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Development of Social Problem-Solving Strategies and Changes in Aggressive Behavior: A 7-Year Follow-Up From Childhood to Late Adolescence

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The aim of this study was to predict a stability of aggressive behavior on the basis of social problem-solving strategies. Subjects were a total of 120 children, but complete follow-up data were available only in 47 cases. Their aggressive behaviors were peer rated, and problem-solving strategies were assessed in childhood subjects being 10 years on average, and 7 years later. Association between a development of social strategies and changes in aggressive behavior was studied with personality-oriented pattern analyses. The main finding was that a development of strategies predicted a stability or changes of aggressive behavior very well. Aggressive strategies, both in childhood and in adolescence, as well as a lack of constructive alternatives characterized permanently aggressive subjects. Turning from nonaggressive to aggressive behavior was also explained by aggressive problem-solving strategies, while a positive development, i.e., turning from childhood aggressive to adolescent nonaggressive behavior, was possible only if a person had never used aggressive strategies. Agreement between behavior and strategies was higher among girls. The findings supported a claim that intervention of aggressive behavior may be possible by modifying social strategies. Aggr. Behav. 25:269–279, 1999.

Key words: stability of aggression; problem-solving strategies; withdrawal

INTRODUCTION

Aggressive behavior may be considered one of today's most substantial social problems. It is of particular importance because, in addition to its harmful consequences, it has been shown to be relatively stable, self-perpetuating behavior that is resistant to change [e.g., Huesmann et al., 1984; Pulkkinen and Pitkänen, 1993].

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Although there is undisputed evidence that constitutional and environmental factors keep aggression stable [e.g., Bandura, 1973; Moyer, 1976], there are also more contrary findings. For instance, Huesmann et al. [1984] reported that childhood aggression explains only about 20% of adolescent and adult aggressive behavior. Consequently, it is important to analyze the factors explaining not only stability but also reduction and increase in aggressive behavior.

Since the end of the 1980s, aggressive behavior has frequently been explained in terms of biases in social-cognitive information processing [Crick and Dodge, 1994; Dodge and Crick, 1990; Huesmann, 1988; Huesmann and Eron, 1989]. In line with that approach, it has been shown that aggressive children and adolescents are likely to interpret their environment in a hostile way [e.g., Dodge and Newman, 1981; Lochman and Dodge, 1994; Quiggle et al., 1992; Slaby and Guerra, 1988], to generate more aggressive response alternatives [e.g., Lochman and Dodge, 1994; Quiggle et al., 1992; Pakaslahti and Keltikangas-Järvinen, 1996; Richard and Dodge, 1982; Slaby and Guerra, 1988], and to evaluate aggressive behavior more favorably [e.g., Huesmann and Guerra, 1997; Pakaslahti and Keltikangas-Järvinen, 1997; Quiggle et al., 1992; Slaby and Guerra, 1988] than their nonaggressive counterparts. Aggressive children and adolescents seem to use aggression as a way of dealing with interpersonal conflict situations more than nonaggressive children and adolescents, i.e., they have a high number of aggressive problem-solving strategies stored in their social-cognitive memory structures [Crick and Dodge, 1994; Dodge and Crick, 1990; Huesmann, 1988; Huesmann and Eron, 1989].

In contrast, nonaggressive children and adolescents have been shown to generate more alternative problem-solving strategies that are socially more accepted, for example, more friendly, negotiative, and help-seeking than those of aggressive children and adolescents [e.g., Lochman and Dodge, 1994; Mize and Cox, 1990; Richard and Dodge, 1982; Slaby and Guerra, 1988]. All nonaggressive children and adolescents, however, do not possess prosocial problem-solving strategies, but their social cognitions may also facilitate social withdrawal [e.g., Crick and Dodge, 1994; Quiggle et al., 1994]. Consequently, as far as aggressive and nonaggressive behavior can be explained on the basis of social cognitions, in addition to aggressive strategies, prosocial and withdrawal strategies are also of importance [e.g., Lindeman et al., 1997].

Intervention studies show that teaching a child or an adolescent to refrain from aggressive cognitions, and to emphasize alternative social cognitions, is successful in terms of decreasing actual aggressive behavior [e.g., Guerra and Slaby, 1990; Lochman et al., 1984]. However, it is not known whether changes in aggressive, prosocial, and withdrawal problem-solving strategies predict the development of aggressive behavior in natural settings, i.e., outside the intervention programs. The present follow-up study, covering the period from childhood to adolescence, was undertaken to investigate this.

Gender differences were also investigated because as far as social cognitions and behavior are concerned, it has been shown that boys are more aggressive—at least when direct aggression is discussed—less prosocial, and less withdrawn than girls [e.g., Cross and Madsen, 1997; Lindeman et al., 1997; Parke and Slaby, 1983]. It has also been found that stability of aggression is higher among boys than among girls [Pulkkinen and Pitkänen, 1993].

METHODS

Subjects

The subjects were 47 participants, 26 girls and 21 boys, who at the baseline of this follow-up project were 10 or 11 years old, and subsequently 17 or 18 years old when they were retested.

The Selection of the Sample

The subjects were part of a population-based 7-year follow-up study focusing on the development of social problem-solving strategies and social behavior during childhood and adolescence [see, e.g., Keltikangas-Järvinen and Asplund-Peltola, 1995; Keltikangas-Järvinen and Kangas, 1988; Lindeman et al., 1997; Pakaslahti and Keltikangas-Järvinen, 1996].

First, aggressive and nonaggressive subjects were selected from pupils in the fourth grade of a primary school, aged 10 years on average. The whole age cohort, i.e., all the pupils in this grade in a medium-sized town in Western Finland, a total of 679, were taken from school registers, and their aggressiveness or lack of it was assessed by peer nomination. With the aid of six fixed questions dealing with daily school life, classmates, boys and girls separately, evaluated each other's aggressiveness and nonaggressiveness, e.g., "Who starts fighting in a conflict situation in the school yard?", "Who scolds and nags other pupils in the break?", and "Who never fights?" [see Keltikangas-Järvinen and Kangas, 1988, for details]. On the basis of these assessments, each student received a score for aggressiveness and nonaggressiveness (intercorrelation being –.79).

Second, for the first follow-up study conducted 3 years later, 30 students were identified at the extremes of the aggression and nonaggression dimensions, girls and boys separately, a total of 120 students.

Third, these 120 students were contacted 4 years later when they were in the second grade of high school or vocational school at the age of 17 on average. A total of 56 students were still able to be contacted, of which 48 were willing to participate. Their baseline assessments were as follows: 19 aggressive (7 girls and 11 boys) and 29 nonaggressive (19 girls and 10 boys).

The drop-out rate of the subjects was noticeable but mostly unsystematic, i.e., caused by moving to another town. A systematic bias was also to be seen: the majority of subjects who "disappeared" were originally classified as aggressive, aggressive girls especially being overrepresented in the drop-out group. In both phases (i.e., 1 and 3), school registers were the sources for identifying the subjects, and thus the aggressive subjects were more likely to interrupt their schooling than were the nonaggressive ones, which is not in the least unexpected.

Design

This study comprises the basic phase and the second follow-up study (7 years later), the first follow-up being omitted here. Consequently, only the subjects participating in both phases, a total of 48, were included.

Measures

Aggressiveness in childhood (baseline, subjects being 10–11 years old). As described above, peer nominations were used for identifying the most aggressive/nonaggressive pupils.

Social problem-solving strategies in childhood (baseline). The subjects were presented with a questionnaire describing six different social situations in children's daily lives. They were asked to analyze the situation and to consider the consequences and causalities. Four of these situations, which were used in the present study, involved frustrative and aggression-provocation elements, while the other two (omitted here) focused on feelings of responsibility not so relevant for this purpose. The children were asked how they themselves would deal with the situations (open answers). The situations were (a brief description):

(1) Your younger sister takes your new record without your permission and breaks it; you take the record away; your sister bursts into tears; your mother comes to comfort your sister but is very angry with you.

(2) You have planned to go to a rock concert and have saved money for it; all your friends are there; as you are leaving, your mother notices that the concert will end too late and says that you may not go.

(3) Instead of lessons the teacher has promised to show movies; you have looked forward to that a lot and have neglected your homework; at school you hear that the movies have been canceled and that an ordinary math class is going to take place.

(4) In the break you are talking with older students; your classmate comes to tease you. You trip her up, her coat tears, and she turns on you. The teacher comes and punishes her.

The scoring system was developed to cover the content of the answers as far as possible. The answers were categorized into four classes:

(1) Aggressive Problem-Solving Strategies (19% of the answers), e.g., (situation 1) "I would throw the pieces of the record at my sister and mother," (situation 2) "I would turn on my mother if she said I couldn't go to a rock concert," (situation 3) "I would call my teacher names for canceling the movie," and (situation 4) "I would openly accuse my classmate. This would make the problem look all her fault."

(2) Constructive Problem-Solving Strategies (21% of the answers), e.g., (situation 1) "I would try to repair my broken record," (situation 2) "I would say to my friend that we could go to another rock concert another time," (situation 3) "I would ask the teacher if we could watch movies the next week," and (situation 4) "I would say to the teacher that the fight was my fault as well."

(3) Submissive Problem-Solving Strategies (29% of the answers), e.g., (situation 1) "I would be quiet," (situation 2) "I would be upset, but wouldn't argue," (situation 3) "I would be disappointed because of not seeing the movie, but I wouldn't say anything," and (situation 4) "I would quietly listen to the teacher."

(4) Withdrawal Problem-Solving Strategies (31% of the answers), e.g., (situation 1) "I would act as if nothing had happened, and would go to my room," (situation 2) "I would lock myself in my room and refuse to listen to my mother," (situation 3) "I would leave the place," and (situation 4) "I would run away from the place."

These four categories covered all the responses. The responses were blind-scored by two psychologists, the scoring agreement being 96%. The strategies used were moderately in line over the four situations: 8.5% of the children used the same strategy in all of the situations, 63.8% applied two strategies, 19.1% applied three strategies, and only 8.6% adopted a different strategy each time.

Aggressiveness in late adolescence (follow-up phase, subjects being 17–18 years old). Peer nominations were used to assess the subjects' behavior 7 years later, also. The pupils were presented with a 20-item questionnaire dealing with behavioral styles

and properties, 7 of the items focusing on aggressiveness (e.g., "Who is easily irritated and starts fighting?," "Who often argues with others?," and "Who engages in intrigue behind other people's backs?") and 13 on positive social properties or behaviors (e.g., "With whom do you spend most of your time at school?," "Who is always friendly?," and "Who in the class would be chosen to resolve a conflict fairly?"). The pupils were asked to name three classmates who behaved or could be characterized in this specific way. The nominations for each pupil were then summed up one item at a time and standardized by dividing the sums by the number of possible nominations, i.e., the number of pupils in that particular class.

It has been shown previously that in a large population-based sample of adolescents the questionnaire resulted in three factors, which have been named aggressive behavior, sociability, and submissiveness (Pakaslahti and Keltikangas-Järvinen, 1996; Pakaslahti and Keltikangas-Järvinen, 1997). The items loading >.35 on the aggressive behavior factor, a total of seven, were summed and used here as an index of aggressive behavior. Cronbach's alpha for the scale was .82.

Social problem-solving strategies in late adolescence (follow-up phase). The subjects were confronted with two social problems commonly encountered in daily school life describing direct aggression ("Your classmate is repeatedly teased...") and indirect aggression ("Your classmate continues to be a target of backbiting...") and were asked how they would behave themselves in that situation. A total of 27 fixed problem-solving alternatives were given (on a 5-point Likert-type scale, 1 = I would do just that; 5 = I would never do that) focusing on aggressiveness, prosocial activity, and withdrawal as ways of solving social problems [for details, see Keltikangas-Järvinen and Terav, 1996; Lindeman et al., 1997; Pakaslahti and Keltikangas-Järvinen, 1996].

It has been shown previously that, in a population-based sample of 17-year-olds, this questionnaire resulted in three factors, i.e., aggressive problem-solving strategies, prosocial problem-solving strategies, and withdrawal problem-solving strategies [Keltikangas-Järvinen and Terav, 1996; Lindeman et al., 1997]. The items with loadings >.35 on these factors were used here to form the respective scales. Aggressive problem-solving strategies (a total of 12 items) comprised items such as "I would join in the backbiting because it is fun," "I would not tease the victim myself, but by supporting the teasers I would try to improve my own status in the classroom," and "I would not join in the teasing but I would side with the teasers because it is the only way to avoid being teased yourself." Prosocial problem-solving strategies (a total of nine items) were characterized by items such as "I would look for help from adults and ask them to deal with the situation," "I would stand up for the victim and I would defend the victim openly," and "I would discuss it with my peers and we would act together." Finally, withdrawal problem-solving strategies (a total of six items) were assessed, for instance, by "I would avoid the situation. It is not my business." "I would do nothing. Interference would only cause problems for me," and "I would avoid the situation. I cannot help the victim anyway." Cronbach's alpha for the scales were .89, .60, and .71, for aggressive strategies, prosocial strategies, and withdrawal strategies, respectively.

Procedure

Permission was obtained from the school authorities, the parents, and the students themselves for both phases. The tests were carried out during school lessons, without a teacher being involved in the process. The students were tested in small groups by two

psychologists, one of them being the same in both phases. In the second phase, the information common to all was given and questionnaires were given to the subjects to be filled out. In the first phase each situation was also orally described to confirm that everybody understood what was required.

Statistical Procedures

Stability and change of aggressive behavior was studied with the aid of a χ^2 test of independence. *T*-tests were applied to examine the differences in social problem-solving strategies between the aggressive and nonaggressive groups.

To investigate the main questions in the study, i.e., whether stability of aggressiveness could be predicted on the basis of (1) childhood problem-solving strategies and (2) patterns taking into account childhood and adolescent strategies combined, personality-oriented log-linear pattern analyses were carried out.

The basis of a log-linear pattern analysis is a multiway frequency table of dichotomous variables in which each cell represents one combination of the categorical variables of the model. Statistically, the paradigm may be conducted in different ways. Here, the interest was in the main effects of (1) the two-way combinations formed by (a) the developmental pathway of aggressiveness (nonaggressive childhood and adolescence, aggressive childhood and adolescence, aggressive childhood and nonaggressive adolescence, and nonaggressive childhood and aggressive adolescence) and (b) the childhood problem-solving strategy one at a time (low/high using the median as a cutoff point) and (2) the three-way combinations formed by (a) the developmental pathway of aggressiveness (nonaggressive childhood and adolescence, etc., see the above-mentioned two-way combinations), (b) the childhood problem-solving strategy one at a time (low/high using the median as a cutoff point), and (c) the adolescence problem-solving strategy one at a time (low/high using the median as a cutoff point). In both of these cases, i.e., a (1) and (2), girls and boys were analyzed separately. In each cell, the obtained frequency was compared with the expected frequency according to the model of independence based on Poisson distribution (which is also suitable for rare events, as was sometimes the case here). The combinations were assessed as typical when the adjusted residual was positive and more frequent than the chance level. In untypical combinations, the residuals were negative and less frequent than the chance level [see Magnusson and Bergman, 1990].

RESULTS

Stability of Behavior, i.e., Aggressiveness or Nonaggressiveness, During the 7 Years

Staying in the original groups (i.e., aggressive and nonaggressive) during the 7 years was noticeable (χ^2 [1] = 5.23, P = .022). However, some students (a total of 11) moved from the nonaggressive to the aggressive group, while the opposite was less common, involving only five girls (Table I).

Social Problem-Solving Strategies

Differences between the aggressive and nonaggressive groups. There were no between-group differences in problem-solving strategies at baseline (in childhood).

During the follow-up (in late adolescence), it was found that aggressive adolescents used

TABLE I. Number of Subjects in Different Groups (Stability of Aggressiveness)

	Childhood					
	Aggressiveness			Nonaggressiveness		
Adolescent	Total	Girls	Boys	Total	Girls	Boys
Aggressive	**18**	12	6	**11**	7	4
Nonaggressive	**5**	5	0	**13**	2	11

aggressive problem-solving strategies more than nonaggressive adolescents did (t[45] = –2.95, P = .005; Ms = 1.88 and 1.40, SDs = .65 and .46, for nonaggressive and aggressive adolescents, respectively). Other differences, however, were statistically nonsignificant.

Since the two measurements were not comparable, it was not reasonable to examine strategy stability. The main question in this study was to examine whether stability in aggressiveness could be predicted on the basis of (1) childhood problem-solving strategies and (2) patterns in which childhood and adolescent strategies are combined. The results of the pattern analyses for significant combinations are given in Tables II and III. The following conclusions may be drawn from them.

Stability of aggressive behavior. Over 7 years, stability of aggressive behavior was predicted both by aggressive childhood problem-solving strategies and by a lack of alternative strategies, i.e., a lack of constructive and submissive strategies. This was true of both girls and boys, although it should be noted, that there were only two girls in this category. For boys, aggressive and incompetent childhood strategies were likely to turn into aggressive strategies, combinations that increasingly predicted stability of aggressive behavior. The same phenomenon was not discovered among girls, perhaps because of the low number of subjects in the cell.

TABLE II. Childhood Strategies Predicting the Change in Aggressive Behavior During 7 Years

	Childhood strategies[a]	Frequency		
		Observed	Expected	Adj. res.
(1) Among girls having nonaggressive childhood and adolescence[b]	Submissiveness ↑	10	5.93	2.40*
(2) Among girls having aggressive childhood and adolescence	Aggressiveness ↓	0	4.13	–2.75**
	Constructiveness ↑	1	4.44	–2.25*
	Submissiveness ↑	0	4.28	–2.83**
	Withdrawal ↓	0	4.44	–2.91**
(3) Among boys having aggressive childhood and adolescence	Aggressiveness ↑	5	2.47	1.96*
	Constructiveness ↓	6	2.22	3.04**
	Submissiveness ↓	6	2.35	2.88**
	Withdrawal ↓	7	3.58	2.36*
(4) Among girls having aggressive childhood and nonaggressive adolescence	Aggressiveness ↓	4	1.59	2.41*
	Submissiveness ↑	5	1.65	3.32***
	Withdrawal ↓	4	1.71	2.25*

[a]↑ refers to a high level and ↓ to a low level of the strategy.

[b]Interpretation key: This pattern consisted of girls having nonaggressive childhood and adolescence and a high level of submissiveness strategies in childhood. The pattern was typical because the observed frequency of 10 significantly exceeded the expected frequency of 5.93.

*P < .05.

**P < .01.

***P < .001.

TABLE III. Childhood and Adolescence Strategies Predicting the Change in Aggressive Behavior During 7 Years

	Childhood strategies[a]	Adolescent strategies[a]	Frequency		
			Observed	Expected	Adj. res.
(1) Among girls having nonaggressive childhood and adolescence[b]	Aggressiveness ↓	Prosociality ↑	6	2.92	2.18*
	Submissiveness ↑	Aggressiveness ↓	8	3.16	3.34**
(2) Among boys having aggressive childhood and adolescence	Aggressiveness ↑	Aggressiveness ↑	5	1.16	3.95***
	Aggressiveness ↑	Withdrawal ↓	3	1.10	1.99*
	Constructiveness ↓	Aggressiveness ↑	5	1.04	4.25***
	Constructiveness ↓	Prosociality ↓	3	1.09	2.02**
	Constructiveness ↓	Withdrawal ↓	4	0.99	3.30***
	Submissiveness ↓	Aggressiveness ↑	5	1.10	4.10***
	Submissiveness ↓	Prosociality ↓	5	1.15	3.97***
	Withdrawal ↑	Aggressiveness ↑	4	1.04	3.18**
	Withdrawal ↓	Aggressiveness ↑	4	1.68	2.05*
	Withdrawal ↓	Prosociality ↓	4	1.75	1.95*
	Withdrawal ↓	Withdrawal ↓	4	1.60	2.16*
(3) Among girls having aggressive childhood and nonaggressive adolescence	Aggressiveness ↓	Prosociality ↓	3	0.78	2.81**
	Aggressiveness ↓	Withdrawal ↑	3	0.88	2.56*
	Constructiveness ↓	Withdrawal ↓	3	0.94	2.42*
	Submissiveness ↓	Aggressiveness ↓	3	0.88	2.57*
	Submissiveness ↑	Prosociality ↓	3	0.81	2.74**
	Submissiveness ↑	Withdrawal ↑	4	0.91	3.68***
	Withdrawal ↓	Prosociality ↓	3	0.84	2.67**
	Withdrawal ↓	Withdrawal ↑	4	0.94	3.59***
(4) Among girls having nonaggressive childhood and aggressive adolescence	Aggressiveness ↓	Withdrawal ↑	5	1.93	2.59**
	Submissiveness ↑	Withdrawal ↑	5	2.01	2.49*
	Withdrawal ↑	Aggressiveness ↑	3	1.09	2.02*
	Withdrawal ↑	Withdrawal ↑	4	1.29	2.68**

[a]↑ refers to a high level and ↓ to a low level of the strategy.
[b]Interpretation key: This pattern consisted of girls having nonaggressive childhood and adolescence with a low level of aggressive strategies in childhood and a high level of prosocial strategies in adolescence. The pattern was typical because the observed frequency of 6 significantly exceeded the expected frequency of 2.92.
*$P < .05$.
**$P < .01$.
***$P < .001$.

From aggressiveness to nonaggressiveness. For girls, low levels of aggressive and withdrawal strategies and a high level of submissive strategies in childhood predicted moving from the aggressive to the nonaggressive group. High in childhood submissive and adolescent withdrawal strategies were likely to combine with a low level of aggressive strategies, and this combination predicted the leap from the aggressive to the nonaggressive group. This means that moving from the aggressive to the nonaggressive was possible for girls who had never used aggressive strategies, i.e., whose behavior in childhood was not consistent with their strategies. The effect could not be gauged among boys because of the lack of boys in this category.

Stability of nonaggressive behavior. For boys, stability of nonaggressiveness could not be predicted on the basis of problem-solving strategies, while in girls, stable nonaggressiveness was predicted by childhood submissiveness as well as by combina-

tions of high childhood submissiveness–low adolescent aggressiveness and low childhood aggressiveness–high adolescent prosociality later.

From nonaggressive to aggressive. Significant movement from the nonaggressive to the aggressive category was found only among girls. Nonaggressive girls who, in agreement with their behavior, did not use aggressive strategies in childhood but withdrew instead, and used withdrawal and aggressive strategies in adolescence, were likely to belong to the aggressive group later.

DISCUSSION

Due to the high drop-out rate among the subjects, the findings must be viewed with caution. The drop-out rate was higher in the original aggressive group, which was a result of the contacting method, i.e., using the school registers. Aggressive students are known to be more likely to become asocial and to interrupt their schooling [e.g., Pulkkinen and Pitkänen, 1993; Rönkä and Pulkkinen, 1995].

Consequently, we cannot conclude whether the lack of boys who after being aggressive in childhood became nonaggressive is attributable to the drop-out bias or to the lack of this phenomenon.

It would have been possible to search for the missing subjects, but outside of the school or a comparable environment, the assessment of their aggressiveness or sociability would encounter significant reliability and validity problems, and, at the very least, the assessments would not be comparable with the assessments in this study.

Despite these undisputable limitations, the present study also has particular strengths. The follow-up time was rather long; as far as we know it was longer than in any previous study with a comparable focus. The identification of the subjects, i.e., selecting the most and least aggressive children from the whole age cohort, also guarantees that these children really represent highly aggressive and nonaggressive young people.

According to previous claims [e.g., Huesmann et al., 1984; Pulkkinen and Pitkänen, 1993], aggressive behavior was likely to be rather stable. If there were changes, they were likely to be negative, i.e., nonaggressive behavior was more likely to turn into aggressiveness than was aggression into nonaggressiveness.

The strategies identified predicted the behavior and its changes very well. The major finding was that aggressive behavior was always related to aggressive problem-solving strategies. Also, using aggressive strategies differed for aggressive and nonaggressive subjects, but this difference manifested itself only in late adolescence. This might indicate that the role of aggressive strategies in aggressive behavior is likely to increase with age [see Crick and Dodge, 1994]. Further, the role of withdrawal was ambivalent. In childhood it was a "negative strategy," i.e., likely to be combined later with an aggressive strategy and to predict aggressive behavior. In late adolescence, withdrawal was likely to indicate a low level of aggressive behavior. It may be that childhood withdrawal reflects suppressed or inward-directed negative emotionality [Buss and Plomin, 1984].

In line with previous studies [e.g., Lochman and Dodge, 1994; Quiggle et al., 1992; Richard and Dodge, 1982; Slaby and Guerra, 1988], it was shown that a lack of alternative social strategies was as important as the existence of aggressive strategies in predicting aggressive behavior. A lack of alternatives combined with aggressive strategies in childhood was likely to turn later into pure aggression, this development being the

most evident predictor of stability of aggressive behavior. In light of the other findings in this study, as well as of previous suggestions [Crick and Dodge, 1994; Huesmann and Eron, 1989], there is reason to expect that the development of strategies is the reason for behavior, not vice versa. However, this causality has been studied only in interventions [Guerra and Slaby, 1990; Lochman et al., 1984], not in naturally occurring processes.

The role of aggressive strategies in aggressive behavior was especially emphasized by the finding that turning from aggressive to nonaggressive behavior was possible only if the person had never used aggressive strategies, i.e., if the behavior in childhood was in disagreement with the strategies adopted. Further, this development existed only with girls; there were no boys whose childhood aggression would disappear in late adolescence. In addition, a combination of childhood submissiveness and late adolescent withdrawal predicted a positive development (from aggression to social behavior), while constructive or prosocial strategies were not involved here. Instead, later prosocial aggressive combined with childhood submissiveness predicted stability in nonaggressive (social) behavior. Again, this was true only for the girls; stability in social behavior was not predictable among the boys on the basis of their social strategies.

Negative development, i.e., nonaggressive children becoming aggressive, was predicted by a combination of childhood withdrawal and late adolescent aggressive strategies, this finding, again, being manifested in girls.

In conclusion, it can be said that the development of social problem-solving strategies was very congruent with the development of aggressive (or social) behavior. These findings strongly support previous claims [e.g., Crick and Dodge, 1994; Dodge and Crick, 1990; Huesmann, 1988; Huesmann and Eron, 1989] that modifying social problem-solving strategies might be a promising tool for intervention in aggressive behavior.

One gender-related difference was worth noting. The agreement between strategies and behavior was strikingly more evident among the girls than among the boys. This was only partially explained by technical reasons, i.e., the number of subjects in the cells, but it was a factual phenomenon. This was especially true with nonaggressive behavior. Several explanations are possible. It may refer to the different roles of internal and environmental factors in boys' and girls' development. It has been shown that girls are more interpersonally oriented and sensitive to interpersonal factors [e.g., see Cross and Madson, 1997], while a peer group is more important for boys [Lagerspetz et al., 1988]. This might indicate that intervening of aggressive behavior by modifying problem-solving strategies is more effective in girls than in boys, while in boys, group processes increasingly need to be taken into account in interventions.

An important question for future study would be that of causes and consequences in the strategy-behavior process.

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