have little effect on aggression, but aggression seems to continue to interfere with intellectual development.

In summary, the 22-year data suggest that diminished intellectual competence has an early effect in increasing the likelihood that a child will adopt characteristically more aggressive styles of behavior. These aggressive styles of behavior persist over time and are predictive in their own right of lower intellectual achievement as an adult.

THE 3-YEAR STUDY

Let us turn now to some data on the cognitive rehearsal of aggressive behavior. These data are from a 3-year study conducted on over 800 primary school children in the Chicago area. These children were interviewed and tested three times at one-year intervals from 1977 to 1979. Half were first graders and half were third graders at the start of the study. The study was replicated with samples of over 200 children each in Finland, Israel, and Poland and over 300 children in Australia.

TABLE III. The Correlations of Fantasy Behaviors With Aggression, Academic Achievement, and TV Viewing in the 3-Year Study^a

	Males		Females	
	Aggressive fantasy	Heroic fantasy	Aggressive fantasy	Heroic fantasy
USA				
Aggression	.23***	.17***	.20***	.16**
Achievement	-.19*	-.11	-.14	—
TV view frequency	.20**	.17**	.15*	.18**
Ident with TV chars	.14*	.41***	.19**	.42***
Australia				
Aggression	.29***	.17*	.22*	—
TV view frequency	—	—	.20*	.30**
Ident with TV chars	.22*	.25**	.18+	.41***
Finland				
Aggression	.16	.27**	.20*	.13
Achievement	—	-.14	—	-.19+
TV violence viewing	.19+	.17+	—	.14
Ident with TV chars	.17	.33**	.24*	.53***
Israel				
Aggression	.24*	—	.11	—
TV violence viewing	—	—	.19+	—
Ident with TV chars	.32**	—	.29**	—
Poland				
Aggression	.11	.18+	.19*	.18+
Achievement	—	-.13	—	-.19+
TV violence viewing	.12	.23**	.17+	—
Ident with TV chars	.22*	.45***	.29**	.33**

^aCorrelations are based on average scores in first two years.

+p < .10.

*p < .05.

**p < .01.

***p < .001.

The measure of rehearsal of aggressive behavior used in all these samples was two scales from the Children's Fantasy Inventory [Rosenfeld et al, 1982]. One scale measured the child's negative-antisocial-aggressive fantasy while the other measured the more-heroic-but-still-aggressive fantasy. Each scale score is derived from a number of self-report items measuring the child's daydreams, nightdreams, and imaginary play.

In Table III the correlations are shown between the fantasy scores, aggression, TV violence viewing, and (except in Australia and Israel) school achievement. One can see that there are very consistent positive correlations in every country between aggressive or active-heroic fantasy and peer-nominated aggression. The children who are more aggressive fantasize more about aggression. Such a finding is consistent with the theory that fantasizing about aggression serves as cognitive rehearsal of aggressive acts. These data also implicate television in the aggression-fantasy cycle. The more a child watches television and identifies with TV characters, the more a child fantasizes about aggression. Academic achievement, on the other hand, relates either not at all or even negatively to heroic fantasizing. Longitudinal regressions were calculated in each country in an attempt to ascertain the causal ordering between

TABLE IV. The Correlations of Aggression and Academic Achievement With TV Viewing in the 3-Year Study^a

	Males		Females	
	Aggression	Achievement	Aggression	Achievement
USA				
Aggression	1.00		1.00	
Achievement	-.40***	1.00	-.38***	1.00
TV view frequency	.26***	-.27**	.29***	-.17+
Ident with TV chars	.24***	-.19*	.12+	—
Australia				
Aggression	1.00		1.00	
TV view frequency	.21*		.14	
Ident with TV chars	.13		.13	
Finland				
Aggression	1.00		1.00	
Achievement	-.23*	1.00	-.24*	1.00
TV violence viewing	.22*	-.12	.12	—
Ident with TV chars	.40***	-.15	.26*	-.37**
Israel				
Aggression	1.00		1.00	
TV violence viewing	.23*		.16	
Ident with TV chars	—		.22+	
Poland				
Aggression	1.00		1.00	
Achievement	-.16+	1.00	-.13	1.00
TV violence viewing	.33***	.12	.15	.27**
Ident with TV chars	.27**	-.11	.21*	.14

^aCorrelations are based on average scores in first two years.

+p < .10.

*p < .05.

**p < .01.

***p < .001.

aggressive fantasy and aggression. Virtually, all of these regressions in every country indicated about equal effects for fantasy on aggression as for aggression on fantasy. These results are consistent with the model that aggression stimulates aggressive fantasy that in turn serves as a rehearsal for later aggression.

The role of television in these cognitive processes is further elucidated by the correlations in Table IV. One can see that TV viewing and particularly TV violence viewing and/or identification with TV characters relate strongly to overt aggression among boys in every country. Identification with TV characters measures the extent to which the child believes he/she is like TV characters. There are similar marginal effects for girls in most countries and significant effects for girls in the United States. On the other hand, for all subjects except Polish girls, academic achievement relates negatively to TV viewing as it does to aggression.

In a recent paper [Huesmann et al, in press] the authors have shown that the data from at least two of these countries (Finland and the USA) strongly suggest a bidirectional relation between violence viewing and aggression, particularly when one considers the cognitive mediators of identification with TV characters. Additional analyses have now demonstrated comparable effects for boys in Israel and girls in Poland.

While fantasy behaviors did not interact significantly with TV violence viewing to affect aggression, Table III indicated that fantasy behavior does relate directly to TV

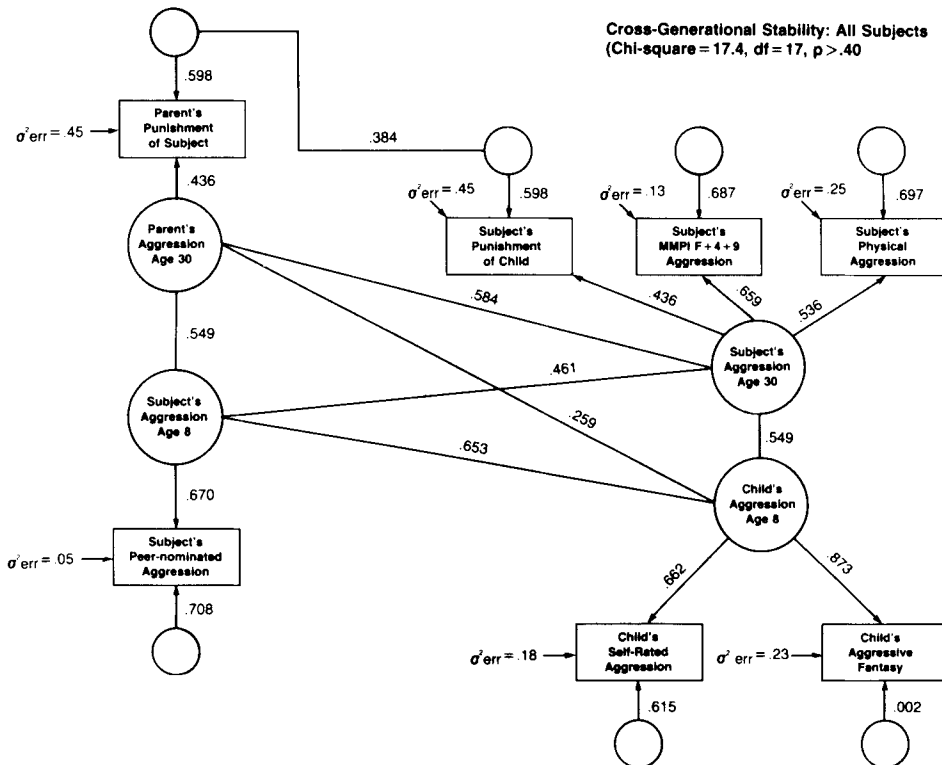


Fig. 1. A correlational model showing the stability of a latent trait of aggression across three generations within a family.

violence viewing as well as aggression. We would argue that the child who does poorly in school watches more television and therefore more television violence. These violent scenes provide examples that the child can encode. These same children also rehearse aggressive acts through aggressive fantasy, and these aggressive acts undoubtedly include the ones viewed on TV. This rehearsal makes it more likely that the aggressive strategies will be employed and that the child will behave aggressively. In turn, this makes it more difficult for the child to succeed in school.

One final piece of data from the 22-year study is worth presenting in this context. When we reinterviewed our subjects in the final wave of that study, we also interviewed their oldest children ($N = 82$). One of the questions we asked the children was about their aggressive fantasy. Unfortunately, we had never asked the subjects themselves such a question. Nevertheless, the data provided some interesting results. The child's aggressive fantasy correlated quite highly with the subject's peer-nominated aggression 22 years earlier ($.40, P < .01$). Apparently, the cognitive processes associated with aggression are stable not only within a subject's life span, but are stable across generations within a family. In Figure 1 a structural model for the cross-generational stability of aggression is reproduced [from Huesmann et al, in press]. One can see that when aggressive fantasy is used as a primary measure of child aggression, the cross-generational stability of aggression from parent at age 8 to child at age 8 is as high as the within-subject stability from age 8 to age 30.

In conclusion, the data from our longitudinal studies indicate that cognitive processes are strongly related to styles of aggressive behavior and that aggressive behavior is quite stable across time and generations. Both these results are consistent with a model that emphasizes the role of acquired cognitive schemas in determining aggressive behavior.

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REFERENCES

- Caplan NS (1965): Intellectual functioning. In Quay HC (ed): "Juvenile Delinquency: Research and Theory." Princeton, NJ: Van Nostrand. 100-138.
- Eron LD (1982): Parent child interaction, television violence and aggression of children. *American Psychologist* 27:197-211.
- Eron LD, Walder LO, Lefkowitz MM (1971): "Learning of Aggression in Children." Boston: Little, Brown.
- Feshbach S, Price J (1984): The development of cognitive competencies and the control of aggression. *Aggressive Behavior*. 10:185-201.
- Huesmann LR, Eron LD, Lefkowitz MM, Walder LO (In press): The stability of aggression over time and generations. *Developmental Psychology*.
- Huesmann LR, Eron LD, Yarmel PW (In press): Intellectual functioning and aggression. *Journal of Personality and Social Psychology*.
- Huesmann LR, Lagerspetz K, Eron LD (1984): Intervening variables in the television violence-aggression relation: Evidence from two countries. *Developmental Psychology*. 20:746-775.
- Kintsch W (1977): "Memory and Cognition." New York: Wiley.
- Lefkowitz MM, Eron LD, Walder LO, Huesmann LR (1977): "Growing up To Be Violent: A Longitudinal Study of the Development of Aggression." New York: Pergamon.
- Rosenfeld E, Huesmann LR, Eron LD, Torney-Purta JV (1982): Measuring patterns of fantasy behavior in children. *Journal of Personality and Social Psychology* 42:347-366.