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**The impact of peer education on classroom outcomes
for children with Tourette Syndrome¹**

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Abstract

A peer-education videotape was developed for elementary school classes with a student with Tourette Syndrome, a chronic, frequently stigmatizing tic disorder. Triads consisting of a child with Tourette Syndrome, the child's parent, and the child's teacher were randomly assigned to either an intervention or control group. The triads completed sets of instruments three times, over five weeks. Only the intervention group received the videotape, as part of a classroom presentation between the first and second data collection times. The results indicated that the triads in both groups perceived gradual improvements in the children's social adjustment. The intervention and control groups, however, also differed in several respects. In the intervention group, the parents reported that their children acquired more friends following the classroom presentation. The children, however, reported having fewer friends at school, less athletic competence, and worse physical appearance. The implications of the results for peer-education interventions are discussed.

Introduction

Tourette Syndrome is a neurological disorder characterized by motor and vocal tics. The motor tics can range from simple repetitive actions, like blinking or lip-licking, to more complex behaviors, like jumping or touching objects or people. The vocal tics can also range in complexity and obtrusiveness, from throat-clearing to shouting. Some people with Tourette Syndrome also display coprolalia—inappropriate sexual, racist, or obscene speech—but that symptom is rare and is not necessary for a diagnosis of Tourette Syndrome. Attention deficit hyperactivity disorder and obsessive compulsive disorder, however, are frequently co-morbidities. Several medications can reduce the severity of the tics, but rarely do medications provide complete relief. Tourette Syndrome primarily affects males. The symptoms often begin between the ages of 5 and 8, worsen until about age 10, and frequently improve during adolescence and early adulthood.

Tourette Syndrome can be stigmatizing, as the symptoms can appear to be bizarre, hostile, disruptive, or socially unacceptable. Also, because most people with the disorder can suppress their symptoms for some amount of time, and the symptoms tend to occur in bouts that wax and wane, others can wrongfully conclude that the tics are willful.

The stigmatization associated with Tourette Syndrome can be especially problematic for children, who are learning key social skills during a period of their lives when their symptoms can be at their worst. Children with Tourette Syndrome tend to feel embarrassment over their tics, to experience discomfort in social situations, and to endure teasing and rejection from peers (Champion, Fulton & Shady, 1988). In all, relationships are often difficult for these children (Fowler, 1995; Hollenbeck, 1999; Rosen, 1996). In one study involving almost 100 adults with Tourette Syndrome, about three-quarters recalled being teased and treated unfairly by peers as a

child (Jagger, Prusoff, Cohen, Kidd, and Carbonari, 1982). Perhaps as a result, children with Tourette Syndrome have relatively high rates of anxiety, depression, poor self-esteem, and diminished social skills (Cohen, Bruun, and Leckman, 1988; Dykens, Leckman, Riddle, Hardin, Schwartz, & Cohen, 1990).

Peers tend to perceive children with Tourette Syndrome as undesirable as a playmate (Friedrich, Morgan, & Devine, 1996). One study found that 35% of children with the disorder received the lowest scores in their class on one or more sociometric ratings (Stokes, Bawden, Camfield, Backman, & Dooley, 1991). A follow-up study compared the sociometric ratings of children with Tourette Syndrome to those of children with diabetes. The results suggested that the peer relationship difficulties associated with Tourette Syndrome are not simply due to the generic effect of having a chronic illness (Bawden, Stokes, Camfield, Camfield, & Salisbury, 1998).

Interventions to mitigate these social difficulties have focused either on the children with Tourette Syndrome themselves, or on the children's peers. Typically, interventions that focused on the children themselves have included social skill training. The children were taught skills for interacting with peers and for deflecting hostile children. This approach has been found to be effective with children with various disabilities (Varni, Katz, Colegrove, and Dolgin, 1993).

To this end, peer education has been widely employed. Many chapters of the Tourette Syndrome Association have volunteers who make classroom presentations. The presenter explains the symptoms and course of Tourette Syndrome and encourages the children to treat their classmate with Tourette Syndrome as they would treat any other child. The rationale for these presentations is that increased knowledge about Tourette Syndrome and greater empathy

toward the child with the disorder will result in improved peer relations, adjustment, and self-esteem for that child.

Evaluations of classroom presentations on various chronic disorders have generally supported that rationale. Westervelt, Brantley and Ware (1983) evaluated a videotape and teacher-led classroom discussion aimed at improving peer acceptance for a child with physical disabilities. This intervention emphasized the similarities between disabled and non-disabled children. The results suggested that the intervention improved peer attitudes toward the disabled child. Other evaluations of peer-targeted interventions had similar outcomes (e.g., Bauman, Drotar, Leventhal, Perrin, and Pless, 1997; Goodell, 1984; Kottle, Mellor, & Schmidt, 1987; Madan-Swain, Frederick, & Wallander, 1999).

Only a few published evaluations have examined the effect of classroom presentations specifically about Tourette Syndrome. The results of those evaluations have been mixed. For example, Friedrich, et al (1996) showed a very brief videotape of a boy with tics to children in several classrooms. In some of the classrooms, the boy on the videotape explained the tic symptoms. The children who watched these videotapes tended to have negative perceptions of the boy, whether or not he provided the explanation of the tics. This result suggests that a very brief peer education videotape may not be immediately helpful for promoting social acceptance of children with Tourette Syndrome.

Woods and Marcks (2005) found that when college students watched a 13-minute videotape about Tourette Syndrome, they adopted more positive attitudes towards people with the disorder. Students who watched a videotape unrelated to Tourette Syndrome, or who did watch any videotape at all, did not tend to adopt these positive attitudes. However, the videotape

about Tourette Syndrome had less impact on the students' behaviors; those who watched it were not more willing to sit close by a person with Tourette Syndrome.

These two studies suggest that peer education interventions are not always helpful for people with Tourette Syndrome. However, in the Friedrich et al (1993) study, the intervention was very brief, and in the Woods and Marcks (2005) study, the audience was entirely college-aged. These studies did not directly address the question of whether a comprehensive classroom peer-education intervention can meaningfully improve the social adjustment of young children with Tourette Syndrome. To study that issue, our research team, in collaboration with a video production company, developed a classroom presentation that included a videotape, titled *You've Got a Friend*, for classrooms having pre-adolescent children with Tourette Syndrome.

The process of developing the videotape had several stages. First, the videotape development team met with an expert panel, composed of professionals who had extensive experience working with children with Tourette Syndrome and their families. Then, the team interviewed 48 parents of children with Tourette Syndrome and conducted focus groups with children with the disorder. A scriptwriter then drafted the content and structure of the videotape. After the expert panel reviewed that draft, the scriptwriter prepared the final script. The production company recruited the talent, arranged the shooting locations, created animated sequences, and taped and edited the final product.

The videotape underwent preliminary testing in four classrooms, none of which had a student with Tourette Syndrome. Half of the children in each classroom were randomly assigned to watch the *You've Got a Friend* videotape, while the other half saw a videotape of approximately the same length that discouraged drug abuse. Both groups of children completed three questionnaires immediately before and after watching the videotape: the Knowledge about

Tourette Syndrome Questionnaire, an eight-item scale that was designed especially for this evaluation; the Chedoke-McMaster Attitudes Towards Children with Handicaps questionnaire (CATCH; Rosenbaum, Armstrong and King, 1986); and the Foley (1979) scale, which assesses children's willingness to interact with a peer with a disability. The results of the evaluation suggested that the *You've Got a Friend* videotape tended to increase the students' knowledge about Tourette Syndrome and promoted empathy toward peers who were affected by it, as measured on the CATCH questionnaire. The drug abuse videotape did not have these effects. Neither videotape significantly affected the Foley scale results.

The *You've Got a Friend* videotape was then shown in two additional classrooms, each of which did have a pupil with Tourette Syndrome. The same three questionnaires were administered immediately before and after the presentation. CATCH scores rose after the videotape was shown in these classrooms more than they had risen in the classrooms that had no pupils with Tourette Syndrome (Holtz, 2000).

The present study was intended to explore the effect of this classroom presentation using a randomized design. The hypothesis being tested was that the children with Tourette Syndrome, their parents, and their teachers would report that the child's social adjustment improved following the classroom presentation, while no such improvement would be reported by a control group that did not receive the classroom presentation during the study period.

Method

Subjects

Tourette Syndrome Association chapters in Maryland, New Jersey, Minnesota, and other states recruited boys and girls between the ages of 6 and 14, in first to seventh grade. All the

children were living with at least one natural or adoptive parent. The parents reported that the children had been diagnosed with Tourette Syndrome by a physician. To confirm this diagnosis, the parents completed a short questionnaire called “About my child with Tourette Syndrome,” created for this study. The children did not receive diagnostic interviews before participating from an external clinician; parent report was used alone because project constraints.

Children were excluded from the evaluation if they were home-schooled or if the *You’ve Got a Friend* videotape had ever been shown at their school. Children were included only if they, their parents, and their teachers all agreed to participate. The parents and the teachers signed informed consent forms. The study was approved by the Institutional Review Boards of Danya International and Westat.

Design

A total of 29 child-teacher-parent triads were randomly assigned to an intervention group while 23 triads were randomly assigned to a control group. The children, teachers, and parents in the intervention group completed their respective paper-and-pencil instruments on three occasions: one week before the classroom presentation (time 1), one week after that presentation (time 2), and four weeks after that presentation (time 3). The control group triads also completed their respective instruments on three occasions: on a date soon after they were recruited (time 1), two weeks after that date (time 2), and five weeks after that date (time 3). The control group did receive classroom presentations, but only after time 3.

Procedure

At the three scheduled times, the teachers received a Federal Express envelope containing a cover letter, the instruments that they were asked to complete, a \$25 check, and a postage-paid

return envelope. At the same times, the parents received a similar Federal Express envelope with the instruments that they and their child with Tourette Syndrome were asked to complete. The \$25 checks arrived with each mailing and were not contingent upon the participant's actually returning the instruments. Such "pre-incentives" tend to be more effective than contingent incentives at motivating respondents to provide their data (Singer, 2002).

When the parents were recruited, they were encouraged to help their child complete the instruments if necessary. When there were two parents in the household, the instructions were that the same parent should complete the instruments at all three time periods. Two parents who wished to complete the instruments collaboratively were permitted to do so, as long as they responded collaboratively at all three time periods.

The cover letters mentioned a toll-free telephone number that the participants could call with any question or comment. A research assistant telephoned the teachers and parents to ensure that they returned the instruments within one week.

The Videotape Presentation

The videotape was intended to appeal to a young audience. The camera techniques and cartoon sequences were similar to those used in children's films and television shows. The videotape had the following scenes:

1. You've Got a Friend. The opening scene was set at a table in a play area. One child introduced children of various ages. He mentioned activities they enjoyed together, and explained that two children in the group had Tourette Syndrome. He emphasized that the disorder did not prevent the group from having fun together.

2. What is Tourette Syndrome? This scene was set at a health education center. One child was appointed the educator, donned a white coat, and provided an overview of Tourette Syndrome, describing it as a genetic disorder – something someone is born with.

3. What does Tourette Syndrome look like? In this scene, set at a firehouse, the children explained tics while cartoon figures provided examples of common tics. Again, the children with and without Tourette Syndrome interacted amicably with each other.

4. What does Tourette Syndrome feel like? The two children with Tourette Syndrome used the acronym “CHI,” meaning “can’t help it.” They revealed that the tics were embarrassing and distracting. The other children conversed empathically with them.

5. What is Tourette Syndrome like on the inside? This scene was set in a classroom. A child explained that some children with Tourette Syndrome exhibited unusual behavior, like rearranging items repeatedly until “it felt right,” while some had trouble sitting still and paying attention. Another child explained that these children were trying not to misbehave, but could not fully control their own behavior.

6. What’s so funny? In this scene, a child asserted that peers with Tourette Syndrome should be accepted. A cartoon figure exhibited tics while thinking “I wish I could stop doing this, I’m so embarrassed.” The children then discussed desirable reactions to children with tics, such as “tell them it’s ok,” and “ignore it.” They concurred that they should treat children with tics as they would treat any other children.

7. Wrap up. In the final scene, a child summarized the content, emphasizing that children with and without Tourette Syndrome have much in common and can be friends. He expressed the sentiment “You can make things better,” and asked the viewer, “What will you do?”

A member of the research team or a volunteer from a TSA chapter made the classroom presentations. A facilitator's guide specified the discussion that should precede and follow the videotape. Table 1 outlines the content of the facilitator's guide. The purpose of the guide was to achieve a level of uniformity in the presentations, while affording the facilitators the freedom to respond to the reactions in each classroom.

Instruments Completed by the Children

The children were asked to complete four instruments at each of the three data collection times: The Self-Perception Profile for Children (SPPC; Harter, 1985), the Classroom Life Instrument (CLI; Johnson, Johnson & Anderson, 1983), the Friendship Questionnaire (FQ; Bierman & McCauley, 1987), and the Revised Social Anxiety Scales for Children (SASC-R; LaGreca, 1998). The psychometric properties of these instruments are documented in the literature.

The SPPC measures the child's feeling of self-esteem and competence on six scales: scholastic ability, social skill, athleticism, physical appearance, behavior, and global self-worth. The SPPC contains 36 items, six for each scale. The questions take this form (from the social skill scale) to maximize clarity: "Some kids find it hard to make friends BUT other kids find it's pretty easy to make friends." The child chooses one of the two alternatives, and then marks whether it is "sort of true for me" or "really true for me."

The CLI contains five-point Likert scale items concerning support and positive relationships in class. For this study, 17 of the original 59 items on the CLI were selected to measure four kinds of perceived support: teacher-personal, teacher-academic, peer-personal, peer-academic. For example, "My teachers care about my feelings" is an item in the teacher-

personal support scale; “My classmates care about how much I learn” is an item on the peer-academic support scale.

The FQ provides a measure of peer relations. It includes questions about the number of friends the child has at school and at home, whether the child has a best friend at school and at home, and the number of activities that the child does with friends at school and at home. It also contains 34 items about the frequency that positive and negative interactions occur with peers. The child answers using a five-point scale ranging from “never or almost never” to “almost always.” The FQ has three scales: positive peer interactions, negative peer interactions, and extensiveness of the peer network. For example, “Is there someone who saves you a seat at lunch? How often?” is an item from the positive peer interactions scale.

The SASC-R measures children’s feelings of social anxiety. The instrument contains 22 items, each having a five-point format (“never or almost never” to “almost always”). The SASC-R has three scales: fear of negative evaluation from peers (FNE), social avoidance and distress in new social situations (SAD-New), and generalized or pervasive social distress (SAD-General). For example, “I feel shy even with kids I know well” is an item from the SAD-General scale.

Instruments Completed by the Parents

The parents were asked to complete the Child Behavior Checklist for Ages 6 to 18 (CBCL; Achenbach & Rescorla, 2001) at each of the three data collection times. The CBCL has two sections, called the competence scales and the syndrome scales. At time 1, the parents completed both sections. At times 2 and 3, they completed only the competence scales. At time 1 the parents also completed the “About My Child with Tourette Syndrome” instrument.

The three CBCL competence scales are called the “activities,” “social,” and “school” scales. The activities competence scale includes questions about the child’s participation in sports, hobbies, and household chores. The social competence scale includes questions about the child’s participation in organizations, contacts with friends, behavior around others, and behavior when alone. The school competence scale includes questions about the child’s academic performance and difficulties at school.

The CBCL contains eight syndrome scales: anxious depressed, withdrawn depressed, rule breaking behavior, somatic complaints, aggressive behavior, social problems, thought problems, and attention problems. Each of these scales consists of questions in the form of a description, like “easily jealous” (on the social problems scale) or “daydreams or gets lost in his/her thoughts” (on the attention problems scale) or “doesn’t seem to feel guilty after misbehaving” (on the rule breaking behavior scale). For each item, the parent marks 0 for “not true (as far as you know),” 1 for “somewhat or sometimes true,” or 2 for “very true or often true.” The syndrome scales were administered only at time 1 because they contain 113 questions and would be burdensome for the parent to complete three times, and because these scales were intended to measure the child’s traits in detail at the start of the study. The psychometric properties of the CBCL were discussed by Achenbach and Rescorla (2001).

The “About My Child with Tourette Syndrome” questionnaire contains questions about the child’s history of Tourette Syndrome and comorbidities, demographic background, medications, and enrollment in special education classes. The questionnaire asks the parent to rate, on a three-point scale, the severity of the child’s verbal tics, physical tics, and overall Tourette Syndrome symptoms. It asks whether the child was enrolled in private or public school, and whether the child has encountered academic difficulties.

Instruments Completed by the Teachers

The teachers were asked to complete the Teacher Report Form (TRF) at each of the three data collection times. This instrument is divided into adaptive functioning scales and syndrome scales. At time 1, the teachers completed all items on the instrument. At times 2 and 3, they completed only the adaptive functioning scales. At all three data collection points, the teachers also completed the Teacher's Rating Scale (Harter, 1985), and the Classroom Environment instrument.

In the TRF section on adaptive functioning, the teacher uses a five-point Likert scale to rate the pupil's academic performance, and a seven-point Likert scale to compare the pupil with typical children of the same age as to the pupil's academic progress, behavior, affect, and industriousness. The eight syndrome scales on the TRF are almost identical to the eight syndrome scales on the CBCL, described above. A few CBCL items, however, have been replaced on the TRF by different items that are more pertinent to a child's classroom behavior. Achenbach and Rescorla (2001) also presented the psychometric properties of the TRF.

The Teacher's Rating Scale (TRS) is structured like the SPPC. It consists of 15 questions in the form "This child finds it hard to make friends OR for this child it's pretty easy." The teacher selects one of the two alternatives and then rates whether it is "really true" or "sort of true." The instrument has five scales: scholastic competence, social acceptance, athletic competence, physical appearance, and behavioral conduct. Harter (1985) presented the psychometric properties of the Teacher's Rating Scale.

The Classroom Environment instrument was created for this project because no existing instrument assesses the classroom atmosphere regarding peer relationships of children who have differences. The instrument consists of 20 four-point Likert items ("strongly agree" to "strongly

disagree”), including “children in my classroom are accepting of individual differences among their peers” and “children in my classroom with differences often appear lonely.” The instrument has three scales: attitudes and behaviors toward children with differences, peer relationships in general, and empathy. Four additional questions in a five-point Likert format (“almost never” to “almost always”) pertain specifically to the child with Tourette Syndrome: “The child with Tourette Syndrome appears lonely or withdrawn,” “The child with Tourette Syndrome is socially awkward,” “The child with Tourette Syndrome has been teased, bullied, or called names,” and “The child with Tourette Syndrome has been excluded from activities by other children in the classroom.”

Classmates

The classmates of the children with Tourette Syndrome did not complete any instruments. The decision to collect no data from classmates was made for a practical reason: this data collection would require permission from the school boards and administrators for over 50 geographically dispersed schools. In many schools, the classmates’ parents would have been required to sign informed consent forms. These procedures would have been overly time-consuming or infeasible at most schools. A manuscript detailing our evaluation of the videotape with naïve peers, however, is currently in preparation.

Data Analysis

The dependent variables were the scores for the scales on the children’s, parents’, and teachers’ instruments. Most of these scales pertain to the child’s peer interactions. However, the SPPC, CLI, CBCL, TRF, and TRS were designed to be global measures of the child’s wellbeing and also have some scales that go beyond measuring peer interactions. Those scales pertain to such issues as the child’s academic achievement and participation in sports, hobbies and

household chores. These scales are not directly relevant to the effect of the classroom presentation upon the children's peer interactions. The questions for these scales could not be easily excised from the instruments, so they were left in and the scores for these scales were calculated.

As mentioned above, the FQ contains three scales, but it also contains several questions that are not a part of any scale. For example, the question about the number of friends is not part of a scale. When individual FQ questions were not part of a scale, the responses to the individual questions served as dependent variables. In addition, the results for the CBCL question "About how many close friends does your child have?" were analyzed individually, even though this question is part of the social competence scale, because of the importance of this question.

The data were analyzed with SAS using PROC GLM, the general linear model procedure. A fully factorial design was specified, with one within-groups measure and one between-groups measure. The within-groups measure was time, which had three levels: data collection times 1, 2, and 3. The between-groups measure was group assignment, which had two levels: intervention group and control group.

The comparisons specified in the SAS program were intended to detect changes that occurred between time 1 and time 2 and between time 1 and time 3. The main effect for time was tested, to reveal changes that affected both the intervention and control groups. The time by group interaction was also tested, to reveal changes that affected the two groups differently.

No Bonferroni or other statistical adjustment to reduce the likelihood of type I errors was applied, because these adjustments increase the likelihood of a type II error (Perneger, 1998), particularly in studies of children's social adjustment or other constructs which are assessed with multiple measures (Fekkes, Pijpers, Fredriks, Vogels, and Verloove-Vanhorick, 2006). In the

present study, a type II error, in which an effect of the intervention upon the children's peer interaction was overlooked, was deemed more important than a type I error.

The "About My Child with Tourette Syndrome" instrument, and the syndrome scales of the CBCL and the TRF were completed only at time 1. Therefore, the only analyses performed for these measures were comparisons between the intervention and control groups at time 1.

Results

Response Rates

In each of the 52 triads, at least one respondent—child, parent, or teacher—provided data at all three data collection times. In the intervention group, 75.9% of the children, 79.3% of the parents, and 82.8% of the teachers provided data at all three times. In the control group, 87.0% of the children, 87.0% of the parents, and 95.7% of the teachers provided data at all three times. *Z* tests did not reveal any differences between the two groups' response rates.

Differences Between the Groups at Time 1

T and chi square tests did not reveal any statistically significant differences between the intervention and control groups as to the characteristics of the children reported at time 1 by the parents on the "About My Child with Tourette Syndrome" instrument and the Child Behavior Check List syndrome scales or by the teachers on the Teacher Report Form syndrome scales. Table 2 shows the results for the "About My Child with Tourette Syndrome" instrument.

Main Effects for Time

The statistical analyses revealed that the ratings of the children, parents, and teachers on several measures changed between time 1 and time 2 or between time 1 and time 3. These

changes over time were statistically significant but the group by time interaction was not, indicating that the intervention and control groups did not differ as to the nature of the change.

Main effects for time in the parents' ratings. The parents' ratings of their children on the Child Behavior Check List social competence scale rose between time 1 and time 3 (from $M=5.94$, $SD=2.96$ to $M=6.38$, $SD=2.97$), $F(1, 37) = 4.23$, $p < .05$. Effect sizes can be computed by subtracting the means of the two ratings and dividing by the standard deviation of the rating at time 1.

The Child Behavior Check List contains the question, "About how many close friends does your child have? (Do not include brothers and sisters.)" The parents' estimates increased significantly between time 1 and time 2 (from $M=1.48$, $SD=0.89$ to $M=1.76$, $SD=0.98$), $F(1, 40) = 7.28$, $p < .02$.

Main effects for time in the children's ratings. On the Classroom Life Instrument, the children reported increased academic support from other children between time 1 and time 2; the scores on this scale rose from $M=2.55$, $SD=1.00$ to $M=2.73$, $SD=0.92$, $F(1, 40) = 4.33$, $p < .05$. The children also reported decreased academic support from their teachers between time 1 and time 2, $F(1, 40) = 11.40$, $p < .002$, and between time 1 and time 3, $F(1, 40) = 6.22$, $p < .02$. The scores on this scale at time 1 were $M=4.64$, $SD=0.41$; at time 2, $M=4.42$, $SD=0.57$; and at time 3, $M=4.41$, $SD=0.66$.

On the Friendship Questionnaire, the children reported that they participated in fewer activities with friends at school between time 1 and time 2. The number of activities dropped from $M=2.45$, $SD=1.75$ to $M=2.03$, $SD=1.36$, $F(1, 31) = 5.12$, $p < .04$.

On the Revised Social Anxiety Scales for Children, the children's mean scores on the Fear of Negative Evaluation scale decreased between time 1 and time 3 (from $M=2.82$, $SD=1.14$ to 2.48 , $SD=1.11$), $F(1, 41) = 7.61$, $p < .01$. A decrease in this score indicates greater confidence and less anxiety about negative evaluations from other children.

Main effects for time in the teachers' ratings. The teachers' ratings of the child's level of social acceptance on the Teacher Rating Scale rose between time 1 and time 2, $F(1, 45) = 6.45$, $p < .02$, and between time 1 and time 3, $F(1, 3) = 10.59$, $p < .0025$. The social acceptance scale scores at time 1 were $M=2.12$, $SD=0.78$; at time 2, $M=2.28$, $SD=0.91$; and at time 3, $M=2.35$, $SD=0.83$.

The teachers indicated on the Classroom Environment questionnaire that students extended more empathy to their peers with differences between time 1 and time 2 (ratings rose from $M=3.01$, $SD=0.42$ to $M=3.11$, $SD=0.40$), $F(1, 42) = 5.38$, $p < .03$. Also, the teachers indicated that the child with Tourette Syndrome became less socially awkward between time 1 and time 3 (ratings changed from $M=3.07$, $SD=1.19$ to $M=3.32$, $SD=1.07$), $F(1, 42) = 4.32$, $p < .05$. The teachers also thought that the child was excluded from activities less between time 1 and time 3 (ratings changed from $M=3.97$, $SD=1.05$ to $M=4.29$, $SD=0.82$), $F(1, 29) = 4.60$, $p < .05$. For these Classroom Environment data, higher scores indicate less awkwardness and exclusion.

Group by Time Interactions

The statistical analyses also revealed that on several measures, the direction of change over time was not the same for the intervention and control groups. These differences between the two groups were revealed as statistically significant group by time interactions.

Group by time interaction in the parent's ratings. Figure 1 shows the significant group by time interaction for the parents' responses on the Child Behavior Check List to the question, "About how many close friends does your child have? (Do not include brothers and sisters.)" A main effect, described above, indicated that the parents' ratings on this question increased for both the intervention and control group between time 1 and time 2. Between time 1 and time 3, however, those ratings continued to increase for the intervention group (from $M=1.32$, $SD=0.99$ to $M=1.73$, $SD=0.94$) but did not change for the control group (from $M=1.65$, $SD=0.75$ to $M=1.60$, $SD=0.94$), $F(1, 40) = 6.19$, $p < .02$.

Group by time interactions in the children's ratings. Significant group by time interactions were found for the children's assessments of their own athletic competence and physical appearance on the Self-Perception Profile for Children (Figures 2 and 3). Between time 1 and time 2, the mean athletic competence self-ratings of the intervention group decreased (from $M=2.66$, $SD=0.74$ to $M=2.37$, $SD=0.76$), while those of the control group remained constant (from $M=2.78$, $SD=0.60$ and $M=2.89$, $SD=0.58$), $F(1, 37) = 8.31$, $p < .01$. Between time 1 and time 3, the mean physical appearance self-ratings of the intervention group decreased (from $M=2.93$, $SD=0.61$ to $M=2.77$, $SD=0.76$) while those of the control group increased (from $M=2.70$, $SD=0.71$ to $M=2.85$, $SD=0.74$), $F(1, 37) = 5.18$, $p < .03$.

On the Friendship Questionnaire, the children listed their friends at school. While the number of friends at school decreased over time for the intervention group, they increased for the control group (Figure 4). This interaction was apparent in comparisons between time 1 and time 2, $F(1, 32) = 6.19$, $p < .02$, and between time 1 and time 3, $F(1, 32) = 6.67$, $p < .02$. For the intervention group, the number of friends listed at time 1 was $M=6.26$, $SD=3.80$; at time 2, $M=5.05$, $SD=3.81$; and at time 3, $M=5.32$, $SD=3.86$. For the control group, the number of friends

listed at time 1 was $M=5.40$, $SD=2.72$; at time 2, 6.27 , $SD=3.06$; and at time 3, $M=7.33$, $SD=3.13$).

Group by time interactions in the teachers' ratings. The Teacher Report Form score of a child's academic performance was computed by finding the means of the teacher's ratings of the child's academic performance in every subject that the child was studying. The teachers made the ratings on a five-point scale ranging from "far below grade" to "far above grade." Figure 5 shows that between time 1 and time 3, the scores decreased for the intervention group (from $M=2.98$, $SD=0.61$ to $M=2.83$, $SD=0.65$), but remained constant for the control group (from $M=3.09$, $SD=0.78$ to $M=3.17$, $SD=0.63$), $F(1, 44) = 4.93$, $p < .04$.

Discussion

The analyses of the results from the "About My Child with Tourette Syndrome" instrument, and the syndrome scales of the CBCL and the TRF revealed that the intervention and control groups did not differ at time 1. The randomization procedure was therefore successful; the parents' and teachers' reports regarding the two groups were not significantly different at the beginning of the study. The response rates for the two groups also did not differ significantly. Thus, comparisons between the two groups were not biased in any obvious way.

The statistically significant main effects for time suggest that the parents, children, and teachers in both the intervention and control groups tended to perceive positive changes during the weeks following time 1, the first data collection point. After approximately two weeks, at time 2, the parents reported that their children with Tourette Syndrome acquired a greater number of close friends. The teachers reported that the children were more likely to receive empathic feelings from their classmates.

After approximately five weeks, at time 3, the parents reported that their children with Tourette Syndrome were better socially adjusted and able to get along with others. The teachers reported that the children seemed less socially awkward and less likely to be excluded by their peers. The children themselves reported less anxiety about being poorly regarded by their peers.

At both times 2 and 3, the teachers reported that the children with Tourette Syndrome were better accepted socially by other children. Also at both times 2 and 3, the children reported that they received less academic support from their teachers. At time 2, the children reported receiving more academic support from other children. These changes may suggest that the children became less reliant on their teachers and more likely to do schoolwork collaboratively with other children.

Taken together, these findings suggest that the social adjustment of the children with Tourette Syndrome tended to improve over time, with or without the videotape presentation. These results are consistent with previous studies which found that as children with and without disabilities spend time together, even without structured intervention, the children without disabilities gradually stop perceiving the disabled children as being different from themselves (Maras & Brown, 1996; Wetstein-Kroft & Vargo, 1984).

The results also revealed six significant interaction effects, suggesting that some changes over time were associated with the classroom presentation of the *You've Got a Friend* videotape. Although parents in both the intervention and control groups reported that their children had acquired more friends between time 1 and time 2, the parents in the intervention group at time 3 tended to think that their children continued to attain a greater number of friends, while the parents in the control group no longer perceived this positive change.

Results from the child measures, however, conflict with these results, as children in the intervention group tended to report having fewer friends at school both one week and one month after the classroom presentation. They also tended to have lower self-ratings of their athletic competence and their physical appearance following the presentation. The teachers' ratings do not help reveal whether the parents' observations or the children's observations were more accurate, as they do not suggest significant differences between the intervention and control groups over time.

The children in the intervention group reported decrements in two self-esteem measures – physical appearance and athletic competence – over the course of the intervention. It is possible that this result is related to the fact that tics are visible symptoms that occur outside the individual's volition, mitigating his sense of physical self-control. Increasing the classroom's awareness of these symptoms could have had the unintended affect of making the child with TS more self-conscious about his or her physical differences and related lack of bodily control. More research is needed to explore the possible impact of Tourette Syndrome and its relationship to self-control, possibly measured through athleticism, and ratings of appearance and attractiveness.

Of course, the parents in the intervention group were aware of the classroom presentation. Their positive ratings may reflect their strong hope that the intervention would be effective. The children themselves, however, may have felt singled out by a presentation that put the spotlight on Tourette Syndrome and their differences. This is an important caveat. All the children in our study were given options for participating in the intervention – ranging from absenting themselves, to simply being in the classroom, to leading the question and answer period. Every child is different in terms of the amount of attention they are comfortable with, and

professionals who implement these types of classroom presentations should work very closely with the child with the difference, regardless of his or her age, to ensure that he participates in a way that will make him comfortable with and empowered by the intervention process. These results also suggest that teachers and parents need to be vigilant following peer education interventions, to ensure there are no unintended effects. Followup interventions may be necessary to help ensure that the presentation achieves meaningful change in social interaction in the classroom.

The results of this study must be approached with caution. All of the children were self-selected and therefore likely to be in especially challenging situations. Also, there was no way to blind the study so that the children, parents or teachers were unaware of whether or not the classroom presentation occurred. The time frame of the data collection had to be relatively short because of the constraints of the grant funding. Prior research (Holtz, 2000; Woods & Marcks, 2005) has suggested that classroom presentations change attitudes more quickly than they change behaviors. Perhaps in the brief time frame of this study, the parents sensed improving attitudes among the children's peers, while the children did not experience much change in their classmates' behavior. As a result, the children and the parents provided conflicting ratings. Finally, social acceptance is a multifaceted and dynamic construct, and therefore difficult to measure. The instruments we chose for this intervention may have been insensitive to some aspects of the children's social wellbeing and classroom experiences.

Future research should examine the impact of peer-focused interventions on outcomes and behaviors, to begin to pinpoint the specific value of the presentations. Such research could help educators and clinicians maximize the beneficial characteristics of the education, while mitigating unintended effects. Woods' (2002) recommended that peer-education presentations

should be tailored to the specific characteristics and social interactions of an individual classroom with a child with Tourette Syndrome. Future research could show how to accomplish that goal.

Table 1. Format of the interventions

10 minutes	Presenter explains the purpose of session; determines what students already know about Tourette Syndrome; asks the students how they treat people who have differences; asks students to describe something that makes them different, such as being left handed; and asks how other people react to their differences.
10 minutes	Presenter shows the <i>You've Got a Friend</i> videotape.
10 minutes	Presenter asks students what they learned about Tourette Syndrome and about interacting with people who have the disorder; asks children to write the Pledge of Allegiance, but to simulate having tics by turning their heads whenever the presenter claps; discusses this experience with the students.

Table 2. Characteristics of the children in the Intervention and control groups.

	Intervention group N=29		Control group n=23	
	Number	Percent	Number	Percent
Male	23	79.3	19	82.6
Female	5	17.2	3	13.0
Public school	24	82.8	18	78.3
Private school	4	13.8	4	17.4
No siblings	3	10.3	0	0.0
Siblings	25	86.2	22	95.7
African American	3	10.3	0	0.0
Caucasian	26	89.7	21	91.3
Latino	1	3.4	2	8.7
ADHD	18	62.1	12	52.2
OCD	15	51.7	14	60.9
Other co-morbidity	4	13.8	5	21.7
Rx for TS	23	79.3	13	56.5
Rx for other condition	8	27.6	10	43.5
Special education	14	48.3	11	47.8
Verbal tics mild	16	55.2	13	56.5
Verbal tics moderate	9	31.0	8	34.8
Verbal tics severe	2	6.9	0	0.0
Physical tics mild	10	34.5	8	34.8
Physical tics moderate	16	55.2	14	60.9
Physical tics severe	2	6.9	0	0.0
All symptoms mild	6	20.7	6	26.1
All symptoms moderate	17	58.6	14	60.9
All symptoms severe	5	17.2	2	8.7
Coprolalia	1	3.4	2	8.7
Academic difficulties	19	65.5	12	52.2
Natural parent in triad	24	82.8	21	91.3
Adoptive parent in triad	4	13.8	1	4.3
	Mean	SD	Mean	SD
Age	10.21	1.63	9.85	1.17
Grade	4.46	1.77	3.86	0.83
Age, first symptoms	5.50	2.17	5.68	1.81
Age, diagnosis	7.43	1.37	7.23	1.54

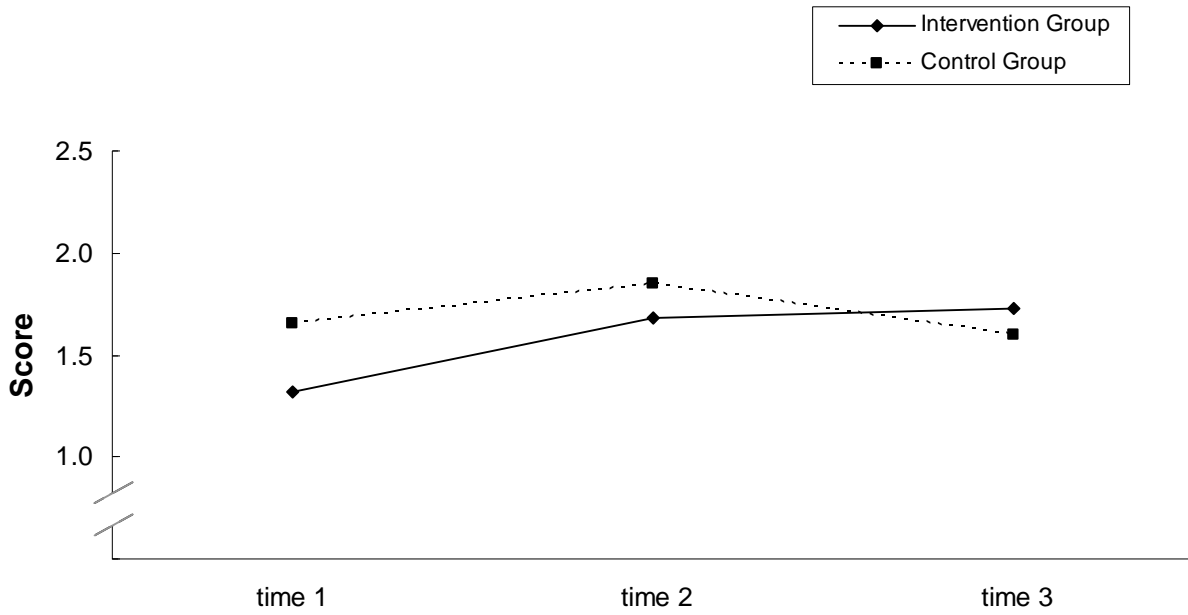


Fig. 1. Change over time in the number of the child's close friends, as the parents reported on the Child Behavior Check List.

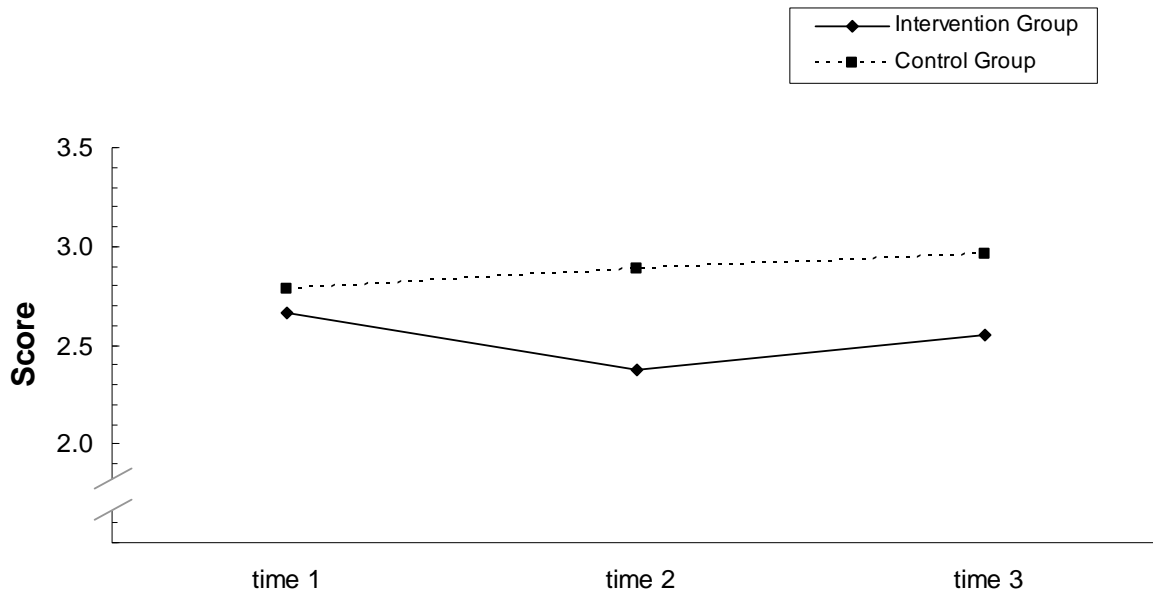


Fig. 2. Change over time in the Athletic scale of the Self-Perception Profile for Children instrument.

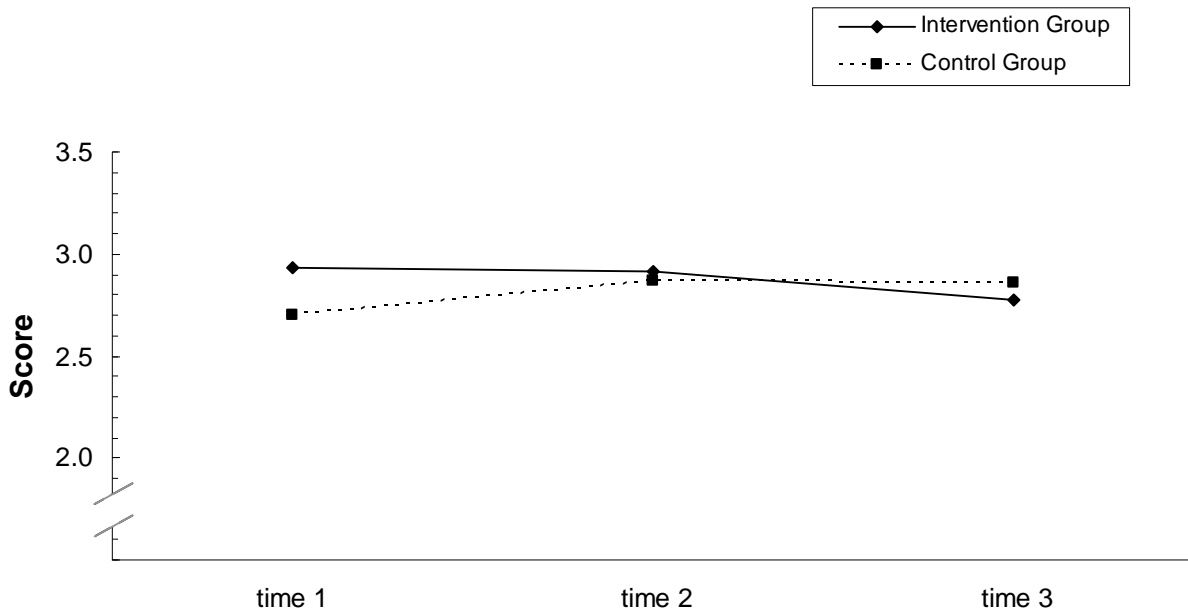


Fig. 3. Change over time of the Physical Appearance scale of the Self-Perception Profile for Children instrument.

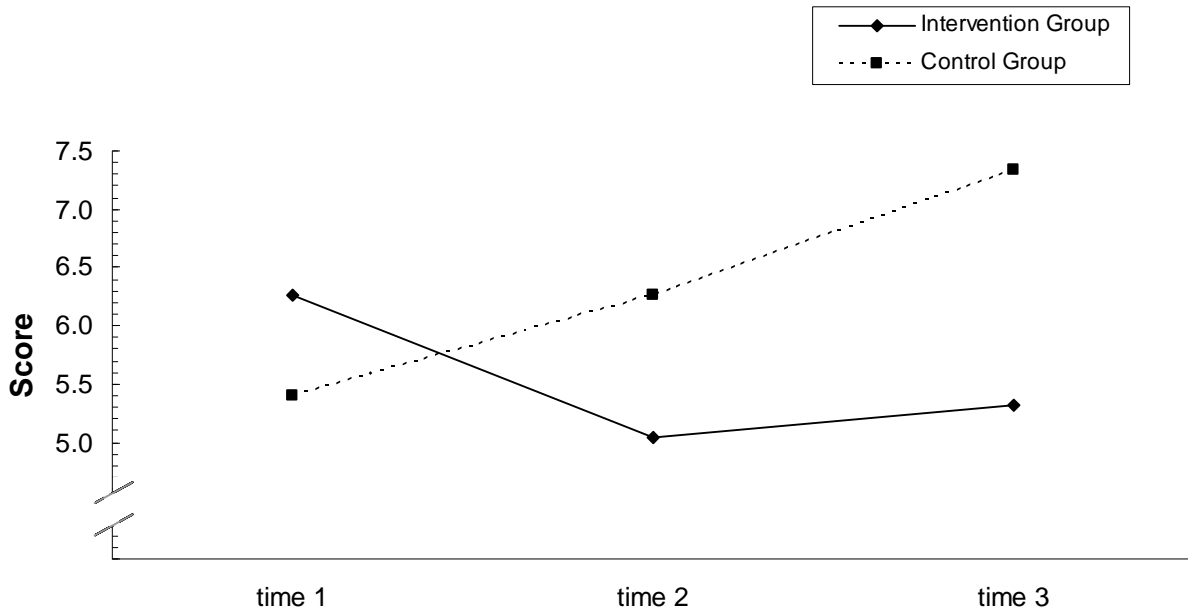


Fig. 4. Change over time on the question about friends at school on the Friendship Questionnaire.

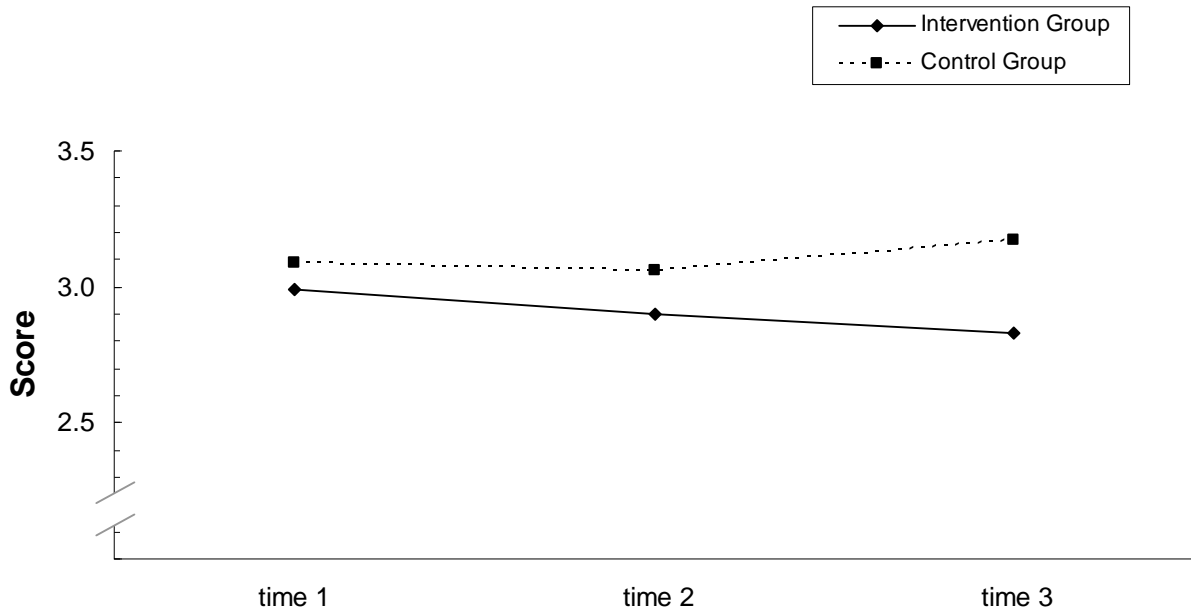


Fig. 5. Change over time in the Performance scale of the Teacher Report Form.

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