Exploring the Bond

Effects of a therapeutic riding program on at-risk and special education children

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Objective—To determine the effects of a therapeutic riding program on psychosocial measurements among children considered at risk for poor performance or failure in school or life and among children in special education programs.

Design—Observational study.

Population—17 at-risk children (6 boys and 11 girls) and 14 special education children (7 boys and 7 girls).

Procedure—For the at-risk children, anger, anxiety, perceived self-competence, and physical coordination were assessed. For the special education children, anger and cheerfulness were measured, and the children's and their mothers' perceptions of the children's behavior were assessed. Measurements were made before and after an 8-session therapeutic riding program.

Results—For boys enrolled in the special education program, anger was significantly decreased after completion of the riding program. The boys' mothers also perceived significant improvements in their children's behavior after completion of the program.

Conclusions and Clinical Relevance—Results suggest that an 8-session therapeutic riding program can significantly decrease anger in adolescent boys in a special education program and positively affect their mothers' perception of the boys' behavior. (*J Am Vet Med Assoc* 2006;228:46–52)

The concept of using horses for rehabilitation of human patients gained worldwide prominence after Liz Hartel, who had polio and used a wheelchair, won the silver medal for dressage at the 1952 Olympics. Hartel's victory was heralded as a demonstration of the power of using horses in a therapeutic setting. Since that time, both the availability of therapeutic riding and the claims of its benefits have increased dramatically. Therapeutic riding provides participants with companionship, nonjudgmental acceptance, responsibility, the opportunity to master new skills, and various physical and neuromuscular benefits.[1–4] Although several studies[5–8] have documented that therapeutic riding programs have been associated with improvements in physical parameters among individuals with physical handicaps, there is little objective data on whether such programs positively affect psychosocial development of the participants.[9]

The purposes of the study reported here were to determine the effects of a therapeutic riding program on anger, perceived self-competence, and gross and fine motor coordination among children classified as at risk for poor performance or failure in school or life (ie, at-risk children) and on anger, cheerfulness, and behavior among children enrolled in a special education program at their school. The study was designed to test the hypothesis that children would show improvements in psychosocial and physical measurements at the end of the therapeutic riding program. Results of studies of stress-related behaviors among horses used in the therapeutic riding program are reported elsewhere.[10]

Materials and Methods

The study was approved by both the All-University Committee on Animal Use and Care and the University Committee on Research Involving Human Subjects at Michigan State University. Because children, especially at-risk children, are considered a vulnerable population, no attempts were made to assess the family situation or dynamics of participating children, nor was any attempt made to contact the school district or health care providers for additional information regarding the participants.

Participants—At-risk children who attended a small, rural school system in the Midwest were recruited to participate in the study. Children were recruited through a letter sent by the school system to the parents or guardians of all children in the sixth through eighth grades in the school sys-

CHUM	Children and Horses United in Movement
STCI-S	State form of the State-Trait Cheerfulness Inventory

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tem. The letter included a phone number for parents to call to volunteer their children for the study. Parents who called were instructed to leave their name, their child's name, and their phone number. A research assistant subsequently contacted the parents to determine whether children met the study's criteria and, if so, to schedule an orientation meeting.

For the present study, children were considered at risk on the basis of a modification of the federal guidelines. Any child who participated in the free lunch program at the school, lived in a single-parent family, lived with his or her family in a shelter, read at less than his or her grade level, used English as a second language, came from a blended family, had parents who had divorced, had moved frequently in the past 5 years, was facing disciplinary action at school, had failed or repeated a grade, or did not participate in any extracurricular activities at school was considered at risk. Self-reporting or parental reporting was used to classify children as being at risk. At-risk children were eligible for inclusion in the study only if they were not taking any psychotropic, mood-altering, or related prescription drugs; had not been identified as having a psychiatric disorder or classified as learning disabled; and were not in the special education program at their school. In addition, at-risk children were included only if they did not have any formal riding experience, were able-bodied, were able to read and speak English, and were able to understand and fill out forms used in the study.

The study goal was to recruit 20 at-risk children in the sixth through eighth grade to participate in the study. A total of 17 at-risk children (6 boys and 11 girls) participated. Mean ± SD age was 10.8 ± 1.3 years (range, 8 to 13 years). Fifteen of the 17 at-risk children were in the sixth through eighth grades at their school. The remaining 2 were in the fourth grade and were the younger brothers of other participants, who were responsible for their younger brothers' care while their parent worked. Fifteen of the at-risk children were white, 1 was Hispanic, and 1 was Native American. One additional child participated in the therapeutic riding program because her cousins participated in the program. However, this child did not meet the criteria for inclusion in the study and was not included in data analyses.

Children in the sixth through twelfth grades who took part in the special education program at their school were also recruited to participate in the study through a letter sent by the school system to parents or guardians of all children in the sixth through twelfth grade who were enrolled in the special education program. Twenty-two children and their parents completed the testing prior to the therapeutic riding program, but only 14 of the children (7 boys and 7 girls; mean ± SD age, 13.6 ± 2.3 years; [range, 10 to 18 years]) completed all parts of the study (ie, completed testing before and after the therapeutic riding program and participated in ≥ 6 of the riding sessions). The mothers of 12 of these 14 children completed testing before and after the therapeutic riding program. Twelve of the children were described by themselves or their parents as having emotional impairment (including attention deficit hyperactivity disorder, oppositional defiant disorder, depression, and bipolar disorder), and 2 were described as having a nonspecific learning disability. One child also had mild cerebral palsy.

Experimental protocol—For the at-risk children, the therapeutic riding program consisted of a 1-hour riding session once a week for 8 weeks (total of 8 riding sessions). The program was conducted during July and August 2003 at the CHUM Therapeutic Riding Center. Three to 5 children rode during each class period. All children completed written psychologic evaluations and physical assessment before and after the 8-week therapeutic riding program while at the riding center. Parents and children were told that the study was designed to assess the effect of the therapeutic riding program on both the children and the horses.

For the special education children, the therapeutic riding program consisted of 1-hour riding sessions twice a week for 4 weeks (total of 8 riding sessions). The program was conducted during July 2004 at the CHUM Therapeutic Riding Center. Three to 5 children rode during each class period. The children and their mothers completed written psychologic evaluations before and after the 4-week therapeutic riding program.

Psychologic evaluations—For the at-risk children, anger, anxiety, perceived self-competence, and gross and fine motor coordination were assessed before and after completion of the therapeutic riding program. Anger was measured with the Children's Inventory of Anger.[11] This inventory has 4 subscales—frustration (11 items), physical aggression (9 items), peer relationships (9 items), and authority relations (10 items), and Cronbach α values reported for the 4 subscales are 0.84, 0.91, 0.73, and 0.88, respectively. Individual items provide scenarios and ask participants how they would feel in these scenarios. Sample items included "Your bike has a flat tire" and "Somebody calls you a chicken," and participants were instructed to respond to these items on a 4-point, Likert-type response scale ranging from "I don't care" to "I can't stand that!"

State anxiety was measured with the State-Anxiety scale of the State-Trait Anxiety Inventory for Children.[12] The reported Cronbach α value for this 20-item scale is 0.80. For this scale, 20 adjectives were provided, and participants were instructed to choose the extent to which they felt that adjective described how they felt at that very moment. For example, participants were asked to choose whether they felt very calm, calm, or not calm.

Trait anxiety was measured with the Trait-Anxiety scale of the State-Trait Anxiety Inventory for Children.[12] The reported Cronbach α value for this 20-item scale is 0.85. Similar to the State-Anxiety scale, 20 descriptions were given, and individuals were asked to describe how they generally feel. For example, participants were asked to choose whether they were "calm, cool, and collected" almost never, sometimes, often, or almost always.

Perceived self-competence was measured with the Self-Perception Profile for Children.[13] This measure has 6 subscales—global self-worth, social acceptance, athletic competence, physical appearance, behavioral conduct, and scholastic competence, and Cronbach α values reported for these subscales are 0.80, 0.80, 0.86, 0.82, 0.79, and 0.85, respectively. Individual items asked participants to pick 1 of 2 statements and then pick whether that statement was "sort of true for me" or "really true for me." Sample items included "Some kids wish they could be a lot better at sports (statement 1), but other kids feel they are good enough at sports (statement 2)" and "Some kids wish their body was different (statement 1), but other kids like their body the way it is (statement 2)."

Motor coordination was assessed with selected items from the Bruininks-Oseretsky test.[14] This standardized individually administered test assesses the motor functioning of children between 4.5 and 14.5 years old. Sixteen items were selected from the complete battery to assess gross and fine motor skills, balance, and bilateral integration of children enrolled in the present study. Items included standing on the preferred leg on the floor and a balance beam, walking forward heel-to-toe on a walking line and balance beam, and touching the nose with an index finger while the eyes are closed. Normative data include standard scores for each age group, percentile ranks, and age equivalents.

For the special education children, anger, cheerfulness, and behavior were measured before and after completion of the therapeutic riding program. Anger was measured with

the Children's Inventory of Anger[11] as described for the at-risk children.

Cheerfulness was measured with the STCI-S.[15] The STCI-S has 4 different forms asking how the participant feels in relation to right now, the past week, the past month, and the past year. The present study used the "past week" version. The STCI-S(w) has 3 subscales—cheerfulness (10 items), seriousness (10 items), and bad mood (10 items), and Cronbach α values reported for the 3 subscales are 0.94, 0.86, and 0.93, respectively. Participants were given a sentence, such as "I was ready to have some fun," "I was in a sober frame of mind," and "I was in a bad mood," and asked to express their agreement with the statement with a 4-point Likert scale (strongly disagree, moderately disagree, moderately agree, and strongly agree).

The revised Conners-Wells' Adolescent Self Report Scale was used to assess the children's perception of their own behavior and to identify behaviors that could be indicative of a psychologic problem in the children.[16] The long version has 87 items, including "I get nervous," "I like to hurt some people," and "I tend to squirm and fidget," and participating children were asked to indicate with a 4-point Likert-type scale (not true at all, just a little true, pretty much true, and very much true) how often each item described their feelings in the past month. The long version has 10 subscales, with some questions overlapping 2 or more subscales; reported Cronbach α values for the subscales range from 0.74 to 0.92.

The Conners' Parent Rating Scale[16] **(Appendix)** was used to assess the mothers' perceptions of their child's behavior before and after the therapeutic riding program. The long version of this scale has 80 items such as "angry or resentful," "spelling is poor," or "easily frustrated," and respondents were asked to indicate with a 4-point Likert-type scale how much each description applied to their child's behavior during the past month. The long version has 14 subscales, with reported Cronbach α values for the subscales ranging from 0.73 to 0.94.

Statistical analysis—Paired *t* tests were used to compare data obtained prior to the therapeutic riding program with data obtained after completion of the program. Data were entered into and analyzed by use of commercial software[a]; values of $P < 0.05$ were considered significant.

Results

At-risk children—For the at-risk children, none of the psychologic measures obtained after the therapeutic riding program were significantly different from values obtained prior to the program. However, significant improvements were found for 3 of the 16 measures of motor coordination. Following completion of the therapeutic riding program, mean number of seconds children could stand on their preferred leg on the floor or on a balance beam was increased by almost 2 seconds. In addition, significantly more children were able to tap their feet while making circles with their fingers after completion of the program (15 children) than before (12 children).

Special education children—For the special education children, total anger score after completion of the therapeutic riding program was significantly decreased, compared with score prior to the program **(Figure 1)**. However, for all 14 children, anger score prior to the riding program was not above normal. When subscales of the anger inventory were assessed, scores for the frustration, physical aggression, and authority relations subscales were found to be significantly decreased, whereas score for the peer relationships subscale was not significantly changed. When anger scores for the 7 boys were evaluated separately, mean anger score before the riding program was in the upper end of the normal range and was significantly decreased after completion of the program. In contrast, mean anger score for the 7 girls before the riding program was lower than the lower limit of the normal range and did not change significantly after completion of the program. Analysis of the subscale scores for the 7 boys revealed significant decreases in scores for the frustration, physical aggression, and authority relations subscales **(Figure 2)**.

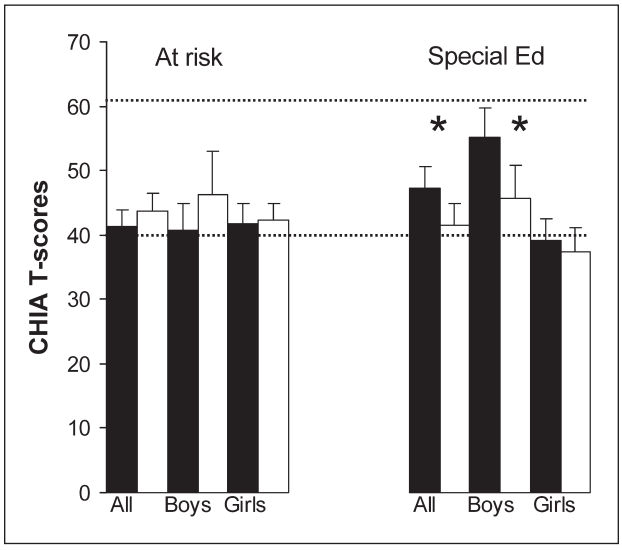

Figure 1—Children's Inventory of Anger (CHIA) T-scores for at-risk children (6 boys and 11 girls) and children enrolled in a special education program (7 boys and 7 girls) before (black bars) and after (white bars) completion of an 8-session therapeutic riding program. The horizontal dotted lines represent normal anger range for children. *Significantly ($P < 0.05$) different from value obtained prior to initiation of the riding program.

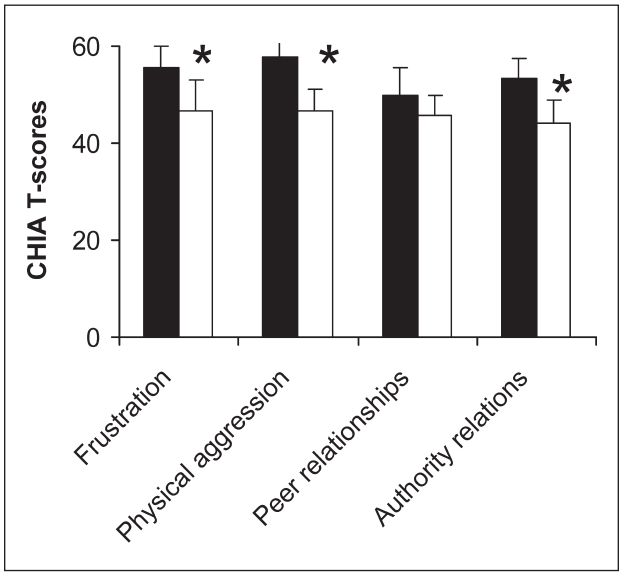

Figure 2—Children's Inventory of Anger subscale T-scores for 7 boys enrolled in a special education program before (black bars) and after (white bars) completion of an 8-session therapeutic riding program. *Significantly ($P < 0.05$) different from value obtained prior to initiation of the riding program.

Table 1—Scores for perceptions of their children's behavior provided by mothers of 12 children (6 boys and 6 girls) enrolled in special education program who completed an 8-session therapeutic riding program.

	Boys		Girls	
Subscale	**Before**	**After**	**Before**	**After**
Oppositional	70.0 ± 5.8*†	62.0 ± 4.1	53.2 ± 1.7	58.0 ± 4.0
Cognitive problems, inattention	65.0 ± 4.2*†	57.8 ± 2.8	60.3 ± 6.2	65.0 ± 6.4†
Hyperactivity	72.3 ± 6.2*†	66.1 ± 6.2†	60.8 ± 7.2	63.5 ± 6.8†
Anxiousness, shyness	59.0 ± 6.2	52.5 ± 2.6	56.0 ± 4.0	59.3 ± 5.8
Perfectionism	57.3 ± 3.4	55.5 ± 4.7	53.0 ± 3.3	51.2 ± 2.8
Social problems	60.5 ± 5.5	53.3 ± 2.6	58.8 ± 7.5	60.3 ± 6.4
Psychosomatic	62.5 ± 6.6	52.5 ± 2.5	52.2 ± 4.2	51.5 ± 3.9
ADHD index	69.3 ± 5.5*†	62.2 ± 4.9	63.3 ± 6.0†	65.7 ± 7.1†
CGI: restless, impulsive	74.3 ± 7.4*†	66.5 ± 5.6†	59.5 ± 5.7	67.0 ± 5.7†
CGI: emotional liability	65.7 ± 7.0†	59.2 ± 4.8	51.2 ± 2.5	53.0 ± 2.9
CGI: total	73.7 ± 7.3†	65.8 ± 5.5†	57.3 ± 4.5	63.0 ± 4.8†
DSM-IV SS: inattentive	67.3 ± 5.5*†	59.5 ± 4.4	59.8 ± 6.6	65.2 ± 8.2†
DSM-IV SS: hyperactive, impulsive	73.3 ± 5.8*†	67.8 ± 4.9†	60.5 ± 6.3	65.2 ± 7.0†
DSM-IV SS: total	74.5 ± 7.0*†	64.2 ± 5.1†	60.7 ± 6.8	66.5 ± 8.0†

Data are given as mean ± SEM.

*Significantly ($P < 0.05$) different from value obtained following completion of the therapeutic riding program. †Mean score was higher than score for approximately 90% of boys and girls in the same age group.

ADHD = Attention deficit hyperactivity disorder. CGI = Connors' global index. DSM-IV SS = Diagnostic and Statistical Manual of Mental Disorders, version 4, symptom subscale.

Interpretive guidelines for T-scores for the individual subscales are as follows: score of 45 to 50 = average score, should not raise concern; score of 56 to 60 = borderline score, should raise concern; score of 61 to 65 = possible clinically important problem; score of 66 to 70 = clinically important problem; and score > 70 = marked clinically important problem.

Scores for cheerfulness after completion of the therapeutic riding program were not significantly different from scores obtained prior to the program.

When data for the children's perception of their own behavior were analyzed, there was a significant decrease in the cognitive problems-inattention subscale score after completion of the riding program, but no other significant differences were detected. When data only for the 7 boys were analyzed, no differences were detected. However, when data for the 7 girls were analyzed, there was a significant decrease in the cognitive problems-inattention subscale score, but no other differences were detected.

Mothers of all 14 special education children completed the Conners' Parent Rating Scale prior to initiation of the therapeutic riding program. On the basis of their responses, 11 of the 14 children were classified as having a profile indicative of psychopathology or problematic functioning (ie, scores for ≥ 3 subscales ≥ 60[16]). Two of the remaining children (a boy and a girl) were classified as having typical profiles (ie, scores for all subscales of approx 50), and 1 girl was classified as having a mildly elevated profile (ie, no subscale score > 65 and no more than 1 subscale score > 60).

Mothers of 12 of the special education children completed the Conners' Parent Rating Scale after their children had completed the therapeutic riding program. When data for all 12 mothers were analyzed as a group, scores obtained after completion of the riding program were not significantly different from scores obtained prior to initiation of the riding program. However, when data for the 6 mothers of boys enrolled in the program were analyzed separately, significant improvements in score were detected for 8 of the 14 subscales (**Table 1**). In contrast, scores for the 6 mothers of girls enrolled in the program were not significantly changed.

Discussion

Results of the present study suggest that an 8-session therapeutic riding program can significantly decrease anger in adolescent boys in a special education program and positively affect their mothers' perception of the boys' behavior. Total anger scores for the 7 boys in the present study who were enrolled in a special education program were in the normal or high-normal range prior to participation in the therapeutic riding program, and mean total anger score was significantly decreased at the end of the 8 riding sessions. Thus, our findings suggest that therapeutic riding may be useful for boys in special education programs with anger issues. Mothers of the boys perceived an improvement in their children's behavior after completion of the riding program, suggesting that the impact of the program may extend beyond the 1-hour riding sessions and influence the family situation.

For 6 of the 7 boys in the present study who were enrolled in a special education program, scores on the parent rating form were indicative of psychopathology or problematic functioning. In the remaining boy, attention deficit hyperactivity disorder, oppositional defiant disorder, and depression had been diagnosed, and the boy was receiving medication. According to the mothers' responses, therapeutic riding improved the boys' ability to function, particularly in areas of anger control, problems with authority, breaking rules, concentrating on tasks, restlessness, and impulsivity. Not unexpectedly, boys' scores were generally higher than girls' scores in the present study, and similar findings have been reported previously.[16] Parents are

believed to be better reporters of externalizing behaviors,[16] which may explain why the mothers reported higher scores than did the boys themselves and why the mothers were able to perceive improvements following completion of the therapeutic riding program.

Anger scores for girls in the present study who were enrolled in a special education program were in the low or low-normal range before and after completion of the therapeutic riding program. However, these low scores may not have been so much a reflection of the girls' true level of anger, as a result of limitation of the Children's Inventory of Anger.[11] The Children's Inventory of Anger measures acknowledged anger, not repression of angry feelings, and therefore may not have tapped into the girls' true anger. Girls are socialized to express anger differently, and it is considered masculine, not feminine, to express anger.[17] Girls still experience anger, but have not learned a socially acceptable way to express it and, therefore, repress it.[17,18]

Interestingly, although at-risk children in the present study caused greater stress to the horses (ie, a higher number of stress-related behaviors) than did other groups of riders in the program,[10] no significant changes in psychologic measures, including anger, were identified. The higher level of stress in the horses may have been related to the high percentage of girls in this group and subsequent repression of anger or acting out against the horses.[19] Although demographically, the population of at-risk children did not appear different from the general population in the area, the finding that these children caused more stress to the horses suggests that there was something about the group that made them different from the general school population, including the children in the special education program. Thus, further study with a larger sample size of more homogenous at-risk children may be warranted.

Although most previous studies[5–7] of the effects of therapeutic riding programs have focused on individuals with specific physical handicaps, particularly cerebral palsy and multiple sclerosis, some studies and case reports[20–27] have evaluated the role of therapeutic riding on psychiatric and psychosocial conditions. Cawley et al,[21] for instance, evaluated the impact of therapeutic riding on self-concept of 23 first-time riders between 11 and 15 years old who had special educational needs (eg, learning disabilities, mental retardation, and severe emotional handicaps). The authors reported a small increase in self-concept, but identified a significant difference only for the behavior subset and suggested that this may have indicated a lessening in behavioral problems. Tolmach[23] reported on the use of a therapeutic riding program to aid indigent, at-risk urban adolescents in behavior control and in anticipating the consequences of their behavior. However, therapeutic riding was only 1 tool used in the context of a therapeutic milieu, and results of the independent effects of therapeutic riding have not been reported.

Tucker[27] examined the effects of therapeutic riding on self-concept, locus of control, hopelessness, and impulsivity of boys between 14 and 18 years old who were in a residential facility because of emotional and behavioral problems. The author found no difference between riding and not riding, but suggested that the lack of significant findings may have been attributable to design problems rather than to the fact that therapeutic riding was not effective. Groups in the study were small, and individuals were assigned to the control group because their insurance providers or their guardians would not allow them to ride. In addition, study instruments were administered by staff members, who assigned them a low priority and completed them at their leisure, so that timing of testing was out of the author's control.

In a retrospective study, Pearson[26] attempted to examine the effect of therapeutic riding on antisocial behavior. This study involved a review of the medical records of 40 of the 63 residents of a private, residential school for young men (9 to 17 years old) with behavioral and serious emotional problems; records reviewed were randomly chosen by the school's administrator. Thirty of the 40 residents were receiving psychotropic drugs, and in many, 4 or more psychiatric disorders had been diagnosed.[26] The author stated that because the staff was busy, the retrospective chart review was designed to minimize the time required of the staff for data collection. Antisocial behavior was assessed by counting the critical incident reports; however, critical incident reports dealing with common medical or sexual behavior issues were not counted. Mean antisocial behavior score for the group who rode less often was greater than mean score for the group who rode more frequently, suggesting that therapeutic riding might have been associated with less serious aggression. However, the fact that the total number of incidents per child was greater in the group that rode more often was not addressed, and other design flaws make it difficult to interpret or extrapolate the results.

Inspired by Liz Hartel's Olympic victory, the first therapeutic riding centers were built in Great Britain in the 1950s, and by 1983, Great Britain had > 500 programs. The first program in the United States was established in Pennsylvania in 1967, and in 1970, the first purposely built center for therapeutic riding was established. Today, there are > 650 therapeutic riding centers in the United States accredited by the North American Riding for the Handicapped Association and hundreds of nonaccredited programs affiliated with 4-H clubs and local organizations.

In the present study, we found that a therapeutic riding program had a significant effect on anger among boys enrolled in a special education program and in their mothers' perception of the boys' behavior. Although qualitative assessment from parents, instructors, and medical professionals and previous case studies have suggested that therapeutic riding has a positive effect on psychosocial measures, research documenting such effects is not common. Because of the wide-ranging backgrounds, cultural influences, and family and psychologic situations of the participants, it is difficult to assess the effects of therapeutic riding by comparing small groups. Such studies are expensive and may require provision of transportation in addition to the cost of participation in the program. Furthermore, studies involving children, especially those at risk or in special education programs, are fraught with bureaucratic and regulatory issues. It is difficult to know, without

expensive pilot testing, which group of children should be evaluated and which psychosocial measures should be used. In the present study, boys in the special education program appeared to benefit most from therapeutic riding. This population could be one to target for further study and evaluation.

a. SPSS, version 11.5, SPSS Inc, Chicago, Ill.

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Appendix

The Conners' Parent Rating Scale to assess parents' perceptions of their children's behavior.

Subscale	Description
Oppositional (10 items)	Children are likely to break rules and have problems with authority; they are more easily annoyed and angered than most individuals their age.
Cognitive problems and inattention (12 items)	Children are likely to be inattentive, have more academic difficulties than most individuals their age, have problems organizing and completing tasks, and have particular trouble concentrating on work that requires mental effort.
Hyperactivity (9 items)	Children have difficulty sitting still for long periods and feel more restless and "on the go" than most individuals their age.
Anxiousness and shyness (8 items)	Children have more worries and fears than most individuals their age; they are prone to be emotional, are sensitive to criticism, are particularly anxious in new or unfamiliar situations, and appear to be shy and withdrawn.
Perfectionism (7 items)	Children are likely to set high goals for themselves, are fastidious about the way they do things at home or at school, and may be more obsessive about their work or tasks than most individuals their age.
Social problems (5 items)	Children are likely to perceive that they have few friends, are likely to have low self-esteem and little self-confidence, and will likely feel more socially detached from their peers than most individuals their age.
Psychosomatic (6 items)	Children report an atypical number of physical symptoms (eg, aches and pains) than do most children their age.
ADHD index (12 items)	Identifies children at risk for ADHD.
CGI: restless or impulsive (7 items)	Indicates restlessness, impulsivity, and inattentiveness.
CGI: emotional liability (3 items)	Indicates that children are prone to more emotional responses and behaviors (eg, crying, temper outbursts, and mood changes) than is typical.
CGI: total (10 items)	Assesses general problematic behavior (eg, restlessness, excitability, inattention, temper outbursts, and disturbing other children) that may indicate psychopathology.
DSM-IV SS: inattentive (9 items)	Used to aid in the diagnosis of ADHD inattention.
DSM-IV SS: hyperactive or impulsive (9 items)	Used to aid in the diagnosis of ADHD hyperactivity.
DSM-IV SS: total (18 items)	Used to aid in the diagnosis of ADHD; higher scores indicate the likely presence of ADHD.

ADHD = Attention deficit hyperactivity disorder. CGI = Connors' global index. DSM-IV SS = Diagnostic and Statistical Manual of Mental Disorders, version 4, symptom subscale.

The first 7 subscales evaluate specific symptoms or behaviors related to child and adolescent psychopathology. The remaining 7 subscales evaluate the same items as used in the first 7 subscales; however, items are grouped differently. The ADHD index contains the 12 items best suited for distinguishing children with ADHD from those without. Interpretive guidelines for T-scores for the individual subscales are as follows: score of 45 to 50 = average score, should not raise concern; score of 56 to 60 = borderline score, should raise concern; score of 61 to 65 = possible clinically important problem; score of 66 to 70 = clinically important problem; and score $>$ 70 = marked clinically important problem.