Effectiveness of the Vienna Social Competence Training on Explicit and Implicit Aggression

Evidence from an Aggressiveness-IAT

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Abstract. A three-wave longitudinal study investigated the effects of the Vienna Social Competence Training (ViSC), a 13-week school class-based social competence training for adolescents, on explicit and implicit aggressiveness. Explicit aggressiveness was assessed via self-reported behavior in conflict situations; implicit aggressiveness was assessed via an Implicit Association Test (IAT). Furthermore, observer ratings regarding aggressive behavior were obtained from teachers and classmates. The ViSC was implemented in seven school classes; four classes served as controls. Data were taken prior to the training, directly after the training, and 4 months after the training was finished. Between pre- and posttest, no differences between training and control classes were found, whereas between posttest and follow-up an increase in aggressiveness was observed among control, but not among training classes. The psychometric properties of the Aggressiveness-IAT for evaluating training effects are discussed.

Keywords: aggression, social competence trainings, prevention, evaluation, IAT

Introduction

Among the numerous approaches to preventing aggression, violence, and socially unacceptable behavior among children and adolescents, social skills training is especially popular (e.g., Farrell, Meyer, Kung, & Sullivan, 2001; Topping, Holmes, & Bremner, 2000). Social skills training is relatively inexpensive and usually easy to implement; yet, meta-analyses have revealed that these trainings are, on average, relatively effective in promoting social-cognitive and behavioral skills (e.g., Beelmann, Pfingsten, & Lösel, 1994; Gansle, 2005; Lösel & Beelmann, 2003; Wilson, Lipsey, & Derzon, 2003): Effect sizes (Cohen's *d*) ranged between .30 and .50 for short-term effects, depending on characteristics of the intervention sample (e.g., age, risk level), the quality of program implementation, methodological quality of the evaluation design, and characteristics of dependent variables. Long-term effects are more difficult to assess reliably, since the number of studies with follow-up assessments is much smaller than the number of mere pre/post test studies. Nevertheless, it appears that effects on cognitive skills are much more sustainable than effects on observable antisocial behavior (Beelmann et al., 1994; Topping et al., 2000; but see Durlak & Wells, 1997). Age of training participants is another important moderator of training effects: Whereas effect sizes are highest among children between 2 and 6 years, as well as among adolescents between 13 and 16 years, social skills trainings appear to be less effective among early adolescents (Beelmann et al., 1994; Durlak & Wells, 1997; Lösel & Beelmann, 2003). Furthermore, training effects depend on the focus of the treatment. Not surprisingly, effect sizes are smaller for universal preventions than for indicated or selective preventions (Wilson et al., 2003). Finally, training effects are stronger when the program is implemented as intended in the training manual (treatment integrity; cf. Wilson et al., 2003).

One important question is how effectiveness criteria for social skills trainings should be measured, especially when aggressiveness or antisocial behavior is the construct of interest. Self-reports of aggressive behavior might be affected by motivated biases (e.g., Blümke & Zumbach, 2007; Harris, 1997) or by individual differences in the availability of aggression-related self-knowledge. Recently, there has been a growing interest in indirect, latency-based methods to assess implicit attitudes, traits, and behavioral dispositions (see Fazio & Olson, 2003, for a review). Researchers have just begun using implicit measures as effectiveness criteria in evaluation designs (e.g., Kawakami, Dovidio, & van Kamp, 2005; Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000; Rudman, Ashmore, & Gary, 2001; Teachman & Woody, 2003). Among the multitude of indirect assessment meth-

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ods, the Implicit Association Test (IAT), originally proposed by Greenwald, McGhee, and Schwartz (1998), has received the most attention (e.g., Nosek, Greenwald, & Banaji, 2006). An IAT variant for measuring aggressiveness has been developed by Banse and Fischer (2002). These authors have demonstrated that IAT scores are positively correlated with explicit measures of aggressiveness, and more importantly, with objective indicators of aggressive behavior. The present study is the first to use the Aggressiveness-IAT to evaluate the effectiveness of a school-class based training program aimed at reducing aggressive behavioral tendencies.

Vienna Social Competence Training

The Vienna Social Competence Training for Pupils (ViSC; Atria, 2002; Atria & Spiel, 2007; Atria, Strohmeier, & Spiel, 2004) is a multimodal training program for school classes. It aims at strengthening pupils' sense of class commitment, the perception of responsibility, and at fostering nonaggressive behavior in conflict situations. The theoretical base of the ViSC integrates the main ideas of social information processing theory (e.g., Crick & Dodge, 1996), and bullying as a group phenomenon (e.g., Salmivalli, Lagerspetz, Björkqvist, Österman, & Kaukiainen, 1996). The structure and outline of the program rests on two principles, *enrichment of the behavioral repertoire* and *participation*. In particular, ViSC aims at reducing hostile attribution biases, and at increasing the salience and cognitive accessibility of "socially competent," nonaggressive behavioral response options in conflict situations. Regarding the participation principle, pupils are trained to become aware of their social role in conflict situations (e.g., as perpetrator, victim, or spectator), and of their responsibility to bring about a peaceful solution. Furthermore, class commitment and willingness to display socially responsible behavior are strengthened.

Previous evaluations of ViSC have demonstrated that the program can effectively strengthen perceptions of democracy and control among trained school classes (Atria & Spiel, 2007). Gollwitzer (2005) found that peer-rated aggressiveness decreased over time among one out of three trained school classes. Finally, in a third implementation of ViSC, Gollwitzer, Eisenbach, Atria, Strohmeier, and Banse (2006) found that ViSC was effective in enhancing pupils' behavioral repertoire in conflict situations. Training effects on aggressiveness were too weak to achieve statistical significance. These previous publications only reported explicit measures of aggressiveness as criteria of the ViSC's effectiveness. The present study builds on yet unpublished data from two earlier implementations of the ViSC (Gollwitzer, 2005; Gollwitzer et al., 2006) and focuses on the Aggressiveness-IAT in order to investigate its usefulness for evaluating the effectiveness of ViSC with regard to short- and long-term aggression reduction.

Materials and Methods

Implementation of ViSC and Sample

ViSC was implemented in three German secondary schools. In School A, a lower secondary school (German "Hauptschule"), the training was conducted in three 7th grade classes in the spring of 2003. In the spring of 2004, the training was conducted in School B, a secondary modern school ("Realschule"), in a 6th- and an 8th-grade class, and in School C, a comprehensive school ("Regionale Schule"), in two 6th-grade classes. The training took place in 13 consecutive weeks (1.5 h per week). Each training unit was conducted by a pair of trainers. Trainers went through an instruction workshop prior to the training, and were supervised during the training. As described in more detail in an earlier publication (Gollwitzer et al., 2006), the implementation integrity of the ViSC was assured.

Training classes were nominated by school principals and class teachers. Control classes were selected on the basis of comparability to training classes: After training classes had been selected, teachers and school principals were asked to nominate the class that was, in their opinion, most comparable to training classes in a respective grade level. These classes received no intervention; they merely took part in the evaluation sessions. Class sizes varied between 18 and 29 pupils. The total sample consists of $N = 283$ pupils, 177 (63%) being in training classes, and 106 in control classes. Data were collected prior to the training (pretest), directly after the training (posttest; approx. 4 months later), and 4 months after the training was finished (follow-up).

Measures

Aggressiveness-IAT

The stimuli used in the original version of the Aggressiveness-IAT by Banse and Fischer (2002) were slightly altered and adapted to a younger sample. Stimuli of the target dimension were I, self, my, mine, and me (for the category "me") and you, others, yours, foreign, and them (for the category "others"). Stimuli of the attribute dimension were beat up, revenge, punch, slap, avenge, strike back, fight, knock-out, threat, and attack (for the category "aggressive") and conciliation, chat, tolerate, discuss, understand, talk, agreement, apology, comply, and agree (for the category "peaceful").

IAT scores were computed according to a procedure suggested by Greenwald, Nosek, and Banaji (2003): The mean response latency in compatible blocks (pairing me/aggressive and others/peaceful) was subtracted by the mean response latency in incompatible blocks (pairing me/peaceful and others/aggressive). Both blocks consisted of 80 trials each. This intraindividual difference was then divided by the pooled within-participant standard deviation. Trials with extreme latencies (> 10,000 ms) were

Table 1. Means, standard deviations, and stability coefficients of dependent variables

Occasion and condition	IAT *M* (*SD*)	EAS *M* (*SD*)	Observer-ratings *M* (*SD*)
Pretest			
Training ($N \geq 172$)	–0.54 (0.49)	11.36 (8.27)	1.44 (1.34)
Control ($N \geq 99$)	–0.51 (0.47)	11.18 (7.85)	1.30 (1.17)
Posttest			
Training ($N \geq 170$)	–0.69 (0.41)	12.52 (9.38)	1.43 (1.08)
Control ($N \geq 101$)	–0.71 (0.43)	11.87 (7.68)	1.31 (1.43)
Follow-up			
Training ($N \geq 107$)	–0.72 (0.42)	11.21 (8.75)	1.18 (0.81)
Control ($N \geq 75$)	–0.62 (0.40)	11.80 (8.39)	1.67 (0.77)
Stability coefficients			
t_1/t_2 (r_{12})	.23**	.69**	.90**
t_1/t_3 (r_{13})	.27**	.66**	.84**
t_2/t_3 (r_{23})	.39**	.79**	.88**

Notes. Higher scores indicate higher aggressiveness. IAT scores are standardized. EAS scores can vary between 0 and 44. Observer-ratings can range between 0–5. Stability coefficients are Pearson correlations (centered around class means) between two occasions of measurement. ** $p \leq .01$ (two-tailed).

eliminated. Response latencies for error trials were replaced by the average block-specific latency for correct trials plus a constant of 600 milliseconds (penalty). Cases with error rates higher than 40% were omitted (cf. Nosek & Smyth, 2005). This applied to six pupils at pretest, four at posttest, and one at follow-up.

Greenwald et al. (2003) suggested computing the reliability of IAT effect scores by randomly generating block halves (by trials within blocks) and computing a Guttman split-half coefficient. In the present sample, these reliability coefficients were .78 for pretest, .74 for posttest, and .74 for follow-up.

Explicit Measure of Aggression

Explicit aggressive behavioral tendencies were assessed with the Assessment Sheet for Aggressive Behavior in Concrete Situations (EAS; Petermann & Petermann, 1993). This instrument consists of 22 drawings displaying conflict or provocation situations that are typical for children and young adolescents. For each situation, the children are asked to identify with the main character and to indicate how they would react in the given situation. The EAS has been used as an evaluation criterion measuring outcome effects of school-based aggression reduction programs (e.g., Petermann, Jugert, Rehder, Tänzer, & Verbeek, 1999; Riffert, 2000). Cronbach's αs ranged between .86 and .89 across occasions of measurement.

Observer Ratings

Ratings on each child's aggressiveness were obtained from classmates and teachers. A sheet that listed the names of every child in the respective class was handed out to classmates and teachers. They were asked to indicate how often each child "... usually displays aggressive behavior" on a six-category scale ranging from 0 (*never*) to 5 (*always*). Teacher ratings were assessed using a more differentiated set of three scales, (1) physical aggression, (2) verbal aggression, and (3) nonverbal aggression. The four ratings that were obtained for each target (three by teachers, one by classmates) yielded a high degree of convergence: Cronbach's αs (based on class-mean centered scores for each pupil) ranged between .91 and .94 across occasions of measurement. Thus, they were aggregated into a composite observer-rating index by computing mean scores.

Procedure

All instruments except for peer-ratings were administered during normal class hours; children were taken out of their classes in groups of five and guided to the first assessment room. The test battery started with the Aggressiveness-IAT, followed by self-report questionnaires, which were administered in a second assessment room. Observer-rating questionnaires were handed out to pupils and teachers during class. Pupils and class teachers were asked to fill in these questionnaires at home and to return them as soon as possible.

Table 1 displays means, standard deviations, number of cases, and stability coefficients for IAT scores, EAS scores, and observer-ratings at each occasion of measurement. The differences in number of cases are the result of (1) missing values because pupils were absent on the day of data collection or failed to return their peer-rating sheets, to (2) excessive error rates (> 40% errors) in the IAT, and to (3) the fact that no peer or teacher ratings could be obtained for pupils who had changed classes.

Table 2. Multilevel models for IAT, EAS, and observer-ratings

	IAT		EAS		Observer	
	M1	M2	M1	M2	M1	M2
Intercept	–0.50**	–0.71**	11.32**	11.89**	1.29**	1.30**
Short-term effect (t_1/t_2)	–0.20**	0.20**	0.57	–0.57	0.02	–0.02
Long-term effect (t_1/t_3)	–0.12*		0.35		–0.08	
Lagged effect (t_2/t_3)		0.09*		–0.22		–0.10*
Condition (COND)	–0.04	0.01	0.24	0.86	0.14	0.12
COND × Short-term effect (t_1/t_2)	0.05	–0.05	0.63		–0.02	0.02
COND × Long-term effect (t_1/t_3)	–0.05		–0.55	–0.63	–0.04	
COND × Lagged effect (t_2/t_3)		–0.10*		–1.17*		–0.02
Variance-covariance matrix at Level-1 (occasions of measurement)	$\begin{bmatrix} 0.22 & 0.05 & 0.05 \\ 0.05 & 0.16 & 0.06 \\ 0.05 & 0.06 & 0.15 \end{bmatrix}$		$\begin{bmatrix} 60.71 & 46.26 & 43.21 \\ 46.26 & 74.07 & 57.59 \\ 43.21 & 57.59 & 70.72 \end{bmatrix}$		$\begin{bmatrix} 1.62 & 1.19 & 0.88 \\ 1.19 & 1.10 & 0.77 \\ 0.88 & 0.77 & 0.65 \end{bmatrix}$	
Random intercept at Level-3	0.01		4.00		0.06	

Notes. *p < .05; **p < .01 (one-tailed). M1 = Model with dummy variables indicating short- and long-term effect, M2 = Model with dummy variables indicating short-term and lagged effect.

Results

Cross-Sectional Analysis

First, bivariate correlations between IAT, EAS, and observer-ratings were inspected. Scores were centered around class means in order to control for between-class differences. Correlations were computed for each occasion of measurement, separately, and then aggregated across occasions of measurement. IAT and EAS were not significantly correlated (r = .06; p = .15). Observer-ratings showed a significant correlation with EAS (r = .28; p < .01), and a marginally significant correlation with the Aggressiveness-IAT scores (r = .11; p = .10). IAT scores correlated higher with classmate ratings (r = .16; p = .02) than with teacher ratings (r = .08; p = .20).

Longitudinal Analysis

In order to investigate whether intraindividual changes in IAT, EAS, and observer-ratings could be attributed to training effects, multilevel models were employed. Models consisted of three levels: occasions of measurement (Level-1; n_1 = 3) nested in pupils (Level-2; 18 ≤ n_2 ≤ 29) nested in classes (Level-3; n_3 = 11). The fixed part of the models consisted of two predictor variables: occasions of measurement (dummy coded; Level-1 predictor) and training condition (0 = control group; 1 = training group; Level-3 predictor). Furthermore, all interaction effects between dummy variables for occasions of measurement and training condition were included in the models.

In order to investigate all possible contrasts between the three occasions of measurement (t_1/t_2, t_1/t_3, and t_2/t_3), two models were run with different codings of occasions of measurement. In Model 1 (M1), the pretest was used as the reference point for all regression parameters: Dummy 1

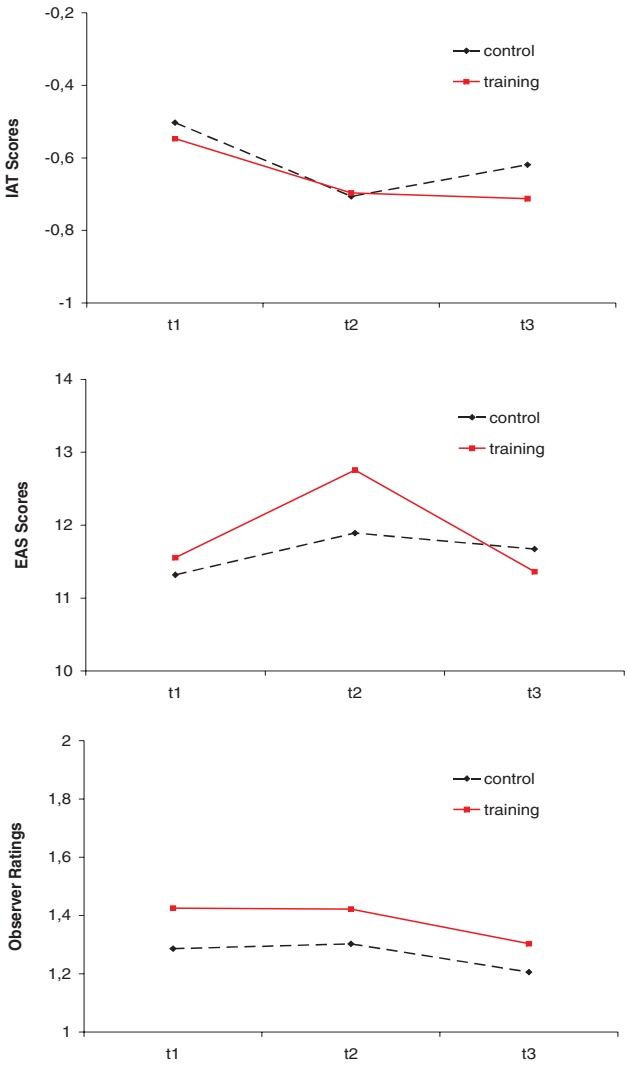

Figure 1. Mean values of IAT, EAS, and observer ratings by occasion of measurement and training condition.

tested a short-term effect ($t_1 = 0$, $t_2 = 1$, $t_3 = 0$), and Dummy 2 tested a long-term effect ($t_1 = 0$, $t_2 = 0$, $t_3 = 1$). In Model 2 (M2), the posttest was used as the reference point: Dummy 1 tested a short-term effect ($t_1 = 1$, $t_2 = 0$, $t_3 = 0$); Dummy 2 tested a lagged effect ($t_1 = 0$, $t_2 = 0$, $t_3 = 1$).

The random part of the models included variance components of Level-1 (occasions of measurement) and of Level-3 (classes). For Level-1, all variances and covariances between occasions of measurement were estimated without restrictions. Furthermore, a Level-3 random intercept was included in the models. The Level-2 random intercept and the Level-3 random slope of training condition were not significant and, therefore, not included in the models.

The data were analyzed with SPSS 13.0 ("mixed" command). Fixed effects parameters were estimated using a Full Maximum Likelihood algorithm and tested with one-sided *t*-tests. Unstandardized estimates are displayed in Table 2. IAT scores decreased significantly between pre- and posttest, irrespective of training condition. Furthermore, IAT scores increased significantly between posttest and follow-up. However, this contrast is qualified by a significant $t_2/t_3 \times$ Condition interaction: Whereas IAT scores increased between posttest and follow-up among control classes, they remained constant among trained classes. For EAS scores, only one effect approached significance, the $t_2/t_3 \times$ Condition interaction: Whereas EAS scores decreased between posttest and follow-up among trained classes, they remained constant among control classes. For observer ratings, the only significant effect is a main effect for the t_2/t_3 contrast: Classmates and teachers observed a decrease between posttest and follow-up, irrespective of training condition (see also Figure 1).

Discussion

This study examined the usefulness of an Aggressiveness-IAT for evaluating the effectiveness of a school-class-based social competence training, and investigated the aggression-reducing effects of this training. We will first discuss the psychometric properties of the IAT in the present setting as well as possibilities to improve them in future applications. Then, we will consider the question of effectiveness.

First, reliabilities of IAT scores ranged between .74 and .78, which appears to be slightly lower than the level of > .80 that is regularly obtained with many IAT-variants. However, most data are obtained in adult samples, not in adolescents. Stability correlations were, on the average, low to moderate, but they also varied by occasion of measurement: The correlation between posttest and follow-up was higher than between pretest and posttest, and pretest and follow-up, respectively (see Table 1). This is not surprising given interindividual differences in intraindividual change between pre- and posttest.

Second, the relative number of errors was relatively high at pretest, but it decreased across occasions of measurement. This suggests a rehearsal effect, or a growing "test routine." In fact, test routine can also explain the increase in (negative) IAT scores between pre- and posttest, irrespective of training condition (see Table 1 and Figure 1): The pooled within-participant standard deviation (on which mean block differences are standardized) decreased from 777 ms (pretest) to 654 ms (posttest). Thus, even if the mean block differences had remained equal, the (negative) IAT effect would have increased. Similar effects of individuals' experience with the IAT have been reported by Greenwald and Nosek (2001) and Nosek et al. (2006). Thus, in order to allow for a more reliable interpretation of pretest scores, future studies should consider using an unrelated training-IAT (e.g., flowers versus insects) before pretest assessment to minimize practice effects.

Third, IAT scores correlated positively with third-party ratings on aggressive tendencies. This correlation was higher for classmate ratings than for teacher ratings. However, even the significant correlation with classmate ratings is relatively small in absolute size. This could be caused by an asymmetry problem: Whereas the target stimuli in the Aggressiveness-IAT are related to physical violence (for the "aggression" category) and to positive conflict resolution (for the "peaceful" category), classmates' observations encompass many more forms of aggressive (e.g., verbal and relational aggression) and peaceful behavior (e.g., civil courage, altruism). In order to scrutinize the Aggressiveness IAT's convergent validity in further detail, future studies should employ more refined and symmetrical behavioral indicators. Furthermore, classmates and teachers might not be optimal data sources. This idea is also supported by the finding that (1) observer ratings had very high stabilities (ranging between .85 and .90), and that (2) they were not able to detect interindividual differences in intraindividual changes over time (see also, Schäfer & Smith, 1996).

Regarding the aggression-reducing effects of ViSC, we found that change in aggressiveness between posttest and follow-up was different in training classes than in control classes. This finding suggests that the ViSC was effective in altering self-reported explicit and implicit aggression, but only a considerable time after completion of the training. One might wonder why training effects only emerged at follow-up, and not at posttest. We argue that since ViSC is a social skills training, and not an anti-aggression training, aggression prevention or reduction can be conceived of as a transfer effect, not as an immediate training effect. Earlier studies suggest that ViSC is, in fact, capable of promoting social-cognitive skills (e.g., Gollwitzer et al., 2006) as a short-term effect. These skills might need time to manifest themselves in observable behavior, and in implicit self-knowledge. Thus, a long-term developmental shift (Hager & Hasselhorn, 2000), as observed in the present data, can be meaningfully interpreted. However, this result needs to be replicated in future studies. It should also be noted that training effects were smaller than usually observed in universal approaches (cf. Lösel & Beelmann,

2003): The "long-term" effect (pretest vs. follow-up) amounted to d = .07 for IAT and EAS, respectively. The "lagged" effect (posttest vs. follow-up), however, amounted to d = .21 for IAT and d = .23 for EAS.

Taken together, the results of the present study speak for aggression-reducing effects of the ViSC and for the applicability of the Aggressiveness-IAT in evaluating these effects. However, when considering these effects, the study's limitations, as outlined above, have to be kept in mind: First, IAT scores were slightly less reliable than usual. Second, the relative number of error trials was generally high in our sample. Third, mean differences on IAT scores between the first and the second occasion of measurement are more difficult to interpret because of an obvious increase in test routine. Fourth, concurrent correlations for IAT scores were generally small, and there was no optimal validity criterion. Fifth, training effects were small, which is, however, not unusual for universal prevention approaches (e.g., Wilson et al., 2003). Despite these methodological aspects of the present study, we believe that indirect, latency-based measures such as the Aggressiveness-IAT have the potential to increase our knowledge of the effectiveness of social skills trainings over and above self-reports of aggression. Thus, the use of such measures in applied research should be more intensively explored than has been the case so far.

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