Massage Therapy Improves Mood and Behavior of Students with Attention-Deficit/hyperactivity Disorder.

by Sonya Khilnani, Tiffany Field, Maria Hernandez-Reif, Saul Schanberg

Attention-deficit/hyperactivity disorder (ADHD) is the most recent diagnostic label for children and adolescents who present with attention, impulse control, and overactivity problems. Children and adolescents with ADHD are commonly referred to family physicians, pediatricians, pediatric neurologists, and child psychiatrists and psychologists. The attention-deficit category has become increasingly popular among clinicians, and while the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000) suggests that only 3% to 7% of all school-age children and adolescents are affected by the disorder, at least 10% of behavior problems seen in general pediatric settings are due to ADHD, and up to 50% in some child and adolescent psychiatric samples. In clinical samples, ADHD is diagnosed in nine males for every female, however the rate of ADHD among girls is rapidly increasing (Robison, Skaer, Sclar, & Galin, 2002). ADHD girls who are clinic-referred are as impaired as their male counterparts in inattention, internalizing behavior, and peer aggression.

ADHD not only has a financial impact, but also is associated with family stress, school disruption, and risk for criminality and substance abuse. School-age youths with ADHD and co-occurring psychopathology have inferior academic performance and poorer social, emotional, and adaptive functioning than their peers (Wilens, Biederman, Brown, Tanguay, Monuteaux, Blake, & Spencer, 2002).

ADHD's etiology is unknown, although multiple pathways have been suggested for this syndrome. Among those are heritability, which is high for ADHD. According to DSM-IV-TR, ADHD is more common in the primary biological relatives of children and adolescents with ADHD than in the general population. Neurophysiological theories have also been investigated. Porges (1984, 1998), for example, examined the physiologic correlates of attention. The inability to attend appropriately has been associated with a variety of diagnoses, including hyperactivity and learning disorders. Porges (1998) has suggested that these behavioral pathologies have a common physiological substrate. The inability of the hyperactive or learning-disabled child/adolescent to mediate and inhibit spontaneous activity is thought to be paralleled by a deficient inhibitory system manifested in the parasympathetic control of the heart. That is, individuals who exhibit an attention disorder may demonstrate relatively lower vagal tone, indicated by heart rate variability during periods when sustained attention is required.

Children with ADHD may vary considerably in their symptoms across situations. However, they are often described as having chronic difficulties in regard to inattention, impulsivity, and overactivity—the "holy trinity" of ADHD. Barkley (1990) notes that ADHD children/adolescents commonly display these characteristics early, to a degree that is inappropriate for their age, and across a variety of situations. According to DSM-IV-TR criteria, symptoms must be "maladaptive and inconsistent with developmental level." The symptoms must also be present across two or more settings.

Comorbidity

Early-onset ADHD frequently co-occurs with other disorders, and symptom overlap raises diagnostic problems. Common mimics of attention disorders are anxiety disorders and mood disorders, and these must be carefully ruled out.

ADHD is often comorbid with other disorders such as learning disabilities (LD),
internalizing disorders, and externalizing disorders. Children with both LD and ADHD have more sociobehavioral problems than those with LD alone, and the former group comprises between 25% and 31% of students in LD classrooms (Forness, Kavale, & San Miguel-Bauman, 1998). About one-fourth of children/adolescents who are anxiety disordered have a comorbid diagnosis of ADHD (Perrin & Last, 1995).

Between 10% and 20% of children with ADHD have mood disorders, 20% have conduct disorders (CD), and up to 40% may have oppositional defiant disorder (ODD) (Goldman, Gonel, Bezman, & Slanetz, 1998). In addition to the high level of comorbidity with anxiety disorders, ADHD often coexists with depressive disorders (Bussing, Zima, Belin, & Forness, 1998). This overlap is more common in ADHD children/adolescents who also experience learning problems. For those with a combination of early-onset ADHD and CD or ODD, there is a more persistent and stable pattern of antisocial behavior. More severe degrees of psychopathology and psychosocial risk occur in youths with both ADHD and an externalizing disorder. ADHD-CD comorbidity has been found to be associated with nonalcohol substance use disorder, drinking levels, and CD severity (Molina, Bukstein & Lynch, 2002). The risk of developing substance use disorders in those with ADHD increases during adolescence (Goldman et al., 1998). Lower attention/attention-functioning scores in adolescents have been found to predict substance use and dependence symptoms eight years later (Tapert, Baratta, Abrantes, & Brown, 2002). Even as college students, those with ADHD symptoms experience more driving anger and display more hostility/aggression and risky behavior on the road. They are prone to be involved in more crash-related outcomes and tend to display their anger in socially unacceptable ways (Richards, Deffenbacher, & Ros, 2002).

Medication Therapy

Psychostimulant medication is the most widespread treatment for ADHD. More children/adolescents receive medication to manage ADHD than any other childhood disorder. Recent reports suggest that prescriptions for psychotropic drugs are increasing among children with ADHD (Guevara, Lozano, Wickizer, Mell, & Gephart, 2002). Lately, more girls are being prescribed stimulants as a result of the broadening conceptualization of ADHD (Goldman et al., 1998)–the initial focus on hyperactivity has shifted to attentional problems and impulsivity. The mean number of office-based visits documenting a diagnosis of ADHD among girls tripled in the 1990s, whereas the number for boys increased about twofold (Robison, Skaer, Sclar, & Galin, 2002).

Currently, the disorder consists of the following three subtypes: predominantly inattentive, hyperactive-impulsive, and combined. According to the DSM-IV, most children/adolescents have the combined type. The most common form of stimulant medication is methylphenidate, otherwise known as Ritalin. Other medications such as Adderall, Dexedrine, and Cylert are also used. Numerous studies (double-blind, placebo-controlled) have concluded that stimulants are more effective in ameliorating ADHD’s core behavioral symptoms of hyperactivity, impulsivity, and inattentiveness than placebos, nonpharmacological therapies, or no treatment (Spencer, Biederman, Coffey, Geller, Crawford, Bearman, Tarazi, & Faraone, 2002). Improvement in dysfunctional social behavior and internalizing symptoms has also been reported (Schachar, Jadad, Gauld, Boyle, Booker, Snider, Kim, & Cunningham, 2002).

There is little empirical evidence that stimulant use contributes to longer-term improvements in academic functioning. Moreover, this mode of treatment continues to be controversial with this population because of its behavior-modifying properties and associated side effects. The following adverse side effects increase linearly with dosage: nervousness, headache, insomnia, and tachycardia (Klein-Schwartz, 2002). Further, as the therapeutic use of stimulants increases, the risk of abuse, overdose, and medication errors may also increase. According to Goldman et al. (1998), stimulants as a class of drugs have “marked abuse potential, and their misuse can have severe medical and social consequences.” Clinical manifestations of overdose include agitation, hallucinations, psychosis, lethargy, seizures, tachycardia, dysrhythmia, hypertension, and hyperthermia.
(Klein-Schwartz, 2002). Moreover, in a study of 223 ADHD children aged three years and younger, over half received psychotropic medication in an idiosyncratic manner and almost half did not have opportunities for optimal monitoring (Rappley, Eneli, Mullan, Alvarez, Wang, Luo, & Gardiner, 2002).

**Nonpharmacological Therapy**

Although pharmacotherapy remains the current treatment of choice for ADHD children, benefits from nondrug treatments have been noted. For example, Wilmshurst (2002) reported good results for youths from a home-based preservation program in terms of reductions in clinical symptoms of ADHD, as well as general anxiety and depression, at one-year follow-up. However, behavioral therapy has generally not proven effective except when combined with pharmacotherapy (Barkley, 1990).

ADHD researchers emphasize the importance of employing a multimodal treatment approach with ADHD children. Multimodal therapy involves integrating pharmacotherapy with a number of environmental, educational, psychotherapeutic and school-based approaches to meet the child’s particular needs. A combined intervention of medication management and behavioral treatment has been found to be more successful than either approach alone in reducing core ADHD symptoms in children from more educated families (Rieppi et al., 2002). In their literature review of the long-term treatment of ADHD, Schachar et al. (2002) noted that combination therapy adds to the effects of medication.

**Massage Therapy**

A nonmedication intervention that has only recently been explored with ADHD children is massage therapy. In a recent study, ADHD adolescents who received ten massage treatments over the course of two weeks rated themselves as happier than those who participated in relaxation therapy; observers rated the massage therapy group as less fidgety, and teachers reported more on-task behavior, when compared to the relaxation therapy group (Field, Quintino, Hernandez-Reif, & Koslovsky, 1998). Teachers also noticed a significant decrease in hyperactivity for the massage therapy group but not for the relaxation therapy group.

Similar changes have been noted for child and adolescent psychiatric inpatients diagnosed with adjustment and depressive disorders; they showed significantly less depression and anxiety following massage therapy (Field, Morrow, Valdeon, Larson, Kuhn, & Schanberg, 1992). The massage group's salivary and urinary cortisol levels decreased, indicating a decrease in stress. Staff nurses also rated the inpatients who received massage therapy as being less anxious and more cooperative when compared to a control group, which viewed relaxing videotapes. In addition, nightwakings decreased and time spent in quiet sleep increased for the massage group.

Touch therapies have also been successful in reducing off-task behavior in autistic children. In one study, massage therapy with autistic children led to a decrease in both off-task behavior and attention to irrelevant sounds and to an increase in social relatedness during classroom observations (Field, Lasko, Mundy, Henteleff, Talpins, & Dowling, 1996). Another study involving autistic children, many of whom had sensory processing deficits, suggested that physiological stimulation from deep touch pressure (a hug machine) reduced hyperactive and self-stimulatory behaviors (Imamura, Wiess, & Parham, 1990).

Furthermore, massage therapy has been shown to significantly reduce anxiety as well as systolic and diastolic blood pressure (Cady & Jones, 1997; Shulman & Jones, 1996). In addition, Field, Ironson, Scafidi, Nawrocki, Goncalves, Burman, Pickens, Fox, Schanberg, and Kuhn (1996) have reported an increase in alertness and EEG wave changes conforming to increased alertness (decreased alpha and beta and increased delta) and better performance on math tasks (half the time required with half the errors) following massage therapy. These studies suggest that touch therapy may attenuate stress and enhance attentiveness in children and adolescents with ADHD. Improved psychological
functioning would be expected to result in less acting-out behaviors in the classroom.

The underlying mechanism by which massage therapy decreases hyperactivity and increases attentiveness is not clear, although physiological and biochemical data from the Field et al. studies suggest some possibilities, including that brain waves are altered in the direction of heightened alertness (see Field et al., 1996). In addition, increased vagal tone (and thus increased parasympathetic activity) has been noted during massage therapy, and this increase is often associated with enhanced attentiveness and a more relaxed state (Porges, 1991). Massage therapy may enhance vagal control of the heart by improving a deficient physiological inhibitory system. This, in turn, might help hyperactive or learning disordered children to mediate and inhibit spontaneous activity and thereby increase their level of attentiveness. Those with each subtype of ADHD are expected to benefit from massage therapy given that the attentional deficit is considered the primary symptom underlying hyperactivity-impulsivity (Dykman, Ackerman, Clements, & Peters, 1971). The restlessness is assumed to be secondary and reflective of diffuse patterns of sensory discharge in the brain (activating motor areas).

In the present investigation, massage therapy was selected as an additional treatment for those receiving ongoing intervention, because prior studies found that it exceeded the effects of relaxation therapy and other stress management treatments used in various clinical samples, including youths with ADHD (Field et al., 1992, 1998). Previous massage studies also reported increases in vagal tone during massage therapy (Field, 1995). It would follow that massage therapy might improve attention in those with ADHD by promoting vagal control of heart rate.

The present study explored the effects of massage therapy on behavioral, emotional, and physiological functioning in ADHD children/adolescents who were receiving special education. The calming effects of massage therapy were expected to ameliorate common behavioral symptoms of ADHD, including restlessness, inattention, and impulsivity. Emotional correlates, such as depressed mood, were also expected to decrease. Specifically, the following hypotheses were tested: (1) students in the massage therapy group would rate themselves as happier and feeling better postmassage on both assessment days when compared to those in the wait-list control group; (2) students who received massage therapy would show a significant decrease in salivary cortisol (a measure of stress) postmassage on both assessment days when compared to those in the wait-list control group; (3) the massage therapy group would show a significant reduction in behavioral problems in the classroom, specifically hyperactivity and inattention (based on teacher ratings), when compared to the wait-list control group; and (4) the massage therapy group would show a significant decrease in depressed mood when compared to the wait-list control group.

METHOD

Participants

Parental consent forms were distributed to all students attending a learning center for children and adolescents with academic and behavioral problems. The sample consisted of the first 30 students who returned signed consent forms and who met the following criteria. Each participant had a current DSM-IV diagnosis of ADHD. Students with other complex medical issues, such as cerebral palsy or a known organic brain dysfunction, were excluded from the study. In addition, all participants had initial T scores in the subclinical to clinical range (i.e., 60 or above) on the hyperactivity and/or inattention subscales of the Conners Teacher Rating Scale to confirm that they were currently displaying symptoms associated with ADHD. Students whose T scores fell below 60 were excluded from the study to ensure a truly clinical sample. Fifty-seven percent of the entire sample scored in the subclinical to clinical range (i.e., 85th percentile or above) on both hyperactivity and inattention. At intake, group means for depression and anxiety did not fall within the clinical range. Therefore, comorbidity was not a salient issue in the present study.

The participants were between the ages of 7 and 18 years (M = 13 years). Eighty percent
were male and 20% were female. They came from middle socioeconomic backgrounds (M = 2.5 on the Hollingshead Two Factor Index), and the ethnic distribution was 77% Caucasian, 13% Hispanic, and 10% African-American.

Procedure

Massage therapy. The students were randomly assigned to a massage therapy group or wait-list control group. The massages were held in a large, quiet room located in the school building. Each student in the massage therapy group received two 20-minute massages per week for a total of nine treatment sessions. Massages were conducted on portable massage tables, and all participants remained fully clothed during each massage. Students were told that the massages might help them relax. The massage entailed moderate-pressure stroking for four-minute periods in each of five regions: head/neck, arms, torso, legs, and back. Massage while in the supine position lasted ten minutes and included lateral stroking of the forehead, gentle rocking (torso and legs), and continuous stretching of the Achilles tendon. Massage while in the prone position also lasted ten minutes and included lateral lumbar stretches, neck squeezes, and kneading of the back.

The massages were given at the same time of day (mid-afternoon) over the course of a month. Treatments were performed by licensed massage therapists and coordinated by the first author. The gender of the massage therapists was counterbalanced. Last day assessments were conducted after the eighth (penultimate) massage session instead of the ninth in order to minimize potential termination effects such as feeling disappointed that the massages were over.

Wait-list control group. Participants in this group were informed that they would have an opportunity to experience the massage procedure on a voluntary basis during the following month and that the reason all students were not massaged at the same time was due to the limited number of available massage therapists. Like the massage therapy group, the wait-list control group completed the identical short-term and longer-term measures during the same time frame. However, the wait-list control group did not receive any massages for the first month of the study. For the assessment sessions, they were asked simply to relax for the 20-minute period.

Short-Term Measures

Pre-post measures were administered at the first session and readministered four weeks later, at the eighth (penultimate) session, for the massage group. These measures were also administered at the first and second assessment sessions for the control group. The intent was to assess the immediate effects of the treatment.

Stress. Salivary samples were obtained (participants placed a dental swab dipped in sugar-free lemonade crystals along their gumline for 30 seconds) immediately before and 20 minutes after the sessions (on the assessment days) to be assayed for cortisol (a hormone indicative of stress level). They were collected 20 minutes postsession because the cortisol response has a 20-minute lag time. The second sample of saliva reflected the participants' stress level during the massage therapy/control session.

Mood state. Information about mood state was collected through the developmentally appropriate use of pictorial self-reports. A faces scale was used to provide an estimate of the participants' experiences. This pictorial measure was a modification of the self-report method designed to assess pediatric patients' anxiety and pain during invasive medical procedures, such as bone marrow aspirations (LeBaron & Zeltzer, 1984). LeBaron and Zeltzer used faces showing increasing degrees of distress and found a strong correlation (r = .63, p < .001) between patient ratings and observer ratings of anxiety. In the present study, drawings of four faces ranging from sad (scored as one) to happy (scored as four) were presented to the participants before and after the first and last assessment sessions (for both massage and control groups). The participants were then asked which face best described the way they felt at that moment. This scale's utility in previous massage studies supported its use as a self-report measure in this investigation.
A modification of the Children's Pain/Fear Thermometer Rating Scale (a drawing of a thermometer with a vertical scale) was used as a second measure of mood state. Participants were asked to select the point on the scale, ranging from zero (i.e., not feeling good at all) to ten (i.e., best I have ever felt), that best described the way they felt. The original scale was used in a study of pain in pediatric cancer patients undergoing bone marrow aspirations (Jay, Ozolins, Elliot, & Caldwell, 1983). In that study, pain ratings were significantly correlated ($r = .67$, $p < .02$) with observed behavior in youths aged 8 years and older. In the current study, this scale was administered before and after the first and last assessment sessions (for both massage and control groups).

**Longer-Term Measure**

Teachers (who were blind to group assignment) were asked to complete the Conners Teacher Rating Scale, which provided an index of changes in classroom behavior across the course of the study. This measure was used at the first session and four weeks later for both groups.

**Classroom behavior.** The Conners Teacher Rating Scale (Conners, 1969) is one of the most widely used behavior rating scales for assessing externalizing symptoms in children. The following six factors from this 39-item scale were examined: hyperactivity, conduct problems, emotional-indulgent, anxious-passive, asocial, and daydream/attention problems. Test-retest reliability coefficients over a one-month interval ranged from $.70$ to $.90$ across factors (Conners, 1973). Inter-teacher agreement of $.92$ was reported for the entire scale (Trites, Blouin, & Laprade, 1982).

**RESULTS**

A $t$ test was performed on age, and chi-square tests were performed on gender and ethnicity. No significant differences were noted between the massage group and wait-list control group on these background variables.

Repeated-measures analyses of variance (ANOVAs) were conducted with the massage therapy and wait-list control groups as the grouping variable and session (pre, post) and day (first, last) as the repeated measures. Significant interaction effects were followed by alpha-corrected post hoc comparison $t$ tests.

**Pre-Post Treatment Measures (Immediate Effects)**

Faces. The ANOVA on the faces scale revealed a significant group by session interaction effect, $F(1, 27) = 5.46$, $p < .05$. Post hoc $t$ tests revealed that the massage therapy group reported feeling happier after the first and last day sessions (see Table 1).

Thermometer. The ANOVA on the thermometer scale revealed a significant group by session interaction effect, $F(1, 27) = 4.70$, $p < .05$. Post hoc $t$ tests indicated that the massage therapy group rated themselves as feeling better after the first and last day sessions (see Table 1).

Cortisol. No significant effects were obtained for salivary cortisol in either group (see Table 1).

**First-Last Day Measures (Longer-Term Effects)**

Conners Teacher Rating Scale. There were significant group by day interaction effects, showing reductions in hyperactivity, $F(1, 28) = 7.92$, $p < .01$, anxiety, $F(1, 28) = 14.70$, $p < .01$, and daydreaming/inattention, $F(1, 28) = 4.42$, $p < .05$, only for the massage group. Both groups improved on the emotional-indulgent factor, $F(1, 28) = 14.39$, $p = .001$ (see Table 1).

**DISCUSSION**

Massage therapy appeared to benefit the children and adolescents with ADHD. Students who received massage therapy twice per week over the course of a month rated
themselves as happier and feeling relatively better after the treatment sessions. The present findings are consistent with a recent massage therapy study in which ADHD adolescents showed improvements in fidgetiness, hyperactivity, on-task behavior, and subjective feelings of happiness (Field et al., 1998) and another study that reported less anxiety after massage therapy (Shulman & Jones, 1996).

The enhanced mood states found in the present study may have contributed to the improved classroom behavior. Teacher ratings of ADHD students who participated in the massage therapy suggest that the therapy reduced the problems most associated with ADHD, namely hyperactivity and daydreaming/inattention, over the course of the treatment period. The convergence of self-report measures and teacher ratings highlights both the immediate and longer-term effectiveness of massage therapy and supports the use of this treatment with this population.

As predicted, ADHD students who received massage therapy showed improvements in short-term (immediate) mood state and longer-term (over the course of a month) classroom behavior. While the findings look promising, they cannot be definitively applied to all ADHD students. The participants in the present study attended a small, private learning center and came from middle to upper socioeconomic status families. As previously noted, they also were receiving school-based interventions. Whether massage therapy would benefit students who had other socioeconomic backgrounds and were in regular classrooms at larger, public schools remains to be studied.

Future studies are needed to ascertain how massage therapy impacts academic achievement in students with ADHD. Incorporating additional measures such as vagal tone and EEG might also help explain the relationship between massage therapy and on-task behavior in ADHD children and adolescents. Several studies suggest that massage therapy enhances cognitive performance (Hart, Field, Hernandez-Reif, & Lundy, 1998), including improved math computations following EEG changes to a pattern of heightened alertness (Field, Ironson, Scafidi, Nawrocki, Goncalves, Burman, Pickens, Fox, Schanberg, & Kuhn, 1996). In the Hart et al. (1998) study, massaged children improved their performance on the Block Design and Animal Pegs subtests of the Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R). In the present study, the increased attentiveness observed in the classroom (using the Conners scale) could be related to enhanced vagal activity that occurs during massage therapy (Field, 1990). Increased vagal control of the heart may enhance the ability of the hyperactive child to mediate spontaneous activity (Porges, 1998).

Anxious-passive behaviors measured by the Conners scale also decreased for the massage therapy group in the present study. This is consistent with another massage therapy study in which child and adolescent psychiatric inpatients displayed fewer internalizing behaviors following massage (Field et al., 1992). However, unlike previous studies by Field and colleagues which noted decreased stress hormones, no decrease in cortisol levels was found here. This may have been due to the time of sampling. In the present study, saliva samples were obtained during the mid-afternoon, a time when cortisol levels are at their lowest and thus difficult to reduce further. Moreover, decreases in salivary cortisol are not necessarily related to reduced activity level (Field et al., 1992). Specific relationships between physiological responses and massage therapy may be more difficult to establish in children due to variability of responses--shaped differentially by environmental events. There is also some evidence that the hypothalamic-pituitary-adrenal (HPA) axis may be underactive in neuropsychiatrically disordered children. In one study, salivary cortisol was significantly lower in a comorbid ADHD/ODD group compared with healthy controls (Kariyawasam, Zaw, & Handley, 2002); this finding suggests underarousal in behaviorally disturbed children. Nevertheless, other, longer-term measures of stress, such as urinary cortisol and norepinephrine levels, might have revealed significant changes in the present study.

In this investigation, initial group means for depression and anxiety did not fall within the clinical range. Therefore, comorbidity was not a salient issue. In future studies, it would be
useful to ascertain whether massage therapy is effective in ameliorating not only short-term mood state in ADHD students, as the present study demonstrated, but also chronic mood disorders.

While teachers and school staff in general supported the use of massage therapy for students, concerns were also raised about how these youths would respond to extensive touch, since those with ADHD usually do not remain still for prolonged periods of time. For example, a few of the children were initially fidgety at the beginning of the massage, whereas the adolescents seemed more comfortable with the procedure. However, the younger participants became less fidgety with time.

Although massage therapy appears to improve short-term mood state and decrease problem behaviors in the classroom in students with ADHD, its efficacy needs to be compared with other treatments such as tai chi therapy, which has also been effective with ADHD children (Hernandez-Reif, Field, & Thimas, 1999). In addition, assessing whether the massage therapy effects generalized to other settings would have been an important outcome to explore (e.g., using the Conners Parent Rating Scale to document the effects of massage therapy in the home). Nonetheless, the findings from both teacher ratings and self-reports suggest that massage therapy could be an important tool in the multimodal management of ADHD.

### Table 1
Means (and Standard Deviations) for Massage Versus Control Group on Pre-Post Session and Session and First-Last Day Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Massage Group</th>
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<th>Control Group</th>
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<tr>
<td><strong>First Day</strong></td>
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<tr>
<td>Mood and Stress</td>
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<td>3.4[(0.5).sub.a]</td>
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<td>Cortisol</td>
<td>1.6[(1.1).sub.a]</td>
<td>1.5[(0.8).sub.a]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavior (T scores)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>63.0[(8.9).sub.a]</td>
<td>60.5[(10.0).sub.a]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct Problems</td>
<td>57.4[(11.5).sub.a]</td>
<td>57.0[(12.1).sub.a]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional-Indulgent</td>
<td>65.9[(9.1).sub.a]</td>
<td>61.5[(9.9).sub.b]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxious-Passive</td>
<td>53.5[(10.9).sub.a]</td>
<td>56.0[(9.9).sub.a]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asocial</td>
<td>54.5[(11.1).sub.a]</td>
<td>55.3[(12.6).sub.a]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daydream/Attention Problems</td>
<td>58.2[(58.2).sub.a]</td>
<td>56.4[(10.4).sub.a]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Different letter subscripts indicate significant differences within groups using post hoc comparison t tests. Superscripts indicate level of significance for adjacent means: (1) p = .05, (2) p = .01, (3) p = .005, (4) p = .001.

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